Gutenprint 5.0

User's Manual

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1) Introduction

1.1) What is Gutenprint?

Gutenprint, formerly named Gimp-Print, is a suite of printer drivers that may be used with most common UNIX and Linux print spooling systems, including CUPS, lpr, LPRng, or others. These drivers provide high quality printing for UNIX (including Macintosh OS X 10.2, 10.3, and 10.4) and Linux systems that in many cases equal or exceed proprietary vendor-supplied drivers in quality and functionality, and can be used for demanding printing tasks requiring flexibility and high quality. This software package includes an enhanced Print plugin for the GIMP that replaces the plugin packaged with the GIMP, and Ghostscript and CUPS drivers, as well as Foomatic data supporting the Ghostscript driver.

Gutenprint has been renamed in order to clearly distinguish it from the GIMP. While this package started out as the original Print plugin for the GIMP, it has expanded into a collection of general purpose printer drivers, and the new, enhanced Print plugin for the GIMP is now only a small part of the package. Furthermore, the name Gutenprint recognizes Johannes Gutenberg, the inventor of the movable type printing press. Finally, the word *guten* is the German word for *good*.

Gutenprint 5.0 incorporates extensive feedback from the beta and release candidate programs. It has been completely revised since the very popular Gimp-Print 4.2 series, and you should read this manual carefully.

Gutenprint supports only the printer part of multi-function devices (devices that typically include scanning, copying, and fax capabilities).

We recommend that all users who wish to use this package for general purpose printing use either CUPS or, if they use another printing system or no spooler at all, use Foomatic with the Ghostscript driver (both described below), rather than integrating the Ghostscript driver with self-made scripts or even manually typing in Ghostscript command lines. It is much simpler to manage with CUPS or Foomatic and its PPDs. CUPS provides an excellent web-based interface for easy printer administration, and all CUPS-enabled applications (OpenOffice.org, all KDE apps, etc.) and printing dialogs (kprinter, xpp, etc.) show all the options in easy to use GUIs. Please visit http://www.cups.org/ for information on downloading and installing CUPS.

Gutenprint currently supports over 700 printer models.

1.2) History of Gutenprint

1.2.1) The early years: Gimp-Print 3.x and 4.0

The predecessor to this software package (the original Print plugin for the GIMP) was first written by Michael Sweet of Easy Software Products and initially worked only as a print plugin to the GIMP (GNU Image Manipulation Program). In the summer of 1999, I purchased an Epson Stylus Photo EX printer to feed my photography hobby. Finding no existing printer drivers, I adapted Mike's GIMP Print plugin to this six-color printer, and by the end of the year released version 3.0 of the Gimp-Print software, which was included in version 1.1 of the GIMP. The intention was for this to be the stable plugin in version 1.2 of the GIMP while development of the GIMP Print plugin continued for later release.

I put the Gimp-Print development tree on SourceForge starting with version 3.1, and quickly found a group of like-minded people who wanted to print high quality output on inexpensive inkjet printers. One of the main goals, which was not expected to be met until late in the version 3.1 cycle, was to write a Ghostscript driver so that printing would not be restricted to the GIMP. Much to my surprise, someone wrote one within days! That gave me my first clue that the project was destined for greater things.

In July 2000, barely a year after I bought my Epson Stylus Photo EX, I was invited to the Linux Printing Summit hosted by VA Linux Systems. In preparation for that, I spent long hours printing out test images. I went back to the Gimp-Print version 3.0.9 release, which seemed like such an advance at the time, and was floored at how far the project had come in four months! Output that had been considered impressive with using six colors was put to shame by four color output. That should give you an idea what modern printing technology can do. It also illustrates what a group of committed people can do.

I came away from the Printing Summit with a lot of new ideas. Other people were busy adding new features and support for more printers, and in November 2000, we released Gimp-Print version 4.0, the culmination of 9 months of work by the team. The quality was already tremendously improved over what the software could do at the Printing Summit.

I knew at the time that Gimp-Print 4.0 had some serious limitations that would restrict what could be done. In particular, its color model was very restricted (it could only handle RGB and CMYK printers, possibly with light magenta and light yellow inks) and the code was still closely tied in with the Print plugin for the GIMP. I wanted to devise a new architecture for the next release that would allow us to take advantage of more printer capabilities and support improved color generation and dithering, but progress was slow. It took us a few months to fully stabilize Gimp-Print 4.0, and it became clear that our more ambitious goals weren't going to be achieved quickly. We decided to do an interim stable release based on improvements to the 4.0 codebase that would give us some breathing space while we worked on a new architecture.

1.2.2) Gimp-Print 4.2

The interim stable release was to become Gimp-Print 4.2. We used the numbering scheme adopted by the Linux kernel team, whereby stable releases were denoted by even numbers in the minor release (the "2" in 4.2) while odd numbers denoted unstable development releases. We were fortunate that Roger Leigh joined the project shortly after the Gimp-Print 4.0 release. Roger is a superb architect, and he quickly whipped the somewhat disorganized code base into shape. We spent most of 2001 cleaning up the code base, adding support for CUPS (by now, Mike Sweet had joined the project) and the nascent Foomatic metadata management project, improving the color generation and dithering code, and adding support for more printers. A lot of our work went into automatically generating the CUPS PPD files and Foomatic data; the project already supported about 200 printers with a large number of options, and writing all of this by hand would be tedious, error-prone, and unmaintainable. We spent most of the fall working on documentation, cleaning up bugs, and the like, and released Gimp-Print 4.2.0 in late November.

Anticipating that the next major release of Gimp-Print would be a more extensive project, we decided to branch the 4.2 release, and work on the next release (which would be either 4.4 or 5.0, depending upon how extensive the changes would be) while also releasing updates to 4.2. This would allow us to fix bugs and add new printers and perhaps minor new capabilities for users wanting a stable Gimp-Print release while making much more radical changes in preparation for the next release. We started work

on Gimp-Print 4.3 (the development series that would eventually mature into the next stable release series) around the beginning of 2002.

The Gimp-Print 4.2 release proved to be far more successful than we ever imagined. First of all, it was wonderfully stable from the outset; it was to be over 4 months before we needed to release an update. We added one major new feature shortly after release, support for the new Ghostscript driver architecture based on HP's HPIJS driver. This driver architecture allowed drivers to be compiled independently of Ghostscript (previously drivers had to be compiled into Ghostscript, a somewhat daunting project for end users). We continued to add more printers, dither algorithms, and so forth, all without breaking compatibility with the initial 4.2.0 release.

2002 was a very exciting year for Gimp-Print. Apple had released OS X for the Macintosh and was planning to rely on a lot of free/open source software for key functions of the OS. In particular from our standpoint, many vendors had not updated printer drivers for OS X, and many did not want to update their drivers for older printers. Since OS X had settled on CUPS as the core of its printing system from 10.2 on, and Gimp-Print had full support for CUPS, the fit was very obvious and Gimp-Print wound up becoming part of the OS X printing system. We were very busy that year preparing for release of Gimp-Print for OS X. This was done in 4.2.2, which we released almost 9 months after the initial 4.2.0 release (which says something about the stability of Gimp-Print 4.2). This release created a lot of excitement in the OS X world and for us, and we did three more releases in quick succession culminating with Gimp-Print 4.2.5 in early 2003.

I was expecting that there would be one more release of Gimp-Print 4.2 that would primarily contain bug fixes and incremental support for new printers. By 2003, many of the printers being released had capabilities beyond what Gimp-Print 4.2 could support. I also expected that we would be ready to release Gimp-Print 4.4 or 5.0 within a year, so there wouldn't be a need for anything more. We released Gimp-Print 4.2.6 in early 2004. However, there were still some problems with that release, and we did one more release (4.2.7) in July 2004. This wound up being the final Gimp-Print 4.2 release.

1.2.3) Gimp-Print Becomes Gutenprint

In the meantime, work on Gimp-Print 4.3 was progressing, albeit rather slowly. We wanted to support the newest generation printers with tiny droplets, very high resolutions, and extra colors, in addition to adding color management and the possibility of supporting many more printer capabilities beyond the fixed set offered in Gimp-Print 4.2. In part due to all of the maintenance work on 4.2, and in part due to the natural tendency of people to move on to other projects, we made only slow progress on Gimp-Print 4.3. It was clear that we weren't going to release a next generation of Gimp-Print in 2002 or early 2003 as we hoped. However, the success of Gimp-Print 4.2 took some of the pressure off, because 4.2 was proving to be highly maintainable. We wanted the next generation of Gimp-Print to be more than just another incremental advance.

The core of the new parameter-based API, and hence of Gimp-Print 4.3, was in place by early 2003. By this time, 4.2 was slowing down, and work on our development tree was starting to pick up. We decided that the architectural and user experience changes were sufficient to name the next release 5.0, and I put together a plan for going to alpha in July and releasing 5.0 in November 2003. That was not to be.

We were doing new releases of 4.3 for intrepid adventurers every few weeks, with extensive changes continuing, and it was only in December that we finally felt ready to move to 5.0 alpha, which we released in January 2004. Progress was slow; there were still quite a few API changes we felt we needed to make, and there were still serious quality problems with many printers. In addition, new

printers were being shipped with additional inks that we couldn't handle very well. We also had to adapt to other changes, such as GIMP 2.0 based on GTK+ 2.0, which was not backward compatible with GTK+/GIMP 1.2. We released Gimp-Print 5.0 beta in June with many improvements, but there were still quite a few things on our release checklist that weren't done.

Based on the popularity of Gimp-Print 4.2, we decided that it was very important that Gimp-Print 5.0 not interfere with the use of Gimp-Print 4.2. It was clear that the changes in 5.0 were too extensive to maintain compatibility in any useful way with 4.2, and a lot of people had incorporated 4.2 into their daily work, so we thought long and hard about how to make the CUPS and Foomatic interfaces not interfere with Gimp-Print 4.2.

It also became apparent that our ties to the GIMP had all but vanished by this point. We had actually squeezed all of the GIMP-related code out into a very small stub that was actually smaller than the original GIMP plugin! Furthermore, the Gimp-Print name was causing a lot of confusion among users; OS X users in parrticular were referring to Gimp-Print as "Gimp". We settled on the name Gutenprint, and renamed the project in the fall of 2004.

We were still in beta; progress was slow at this point, but we weren't satisfied with the results. We finally did our first release candidate in September 2005, over a year after we entered beta. We continued to move toward 5.0 release, but there was still a lot of cleanup work that needed to be done: printers needed to be retuned, PPD files needed to be validated, we needed to incorporate feedback from users that we only really started to get from the release candidates. There were a number of serious but subtle bugs with the CUPS and Foomatic interfaces that needed to be fixed in order to have a useful 5.0 public release.

In April 2006 I attended my second printing summit, this one hosted by Lanier, and spent three days working with many key players in the Linux/UNIX printing world. This was very productive; I got a lot of useful feedback on various issues and was able to raise issues important to Gutenprint. We released the third release candidate in May 2006, with a tremendous number of bug fixes and improvements, and this finally felt like a real release candidate. We received extensive feedback from this release, and fixed other problems and made some other changes to improve quality.

Unfortunately, we didn't accomplish all of our goals for Gutenprint 5.0. We have not incorporated true color management; our Postscript output driver in the GIMP plugin (and indeed, the GIMP plugin itself) is still in need of a rewrite; the drivers other than the Epson driver haven't been fully updated to take advantage of the capabilities of Gutenprint 5.0. However, these changes can be made later, either in later 5.0 releases or in the next release series. Gutenprint is not "finished" and never will be!

1.3) Note to Packagers and Distributors

We recommend that all packagers of Gutenprint, such as Linux distribution vendors, read this manual carefully. There are important notes throughout. Please contact us via email at gimp-print-devel@lists.sourceforge.net if you have any questions. We request that vendors notify us of private patches that they plan to distribute.

2) General Requirements

Gutenprint will run on any reasonably modern computer running Linux, Macintosh OS X (10.2 or above), Solaris, or any other UNIX-like operating system. If you plan to compile this package from source, you will also need an ANSI C compiler, such as `gcc` (recommended), and GNU `Make`. A compiler is not required if you are installing a pre-compiled package.

Processor and memory requirements vary depending upon the printer and runtime options selected; it is suggested that you have at least 64 MB of memory for general purpose printing, 256 MB or more for high quality printing on a good printer, and 1 GB or more for large format printing at high resolution. You should have at least 50 MB of free disk space to compile and install Gutenprint. Disk space requirements for printing will vary depending upon how you use Gutenprint, but are generally modest except as noted below. We recommend a processor speed of at least 300 MHz. Fast printers may require a faster processor to achieve maximum printing speed.

For general use, you should have the Common UNIX Printing System, CUPS (version 1.1.15 or above) or Foomatic (2.0 or above) installed. Please read the rest of the release notes, in particular the Exceptions and Workarounds, for full details on installation, as there is important information to be aware of. CUPS is the printing system used on Macintosh OS X 10.2 and above, and many other systems use it. The combination of CUPS and Gutenprint provides a flexible, general purpose printing system capable of producing the highest quality output with any of the printers supported by this package. We strongly recommend using CUPS with Gutenprint as a general-purpose printing solution.

The enhanced Print plugin for the GIMP requires either the GIMP 2.0 or above, or 1.2.3 or above on the 1.2 line (1.2.5 is recommended). This plugin will work with any printing system, and offers a comprehensive user interface to control all aspects of the printing process. If you are printing photographs in large format from the GIMP at very high resolution, disk space requirements may be substantial, and we recommend at least 2 GB of free disk space for that purpose.

The Ghostscript driver requires GNU Ghostscript 6.53 or higher, ESP Ghostscript 7.05 or higher, or AFPL Ghostscript 7.04 or higher. It uses the IJS package included with these versions of Ghostscript to create a driver that may be built much more easily than traditional Ghostscript drivers. This driver should be used in conjunction with Foomatic to configure printers.

Users of Macintosh OS X 10.2 (Jaguar), 10.3 (Panther), and 10.4 (Tiger) can use this package, as the printing system is based on CUPS. For ease of installation, a pre-built package with installer is normally supplied a few days after the release of the source package. We strongly recommend that OS X users use the pre-built package rather than attempt to build it themselves.

Note: This package will not work with any version of OS X 10.0 and 10.1 (such as 10.1.5). The printing system used with these versions of OS X is not compatible with Gutenprint. OS X 10.2 and above use CUPS as the basis of the printing system, which is compatible with Gutenprint.

3) Installation

This section is provided for distributors people installing the package from source. If you are installing from a pre-compiled package (such as the Macintosh OS X package, or a package provided by your distribution vendor), you may skip this section. **We strongly urge all distributors of the Gutenprint package, such as Linux distribution vendors, to read this information carefully!**

Installing packages from source requires some level of system administration skills along with superuser privileges. Superuser privilege allows you to perform actions that may be damaging to your system. If you are not comfortable with the material discussed here and in the release notes, we recommend that you not attempt to install this package from source.

Before beginning, please read the release notes carefully for any updates.

3.1) Overview

Gutenprint includes the following primary components:

- The core driver library (required for everything else)
- A CUPS (Common UNIX Printing System) driver
- An enhanced Print plugin for the GIMP
- Support for the Foomatic spooler configuration system
- A Ghostscript driver using the IJS plugin facility
- A command-line utility to administer and maintain Epson printers

This package requires the use of GNU Make to compile. On systems with both GNU make and another make installed, GNU make may be named `gmake` or `gnumake`. BSD users in particular must take care to use `gmake`.

The general procedure to build Gutenprint is as follows:

```
./configure [options]
make
make install
```

The `configure` script, which must be run before doing anything else, controls which of these components are built along with any options desired. This script determines what software is installed on your system and what components will be compatible with it, and prepares the package to be built and installed. If the script emits any warnings or errors, please be certain that you understand them before proceeding.

After the configure script has completed its work, it will print a summary of its choices. Please ensure that it is correct before proceeding, and save it in case you have any problems. If you request assistance from the Gutenprint development team, you will be asked to provide this report. The summary looks like this:

```
Configuration Summary:
------------- --------


If you have any problems, please report the information below to
gimp-print-devel@lists.sourceforge.net


=================================================================
  Release: gutenprint 5.0.0 generated on 01 Jul 2006

  Features:
    Build CUPS:                               yes, installing in /usr
        Build CUPS PPD files:                 yes
            Build translated CUPS PPD files:  no
            Build simplified CUPS PPD files:  no
            Generate PS level 3 CUPS PPD files: yes
        Install CUPS PPD files at top level:  no
        Build genppd statically:              yes
    Build Ghostscript IJS driver:             yes
    Build Foomatic data:                      yes
        Build Foomatic 3.x data:              yes
    Build enhanced Print plugin for the GIMP: yes
        Build GIMP 1.2 plugin:                yes
        Build GIMP 2.x plugin:                yes
            GIMP 2.x plugin will be named:    print
        Install plugin(s) in home directory:  no
    Build EPSON Stylus utility:               yes
    Build test programs:                      yes
    Build testpattern generator:              yes

Installation summary:
    Installation prefix:                      /usr/local
    Data directory:                           /usr/local/share/gutenprint
    Library directory:                        /usr/local/lib/gutenprint
    XML data directory:                       /usr/local/share/gutenprint/5.0.0/xml
    Module directory:                         /usr/local/lib/gutenprint/5.0.0/modules
    Install user guide:                       yes
    Install sample images:                    yes

General configuration:
    Compiler options:                             -g -O2  -Wall -Wcast-align -Wstrict-
prototypes -Wmissing-prototypes -Wmissing-declarations -Wnested-externs -Wwrite-strings -
Werror-implicit-function-declaration -Winline -finline-limit=1048576 -pedantic -Waggregat
e-return -Wcast-qual -Wshadow -Wredundant-decls
    Build static libraries:                   yes
    Build shared libraries:                   no
    Maintainer mode:                          yes
    Generate profiling information:           no
    Generate debugging symbols:               no
    Use modules:                              static
    Use readline libraries:                   yes, extra arguments: -lncurses
=================================================================
```

The CUPS, GIMP, Foomatic, and Ghostscript components require that the appropriate packages be installed on your system. Many distribution vendors separate packages into runtime and development packages. The development packages are required in order to successfully compile Gutenprint. In many cases the configure script cannot detect whether these development packages are installed, in which case you will get an error during compilation. Also note that it is necessary for the versions of the development packages to match exactly the versions of the runtime packages they are related to.

3.2) Core Driver Library

The core driver library, which is always built, contains all of the printer drivers comprising the Gutenprint package. When the package is built, it consists of a core library (libgutenprint), a set of XML files, and depending upon the options selected, additional libraries containing the drivers for each family of printers.

By default dynamically loadable modules (plugins) will be built for the family drivers, and loaded at run-time if your operating system supports it. If you experience problems, `--with-modules=dlopen` or `--with-modules=ltdl` may be used to select the module loading method (dlopen is the default, but GNU libltdl is more portable), or `--with-modules=static` or `--without-modules` disables them. If you wish to compile Gutenprint entirely statically (with no use of shared libraries), you may use the option `--disable-shared`.

Notes to Packagers

1. You may wish to create a development package containing header files and linkable libraries separate from the runtime package. There are a few third party applications that link against Gutenprint.

2. Gutenprint permits installation of Gimp-Print 4.2 alongside Gutenprint 5.0, and in the future will permit concurrent installation of different stable versions of Gutenprint with different minor version numbers. Gutenprint uses the old-style kernel numbering system, whereby even numbered minor versions are stable (4.2, 5.0, 5.2) and odd numbered minor versions are development (4.3, 5.1). Therefore, you should consider allowing Gutenprint 5.0 and Gimp-Print 4.2 to be installed concurrently.

3.3) CUPS

Gutenprint may be used as a driver under CUPS (Common UNIX Printing System), if your system uses that spooler. Full description of CUPS is beyond the scope of this README file; full information may be found at http://www.cups.org. Gutenprint 5.0 requires CUPS 1.1.9 or higher. We recommend use of 1.1.15 or above; that release of CUPS fixes some important bugs. Gutenprint supports CUPS 1.2, but at this time does not take advantage of the new features of that release.

Gutenprint will normally detect the presence of CUPS on your system and will attempt to build the CUPS driver if it finds CUPS installed. If your distribution separates the CUPS installation into development and runtime packages, you must install the CUPS development package (cups-devel or similar). You may need to install other development packages depending upon how your distribution has built CUPS. The list of packages varies, but commonly development packages for TIFF (`libtiff-devel`), JPEG (`jpeg-devel` or `libjpeg-devel`), PNG (`libpng-devel`) and OpenSSL (`openssl-devel`) will be required. **Failure to install these packages will lead to errors when the package is compiled.**

Installing the CUPS driver for Gutenprint 5.0 will not interfere with your ability to continue using the Gimp-Print 4.2 CUPS driver.

The Gutenprint CUPS driver consists of the following components:

- The core Gutenprint CUPS driver, `rastertogutenprint.5.0`. This is a CUPS filter that converts CUPS raster data into printer-specific data. This is most commonly installed in `/usr/lib/cups/filter`.

- Back ends for driving Canon and Epson printers, named `canon` and `epson`. These provide the ability to get information from the printer for CUPS to use, and are normally installed in `/usr/lib/cups/backend`. Additional utilities to send certain commands to these printers are installed as `commandtocanon` and `commandtoepson`; they are installed in `/usr/lib/cups/filter`.

- One or more sets of PPD files describing all of the printers supported by Gutenprint. These are normally installed in `/usr/share/cups/model/gutenprint`. These PPD files can only be used by the precise version of Gutenprint that they were built with; for example, it is not possible to use PPD files from Gutenprint 5.0.0 with Gutenprint 5.0.1.

- A utility to update PPD files from an earlier release of Gutenprint, `cups-genppdupdate.5.0`. This utility may be used to update PPD files generated by earlier versions of Gutenprint starting from 4.3.21. This is normally installed in `/usr/sbin`. This utility cannot update PPD files from Gimp-Print 4.2.

- A utility to generate PPD files, `cups-genppd.5.0`. Normally this is only required when the package is built. This is normally installed in `/usr/sbin`.

- A utility to permit additional color calibration for Gutenprint-supported printers, `cups-calibrate`. This is normally installed in `/usr/bin`.

Warning: With certain versions of CUPS and in certain non-default configurations, if a new version of Gutenprint is installed over an existing version genppd will create PPD files based on the older version of Gutenprint rather than the newer version. This will happen if all of the following are true:

1. The cups-config provided by the CUPS driver adds `-Wl,rpath=/usr/lib`. This is done by some versions of CUPS reportedly because in some cases the runtime linker does not pick up libraries out of `/usr/lib`. This can be checked by running

   `cups-config --libs --ldflags`

   and inspecting the output for any mention of `rpath`, `RPATH`, `RUN_PATH`, or the like. This is controlled by the CUPS installation on your system.

2. There is presently a version of Gutenprint installed in `/usr` (`--prefix=/usr`) rather than `/usr/local` or the like. The default location of Gutenprint installation is in `/usr/local`, but system vendors typically install Gutenprint in `/usr`.

3. Gutenprint is built dynamically only (`--disable-static` or `--disable-static-genppd`). This is not a default, and requires the explicit use of these options on the Gutenprint `configure` command line. Therefore, if you build Gutenprint normally you should not be vulnerable to this problem.

Note that in general if you install CUPS into a non-standard location, and install Gutenprint into the same location, this problem can surface. For example, if you choose to install CUPS in `/usr/local` and Gutenprint in `/usr/local` you are vulnerable to this. However, it is not standard practice to install CUPS anywhere but `/usr`.

In this case, the run path embedded in the `genppd` executable points to the version of Gutenprint installed in `/usr/lib`. This run path overrides any attempt by libtool to look in the build directory. The result is that `cups-genppd` and `rastertogutenprint` are run against the older version of Gutenprint. If the new version contains additional features (more printers, changes to printer options, etc.) they will not be available.

This bug is difficult to detect in a normal build. It normally does not cause an error to happen during build unless there is an API change from the version installed and the version being built; the only failure is frequently that some PPD files may not be built or may be built with missing options. Due to the PPD version checking introduced in this release, the behavior might manifest itself as a runtime error. It is also possible that there will be no error at all other than the older version of Gutenprint being used, with the result that new features and bug fixes are not available.

If you wish to use only shared libraries, do not wish to build static libraries at all, and are vulnerable to this issue (because `cups-config --ldflags` sets the run path), there are three workarounds available:

1. Build and install Gutenprint into `/usr` (rather than `/usr/local`) and then rebuild Gutenprint from scratch. This will install the correct libgutenprint.so in `/usr/lib`, and in the rebuild `genppd` will be run against the correct library.

2. Remove the old version of Gutenprint prior to building the new version of Gutenprint. The important files to remove are anything named `/usr/lib/libgutenprint*`.

3. Edit `cups-config` to remove the reference to the run path.

Note: when you run `make install`, some non-fatal errors will be displayed:

```
make[4]: Entering directory `/home/rlk/sandbox/print-4.3/src/cups'
Expect a number of "rmdir: Directory not empty" warnings
These messages are harmless and should be ignored.
rmdir /usr/share/cups/model/gutenprint/5.0/
rmdir: `/usr/share/cups/model/gutenprint/5.0/': Directory not empty
make[4]: [install-data-hook] Error 1 (ignored)
rmdir /usr/share/cups
rmdir: `/usr/share/cups': Directory not empty
make[4]: [install-data-hook] Error 1 (ignored)
rmdir /usr/lib/cups/backend
rmdir: `/usr/lib/cups/backend': Directory not empty
make[4]: [install-data-hook] Error 1 (ignored)
rmdir /usr/lib/cups/filter
rmdir: `/usr/lib/cups/filter': Directory not empty
make[4]: [install-data-hook] Error 1 (ignored)
rmdir /usr/bin
rmdir: `/usr/bin': Directory not empty
make[4]: [install-data-hook] Error 1 (ignored)
rmdir /usr/lib/cups
rmdir: `/usr/lib/cups': Directory not empty
make[4]: [install-data-hook] Error 1 (ignored)
rmdir /etc/cups
rmdir: `/etc/cups': Directory not empty
make[4]: [install-data-hook] Error 1 (ignored)
rmdir `dirname /usr/share/cups`
rmdir: `/usr/share': Directory not empty
make[4]: [install-data-hook] Error 1 (ignored)
rmdir `dirname /usr/lib/cups`
rmdir: `/usr/lib': Directory not empty
make[4]: [install-data-hook] Error 1 (ignored)
rmdir `dirname /etc/cups`
rmdir: `/etc': Directory not empty
make[4]: [install-data-hook] Error 1 (ignored)
```

These errors are harmless and can be safely ignored.

Following installation of the package with make install, you must restart CUPS to permit CUPS to see the new PPD files. The exact command to restart CUPS varies; it is typically something like /etc/init.d/cups, /etc/software/init.d/cups, /etc/rc.d/cups, /usr/sbin/rccups, or even /etc/rc.d/init.d/cups. Your system may have a different way to restart the CUPS server. OS X, for example, uses the following command:

```
sudo /System/Library/StartupItems/PrintingServices/PrintingServices.sh restart
```

You may optionally choose to update your existing PPD files using the command cups-genppdupdate.5.0, after which you should restart CUPS as described above. We strongly recommend use of this update procedure. This script will automatically update Gutenprint PPD files from earlier versions. This script will only update PPD files from earlier versions of Gutenprint; it will not update Gimp-Print 4.2 PPD files. However, you may install Gutenprint 5.0 alongside Gimp-Print 4.2, and use both Gimp-Print 4.2 and Gutenprint 5.0 drivers concurrently in separate printer queues. Therefore, you need not convert a workflow based on Gimp-Print 4.2 right away, but can gradually convert or even permanently use both drivers for different printer queues.

The following options to configure are available for compiling the Gutenprint driver for CUPS:

`--disable-translated-cups-ppds`

By default, PPD files for all languages available in Gutenprint are created. If this option is used, only the default (US-English) PPD files are created. Distributors may wish to package up the PPD files separately for each language.

Some systems may not build the translated PPD files correctly, in which case all of the PPD files will be in English. If this is the case on your system, you should use `--disable-translated-cups-ppds` to avoid having many duplicate PPD files.

`--enable-simplified-cups-ppds`

Gutenprint 5.0 offers an option of creating simplified PPD files (containing only basic options and standard paper sizes) in addition to PPD files offering all available options (including all color correction options). If this option is used, both the simplified and standard PPD files are created. If `--enable-simplified-cups-ppds=only` is specified, then only the simplified PPD files are built.

`--disable-cups-level3-ppds`

By default, the Gutenprint PPD files are configured for PostScript Level 3. If this option is used, Level 2 PPD files are created. This may be useful if you are using a version of CUPS older than 1.1.15. It is normally not necessary to use this explicitly, as the configure script detects the version of CUPS in use and selects the appropriate PostScript level automatically.

`--disable-cups-ppds-at-top-level`

Normally, the PPD files are placed in `/usr/share/cups/model/gutenprint/5.0`. If this option is used, the PPD files are placed in `/usr/share/cups/model`. There is normally no good reason to use this option.

`--disable-static-genppd`

Build `genppd` and `rastertogutenprint` dynamically linked rather than statically linked. **Warning**: Use of this option may lead to failure during build or installation, or incorrect installation, as described above. It is **strongly** recommended that you not use this option unless you are certain that you understand the problem and how to work around it.

Notes to Packagers

- We recommend that your installation package run `cups-genppdupdate.5.0` and restart CUPS as part of the installation process.

- All files and directories with versioned names (e. g. `cups-genppdupdate`, `rastertogutenprint`, the PPD files) may be installed concurrently with other versions of Gimp-Print and Gutenprint as described above. Other executables (such as the Canon and Epson back ends, and `cups-calibrate`) are not versioned, but are not linked against libgutenprint and do not have any other dependencies on Gutenprint.

- You may wish to use `--disable-static-genppd` if your distribution separates the Gutenprint core libraries from the CUPS component. Be sure that you understand the issues surrounding this.

3.4) Foomatic

Foomatic is a printer meta-driver that can be used with any spooler (CUPS, lpd, LPRng, etc.) or even no spooler at all. It uses XML data describing printer and driver capabilities in conjunction with Ghostscript to allow printing in any environment. Please visit http://www.openprinting.org/foomatic.html for more information.

We normally recommend using the native CUPS driver described above if your system uses CUPS as its spooler. However, some systems (many releases of Fedora Core, for example) use Foomatic as the repository for all printer information; the tools provided on those systems will not recognize the CUPS PPD files. If your system uses Foomatic in this way, or does not use CUPS, you should use Foomatic to manage your printers.

The Gutenprint driver for Foomatic requires Foomatic 2.0 or higher; Foomatic 3.0 or above is highly recommended. It also requires GNU Ghostscript 6.53 or newer, AFPL Ghostscript 7.04 or newer, or ESP Ghostscript 7.05 or newer for IJS support.

The Foomatic support in Gutenprint consists of a data generator and an IJS-based Ghostscript driver. It is possible to use the Ghostscript driver without Foomatic, but the Gutenprint options are complex and subject to change without notice. Older printer configuration tools such as apsfilter and magicfilter do not provide a convenient interface to the driver's capabilities. Therefore, we no longer provide documentation on direct use of the Ghostscript driver without the Foomatic front end.

The Ghostscript driver in Gutenprint 5.0 is based on the IJS protocol. IJS is a protocol originally developed by Hewlett-Packard to allow new drivers to be used with Ghostscript without having to be compiled into Ghostscript. As this driver runs in a separate process, and IJS is licensed in a way compatible with the GPL, this driver may be used with AFPL Ghostscript if desired. We no longer offer the legacy `stp` driver provided in Gimp-Print 4.2. This driver was difficult to maintain and required a complex procedure to integrate with Ghostscript.

Gutenprint 5.0 offers two Foomatic drivers, one supporting the full range of options and the other supporting simplified options, as describe above under CUPS. The full-featured driver is named `gutenprint-ijs.5.0`; the simplified driver is named `gutenprint-ijs-simplified.5.0`. This allows Gutenprint 5.0 to coexist with Gimp-Print 4.2; both drivers may be installed and used (on separate printer queues, of course) on the same system.

Normally, the Gutenprint configure script will automatically detect the presence of Foomatic and Ghostscript on your system. In some cases, you may have to install a Ghostscript development package that may be named `gs-devel`, `ghostscript-library`, or the like for the IJS capability.

The Foomatic driver will not allow use of PPD files created from Foomatic data from a different version of Gutenprint. This ensures that the PPD files accurately match the driver in use. However, there is no automatic upgrade tool provided for the Foomatic driver, unlike the CUPS driver. Therefore, all queues using a Gutenprint driver must be updated manually, using either tools provided by your distribution or the Foomatic tool `foomatic-ppdfile`.

Notes to Packagers

- We recommend packaging the IJS driver (`/usr/bin/ijsgutenprint.5.0`) and its man page (`/usr/man/man1/ijsgutenprint.1.gz`) together with the Foomatic data.

- The IJS driver and the Foomatic data kit and PPD files are versioned at the minor release level (e. g. 5.0), and hence you should consider permitting multiple versions to be installed concurrently. The man page (`/usr/man/man1/ijsgutenprint.1.gz`) is not versioned, and is just a stub to satisfy distribution requirements that a man page be provided for all commands installed on the system.

3.5) The GIMP

Gutenprint may be used with an enhanced Print plugin for the GIMP, providing the ability to print images. If you wish to do so, you must use the GIMP 1.2.3 or above on the 1.2 line, or any GIMP 2.x release (2.0, 2.2, etc.) Please read the release notes in addition to this README, as there have been some changes in procedure since Gimp-Print 4.2 if you are using certain versions of the GIMP.

The enhanced Print plugin for the GIMP replaces the Gimp-Print 4.2-based plugin provided with the GIMP 2.0 and 2.2. As of the GIMP 2.4, the GIMP team provides a new Print plugin based on the GtkPrint framework. This plugin provides standard printing capabilities, but does not provide all of the new Gutenprint 5.0 features. Therefore, the enhanced Print plugin for the GIMP distributed with Gutenprint does not replace that plugin, but is installed alongside that plugin.

If your system separates development packages from runtime packages, you will typically have to install development packages for the GIMP itself, in addition to GTK+ and glib. With the GIMP 2.x and GTK+ 2.x, additional packages may be required.

Normally, the Gutenprint configure script detects which version, if any, of the GIMP is installed and builds an appropriate plugin. If the configure script does not detect it properly, you may need to specify `--with-gimp` or `--with-gimp2`. However, it's more likely that you need to install appropriate development packages.

Normally Gutenprint installs the GIMP Print plugin in your system plugin directory. If you wish to install it in your personal plugin directory, you may use

```
./configure --enable-user-install
```

It is not possible for Gimp-Print 4.2 and Gutenprint 5.0 (or any future release) to coexist in the same installation of the GIMP. The Gutenprint 5.0-based plugin can read settings from previous versions of Gimp-Print, but the configuration file format in Gutenprint 5.0 cannot be read by older versions of Gimp-Print.

The GIMP 1.2 will not be supported in Gutenprint 5.1 and beyond. However, all Gutenprint 5.0 releases will support the GIMP 1.2.

The GIMP 2.x plugin may eventually be migrated to the GIMP project for a future GIMP release and be removed from the Gutenprint distribution.

Note to Packagers

The GIMP plugin, unlike the core library and the Foomatic and CUPS drivers, may not be installed concurrently with other versions. For example, you may not install both the Gimp-Print 4.2 and the Gutenprint 5.0 version of the Print plugin, as they use different configuration file formats.

3.6) escputil

`escputil` is a command line utility for administering Epson inkjet printers. It performs head alignment, retrieval of ink levels and status information, printing of test patterns, etc. It is built and installed by default; if you don't want it, you may use `--without-escputil` when configuring.

`escputil` uses the `readline` package for interactive commands (currently only head alignment falls into this category). Linking against libreadline sometimes requires linking against other packages. Gutenprint attempts to determine the correct packages to link against; the exact sequence is described in the release notes. If you do not wish to use readline, you may use `--without-readline`.

Unlike the case in Gimp-Print 4.2, this utility is not standalone; it requires the installation of the core Gutenprint package to function. This allows it to support new printers without modification.

Note to Packagers

`escputil` presents installation problems in that on most systems users without superuser privileges do not have access to the raw printer port. We have tried to make `escputil` robust (in particular, we've tried to identify potential buffer overflow issues), but we have not conducted a full security audit to ensure that it is safe to install with setuid privileges. We advise distributors to carefully consider their installation strategy for `escputil`.

3.7) Other Packages

Gutenprint includes a few other packages: a test pattern generator and a test suite. If you wish to compile these, you may use `--enable-test` and/or `--enable-testpattern`.

The test pattern generator permits generating various test patterns; it can also be used to print images in 16-bit depth and specifying all ink channels separately. The image format is not documented outside of the code itself; it is not a general purpose printing tool. It is used as part of the regression test suite.

To run the test suite, you must configure in both the tests and the test pattern generator and run make check. The test suite takes about 12 hours to run, depending upon the speed of the processor.

The tests currently cover the following areas:

1. Regression test each printer with default settings, using each dither algorithm.

2. Regression test each input and output type in 8 and 16 bit, in grayscale and color, on the Epson Stylus Photo R800 (which has additional red and blue inks that use additional code paths).

3. Regression test each resolution and ink type in color and black and white on each printer.

4. Regression test CUPS PPD files for correctness, using the cupstestppd command provided with CUPS. This test fails if there are any errors in relaxed mode; it allows failures in strict mode but gives a warning.

5. Test functionality of the new curve data type.

6. Regression test each dither algorithm with different types of inputs and drop sizes.

7. Regression and functional test of the weave (interleave) code. This test is the most time-consuming of the entire suite, as it tests every weave pattern used by every printer in every mode (currently about 700,000 cases).

Four of the tests in the suite can be run individually under valgrind to check correctness of memory use. These are:

- `src/testpattern/run-testpattern`

- `src/testpattern/run-testpattern-1`

- `src/testpattern/run-testpattern-2`

- `test/run-testdither`

The following options can be passed to each of these tests:

- `-v`   Run valgrind normally, displaying errors and memory leaks.

- `-v -v`   Run valgrind with enhanced leak resolution, and show reachable memory in addition to memory leaks.

- `-v -v -v`   Run valgrind with enhanced leak resolution, show reachable memory in addition to memory leaks, and display all errors (no limit on errors displayed).

- `-c`   Use cachegrind for performance profiling (cannot be used in combination with other `-v` options).

If you use valgrind with `run-testpattern-2`, we recommend use of the `-s` option to skip testing printers that share identical characteristics with other printers, in order to save time. Programs run under valgrind take many times longer to run than normal.

In addition, in order to successfully use valgrind, you must compile with static libraries only (`--disable-shared`). If you do not do so, you will run valgrind on a small wrapper script rather than on the test itself.

It is a release requirement that all tests pass, with valgrind where applicable. At the present time there is one known non-fatal valgrind error (on the Canon iPixma 4000 in grayscale mode) and one memory leak associated with that error. This is under investigation and will either be fixed or the requirement be waived for this particular issue.

Note to Packagers

You may wish to distribute the test pattern generator in a development package, as it's useful as sample code if nothing else. In addition, there are some tools in the test directory that aren't installed that may be of use. These tools are:

`parse-escp2` is a Perl script that parses Epson inkjet output files. This is useful as a data gathering tool for reporting bugs; the output of this tool is much more compact than the actual print file. `parse-bjc` is a similar script for parsing Canon inkjet output files; it is not as well maintained.

`unprint` is a tool for reconstituting an image from an Epson inkjet output file. The image is not a true continuous-tone image; each pixel is synthesized based on which drops are printed. `pcl-unprint` and `bjc-unprint` are similar tools for PCL and Canon output files, respectively.

None of these tools are versioned.

4) Getting Started

This section describes how to get started using Gutenprint. Certain details (particularly for installation and configuration of printers) may vary depending upon your operating system.

Using Gutenprint consists the following steps:

1. Installing your printer
2. Configuring desired options

4.1) Printer Installation

The actual procedure to install a printer depends upon your operating system and the spooler (printing system) in use on your system. This section describes how to identify the correct Gutenprint driver for your printer; the instructions for installing and configuring printers vary widely with operating system distributions.

Gutenprint does not require the use of non-standard procedures (such as starting special programs at boot time) to install and use printers. Assuming that you are using either CUPS or Foomatic, it integrates with your printing system, so the tools provided by your distribution vendor should work correctly with Gutenprint.

Most printing systems currently use PPD files to describe printer capabilities. Some printers are supported by more than one driver, so you may find more than one PPD file for your printer. Gutenprint PPD files are described as

- `Epson Stylus Photo R300 Foomatic/gutenprint-ijs.5.0`
- `Epson Stylus Photo R300 Foomatic/gutenprint-ijs-simplified.5.0`
- `Epson Stylus Photo R300 - CUPS+Gutenprint v5.0.0`
- `Epson Stylus Photo R300 - CUPS+Gutenprint v5.0.0 Simplified`

The "simplified" PPD files offer a basic set of options only, for selecting printer options, standard paper sizes, and basic quality settings. The PPD files that are not "simplified" offer a much broader set of controls, giving the user extensive control over quality and color adjustment.

If you are using CUPS, you may be offered a choice between `CUPS+Gutenprint` and `Foomatic/gutenprint-ijs` PPD files. While either kind of PPD file will work, we recommend using the `CUPS+Gutenprint` PPD files. These PPD files can be automatically updated to future versions of Gutenprintwith `cups-genppdupdate.5.0`.

Other PPD files are described differently, such as

- `Epson MJ 520C Foomatic/stcolor (recommended)`

These PPD files, whether "recommended" or not, are not Gutenprint PPD files.

4.1.1) CUPS

- If you have previously installed any version of Gutenprint numbered 5.0 (including alpha, beta, and release candidates), you do not need to reinstall your printer queues from scratch when you

upgrade Gutenprint to a newer version. The Gutenprint utility `cups-genppdupdate.5.0` will upgrade your printer queues automatically, after which you must restart CUPS (the procedure to do this is system-dependent). `cups-genppdupdate.5.0` will *not* upgrade PPD files from Gimp-Print 4.2. Your operating system distribution vendor or packager may provide alternate instructions.

This procedure works only with native CUPS PPD files ("CUPS+Gutenprint"), not with Foomatic PPD files ("Foomatic/gutenprint-ijs").

- If you do not choose to automatically update existing PPD files, you should reinstall any printers that you are using Gutenprint PPD files with. The Gutenprint driver and the PPD files must be kept in sync, since the PPD files reflect the particular version of the driver that they were built against. If you attempt to use a version of Gutenprint with PPD files not built for that precise version, the driver will fail with a diagnostic error message. For example, PPD files built for Gutenprint 5.0.0-beta4 will not work with driver version 5.0.0. You can identify Gutenprint versions by the name of the PPD file, which will be something like:

        EPSON Stylus Photo EX - CUPS+Gutenprint v5.0.0(en)

- Linux users please note: if you are using CUPS 1.1.11 or higher, and you have a USB-connected printer, you must have a printer connected to each USB port that you plan to use and powered on when you restart CUPS. If you do not do so, you will not be able to reinstall the printer. It is only necessary to do this if you wish to update PPD files manually; if you use cups-genppdupdate.5.0, you do not need to do this.

- Starting with CUPS 1.1.11, you cannot choose an AppSocket connection and enter `usb:/dev/usblp0` or the like as the URI; you will get a `client-error-not-possible` error at the end of the installation process, and you will have a message like the following in your CUPS error log (typically `/var/log/cups/error_log`):

    `E [21/Nov/2001:17:59:07 +0500] add_printer: bad device-uri attribute 'usb:/dev/usb/lp0'!`

    If the printer was turned on correctly, you will be given a choice of a USB connection in the Device dialog.

- You may also have problems if you have a `.lpoptions` file that has old options set. If you have problems printing, please remove any existing `.lpoptions` file in your home directory and try printing again.

4.1.2) Foomatic

- When you install a new version of Gutenprint, you must upgrade your PPD files (any PPD files with "Foomatic/gutenprint-ijs" in their name). Your vendor may provide system-specific instructions for installing and/or upgrading PPD files. The standard Foomatic tool for generating PPD files is `foomatic-ppdfile`. The normal command line is

    `foomatic-ppdfile -d <driver> -p <Foomatic-printer-ID>`

    The list of supported printers in this manual provides the Foomatic ID for each supported printer. So for example, to create a PPD file for an Epson Stylus CX4500, the command line is

```
foomatic-ppdfile -d gutenprint-ijs.5.0 -p Epson-Stylus_CX4500
```

- Many of the options offered in the Foomatic-based PPD files have additional options with "Enable" in their name, e. g. "Density Enable". Due to the way Foomatic works, it is not currently possible to have options that take numeric values that can also take a non-numeric value of "Default". The solution in Gutenprint is to add an additional option that enables or disables the numeric option. Therefore, if you want to set the ink density, you must also set Density Enable to "Enabled".

- Some versions of Foomatic 3.x cannot handle the volume of data in the Gutenprint printer database. The solution is to upgrade to the newest version of Foomatic offered on http://openprinting.org.

4.1.3) The GIMP

- The main dialog of the enhanced Print plugin is similar to that of the Gimp-Print 4.2 plugin. It offers additional options. In addition, the preview is now always oriented so that the top of the preview represents the top edge of the page (the edge that's fed first into the printer).
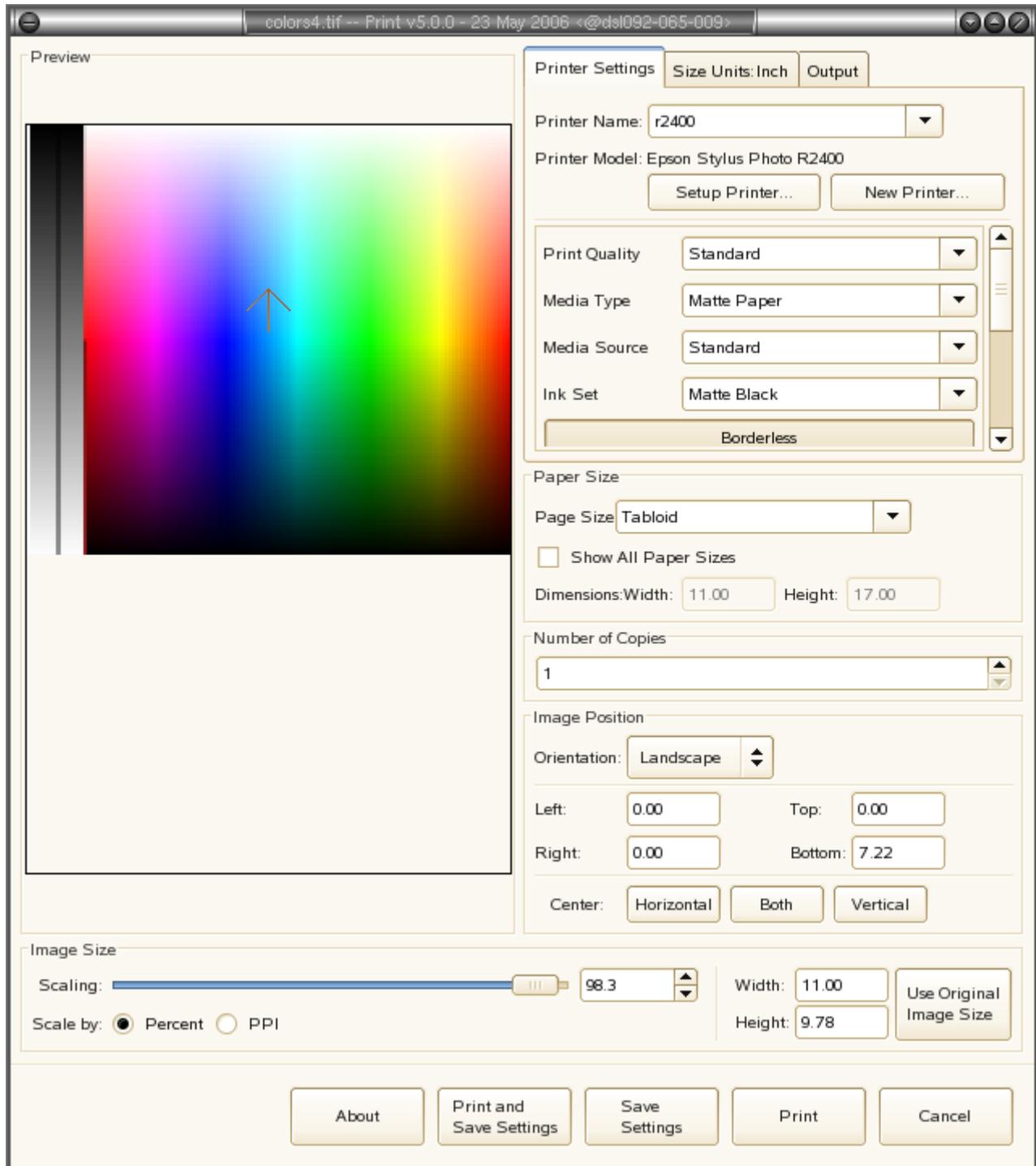
Illustration 1: Main Enhanced Print Plugin dialog

- The color adjustment dialog offers many new options compared to Gimp-Print 4.2. Many adjustments are "off" by default and must be enabled via the checkbox to have any effect. The default value for numerical options does not mean the same thing as the option being turned off; when the option is turned off, the driver selects an appropriate value.

Note that it is possible to view the output of each ink channel independently if so desired.
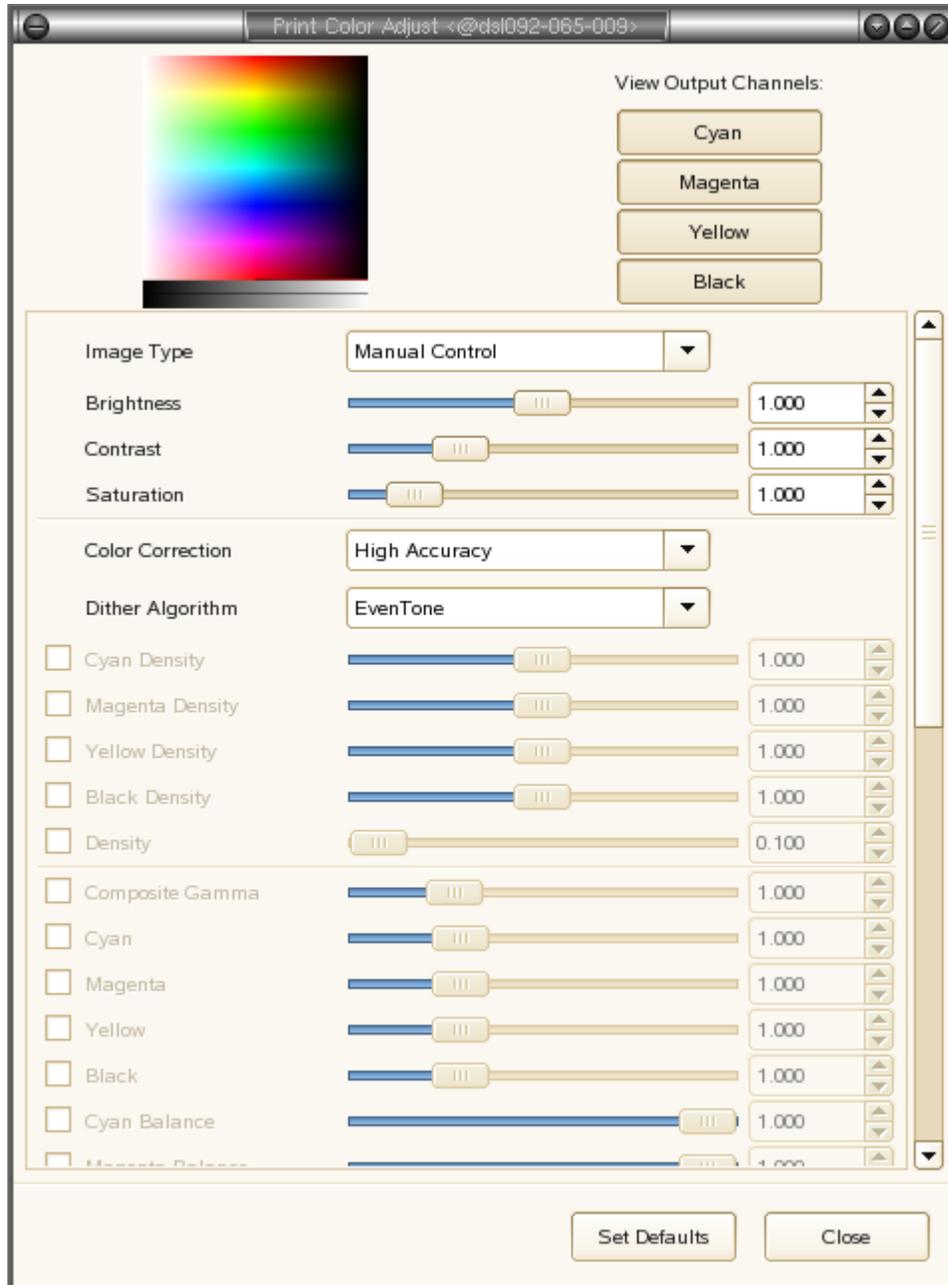
Illustration 2: Color Adjustment dialog

- The New Printer dialog provides a way of creating a new group of settings. For example, you may wish to create a "printer" with settings appropriate for printing photographs to high quality glossy paper, with a second printer set up for printing to high quality matte paper. The printer is created with the current settings; when you select the printer from the Printer Name dialog, its settings are then used. The new printer's settings can now be changed independent of the other printers defined.

Illustration 3: New Printer dialog

- The Setup Printer dialog is very different from Gimp-Print 4.2; it provides a much more intuitive interface for selecting the printer and model to print to.
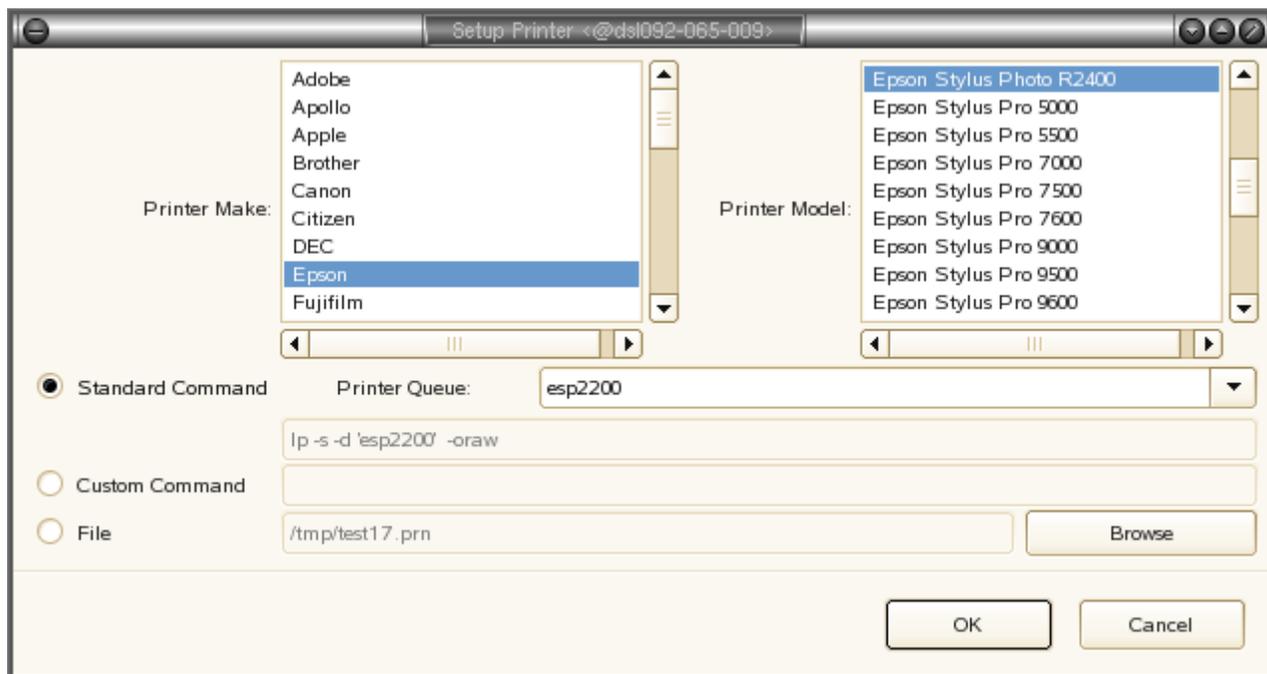
Illustration 4: Setup Printer dialog for supported printers

The printer make and model should be self-explanatory. The dialog offers a choice of printer queue and shows the command that will be used to print the file. You may also select a file to print to, or specify a custom command if so desired.

- If you wish to print to a printer that is not on the list of printers supported by Gutenprint, but for which you have a PPD file, you should select Adobe PostScript Level 2 (or Level 1 if your printer is very old). This will let you select the appropriate PPD file. Currently the dialog offers only a few options from the PPD file.

  It is possible to use this with printers natively supported by Gutenprint, but you will lose all of the enhanced features of Gutenprint 5.0.

  This interface is likely to be redesigned to offer all PPD options and also to not require specifying a PPD file (the plugin will find the correct PPD file based on the printer selected).
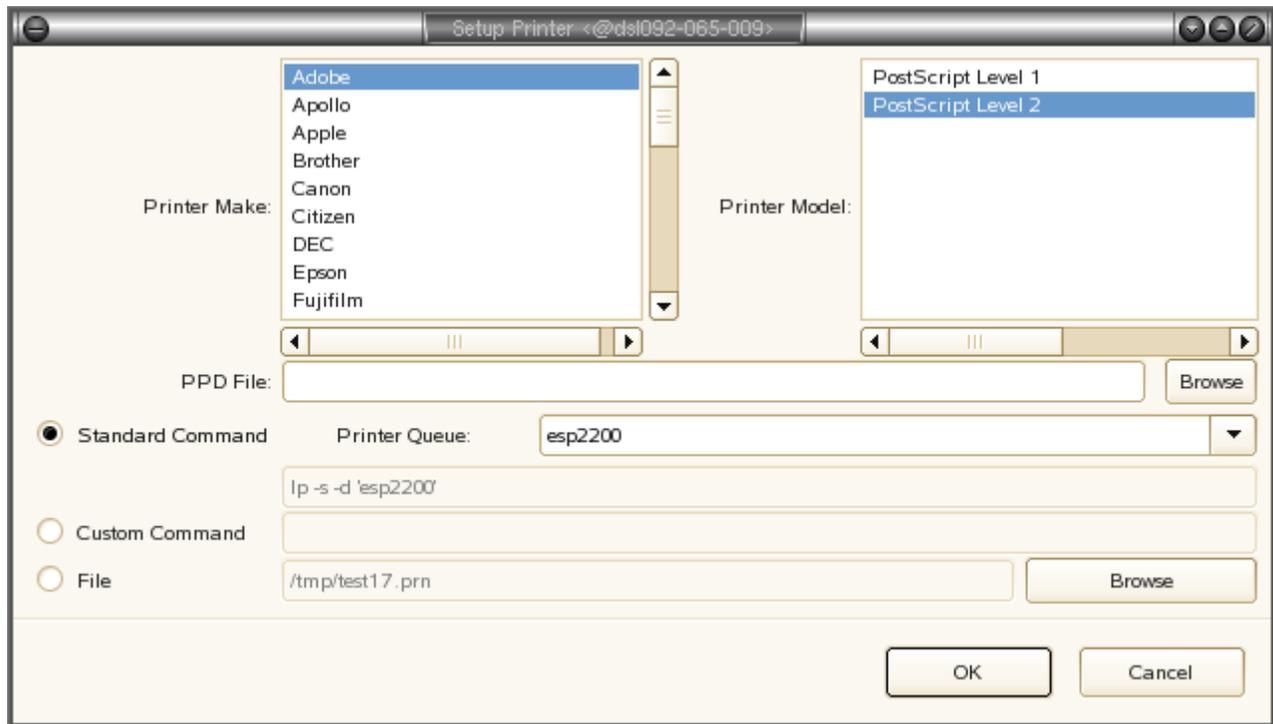
Illustration 5: Setup Printer dialog for unsupported printers

4.2) Configuring Printer Options

Gutenprint offers a variety of printing options, controlling printer options, color correction, and quality. Depending upon the application you're printing from and the tools provided by the system, they may be organized in various ways.

A description of all of the options available with this package, which vary from printer to printer, is provided at the end of this manual. The most important settings are the Basic Printer Options and the Basic Output Controls. The most important of these are:

Page Size

Select the paper (media) size to print to.

Double-Sided Printing

Otherwise known as "duplex" printing, this is offered for printers capable of printing on both sides of the page (generally laser printers).

Media Type

Select the kind of paper or other media being printed to. This enables the printer and driver to be set up appropriately for the kind of paper in use. It is important to set this to the kind of paper you are printing to; failure to do so will typically yield poor results.

Media Source

Select the source of the paper or other media. This option is offered with printers that have multiple feeds, for example multiple paper bins, manual feed, printing directly to a CD, etc.

Output Type

This option specifies whether to print in color or black and white/grayscale (using only black inks). Black and white printing is generally faster than color printing, even if the item being printed is entirely black and white. However, printing with only black ink may yield a "grainy" appearance.

Color Correction

This selects the choice of color correction method within Gutenprint. Normally it is not necessary to change this setting from the default, which selects a color correction mode appropriate for the document being printed. Other common settings:

- **High Accuracy** Apply optimum color correction to the output to produce the best color quality. This corrects the hue, brightness, and saturation (brilliance of color). This is the normal setting to use for printing photographs or graphics if you are not using any external color management.

- **Bright Colors** Apply color correction to the output, but generate more brilliant colors in some cases.

- **Uncorrected** Do not apply any color correction to the output beyond generating linear output. This is the best setting to use when utilizing external color management; the high accuracy modes employ correction algorithms that may not work well with color management.

Note: if you use color management with ColorSync or ICC profiles you should use profiles created with Gutenprint and with the exact settings that you plan to print with. We recommend using the **Uncorrected** setting for color correction in this situation, both when creating the profile and when printing. Profiles provided by the printer vendor are calibrated for the vendor's driver, which may not be identical to Gutenprint's calibration. In addition, profiles created using Gimp-Print 4.2 or earlier will generally not perform well with Gutenprint 5.0.

Image Type

Specify the option that best describes what you are printing. Your choice here will affect the processing of the print job. Currently available settings include:

- **Text** Optimize the output for printing black text with no graphics. This option results in crisp output and is very fast, but will yield very poor results with any color or grayscale graphics.

- **Graphics** Optimize the output for printing color graphics. This option will generate smooth, bright output.

- **Mixed Text and Graphics** Optimize the output for printing a mixture of text and graphics.

- **Photograph** Optimize the output for printing photographs. This option will generate smooth tones and high quality colors, but will be slower than the other options.

- **Line Art** Optimize the output for printing black and white line art with intricate detail.

Resolution

Note: Epson inkjet printers offer a **Quality** option, which should normally be used on those printers. Users of other printers must use the **Resolution** option.

Select the resolution to print at (dots per inch). In general, higher resolutions produce better quality, at the expense of additional time.

As a general rule of thumb, on laser printers and older inkjet printers (made before 1999 or thereabouts) resolutions of 300 DPI or thereabouts provide draft quality; lower resolutions provide economy draft quality and cannot produce solid black. Resolutions of 600 or 720 DPI produce good quality output; higher resolutions are useful for very high quality image or graphic output. Newer inkjet printers, with smaller ink drop sizes, typically require higher resolutions to produce acceptable output; in some cases even 1440x720 DPI does not produce very high quality.

Print Quality

Specify the desired output quality using convenient presets. Where this option is available, Gutenprint will automatically adjust the printing resolution and other options to generate the desired quality. Not all printers offer all of these options. The most commonly used settings include:

- **Economy** Print very rapidly with a reduced amount of ink. This option will produce washed out colors and grays and will typically be quite grainy and streaky.

- **Draft** Print low quality draft output quickly. This option will typically produce acceptable output on plain paper, but will typically produce faded and grainy output on high quality papers.

- **Standard** Print at a normal quality level for text or text/graphics on plain paper. This option may also be useful for printing draft copies of photographs on coated inkjet paper, but will not normally yield good results for printing photographs on glossy paper. This is the default setting, and is a good starting point for text or text/graphics printing.

- **High** Print high quality text or text/graphics on plain paper or inkjet paper. This option will typically produce good color quality. This option may also be useful for printing draft copies of photographs on glossy paper.

- **Photo** Print photographs on glossy paper. This may also be used to print very high quality text or graphics on high quality inkjet paper, rivaling laser printer quality. This is a good starting point for printing photographs on glossy or premium matte papers.

- **Super Photo** Print photographs on glossy paper with very high quality. This may also be appropriate for line art with extremely fine detail, for which the required resolution may exceed the capabilities of laser printers.

- **Best** Print with the best quality available on the printer for the application chosen. This may be equivalent to one of the other settings; on a very few printers the resolution may exceed that of **Super Photo** mode.

4.3) Using escputil

escputil is a command line utility which allows the user to perform a variety of maintenance tasks on EPSON Stylus inkjet printers. These tasks include head alignment, head cleaning, nozzle check, printer identification, and retrieval of the ink level from the printer. In order for many of the escputil functions to work, the user must have read/write access to the raw printer device (typically /dev/lp0, /dev/usb/lp0, and the like). On many systems, this requires superuser privileges. If you are using packages provided by your system vendor, you may have received special instructions about using escputil.

This command has been enhanced considerably since Gimp-Print 4.2; it is faster and more robust.

Caution: the escputil utility was designed for use only with EPSON Stylus inkjet printers supported by the Gutenprint software. It is possible that damage may occur to your printer if this utility is misused or if it is used with a printer other than supported printer. It is the sole responsibility of the user to insure that this utility is suitable for the task at hand.

escputil performs one of the following operations depending upon the command line option selected:

- **-c** Clean the print head. This does not require access to the raw printer device.

- **-n** Print a nozzle check pattern. Dirty or clogged nozzles will show as gaps in the pattern. If you see any gaps, you should clean the print head. This does not require access to the raw printer device.

- **-a** Align the print head. This is an interactive operation that prints a number of test patterns and asks you to select the best aligned patterns. This operation does not function on all printers. This does not require access to the raw printer device. **Caution:** misuse of this utility may result in poor print quality and in extreme cases potential damage to the printer. Follow the instructions carefully!

- **-s** Display printer status. This requires access to the raw printer device.

- **-i** Display the quantity of ink remaining in the printer. This requires access to the raw printer device.

- **-e** Display extended ink information, including cartridge number and date of manufacture. This requires access to the raw printer device. On some printers, this displays only the standard ink information.

- **-d** Identify the printer. This requires access to the raw printer device.

The following additional options are available:

- **-r device** Specify the name of the raw device that the printer is connected to. This is typically something like /dev/lp0, /dev/usb/lp0, etc. It is important that you have read/write access to the printer for this to work. In particular, if you have a parallel port printer, it is important that your kernel be able to read back from the parallel port. This is not normally a problem with modern systems, but may be an issue on older systems. Consult your operating system documentation for any issues.

- **-P printer_queue** Specify the name of the printer queue that the printer is connected to. This may be used for the -c, -n, and -a operations, but not for any of the operations that return information.

- **-u** The printer is a new printer (Stylus Color 740 or newer). This option is only needed when using the -P option; when using the -r option, escputil is capable of detecting what model of printer is in use.

- **-m model** Specify the printer model for head alignment. This option is only needed when using the -P option; when using the -r option, escputil is capable of detecting what model of printer is in use.

Other less frequently used options are available; please run **escputil -h** for more information.

5) Solving Problems

While we have attempted to make use of Gutenprint as straightforward and trouble-free as possible, we certainly recognize that there may be problems with installing and using Gutenprint. In the event of any difficulty, we ask that you take the following actions:

1. Read the release notes in this manual and in the `NEWS` file.

2. Read the FAQ, in `doc/FAQ.html`. Your question may be answered there.

3. Make sure that the paper type and size, and media source, that you have selected matches the paper loaded into the printer. This is only necessary if the printer attempts to print, but does not succeed or prints poorly. It is a good starting point if quality is poor (too dark or too light, wet ink on the paper, etc.).

4. Reset all settings (particularly the color and quality settings) to their defaults.

5. If you are using CUPS, search `/var/log/cups/error_log` (which may be located elsewhere on some systems) for lines starting with "E" (these lines indicate errors). Also search for log information produced by Gutenprint; all such output lines will contain the word "Gutenprint". These lines may help you solve the problem.

6. If you are using CUPS, enable debugging output. This can be done by editing `/etc/cups/cupsd.conf` (which must be done as the superuser, or "root"). Change the following line from:

    `LogLevel Info`

    to

    `LogLevel Debug`

    This will allow CUPS to produce extensive debugging output. You will need to restart CUPS (the exact procedure is system-dependent) after doing this. If you report a problem to the Gutenprint team, you will be asked for this information.

7. There are public forums on Sourceforge dedicated to this package. Please see http://sourceforge.net/forum/?group_id=1537 for more information. The Help forum is a good source of information.

8. If you have a technical support issue that does not appear to be a bug in the software, you can use the Tech Support Manager. Please see http://sourceforge.net/support/?group_id=1537. Please provide the name and version of your distribution or operating system, and if you compiled the package from source, the configuration summary.

9. If you have found a clear bug in the package, you may file a bug report at http://sourceforge.net/bugs/?group_id=1537. Please provide the name and version of your distribution or operating system, and if you compiled the package from source, the configuration summary.

10. You may send mail to the gimp-print-devel@lists.sourceforge.net mailing list. This is recommended as a last resort only. Please provide the name and version of your distribution or operating system, and if you compiled the package from source, the configuration summary.

6) Release Notes

6.1) Overall Changes Between Gimp-Print 4.2 and Gutenprint 5.0

6.1.1) General User-Visible Changes

1. Gutenprint offers many new options, which are described separately below. Many other options that are present in both 4.2 and 5.0 function differently between the two releases.

2. Options in the CUPS driver and GIMP plugin are now grouped according to function. This work is still in progress, and we expect to make further usability improvements.

3. Simplified bundles of settings are now offered for users who do not need to customize the settings. The Print Quality and Image Type controls offer a variety of settings optimized for common printing tasks; these settings may be overridden by explicit user choice.

4. Many of the color settings have changed effect. We recommend starting with no color adjustments and making appropriate changes only as required. Specific changes that you should be aware of include:

    - The default operation of the contrast setting has changed to be more in accord with other packages. In 4.2, reducing the contrast resulted in changing the black and white setting. In 5.0, reducing the contrast does not change the black and white settings. As a result, it is possible to use the contrast setting to improve highlight and shadow detail by reducing the contrast.

        The previous behavior is available by turning on the "Linear Contrast Adjustment" setting.

    - The brightness control now behaves more in accord with standard practice, adjusting the image's overall brightness without changing the black or white points.

    - The Cyan, Magenta, and Yellow settings have been replaced with separate settings for gamma, density, and gray balance for Cyan, Magenta, Yellow, and Black. The Cyan, Magenta, and Yellow settings in Gimp-Print 4.2 most closely correspond to the gamma settings in 5.0.

        The per-channel density settings do not affect the color correction. They are applied after the color correction to scale the individual channels. The per-channel gray balance settings adjust gray balance without affecting per-channel density settings (i. e. the adjust the amount of ink used to generate gray), permitting increased color saturation without compromising gray balance.

5. The Uncorrected color correction mode is recommended for users who wish to use their own color (ICC or otherwise) profiles with Gutenprint drivers. This will yield the maximum gamut and most uniform response. If you are not using your own color management, you will generally get best results from the High Accuracy color correction setting. Users who wish to perform their own linearization and ink limiting may wish to use the Raw color correction mode, which does not adjust the density.

    Any profiles generated against Gimp-Print 4.2 are unlikely to produce good results with Gutenprint 5.0. The color generation is sufficiently different that you will need to create new

profiles against Gutenprint 5.0. In general, color adjustment should not change between Gutenprint 5.0 releases starting with release 5.0.0, unless particularly critical issues are identified.

6. The old man pages, and `src/ghost/README`, have been withdrawn. These pages, and the Ghostscript `README` file, were based on the Gimp-Print 4.2 options, which were much less extensive than the current option system. It is not practical to keep them up to date in any meaningful way. Our recommendation is that people use either the native CUPS driver or Foomatic to manage options rather than attempt to create and manage printer queues by hand. The old user's manual has been replaced with this manual.

7. The source browser in the documentation package has been removed. This information, which consists of color-coded annotation of the source code, is of little interest to the vast majority of users and consumes a significant amount of space in the installation.

6.1.2) New Functionality

1. This release offers a new "curve" data type, permitting very precise adjustments of output. Currently the curves are only accessible in the GIMP plugin.

2. This release offers many new output controls:

   - Balance (density) controls for each color channel, in addition to the gamma controls present in 4.2.

   - Gray balance controls for the cyan, magenta, and yellow channels. These controls allow fine tuning of gray tones without affecting color.

   - Black (GCR) transition, including the transition gamma and the upper and lower limits.

   - Transitions for photo (light cyan, light magenta, and gray) inks.

   - Transfer curves for each channel (cyan, magenta, yellow, black, and composite), allowing very precise control over the output.

   - Transfer curves for generation of additional channels where applicable, such as red and blue inks for the Epson Stylus Photo R800 and R1800.

   - Hue, saturation, and luminosity transfer curves permit tuning of the color corrections utilized by Gutenprint.

   - Ink limit control.

   - The density control now permits setting density as high as 8.0, vs. 2.0 in 4.2.

3. The Epson driver offers (almost) true full bleed for printers that support it (but see the limitations below).

4. The PCL driver now offers duplex (two sided) printing support on appropriate printers.

5. The package now includes support for a number of dye sublimation photo printers made by Olympus, Canon, Sony, and Fujifilm.

6. The resolution list for Epson printers has been simplified; many redundant resolutions have been removed.

7. Print head direction for Epson printers (unidirectional vs. bidirectional) is now a separate control. In addition to contributing to the simplification of the Epson printer resolutions, this permits the choice of unidirectional vs. bidirectional at all resolutions if desired. By default, the driver picks the most appropriate choice for the situation.

8. The Epson driver now allows printing directly to CD's and DVD's on printers that support this functionality. In addition, a choice of center hole size (16 mm or 43 mm) is now offered. A fine adjustment is provided to permit control over positioning of the image on the CD. This fine adjustment setting is not available in the Foomatic interface at present.

    To print to a CD, you need to select the "Print to CD" media source (input slot). You must also select the appropriate page size (3" CD or 5" CD). Note that this is different from the instructions Epson provides, which specify A4 media size.

9. The Epson driver now offers a choice of print head weave patterns. In addition to simplifying the resolution choices for Epson Stylus Pro printers, this offers an additional control for fine tuning output quality.

10. The Epson driver offers an Ink Set control for printers taking different choices of inks (such as the Epson Stylus Photo 2200, which offers a choice of Matte Black and Photo Black inks).

11. Where practical, all controls offer a default setting for simplicity of operation. This default value is intended to offer the optimal choice given the printer and its other settings. For example, if "Automatic" is selected for print head direction, the print head motion will be unidirectional at high resolutions (since unidirectional usually produces better output), but bidirectional at low resolutions (for faster printing).

    The default is only offered for options that are not directly controlled by the user's action. For example, there is no default choice offered for paper type, since the correct value is based on the paper type loaded by the user. Similarly, there is no default for the input slot or ink set.

12. Support for a variety of input types, in both 8 and 16 bit resolution, has been added. Gutenprint can now handle input in grayscale, whitescale (inverted grayscale), RGB, CMY, CMYK, and KCMY in 8 and 16 bit resolutions for all output types.

13. A new Threshold color correction mode has been added that produces either all-on or all-off of each color. This is similar to the Monochrome mode in 4.2, except that it works for color as well as black.

14. A new Desaturated color correction mode has been added that produces gray (desaturated) output using color inks.

15. A new Density color correction mode has been added that corrects only for density. This will normally produce excessively dark output. However, applications that wish to use their own linearization curves may wish to use this interface to prevent Gutenprint from performing its own linearization.

16. A new Raw color correction mode has been added that performs no correction whatsoever on the input. This mode may be used by applications that wish to perform their own ink limiting and linearization, and use Gutenprint to perform dithering (screening) and output generation only.

17. A new Predithered color correction mode has been added that combines the effects of Raw and Threshold. This mode may be used by applications that wish to perform their own dithering

and use Gutenprint to generate printer-specific output only. The input value should be the size of the drop desired (for single-level printers, it should be 0 or 1; for printers with three drop sizes, it should be 0, 1, 2, or 3).

18. A new Correct Hue Only color correction mode has been added that performs partial color correction (adjusts hue, but not darkness).

19. The `escputil` command, which performs various printer administration activities on Epson Stylus printers, has a number of improvements:

   - A new extended ink information command has been added. This command, which is supported on printers with separate individual ink cartridges, prints additional information about the ink cartridge in addition to the amount of ink present. On older printers, it simply returns the standard ink information.

   - The status command now prints status in a human-readable format rather than simply reporting the raw information returned by the printer.

   - Ink level detection now works on all known supported printers, and may work on other non-supported printers. Previously it did not work on some newer printers.

   - Ink level detection now prints the correct ink color names for the printer model.

   - It is now no longer necessary to use the `-u` flag with certain printers in most cases. The utility now autodetects the printer model and generates appropriate commands in all cases.

     If you supply a printer queue (with the `-P` option) rather than a raw device (with the `-r` option), you will still need to provide the `-u` flag, as the utility cannot detect the actual printer connected to a queue. However, commands that must be run bidirectionally (ink level, identify, and printer status) do not require the `-u` flag any more.

   - `escputil` now successfully detects ink level, printer model, and status even if the printer is out of ink.

20. The Epson driver permits adjusting the dot size if required to increase the amount of ink printed. For example, if 1440x720 DPI is selected, but the density requested is very high, the printer will switch to using drop sizes appropriate for 720 DPI. This option is not normally required and is disabled by default.

6.1.3) Changes to the Enhanced Print Plugin for The GIMP

1. A new plugin for the GIMP 2.x, enhanced with all new Gutenprint 5.0 functionality, is now provided.

2. The Print plugin for the GIMP 1.2 is now deprecated and will be withdrawn in 5.1 (the development release following 5.0). The Print plugin for the GIMP 1.2 will continue to be supported with critical bug fixes in all 5.0 releases, but no new functionality will be added, or non-critical bugs fixed, following the release of 5.0.0.

3. The plugin now always displays the page preview with the top of the page at the top of the preview pane, rotating the image preview as necessary to display landscape or portrait mode.

4. The positioning controls have been simplified.

5. The `printrc` file format is different. Gutenprint 5.0 can read printrc files created by Gimp-Print 4.2 and earlier, but it writes out the printrc file in a format that earlier versions of Gimp-Print cannot read.

6. Printer queue discovery and command specification are greatly simplified over 4.2. The plugin now offers a default printing command that is determined based on the characteristics of the system, and also offers the choice of printing to a file or using a custom print command for each printer defined in the printrc file. The default printing command is correct whether the output is Postscript or not; it is no longer necessary to manually remove `-oraw` from the print command line.

7. The Print plugin now always displays all options relevant to what's being printed, enabling and disabling options as appropriate.

8. The plugin now lists printers grouped by manufacturer, rather than a single long list.

9. If you are using an older version of the GIMP 1.2, and the GIMP is installed in a non-standard location on your system such that you cannot run configure in Gutenprint without using `--with-gimp-prefix` or `--with-gimp-exec-prefix`, please read the Exceptions and Workarounds below. In addition, if you have both the GIMP 2.x and the GIMP 1.2 installed on your system, you should read the same material.

6.1.4) Changes to the CUPS Interface

1. The CUPS PPD files now offer both fine and coarse adjustments for all color controls, permitting much finer control over output (in steps of .005 rather than .05) without making the menus unwieldly.

2. The CUPS driver refuses to function with PPD files created for a different version of Gutenprint or Gimp-Print, providing an error message indicating the problem. This avoids problems caused by mismatches between the PPD files and the driver. While mismatches are potentially not harmful in all cases, they could cause problems ranging from failures to print with poor diagnostic messages to incorrect results.

3. The Gutenprint 5.0 CUPS driver can be installed concurrently with the 4.2 driver. Both the PPD files and the driver carry different names from their 4.2 counterparts, permitting a parallel installation or gradual switchover between 4.2 and 5.0-based releases.

4. An update script (`cups-genppdupdate.5.0`) is provided to update PPD files between later 4.3 and 5.0-based releases, preserving option values where possible. This script will not update PPD files based on Gimp-Print 4.2, or Gimp-Print 4.3 releases prior to 4.3.21.

5. On printers capable of borderless output, the CUPS driver now advertises (via the `*ImageableArea` in PPD files) the full page dimension, and crops the output if the borderless mode is not selected. If borderless mode is selected, the full image (up to the limits of the printer) will be printed.

   This compromise is necessitated by the fact that PPD files can only supply a single imageable area for a particular page size, so it was necessary to select which imageable area to provide. In early prereleases of Gutenprint 5.0, we supplied the normal page area, and stretched the output if the user selected full bleed. This caused problems for many users, in that it was not possible to print the full surface of the paper while preserving dimensions.

Based on user feedback, we determined that the best solution is to provide the full page size as the imageable area and crop the result if full bleed mode is not selected.

6. The CUPS driver now offers 16-bit printing as an option with ESP Ghostscript 8.15, and Apple Macintosh OS X 10.4 ("Tiger"), using the new Color Precision control. Setting Color Precision to "Best" enables 16-bit printing if the system supports it; setting it to "Normal" uses 8-bit printing. Setting Color Precision to "Best" has no effect if the version of CUPS does not support 16-bit printing; in that case, "Best" is still 8-bit.

   The higher precision may improve results with certain source material, particularly if it contains smooth color gradients. The result would be freedom from banding, particularly in highlights where it might be visible with 8-bit color computation. It may be somewhat slower than 8-bit printing.

7. Due to the implementation of CUPS, it is necessary on some systems to link the programs associated with the CUPS driver (in particular, cups-genppd and rastertogutenprint) statically against the Gutenprint library. Please see bugs 865253 and 865265 for full details.

   This fix works correctly unless `--disable-static` (to disable building static libraries) is passed on the command line. Normally, only organizations packaging up Gutenprint for distribution use this option. If you wish to use this option, please read the discussion in Exceptions and Workarounds **carefully** for a full description of the problem along with suggested methods of procedure.

6.1.5) Changes to the Ghostscript Driver

1. The `stp` driver, a monolithic (traditional) Ghostscript driver used with Ghostscript 5.10, 5.50, and 6.51, has been withdrawn. The only supported Ghostscript driver is the IJS-based driver, for GNU Ghostscript 6.53 and above, ESP Ghostscript 7.05 and above, and AFPL Ghostscript 7.04 and above.

   This change was made due to the difficulty of supporting the monolithic driver and the complexity of building it. The traditional monolithic driver architecture required that all drivers be compiled into Ghostscript, requiring that program to be recompiled whenever a driver is added. This is a rather complicated operation that cannot easily be automated. The IJS architecture, based on the open source HPIJS driver supplied by Hewlett-Packard for HP inkjet printers, allows for drivers to be compiled independently of the core Ghostscript. A Gimp-Print/Gutenprint driver based on the IJS architecture was introduced into Gimp-Print 4.2.1 and 4.3.0, and has been recommended for use since Gimp-Print 4.2.2.

   In addition to a greatly simplified build procedure and overall cleaner architecture, the separation between Ghostscript and driver imposed by the IJS architecture permits use of Gutenprint with AFPL Ghostscript with no license conflict.

6.1.6) Changes to Foomatic Data Generation

1. The Ghostscript IJS driver now functions only with Foomatic PPD files created for the matching version of Gutenprint, providing an error message indicating the problem if an incorrect PPD file is used. This avoids problems caused by mismatches between the PPD files and the driver. While mismatches are not harmful in all cases, they could cause problems ranging from failures to print with poor diagnostic messages to incorrect results.

2. The Gutenprint 5.0 Foomatic data and IJS driver can be installed concurrently with the 4.2 driver. Both the PPD files and the driver carry different names from their 4.2 counterparts, permitting a parallel installation or gradual switchover between 4.2 and 5.0-based releases.

3. On printers capable of borderless output, the Foomatic driver now advertises (via the `*ImageableArea` in PPD files) the full page dimension, and crops the output if the borderless mode is not selected. If borderless mode is selected, the full image (up to the limits of the printer) will be printed.

   This compromise is necessitated by the fact that PPD files can only supply a single imageable area for a particular page size, so it was necessary to select which imageable area to provide. In early prereleases of Gutenprint 5.0, we supplied the normal page area, and stretched the output if the user selected full bleed. This caused problems for many users, in that it was not possible to print the full surface of the paper while preserving dimensions.

   Based on user feedback, we determined that the best solution is to provide the full page size as the imageable area and crop the result if full bleed mode is not selected.

6.1.7) Quality Improvements

1. Color and tonal accuracy is greatly improved compared to 4.2 while the gamut (range of printable colors) has been increased. This particularly improves the hue accuracy of red, magenta, and blue, and the tonal accuracy of cyan and green. Most Epson printers have been fully tuned for the new color correction algorithms introduced for this release.

   The default gamma has been changed to produce lighter midtones with all Epson printers.

2. The handling of variable drop sizes and photo inks (6 and 7 color printers) has been completely revised, with the result being that variable drop size printers with photo inks (such as most Epson Stylus Photo and Stylus Pro printers) give much more consistent results with fewer artifacts. In particular, colors match correctly across all resolutions, which was not the case in 4.2.

   In 4.2, variable size drops and light inks were treated the same way; an "effective drop size" based on the relative size of the drops and the darkness of the inks was used to decide what kind of drop to print. While this method has some advantages (it ensures that dark and light inks are never printed at the same place, and also that dark dots are optimally dispersed among light dots), it has some serious disadvantages as well: the properties of a small dark dot and a large light dot are not really the same, particularly when inks are mixed. The combination of different drop sizes being used at different resolutions meant that the transition between light and dark inks differed depending upon the resolution chosen, and if more than one drop size was required at a given resolution, the transition tended to be quite marked.

   The new method of handling variable size drops and light inks is to first separate each of the four channels (cyan, magenta, yellow, and black) into the appropriate light and dark inks, if needed. This separation is performed based on the relative darkness of the different ink sub-colors (such as light and dark cyan) and specific characteristics of the printer, ink type, and paper chosen. Following this, each sub-color is screened separately, and the appropriate combination of drop sizes is chosen.

The drop size selection in this release has also been changed to fill the page with as many small drops as possible before switching to larger drops. This ensures that the largest number of the smallest possible drops is printed, which yields a smoother texture in the midtones.

Finally, new dither algorithms described below allow drops of ink of different colors to be dispersed, avoiding clumping or overprinting of drops.

3. The EvenTone dither algorithm has been extensively reworked in this release, offering many improvements.

First, it has been rewritten to work correctly with variable drop size and photo printers. This algorithm, which offers significant improvements over the standard Adaptive Hybrid algorithm, does not work optimally with variable drop sizes or photo printers in 4.2.

Secondly, a variation called Hybrid EvenTone has been added. This dither algorithm perturbs the dot positions slightly to break up some patterning seen in standard EvenTone dithering in solid regions of pale tones, particularly when printing with black ink only. This very slightly reduces the smoothness of texture in exchange for largely eliminating this undesirable patterning. This algorithm is also expected to be more resistant to microbanding effects.

4. The conversion between black and composite (CMY) gray has been improved in this release, yielding more neutral grays on most printers.

5. Epson printers have been completely retuned, in most cases yielding much better density, more accurate gray scale, and darker black on all paper types.

6.1.8) Architectural Changes

1. Family drivers are now modular. A "family driver" is a collection of printer drivers for one group of printers sharing a common programming architecture, e. g. ESC/P2, PCL, Lexmark, Canon. The drivers can be built as separate modules and loaded at runtime as needed.

2. Color processing is now partially modularized. This architecture will enable us, or others, to provide color management without having to change the internal interfaces within Gutenprint.

3. New composite data types. Gutenprint 5.0 defines additional data types. These types include:

   ● Sequences, curves, and arrays. A sequence is a primitive vector of numbers data type; curves and arrays provide additional capabilities such as interpolation (for curves) and multiple dimensions (for arrays).

   ● Lists are a general ordered container of named objects of arbitrary type. They are used throughout the core library in a variety of ways. The creator of a list can specify constructor, destructor, name comparison, copy, and sort operations on list members.

   ● Parameters, which are part of the options system described below. In addition to storing values and descriptions of the parameter, parameters can be queried to determine defaults and constraints. Parameter lists (which use the list container internally) are also defined as part of this.

   ● String lists are used in various ways; in particular, they are used by the parameter system to inform programs of the available choices of values for string-valued parameters.

4. Complete overhaul of the options system. Rather than offering a fixed set of operations, family drivers, color modules, etc. can now offer a wide variety of options using a predefined set of data types. The data types currently supported are strings picked from a list, floating point numbers, integers, curves, arrays, Boolean (on/off) values, dimensions, and filenames.

    The new options system provides a flexible way for drivers to inform applications of default values and UI hints, the ability to selectively enable and disable options, and a generalized way of verifying legality of option choices.

5. The coordinate system has been changed from bottom left to top left of the page, and the printable area can now extend beyond the edge of the page. The result is a more intuitive coordinate system for driver writers that matches the coordinate system of printers, and the ability to do true full bleed.

6. The specification of color correction, input, and output modes has been completely revised, permitting applications to specify input mode, output mode, channel bit depth, and color correction completely independently. This architecture is also more extensible.

7. Complete overhaul of the black generation in CMYK output. Black generation is now performed in the color code rather than the dither code. This simplifies the dither code, puts the CMYK generation where it should be, and improves overall flexibility.

8. Complete overhaul of the multi-tone (photo or quadtone) ink processing architecture (channels). Instead of being processed as part of the dithering code as in 4.2, where ink drops of lighter inks were assigned virtual values proportional to their darkness as well as their size, this is now processed after the initial color conversion. This has a number of major advantages:

    ● As the actual amount of ink to be printed is visible to the color code, the color code can do ink limiting without fear that the dither code will change the amount of ink to be printed.

    ● It ensures that the same proportions of inks will be printed at any density and resolution. In 4.2, the ramp from light to dark ink varied depending upon the dot sizes available and hence the resolution. This has already been demonstrated to yield much better linearity and much more neutral gray scale with even very modest tuning effort.

    ● It enables use of all drop sizes of all ink tones. In 4.2, we could not use the smallest drop size of dark ink, because the virtual dot size of a small dot of dark ink is typically close to the virtual dot size of a large dot of small ink. This would yield very sharp transition, and perhaps even result in more light ink printed in darker regions than in lighter regions. With channel processing separate from dithering, this concern no longer exists; we can safely use small drops of dark ink, improving smoothness.

    ● It enables the color code to do ink limiting intelligently without concern that the dither code will rearrange things behind its back.

    ● It greatly simplifies the specification of inks. With drop size and darkness orthogonal, family drivers can greatly simplify their tables of inks.

    ● Dither algorithms can choose to ignore smaller drop sizes if they wish to offer fast operation.

    ● Applications with special requirements can now access the raw ink channels directly. This facility was used to create a mechanism to more accurately tune printer inks.

9. The color system can now generate arbitrary ink colors, lifting the CMYK-only restriction in previous versions of the package. This permits full support for the Epson Stylus Photo R800 and R1800, which use red and blue ink in addition to the traditional CMYK.

10. Use of true XML to store data about printers and paper sizes, and to represent new data types (sequences, curves, and arrays). This uses the `mxml` XML library, a fast, lightweight XML parser written by Mike Sweet for this project. Currently, the use of XML (as opposed to compiled-in data) is limited, but we expect that this will change in the future.

11. In addition to parameters, internal components such as family drivers, color drivers, etc. can store arbitrary data in the basic `stp_vars_t` object. This facility is used to simplify the internal driver API; the family driver no longer needs to keep track of dither, color, etc. information itself.

12. The Epson Stylus family driver has been split into more functionally distinct units. The data schema has been considerably improved, and the code itself broken into more easily maintained units.

13. The build system has been updated with a more contemporary toolchain based on autoconf 2.5 and gettext 0.11.

14. The Print plugin for the GIMP has been split into a UI library and the core plugin. The user interface library is a pure GTK-based library; the tiny GIMP plugin is a client of this library.

15. Printer characteristics are exposed to the application level as read-only parameters. This permits the escputil utility to not duplicate information stored in the printer driver.

6.2) Exceptions and Workarounds

6.2.1) General Issues

1. Full bleed mode does not work completely correctly on most Epson printers at present. Typically there is a small margin at the bottom of the page (1-2 mm) and possibly a very small margin at the top. However, it works correctly along the left and right margins. We do not have an estimated time for a fix.

2. The Canon, Hewlett-Packard, and Lexmark drivers do not offer all of the additional options and improvements that the Epson driver does. We do not have an estimated time for fix. Please contact us if you would like to assist with this.

3. Support for the Canon S200 has not yet been ported forward from 4.2.

4. This release is slower than 4.2 in many cases, particularly when using High Accuracy (which is the default color correction in most cases) or Bright color correction. It is possible that this release will not be able to drive some printers at full speed, particularly if your computer has a slow processor. Performance has been only partially analyzed or tuned at present.

5. The user's manual and developer's guide have not been updated for this release.

6.2.2) Build/Installation Issues

6.2.2.1) Incorrect Generation of CUPS PPD Files

With certain versions of CUPS and in certain non-default configurations, if a new version of Gutenprint is installed over an existing version `genppd` will create PPD files based on the older version of Gutenprint rather than the newer version. This will happen if all of the following are true:

    i.   The cups-config provided by the CUPS driver adds `-Wl,rpath=/usr/lib`. This is done by some versions of CUPS reportedly because in some cases the runtime linker does not pick up libraries out of `/usr/lib`. This can be checked by running

        `cups-config --libs --ldflags`

        and inspecting the output for any mention of "rpath", "RPATH", "RUN_PATH", or the like. This is controlled by the CUPS installation on your system.

    ii. There is presently a version of Gutenprint installed in /usr (`--prefix=/usr`) rather than /usr/local or the like. The default location of Gutenprint installation is in /usr/local, but system vendors typically install Gutenprint in /usr.

    iii. Gutenprint is built dynamically only (`--disable-static` or `--disable-static-genppd`). This is not a default, and requires the explicit `--disable-static` or `--disable-static-genppd` on the Gutenprint `configure` command line. Therefore, if you build Gutenprint normally you should not be vulnerable to this problem.

Note that in general if you install CUPS into a non-standard location, and install Gutenprint into the same location, this problem can surface. For example, if you choose to install CUPS in `/usr/local` and Gutenprint in `/usr/local` you are vulnerable to this. However, it is not standard practice to install CUPS anywhere but `/usr`.

In this case, the run path embedded in the genppd executable points to the version of Gutenprint installed in `/usr/lib`. This run path overrides any attempt by libtool to look in the build directory. The result is that `cups-genppd` and `rastertogutenprint` are run against the older version of Gutenprint. If the new version contains additional features (more printers, changes to printer options, etc.) they will not be available.

This bug is difficult to detect in a normal build. It normally does not cause an error to happen during build unless there is an API change from the version installed and the version being built; the only failure is frequently that some PPD files may not be built or may be built with missing options. Due to the PPD version checking introduced in this release, the behavior might manifest itself as a runtime error. It is also possible that there will be no error at all other than the older version of Gutenprint being used, with the result that new features and bug fixes are not available.

If you wish to use only shared libraries, do not wish to build static libraries at all, and are vulnerable to this issue (because `cups-config --ldflags` sets the run path), there are three workarounds available:

i. Build and install Gutenprint into `/usr` (rather than `/usr/local`) and then rebuild Gutenprint from scratch. This will install the correct `libgutenprint.so` in `/usr/lib`, and in the second build `genppd` will be run against the correct library.

ii. Remove the old version of Gutenprint prior to building the new version of Gutenprint. The important files to remove are anything named `/usr/lib/libgutenprint*`.

iii. Edit `cups-config` to remove the reference to the run path.

6.2.2.2) CUPS PPD Files are Not Translated

There is a known translation problem building the PPD files used by the CUPS driver such that on many systems all of the PPD files are in the English language. This causes CUPS tools, such as KUPS or `http://localhost:631` to display many copies of each PPD file, all in the English (en) language. In fact, the PPD files should be translated into many different languages.

The PPD files are created by a program named `cups-genppd.5.0` in the `src/cups` directory. This program is called once for each language, and creates all of the PPD files for the language in one run.

The command `zgrep` can be used to determine if `genppd` is creating the PPD files correctly, as follows:

```
src/cups$ zgrep LanguageVersion ppd/*/pcl-4.ppd.gz
ppd/C/pcl-4.ppd.gz:*LanguageVersion: English
ppd/da/pcl-4.ppd.gz:*LanguageVersion: Danish
ppd/en_GB/pcl-4.ppd.gz:*LanguageVersion: English-GB
...
```

If the PPD file for each language has a different language version, the genppd program operated correctly. If instead the output looks like this:

```
src/cups$ zgrep LanguageVersion ppd/*/stp-pcl-4.5.0.ppd.gz
ppd/C/stp-pcl-4.5.0.ppd.gz:*LanguageVersion: English
ppd/da/stp-pcl-4.5.0.ppd.gz:*LanguageVersion: English
ppd/en_GB/stp-pcl-4.5.0.ppd.gz:*LanguageVersion: English
...
```

the program did not operate correctly.

If you do not have 'zgrep' on your system, you can gunzip the PPD files, and use

```
grep LanguageVersion ppd/*/stp-pcl-4.5.0.ppd
```

to accomplish the same test.

The normal mechanism for performing translations is to set the LANG environment variable to the appropriate language prior to running the program. This normally causes the program to search the translations (normally in `/usr/share/locale` or `/usr/lib/locale`) for the chosen language. When a specially marked string is used, a special macro calls `gettext()` on the string to retrieve the translation, and substitutes the translation for the string in question.

There are two problems with this approach in the context of cups-genppd.5.0. The translation engine is intended to be used after installation, not during build, and this causes problems.

i. At the time `cups-genppd.5.0` is run, the translations have not been installed in the normal system directories. Fortunately, it's possible to tell the translation machinery (via `bindtextdomain`) to look elsewhere for the translation catalogs. What we do is install the catalogs in a temporary directory under `src/cups`, and tell genppd to instruct the translation machinery to look there. This workaround is straightforward, and doesn't normally cause problems.

ii. `LANG` only lets us pick a valid locale (normally determined by listing the directories in `/usr/share/locale` or `/usr/lib/locale`). Unfortunately, while language codes (which form the base of locales) are standard, the actual locale names aren't always. On some systems, the locale names are just the language base names; on others, they are the language names concatenated with country codes (e. g. `en_US`), while on others they are language codes concatenated with character sets. We are not aware of any workaround for this, possibly short of actually running make install and then rebuilding the PPD's. `make install` will install the message catalogs, and that may create the necessary locale directories. This is not exactly a very elegant approach.

The GNU `gettext` library (`libintl.a`) provides another environment variable, `LANGUAGE`, which unconditionally looks up translations according to the language, ignoring `LANG` and the `LC_*` environment variables that are normally used for translation. This library is no longer included with Gutenprint (`--with-included-gettext` will not work). Install the GNU `gettext` package first if you need `libintl.a`. Many systems provide translation machinery in their standard libraries, and it may not always be best to use foreign libraries to replace standard system functionality.

We have chosen to use `LANGUAGE` for this purpose, as the GNU gettext library appears to offer the most reliable translation, and `LANGUAGE` appears to offer the most reliable mechanism. We have actually found that `LANG` and `LC_*` can interfere with `LANGUAGE`, thus we do not use both.

To determine if the translations are working, you must actually inspect the PPD files. You will need to

```
cd src/cups/ppd/sv
gunzip *
more *
```

or the like to determine if this is successful. In particular, look for LanguageVersion, and make sure that it is correct (it should be "Swedish" in the `sv` directory, for example), and also make sure that the paper sizes are also translated. We currently suggest using the Swedish translation for this purpose as it is the most complete.

If packagers find that the PPD files are all in English, rather than translated into the appropriate languages, we suggest the following:

i. Install GNU `gettext` (`libintl.a`). If your system is not based on GNU libc (Linux usually is based on GNU libc; BSD, Solaris, IRIX, etc. are not), you will need this to have any possibility of creating the translated PPD files.

ii. Run `make install` to install the package (including the message catalogs) onto the system first, and then do the following:

```
cd src/cups
rm ppd-stamp
make
```

to rebuild the PPD files. Having the message catalogs on the system may permit this to succeed.

iii. Ensure that your system actually has locales named "sv", "pl", and all of the other supported languages, and change `LANGUAGE` to something more appropriate (most likely `LANG`, `LC_MESSAGES`, or `LC_ALL`).

iv. Build the PPD files on a Linux-based system; they are portable.

v. Use `--disable-translated-cups-ppds` on the configure command line to suppress the translated PPD files altogether.

Please feel free to contact us about this issue.

6.2.2.3) Issues with Building and Installing Foomatic Data

1. Before installing any new release of Gutenprint 5.0, you must manually remove any existing Foomatic option files. This is because the Foomatic utility to load data kits (`foomatic-kitload`) does not remove obsolete data files from the Foomatic database. If you do not do this, any PPD files you generate will be incorrect and printing may work incorrectly or not at all.

   Foomatic option files are usually located in

   ```
   /usr/local/share/foomatic/db/source/opt
   ```

   or

   ```
   /usr/share/foomatic/db/source/opt
   ```

   Assuming they're in the former location, you must remove data files associated with the Gutenprint driver. The command to do this, which must be run as the superuser (root) is

   ```
   cd /usr/local/share/foomatic/db/source/opt
   ls -l gutenprint-ijs*.xml
   ```

   If there are existing files present, you must remove them:

   ```
   rm -f gutenprint-ijs*.xml
   ```

   Now check to make sure that they are gone:

   ```
   ls -l gutenprint-ijs*.xml
   ```

   Caution: Be very careful when typing this command! Minor errors in typing these commands may result in severe damage to your system.

   After this, you may run `make install` in your Gutenprint source directory to install the package. You will then need to re-create any printer queues using Foomatic. In general, you will have to perform this procedure any time you install a new version of Gutenprint. Please check the Foomatic site (http://www.openprinting.org/foomatic.html) and the Gutenprint site (http://gimp-print.sourceforge.net) for updated instructions about this.

2. Unlike with the CUPS native driver, there is no simple way to update all PPD files when you install a new version of Gutenprint. You must either use the `foomatic-ppdfile` command to upgrade PPD files individually, or `foomatic-compiledb` to build all PPD files. Your system may provide an alternate way to install new PPD files, in which case you may use that method.

3. The Foomatic data is version locked to the Gutenprint release installed on the system. For example, PPD files generated with the Foomatic data for release 5.0.0 will not work with the ijsgutenprint in release 5.0.1. This is to prevent accidentally using incorrect data, which could cause incorrect function to take place.

6.2.2.4) Problems Building escputil

There is a known complication building `escputil` that causes problems on some systems. `escputil` uses the `readline` package, to support command editing and history within the program. Unfortunately, linking programs with `readline` often requires linking against additional libraries, and the exact library depends upon the system (e. g. not all Linux systems have the same requirements).

The configure script attempts to determine which additional library must be linked against. It tries using the following libraries in this order to build a test executable:

1. `-lncurses`

2. `-lcurses`

3. `-ltermcap`

4. no additional libraries

The reason it tries other libraries first is that some systems will link successfully, but only fail when an attempt is made to actually call `readline`. Therefore, we assume that additional libraries are required. Since we try the extra libraries in order from most recent to oldest, we expect that the first one we find will be appropriate. For example, if the `ncurses` library is the standard on a given system, the `termcap` library may be provided for back compatibility, but it is unlikely that `termcap` will be the standard with `curses` or `ncurses` being provided for compatibility only (so that the link will succeed but the command will use the incorrect library).

As this procedure is not failsafe, we provide the following configure options to control this behavior:

`./configure --with-readline=yes` (the default; attempts to determine the correct library to link against)

`./configure --with-readline=no` (disables use of readline altogether)

`./configure --with-readline=only` (specifically instructs configure to not attempt to link against any other libraries)

`./configure --with-readline=`*`libs`* (specifies the libraries to be linked against)

A hypothetical (this won't work anywhere!) example of the latter would be

`./configure --with-readline='-lncurses -ltermcap'`

Note that configure will not allow readline to be used if it cannot successfully build the test program, regardless of the option selected. If you are having difficulty getting `escputil` to build, we suggest using `--with-readline=no`. The commands used within `escputil` are very short and seldom require significant editing.

6.2.2.5) Problems Building the Print plugin for the GIMP

The fix for bug 929227 (Gimp-Print incorrectly attempts to build against GIMP 2.0) requires special build instructions if you are using a very old version of the GIMP 1.2 (1.2.0, 1.2.1, or 1.2.2). Specifically, you must set `GIMPTOOL` in the environment to point to the proper version of gimptool when running Gutenprint's configure script. For example:

```
GIMPTOOL=/usr/bin/gimptool ./configure
```

The bug fix involves checking for the presence of the GIMP slightly differently from how it was previously done. Previously, Gimp-Print checked for the presence of a program named "gimptool", which provides information about how to build plugins against the GIMP. This worked correctly when only the GIMP 1.2 was installed, but not when the GIMP 2.0 was installed.

The GIMP 2.0 actually installs a program named "gimptool-2.0", and creates a symbolic link named "gimptool" pointing to it. Later versions of the GIMP 1.2 (1.2.3, 1.2.4, and 1.2.5) similarly create a program named "gimptool-1.2" and a symbolic link named "gimptool". As the configure script prior to this bug fix simply checked for gimptool, it incorrectly detected a gimptool from the GIMP 2.0.

The current configure script checks first for gimptool-1.2 and then for gimptool, and only accepts the use of a GIMP 1.2 version of one of these programs. However, if you have one of the older versions of the GIMP 1.2 installed in a non-standard location, and you use `--with-gimp-prefix` or `--with-gimp-exec-prefix` to specify its location, the configure script will not automatically detect the correct location of gimptool, and you must specify it as described above. Note that you must specify a copy of gimptool from the GIMP 1.2, not from the GIMP 2.0. If your copy of the GIMP is installed in a standard location (typically `/usr/bin` or `/usr/local/bin`), you do not need to use `--with-gimp-prefix` or `--with-gimp-exec-prefix`, and therefore do not need to use this workaround.

If you cannot upgrade to the GIMP 2.x, the Gutenprint and GIMP projects recommend upgrading to revision of the GIMP 1.2.5, which will not require this workaround. This workaround is available in the event that you cannot or do not wish to upgrade your installation of the GIMP.

6.3) Printer-Specific Notes

1. Support for color laser printers (e. g. Color LaserJet printers) is currently black and white only. We do not have a schedule for implementing color support for these printers.

2. The Gutenprint driver does not in all cases offer the same set of resolutions offered by the printer manufacturer's drivers. There are a variety of reasons why that is the case:

i. In some cases, we have not determined the necessary commands to utilize some resolutions (particularly very high resolutions).

ii. In some cases, the advertised printer resolution may not match what we determine to be the maximum resolution based on our understanding of the printer's capabilities. Sometimes the advertised resolution is qualified by a statement that implies that the actual resolution may be different from the stated resolution. In some cases, we may be able to achieve the same number of drops per square inch by means of a different resolution. For example, we may determine that a printer that is advertised to support 5760x720 DPI in fact supports 2880x1440 DPI. This is the same number of droplets per square inch (4147200), but with a different aspect ratio (the ratio of the horizontal resolution to the vertical resolution).

iii. In some cases, we offer additional resolutions not offered by the printer vendor. These resolutions may be either lower or higher than those offered by the printer vendor.

We frequently offer lower resolutions than those offered by the printer vendor to offer a greater choice of printing speed. These resolutions will offer low quality but very fast printing speed for use where the quality is unimportant but speed is of the greatest importance.

In some cases, we offer resolutions higher (or simply different) than those advertised by printer vendors. We will offer these options if testing determines that these resolutions can be used safely and we determine that these resolutions offer a potential benefit in quality in some cases.

It is almost always better to have a printing resolution with a smaller aspect ratio (i. e. the horizontal and vertical resolutions are similar). For example, a resolution of 2880x1440 DPI is likely to yield superior results to a resolution of 5760x720 DPI. Therefore, in some cases we do not offer certain resolutions offered by the printer vendor (in the case of the Epson Stylus Photo R800, 5760x1440 DPI) because they are not likely to yield any benefit (either speed or quality) over another resolution that we offer (in this case, 2880x1440 Highest Quality).

Indeed, we have received reports that in some cases a lower resolution may actually offer improved quality over a higher resolution. For example, the Epson Stylus Photo 780 is reported to yield better quality at 1440x720 DPI Highest Quality than 2880x720 DPI.

We periodically evaluate the list of resolutions we offer to decide whether to offer any additional options.

3. Many Epson printers (specifically, the Epson Stylus Color 740 and all newer printers) will not respond to ASCII text without a special "activation" sequence (specifically, this command takes the printers out of "packet mode"). A brand new printer, or one that has been connected to a Windows system, may or may not work in packet mode. Therefore, the common suggestion to test a printer port by sending plain text to it may not work for these printers; failure to print in this fashion is not a positive indication that the printer or the connection is malfunctioning. These printers are, however, able to print plain text *after* the activation sequence is sent.

A suggestion would be to first verify that the printer is capable of returning ink levels. This may be done via

```
escputil -i -r /dev/lp0
```

(or whatever device your printer is connected to in place of `/dev/lp0`). If this returns status, it demonstrates that the link between your computer and printer is working.

4. It is strongly recommended that four color mode not be used on the Epson Stylus C63, C64, C65, C66, C70, C80, and CX-5200, and the PX-V500 and PX-V600 when printing to glossy papers, as the black ink is formulated differently from the color ink and does not adhere properly to these papers. Epson Photo Paper, Premium Glossy Photo Paper, Premium Luster Photo Paper, and Premium Semigloss Photo Paper are known to be affected. If you use the default settings (specifically, the Standard ink type), this will be handled automatically.

7) List of Supported Printers

The following is the complete list of printers believed to be compatible with Gutenprint, along with the name of the driver. Some of these printers may work only partially; the specified drivers may not support the full range of resolutions, paper sizes, media sources, etc. that some of these printers may offer.

Our practice is to provide preliminary support for printers as soon as we have information sufficient to code a functioning driver, and to release this support even in an otherwise stable release. In this case, we note in the list below that support for a particular printer is "Experimental". It is likely that printers that are supported in "Experimental" mode will produce poor quality at some or all resolutions and in addition may not function correctly at some resolutions. Experimental Epson printers are most likely to produce good output at the highest resolution offered (2880x720, 2880x1440, 2880x2880, or 5760x2880 DPI), since in general these printers will not use multiple drop sizes at such high resolutions.

Note that Gutenprint supports only the printer in multi-function devices — this package does not support scanning, fax, copying, or any other function. For scanning, please see the SANE project (http://www.sane-project.org).

Printer Model	*Driver Name*	*Foomatic Name*	*Notes*
Apollo P-2100	pcl-apollo-p2100	Apollo-P-2100	
Apollo P-2150	pcl-apollo-p2150	Apollo-P-2150	
Apollo P-2200	pcl-apollo-p2200	Apollo-P-2200	
Apollo P-2250	pcl-apollo-p2250	Apollo-P-2250	
Apollo P-2500	pcl-apollo-p2500	Apollo-P-2500	
Apollo P-2550	pcl-apollo-p2550	Apollo-P-2550	
Apollo P-2600	pcl-apollo-p2600	Apollo-P-2600	
Apollo P-2650	pcl-apollo-p2650	Apollo-P-2650	
Apple Color StyleWriter 4100	pcl-apple-4100	Apple-Color_StyleWriter_4100	
Apple Color StyleWriter 4500	pcl-apple-4500	Apple-Color_StyleWriter_4500	
Apple Color StyleWriter 6500	pcl-apple-6500	Apple-Color_StyleWriter_6500	
Apple LaserWriter Select 360	pcl-apple-lw360	Apple-LaserWriter_Select_360	
Brother DCP-1200	brother-dcp-1200	Brother-DCP-1200	
Brother HL-1040	brother-hl-1040	Brother-HL-1040	
Brother HL-1050	brother-hl-1050	Brother-HL-1050	
Brother HL-1060	brother-hl-1060	Brother-HL-1060	
Brother HL-1070	brother-hl-1070	Brother-HL-1070	
Brother HL-10h	brother-hl-10h	Brother-HL-10h	
Brother HL-10V	brother-hl-10v	Brother-HL-10V	
Brother HL-1240	brother-hl-1240	Brother-HL-1240	
Brother HL-1250	brother-hl-1250	Brother-HL-1250	
Brother HL-1260	brother-hl-1260	Brother-HL-1260	
Brother HL-1270N	brother-hl-1270n	Brother-HL-1270N	
Brother HL-1440	brother-hl-1440	Brother-HL-1440	
Brother HL-1660e	brother-hl-1660e	Brother-HL-1660e	
Brother HL-2060	brother-hl-2060	Brother-HL-2060	
Brother HL-4Ve	brother-hl-4ve	Brother-HL-4Ve	
Brother HL-630	brother-hl-630	Brother-HL-630	
Brother HL-660	brother-hl-660	Brother-HL-660	
Brother HL-760	brother-hl-760	Brother-HL-760	
Brother HL-960	brother-hl-960	Brother-HL-960	

Printer Model	Driver Name	Foomatic Name	Notes
Brother MFC-6550MC	brother-mfc-6550mc	Brother-MFC-6550MC	
Brother MFC-8300	brother-mfc-8300	Brother-MFC-8300	
Brother MFC-9500	brother-mfc-9500	Brother-MFC-9500	
Brother MFC-9600	brother-mfc-9600	Brother-MFC-9600	
Canon BJ-30	bjc-30	Canon-BJ-30	
Canon BJC-1000	bjc-1000	Canon-BJC-1000	
Canon BJC-2000	bjc-2000	Canon-BJC-2000	
Canon BJC-2010	bjc-2010	Canon-BJC-2010	
Canon BJC-210	bjc-210	Canon-BJC-210	
Canon BJC-2100	bjc-2100	Canon-BJC-2100	
Canon BJC-2110	bjc-2110	Canon-BJC-2110	
Canon BJC-240	bjc-240	Canon-BJC-240	
Canon BJC-250	bjc-250	Canon-BJC-250	
Canon BJC-3000	bjc-3000	Canon-BJC-3000	
Canon BJC-4000	bjc-4000	Canon-BJC-4000	
Canon BJC-4300	bjc-4300	Canon-BJC-4300	
Canon BJC-4400	bjc-4400	Canon-BJC-4400	
Canon BJC-50	bjc-50	Canon-BJC-50	
Canon BJC-55	bjc-55	Canon-BJC-55	
Canon BJC-6000	bjc-6000	Canon-BJC-6000	
Canon BJC-6100	bjc-6100	Canon-BJC-6100	
Canon BJC-6200	bjc-6200	Canon-BJC-6200	
Canon BJC-6500	bjc-6500	Canon-BJC-6500	
Canon BJC-7000	bjc-7000	Canon-BJC-7000	
Canon BJC-7100	bjc-7100	Canon-BJC-7100	
Canon BJC-80	bjc-80	Canon-BJC-80	
Canon BJC-8200	bjc-8200	Canon-BJC-8200	
Canon BJC-85	bjc-85	Canon-BJC-85	
Canon CP-100	canon-cp100	Canon-CP-100	
Canon CP-200	canon-cp200	Canon-CP-200	
Canon CP-220	canon-cp220	Canon-CP-220	
Canon CP-300	canon-cp300	Canon-CP-300	
Canon CP-330	canon-cp330	Canon-CP-330	
Canon GP 335	canon-gp_335	Canon-GP_335	
Canon imageRunner 330s	canon-ir_330s	Canon-imageRunner_330s	
Canon iP4000	bjc-iP4000	Canon-iP4000	Experimental
Canon LBP-1000	canon-lbp-1000	Canon-LBP-1000	
Canon LBP-1260	canon-lbp-1260	Canon-LBP-1260	
Canon LBP-1760	canon-lbp-1760	Canon-LBP-1760	
Canon LBP-430	canon-lbp-430	Canon-LBP-430	
Canon LBP-4sx	canon-lbp-4sx	Canon-LBP-4sx	
Canon S100	bjc-s100	Canon-S100	
Canon S200	bjc-s200	Canon-S200	Experimental
Canon S300	bjc-s300	Canon-S300	
Canon S400	bjc-s400	Canon-S400	
Canon S450	bjc-s450	Canon-S450	
Canon S4500	bjc-s4500	Canon-S4500	
Canon S500	bjc-s500	Canon-S500	
Canon S600	bjc-s600	Canon-S600	
Canon S630	bjc-s630	Canon-S630	

Printer Model	Driver Name	Foomatic Name	Notes
Canon S800	bjc-s800	Canon-S800	
Canon SELPHY-CP-400	canon-cp400	Canon-SELPHY-CP-400	
Canon SELPHY-CP-500	canon-cp500	Canon-SELPHY-CP-500	
Canon SELPHY-CP-510	canon-cp510	Canon-SELPHY-CP-510	
Canon SELPHY-CP-600	canon-cp600	Canon-SELPHY-CP-600	
Canon SELPHY-CP-710	canon-cp710	Canon-SELPHY-CP-710	
Citizen ProJet II	citizen-projet_ii	Citizen-ProJet_II	
DEC 1800	dec-1800	DEC-1800	
DEC LN17	dec-ln17	DEC-LN17	
Epson ActionLaser 1100	epson-actl_1100	Epson-ActionLaser_1100	
Epson ActionLaser II	epson-actl_ii	Epson-ActionLaser_II	
Epson AcuLaser C2000	epson-acl_c2000	Epson-AcuLaser_C2000	
Epson AcuLaser C2000PS	epson-acl_c2000ps	Epson-AcuLaser_C2000PS	
Epson AcuLaser C8500	epson-acl_c8500	Epson-AcuLaser_C8500	
Epson AcuLaser C8500PS	epson-acl_c8500ps	Epson-AcuLaser_C8500PS	
Epson AcuLaser C8600	epson-acl_c8600	Epson-AcuLaser_C8600	
Epson AcuLaser C8600PS	epson-acl_c8600ps	Epson-AcuLaser_C8600PS	
Epson CL 700	escp2-cl700	Epson-CL_700	
Epson CL 750	escp2-cl750	Epson-CL_750	
Epson CL 760	escp2-cl760	Epson-CL_760	Experimental
Epson E 100	escp2-e100	Epson-E_100	
Epson E 150	escp2-e150	Epson-E_150	
Epson E 200	escp2-e200	Epson-E_200	
Epson EM 900C	escp2-em900c	Epson-EM_900C	
Epson EM 930C	escp2-em930c	Epson-EM_930C	
Epson EPL-5200	epson-epl-5200	Epson-EPL-5200	
Epson EPL-5200+	epson-epl-5200plus	Epson-EPL-5200plus	
Epson EPL-5700	epson-epl-5700	Epson-EPL-5700	
Epson EPL-5700PS	epson-epl-5700ps	Epson-EPL-5700PS	
Epson EPL-5800	epson-epl-5800	Epson-EPL-5800	
Epson EPL-5800PS	epson-epl-5800ps	Epson-EPL-5800PS	
Epson EPL-5900	epson-epl-5900	Epson-EPL-5900	
Epson EPL-5900PS	epson-epl-5900ps	Epson-EPL-5900PS	
Epson EPL-6100	epson-epl-6100	Epson-EPL-6100	
Epson EPL-6100PS	epson-epl-6100ps	Epson-EPL-6100PS	
Epson EPL-7100	epson-epl-7100	Epson-EPL-7100	
Epson MC 10000	escp2-mc10000	Epson-MC_10000	
Epson MC 2000	escp2-mc2000	Epson-MC_2000	
Epson MC 5000	escp2-mc5000	Epson-MC_5000	
Epson MC 7000	escp2-mc7000	Epson-MC_7000	
Epson MC 9000	escp2-mc9000	Epson-MC_9000	
Epson MJ 5100C	escp2-mj5100c	Epson-MJ_5100C	
Epson MJ 6000C	escp2-mj6000c	Epson-MJ_6000C	
Epson MJ 8000C	escp2-mj8000c	Epson-MJ_8000C	
Epson MJ 930C	escp2-mj930c	Epson-MJ_930C	
Epson PictureMate	escp2-picmate	Epson-PictureMate	
Epson PictureMate Deluxe	escp2-picmated	Epson-PictureMate_Deluxe	
Epson PM 10000	escp2-pm10000	Epson-PM_10000	
Epson PM 2000C	escp2-pm2000c	Epson-PM_2000C	
Epson PM 2200C	escp2-pm2200c	Epson-PM_2200C	

Printer Model	Driver Name	Foomatic Name	Notes
Epson PM 3000C	escp2-pm3000c	Epson-PM_3000C	
Epson PM 3300C	escp2-pm3300c	Epson-PM_3300C	
Epson PM 3500C	escp2-pm3500c	Epson-PM_3500C	
Epson PM 3700C	escp2-pm3700c	Epson-PM_3700C	Experimental
Epson PM 4000PX	escp2-pm4000px	Epson-PM_4000PX	
Epson PM 5000C	escp2-pm5000c	Epson-PM_5000C	
Epson PM 7000C	escp2-pm7000c	Epson-PM_7000C	
Epson PM 700C	escp2-pm700c	Epson-PM_700C	
Epson PM 730C	escp2-pm730c	Epson-PM_730C	
Epson PM 740C	escp2-pm740c	Epson-PM_740C	Experimental
Epson PM 750C	escp2-pm750c	Epson-PM_750C	
Epson PM 760C	escp2-pm760c	Epson-PM_760C	
Epson PM 770C	escp2-pm770c	Epson-PM_770C	
Epson PM 780C	escp2-pm780c	Epson-PM_780C	
Epson PM 790PT	escp2-pm790pt	Epson-PM_790PT	
Epson PM 800C	escp2-pm800c	Epson-PM_800C	
Epson PM 850PT	escp2-pm850pt	Epson-PM_850PT	
Epson PM 870C	escp2-pm870c	Epson-PM_870C	Experimental
Epson PM 880C	escp2-pm880c	Epson-PM_880C	
Epson PM 9000C	escp2-pm9000c	Epson-PM_9000C	
Epson PM 930C	escp2-pm930c	Epson-PM_930C	Experimental
Epson PM 940C	escp2-pm940c	Epson-PM_940C	Experimental
Epson PM 950C	escp2-pm950c	Epson-PM_950C	
Epson PM 970C	escp2-pm970c	Epson-PM_970C	Experimental
Epson PM 980C	escp2-pm980c	Epson-PM_980C	Experimental
Epson PM A650	escp2-pma650	Epson-PM_A650	Experimental
Epson PM A750	escp2-pma750	Epson-PM_A750	Experimental
Epson PM A890	escp2-pma890	Epson-PM_A890	Experimental
Epson PM A900	escp2-pma900	Epson-PM_A900	
Epson PM A950	escp2-pma950	Epson-PM_A950	
Epson PM D1000	escp2-pmd1000	Epson-PM_D1000	
Epson PM D600	escp2-pmd600	Epson-PM_D600	Experimental
Epson PM D750	escp2-pmd750	Epson-PM_D750	
Epson PM D770	escp2-pmd770	Epson-PM_D770	
Epson PM D800	escp2-pmd800	Epson-PM_D800	Experimental
Epson PM G700	escp2-pmg700	Epson-PM_G700	
Epson PM G720	escp2-pmg720	Epson-PM_G720	
Epson PM G730	escp2-pmg730	Epson-PM_G730	
Epson PM G800	escp2-pmg800	Epson-PM_G800	Experimental
Epson PM G820	escp2-pmg820	Epson-PM_G820	Experimental
Epson PX 5500	escp2-px5500	Epson-PX_5500	
Epson PX 7000	escp2-px7000	Epson-PX_7000	
Epson PX 9000	escp2-px9000	Epson-PX_9000	
Epson PX A650	escp2-pxa650	Epson-PX_A650	
Epson PX G5000	escp2-pxg5000	Epson-PX_G5000	
Epson PX G900	escp2-pxg900	Epson-PX_G900	
Epson PX G920	escp2-pxg920	Epson-PX_G920	
Epson PX V500	escp2-pxv500	Epson-PX_V500	
Epson PX V600	escp2-pxv600	Epson-PX_V600	
Epson PX V630	escp2-pxv630	Epson-PX_V630	

Printer Model	Driver Name	Foomatic Name	Notes
Epson Stylus C20	escp2-c20	Epson-Stylus_C20	
Epson Stylus C20SX	escp2-c20sx	Epson-Stylus_C20SX	
Epson Stylus C20UX	escp2-c20ux	Epson-Stylus_C20UX	
Epson Stylus C40	escp2-c40	Epson-Stylus_C40	
Epson Stylus C40SX	escp2-c40sx	Epson-Stylus_C40SX	
Epson Stylus C40UX	escp2-c40ux	Epson-Stylus_C40UX	
Epson Stylus C41	escp2-c41	Epson-Stylus_C41	
Epson Stylus C41SX	escp2-c41sx	Epson-Stylus_C41SX	
Epson Stylus C41UX	escp2-c41ux	Epson-Stylus_C41UX	
Epson Stylus C42	escp2-c42	Epson-Stylus_C42	
Epson Stylus C42SX	escp2-c42sx	Epson-Stylus_C42SX	
Epson Stylus C42UX	escp2-c42ux	Epson-Stylus_C42UX	
Epson Stylus C43	escp2-c43	Epson-Stylus_C43	
Epson Stylus C43SX	escp2-c43sx	Epson-Stylus_C43SX	
Epson Stylus C43UX	escp2-c43ux	Epson-Stylus_C43UX	
Epson Stylus C44	escp2-c44	Epson-Stylus_C44	
Epson Stylus C44SX	escp2-c44sx	Epson-Stylus_C44SX	
Epson Stylus C44UX	escp2-c44ux	Epson-Stylus_C44UX	
Epson Stylus C45	escp2-c45	Epson-Stylus_C45	
Epson Stylus C46	escp2-c46	Epson-Stylus_C46	
Epson Stylus C48	escp2-c48	Epson-Stylus_C48	
Epson Stylus C50	escp2-c50	Epson-Stylus_C50	
Epson Stylus C60	escp2-c60	Epson-Stylus_C60	
Epson Stylus C61	escp2-c61	Epson-Stylus_C61	
Epson Stylus C62	escp2-c62	Epson-Stylus_C62	
Epson Stylus C63	escp2-c63	Epson-Stylus_C63	
Epson Stylus C64	escp2-c64	Epson-Stylus_C64	
Epson Stylus C65	escp2-c65	Epson-Stylus_C65	
Epson Stylus C66	escp2-c66	Epson-Stylus_C66	
Epson Stylus C68	escp2-c68	Epson-Stylus_C68	
Epson Stylus C70	escp2-c70	Epson-Stylus_C70	
Epson Stylus C80	escp2-c80	Epson-Stylus_C80	
Epson Stylus C82	escp2-c82	Epson-Stylus_C82	
Epson Stylus C83	escp2-c83	Epson-Stylus_C83	
Epson Stylus C84	escp2-c84	Epson-Stylus_C84	
Epson Stylus C85	escp2-c85	Epson-Stylus_C85	
Epson Stylus C86	escp2-c86	Epson-Stylus_C86	
Epson Stylus C88	escp2-c88	Epson-Stylus_C88	
Epson Stylus Color	escp2	Epson-Stylus_Color	
Epson Stylus Color 1160	escp2-1160	Epson-Stylus_Color_1160	
Epson Stylus Color 1500	escp2-1500	Epson-Stylus_Color_1500	
Epson Stylus Color 1520	escp2-1520	Epson-Stylus_Color_1520	
Epson Stylus Color 3000	escp2-3000	Epson-Stylus_Color_3000	
Epson Stylus Color 400	escp2-400	Epson-Stylus_Color_400	
Epson Stylus Color 440	escp2-440	Epson-Stylus_Color_440	
Epson Stylus Color 460	escp2-460	Epson-Stylus_Color_460	
Epson Stylus Color 480	escp2-480	Epson-Stylus_Color_480	
Epson Stylus Color 500	escp2-500	Epson-Stylus_Color_500	
Epson Stylus Color 580	escp2-580	Epson-Stylus_Color_580	
Epson Stylus Color 600	escp2-600	Epson-Stylus_Color_600	

Printer Model	Driver Name	Foomatic Name	Notes
Epson Stylus Color 640	escp2-640	Epson-Stylus_Color_640	
Epson Stylus Color 660	escp2-660	Epson-Stylus_Color_660	
Epson Stylus Color 670	escp2-670	Epson-Stylus_Color_670	
Epson Stylus Color 680	escp2-680	Epson-Stylus_Color_680	
Epson Stylus Color 740	escp2-740	Epson-Stylus_Color_740	
Epson Stylus Color 760	escp2-760	Epson-Stylus_Color_760	
Epson Stylus Color 777	escp2-777	Epson-Stylus_Color_777	
Epson Stylus Color 8 3	escp2-83	Epson-Stylus_Color_8_3	
Epson Stylus Color 800	escp2-800	Epson-Stylus_Color_800	
Epson Stylus Color 850	escp2-850	Epson-Stylus_Color_850	
Epson Stylus Color 860	escp2-860	Epson-Stylus_Color_860	
Epson Stylus Color 880	escp2-880	Epson-Stylus_Color_880	
Epson Stylus Color 900	escp2-900	Epson-Stylus_Color_900	
Epson Stylus Color 980	escp2-980	Epson-Stylus_Color_980	
Epson Stylus Color I	escp2-i	Epson-Stylus_Color_I	
Epson Stylus Color II	escp2-ii	Epson-Stylus_Color_II	
Epson Stylus Color IIs	escp2-iis	Epson-Stylus_Color_IIs	
Epson Stylus Color PRO	escp2-pro	Epson-Stylus_Color_PRO	
Epson Stylus CX1500	escp2-cx1500	Epson-Stylus_CX1500	
Epson Stylus CX3100	escp2-cx3100	Epson-Stylus_CX3100	
Epson Stylus CX3200	escp2-cx3200	Epson-Stylus_CX3200	
Epson Stylus CX3500	escp2-cx3500	Epson-Stylus_CX3500	
Epson Stylus CX3600	escp2-cx3600	Epson-Stylus_CX3600	
Epson Stylus CX3650	escp2-cx3650	Epson-Stylus_CX3650	
Epson Stylus CX3700	escp2-cx3700	Epson-Stylus_CX3700	
Epson Stylus CX3800	escp2-cx3800	Epson-Stylus_CX3800	
Epson Stylus CX3805	escp2-cx3805	Epson-Stylus_CX3805	
Epson Stylus CX3810	escp2-cx3810	Epson-Stylus_CX3810	
Epson Stylus CX4100	escp2-cx4100	Epson-Stylus_CX4100	
Epson Stylus CX4200	escp2-cx4200	Epson-Stylus_CX4200	
Epson Stylus CX4500	escp2-cx4500	Epson-Stylus_CX4500	
Epson Stylus CX4600	escp2-cx4600	Epson-Stylus_CX4600	
Epson Stylus CX4700	escp2-cx4700	Epson-Stylus_CX4700	
Epson Stylus CX4800	escp2-cx4800	Epson-Stylus_CX4800	
Epson Stylus CX5100	escp2-cx5100	Epson-Stylus_CX5100	
Epson Stylus CX5200	escp2-cx5200	Epson-Stylus_CX5200	
Epson Stylus CX5300	escp2-cx5300	Epson-Stylus_CX5300	
Epson Stylus CX5400	escp2-cx5400	Epson-Stylus_CX5400	
Epson Stylus CX5700	escp2-cx5700	Epson-Stylus_CX5700	
Epson Stylus CX5800	escp2-cx5800	Epson-Stylus_CX5800	
Epson Stylus CX6300	escp2-cx6300	Epson-Stylus_CX6300	
Epson Stylus CX6400	escp2-cx6400	Epson-Stylus_CX6400	
Epson Stylus CX6500	escp2-cx6500	Epson-Stylus_CX6500	
Epson Stylus CX6600	escp2-cx6600	Epson-Stylus_CX6600	
Epson Stylus CX7700	escp2-cx7700	Epson-Stylus_CX7700	
Epson Stylus CX7800	escp2-cx7800	Epson-Stylus_CX7800	
Epson Stylus CX8300	escp2-cx8300	Epson-Stylus_CX8300	
Epson Stylus CX8400	escp2-cx8400	Epson-Stylus_CX8400	
Epson Stylus D68	escp2-d68	Epson-Stylus_D68	
Epson Stylus D88	escp2-d88	Epson-Stylus_D88	

Printer Model	Driver Name	Foomatic Name	Notes
Epson Stylus DX3800	escp2-dx3800	Epson-Stylus_DX3800	
Epson Stylus DX3850	escp2-dx3850	Epson-Stylus_DX3850	
Epson Stylus DX4200	escp2-dx4200	Epson-Stylus_DX4200	
Epson Stylus DX4250	escp2-dx4250	Epson-Stylus_DX4250	
Epson Stylus DX4800	escp2-dx4800	Epson-Stylus_DX4800	
Epson Stylus Photo	escp2-photo	Epson-Stylus_Photo	
Epson Stylus Photo 1200	escp2-1200	Epson-Stylus_Photo_1200	
Epson Stylus Photo 1270	escp2-1270	Epson-Stylus_Photo_1270	
Epson Stylus Photo 1280	escp2-1280	Epson-Stylus_Photo_1280	
Epson Stylus Photo 1290	escp2-1290	Epson-Stylus_Photo_1290	
Epson Stylus Photo 2000P	escp2-2000	Epson-Stylus_Photo_2000P	
Epson Stylus Photo 2100	escp2-2100	Epson-Stylus_Photo_2100	
Epson Stylus Photo 2200	escp2-2200	Epson-Stylus_Photo_2200	
Epson Stylus Photo 700	escp2-700	Epson-Stylus_Photo_700	
Epson Stylus Photo 720	escp2-720	Epson-Stylus_Photo_720	
Epson Stylus Photo 750	escp2-750	Epson-Stylus_Photo_750	
Epson Stylus Photo 780	escp2-780	Epson-Stylus_Photo_780	
Epson Stylus Photo 785	escp2-785	Epson-Stylus_Photo_785	
Epson Stylus Photo 790	escp2-790	Epson-Stylus_Photo_790	
Epson Stylus Photo 810	escp2-810	Epson-Stylus_Photo_810	
Epson Stylus Photo 820	escp2-820	Epson-Stylus_Photo_820	
Epson Stylus Photo 825	escp2-825	Epson-Stylus_Photo_825	
Epson Stylus Photo 830	escp2-830	Epson-Stylus_Photo_830	
Epson Stylus Photo 830U	escp2-830u	Epson-Stylus_Photo_830U	
Epson Stylus Photo 870	escp2-870	Epson-Stylus_Photo_870	
Epson Stylus Photo 875	escp2-875	Epson-Stylus_Photo_875	
Epson Stylus Photo 890	escp2-890	Epson-Stylus_Photo_890	
Epson Stylus Photo 895	escp2-895	Epson-Stylus_Photo_895	
Epson Stylus Photo 900	escp2-ph900	Epson-Stylus_Photo_900	
Epson Stylus Photo 915	escp2-915	Epson-Stylus_Photo_915	
Epson Stylus Photo 925	escp2-925	Epson-Stylus_Photo_925	
Epson Stylus Photo 935	escp2-935	Epson-Stylus_Photo_935	
Epson Stylus Photo 950	escp2-950	Epson-Stylus_Photo_950	
Epson Stylus Photo 960	escp2-960	Epson-Stylus_Photo_960	
Epson Stylus Photo EX	escp2-ex	Epson-Stylus_Photo_EX	
Epson Stylus Photo EX3	escp2-ex3	Epson-Stylus_Photo_EX3	
Epson Stylus Photo R1800	escp2-r1800	Epson-Stylus_Photo_R1800	
Epson Stylus Photo R200	escp2-r200	Epson-Stylus_Photo_R200	
Epson Stylus Photo R210	escp2-r210	Epson-Stylus_Photo_R210	
Epson Stylus Photo R220	escp2-r220	Epson-Stylus_Photo_R220	
Epson Stylus Photo R2400	escp2-r2400	Epson-Stylus_Photo_R2400	
Epson Stylus Photo R300	escp2-r300	Epson-Stylus_Photo_R300	
Epson Stylus Photo R310	escp2-r310	Epson-Stylus_Photo_R310	
Epson Stylus Photo R320	escp2-r320	Epson-Stylus_Photo_R320	
Epson Stylus Photo R340	escp2-r340	Epson-Stylus_Photo_R340	
Epson Stylus Photo R800	escp2-r800	Epson-Stylus_Photo_R800	
Epson Stylus Photo RX400	escp2-rx400	Epson-Stylus_Photo_RX400	
Epson Stylus Photo RX420	escp2-rx420	Epson-Stylus_Photo_RX420	
Epson Stylus Photo RX425	escp2-rx425	Epson-Stylus_Photo_RX425	
Epson Stylus Photo RX430	escp2-rx430	Epson-Stylus_Photo_RX430	

Printer Model	Driver Name	Foomatic Name	Notes
Epson Stylus Photo RX500	escp2-rx500	Epson-Stylus_Photo_RX500	
Epson Stylus Photo RX510	escp2-rx510	Epson-Stylus_Photo_RX510	
Epson Stylus Photo RX600	escp2-rx600	Epson-Stylus_Photo_RX600	
Epson Stylus Photo RX620	escp2-rx620	Epson-Stylus_Photo_RX620	
Epson Stylus Photo RX630	escp2-rx630	Epson-Stylus_Photo_RX630	
Epson Stylus Photo RX700	escp2-rx700	Epson-Stylus_Photo_RX700	
Epson Stylus Pro 10000	escp2-10000	Epson-Stylus_Pro_10000	
Epson Stylus Pro 5000	escp2-5000	Epson-Stylus_Pro_5000	
Epson Stylus Pro 5500	escp2-5500	Epson-Stylus_Pro_5500	
Epson Stylus Pro 7000	escp2-7000	Epson-Stylus_Pro_7000	
Epson Stylus Pro 7500	escp2-7500	Epson-Stylus_Pro_7500	
Epson Stylus Pro 7600	escp2-7600	Epson-Stylus_Pro_7600	
Epson Stylus Pro 9000	escp2-9000	Epson-Stylus_Pro_9000	
Epson Stylus Pro 9500	escp2-9500	Epson-Stylus_Pro_9500	
Epson Stylus Pro 9600	escp2-9600	Epson-Stylus_Pro_9600	
Epson Stylus Pro XL	escp2-pro-xl	Epson-Stylus_Pro_XL	
Epson Stylus Scan 2000	escp2-scan2000	Epson-Stylus_Scan_2000	
Epson Stylus Scan 2500	escp2-scan2500	Epson-Stylus_Scan_2500	
Fujifilm Printpix-CX-400	fujifilm-cx400	Fujifilm-Printpix-CX-400	
Fujifilm Printpix-CX-550	fujifilm-cx550	Fujifilm-Printpix-CX-550	
Fujitsu PrintPartner 10V	fujitsu-pp_10v	Fujitsu-PrintPartner_10V	
Fujitsu PrintPartner 16DV	fujitsu-pp_16dv	Fujitsu-PrintPartner_16DV	
Fujitsu PrintPartner 20W	fujitsu-pp_20w	Fujitsu-PrintPartner_20W	
Fujitsu PrintPartner 8000	fujitsu-pp_8000	Fujitsu-PrintPartner_8000	
Generic PCL 4 Printer	pcl-g_4	Generic-PCL_4_Printer	
Generic PCL 5 Printer	pcl-g_5	Generic-PCL_5_Printer	
Generic PCL 5c Printer	pcl-g_5c	Generic-PCL_5c_Printer	
Generic PCL 5e Printer	pcl-g_5e	Generic-PCL_5e_Printer	
Generic PCL 6/PCL XL Printer	pcl-g_6	Generic-PCL_6_PCL_XL_Printer	
HP Business Inkjet 2200	hp-bij_2200	HP-Business_Inkjet_2200	
HP Business Inkjet 2230	hp-bij_2230	HP-Business_Inkjet_2230	
HP Business Inkjet 2250	hp-bij_2250	HP-Business_Inkjet_2250	
HP Business Inkjet 2250TN	hp-bij_2250tn	HP-Business_Inkjet_2250TN	
HP Business Inkjet 2280	hp-bij_2280	HP-Business_Inkjet_2280	
HP Color Inkjet Printer CP1160	hp-cij_cp1160	HP-Color_Inkjet_Printer_CP1160	
HP Color Inkjet Printer CP1700	hp-cij_cp1700	HP-Color_Inkjet_Printer_CP1700	
HP Color LaserJet 2500	hp-clj_2500	HP-Color_LaserJet_2500	Black and white only
HP Color LaserJet 4500	hp-clj_4500	HP-Color_LaserJet_4500	Black and white only
HP Color LaserJet 4550	hp-clj_4550	HP-Color_LaserJet_4550	Black and white only
HP Color LaserJet 4600	hp-clj_4600	HP-Color_LaserJet_4600	Black and white only
HP Color LaserJet 5	hp-clj_5	HP-Color_LaserJet_5	Black and white only
HP Color LaserJet 5000	hp-clj_5000	HP-Color_LaserJet_5000	Black and white only
HP Color LaserJet 5500	hp-clj_5500	HP-Color_LaserJet_5500	Black and white only
HP Color LaserJet 8550GN	hp-clj_8550gn	HP-Color_LaserJet_8550GN	Black and white only
HP DesignJet 230	pcl-desnj-230	HP-DesignJet_230	
HP DesignJet 2500CP	pcl-desnj-2500	HP-DesignJet_2500CP	
HP DesignJet 250C	pcl-desnj-250	HP-DesignJet_250C	
HP DesignJet 3500CP	pcl-desnj-3500	HP-DesignJet_3500CP	
HP DesignJet 430	pcl-desnj-430	HP-DesignJet_430	
HP DesignJet 450C	pcl-desnj-450	HP-DesignJet_450C	

Printer Model	Driver Name	Foomatic Name	Notes
HP DesignJet 455CA	pcl-desnj-455	HP-DesignJet_455CA	
HP DesignJet 488CA	pcl-desnj-488	HP-DesignJet_488CA	
HP DesignJet 700	pcl-desnj-700	HP-DesignJet_700	
HP DesignJet 750C	pcl-750	HP-DesignJet_750	
HP DesignJet 750C Plus	hp-desnj_750c_plus	HP-DesignJet_750C_Plus	
HP DesignJet ColorPro CAD	hp-desnj_cp_cad	HP-DesignJet_ColorPro_CAD	
HP DeskJet 1100C	pcl-1100	HP-DeskJet_1100C	
HP DeskJet 1120C	pcl-1120	HP-DeskJet_1120C	
HP DeskJet 1125C	hp-dj_1125c	HP-DeskJet_1125C	
HP DeskJet 1200C	pcl-1200	HP-DeskJet_1200C	
HP DeskJet 1220C	pcl-1220	HP-DeskJet_1220C	
HP DeskJet 1600C	pcl-1600	HP-DeskJet_1600C	
HP DeskJet 1600CM	hp-dj_1600cm	HP-DeskJet_1600CM	
HP DeskJet 2000	pcl-2000	HP-2000C	
HP DeskJet 2500	pcl-2500	HP-2500C	
HP DeskJet 2500CM	hp-2500cm	HP-2500CM	
HP DeskJet 340C	pcl-340	HP-DeskJet_340C	
HP DeskJet 3810	hp-dj_3810	HP-DeskJet_3810	
HP DeskJet 3816	hp-dj_3816	HP-DeskJet_3816	
HP DeskJet 3820	hp-dj_3820	HP-DeskJet_3820	
HP DeskJet 3822	hp-dj_3822	HP-DeskJet_3822	
HP DeskJet 400	pcl-400	HP-DeskJet_400	
HP DeskJet 420C	hp-dj_420c	HP-DeskJet_420C	
HP DeskJet 450	hp-dj_450	HP-DeskJet_450	
HP DeskJet 500	pcl-500	HP-DeskJet_500	
HP DeskJet 500C	pcl-501	HP-DeskJet_500C	
HP DeskJet 505J Plus	hp-dj_505j_plus	HP-DeskJet_505J_Plus	
HP DeskJet 510	hp-dj_510	HP-DeskJet_510	
HP DeskJet 520	pcl-520	HP-DeskJet_520	
HP DeskJet 540C	pcl-540	HP-DeskJet_540C	
HP DeskJet 550C	pcl-550	HP-DeskJet_550C	
HP DeskJet 5550	hp-dj_5550	HP-DeskJet_5550	
HP DeskJet 5551	hp-dj_5551	HP-DeskJet_5551	
HP DeskJet 560C	pcl-560	HP-DeskJet_560C	
HP DeskJet 600	pcl-600	HP-DeskJet_600	
HP DeskJet 600C	pcl-601	HP-DeskJet_600C	
HP DeskJet 610C	hp-dj_610c	HP-DeskJet_610C	
HP DeskJet 610CL	hp-dj_610cl	HP-DeskJet_610CL	
HP DeskJet 6122	hp-dj_6122	HP-DeskJet_6122	
HP DeskJet 6127	hp-dj_6127	HP-DeskJet_6127	
HP DeskJet 612C	hp-dj_612c	HP-DeskJet_612C	
HP DeskJet 640C	hp-dj_640c	HP-DeskJet_640C	
HP DeskJet 648C	hp-dj_648c	HP-DeskJet_648C	
HP DeskJet 660C	hp-dj_660c	HP-DeskJet_660C	
HP DeskJet 670C	hp-dj_670c	HP-DeskJet_670C	
HP DeskJet 670TV	hp-dj_670tv	HP-DeskJet_670TV	
HP DeskJet 672C	hp-dj_672c	HP-DeskJet_672C	
HP DeskJet 680C	hp-dj_680c	HP-DeskJet_680C	
HP DeskJet 682C	hp-dj_682c	HP-DeskJet_682C	
HP DeskJet 690C	pcl-690	HP-DeskJet_690C	

Printer Model	Driver Name	Foomatic Name	Notes
HP DeskJet 692C	hp-dj_692c	HP-DeskJet_692C	
HP DeskJet 693C	hp-dj_693c	HP-DeskJet_693C	
HP DeskJet 694C	hp-dj_694c	HP-DeskJet_694C	
HP DeskJet 695C	hp-dj_695c	HP-DeskJet_695C	
HP DeskJet 697C	hp-dj_697c	HP-DeskJet_697C	
HP DeskJet 810C	pcl-810	HP-DeskJet_810C	
HP DeskJet 812C	pcl-812	HP-DeskJet_812C	
HP DeskJet 815C	hp-dj_815c	HP-DeskJet_815C	
HP DeskJet 816C	hp-dj_816c	HP-DeskJet_816C	
HP DeskJet 825C	hp-dj_825c	HP-DeskJet_825C	
HP DeskJet 830C	hp-dj_830c	HP-DeskJet_830C	
HP DeskJet 832C	hp-dj_832c	HP-DeskJet_832C	
HP DeskJet 840C	pcl-840	HP-DeskJet_840C	
HP DeskJet 841C	hp-dj_841c	HP-DeskJet_841C	
HP DeskJet 842C	pcl-842	HP-DeskJet_842C	
HP DeskJet 843C	hp-dj_843c	HP-DeskJet_843C	
HP DeskJet 845C	pcl-845	HP-DeskJet_845C	
HP DeskJet 850C	pcl-850	HP-DeskJet_850C	
HP DeskJet 855C	pcl-855	HP-DeskJet_855C	
HP DeskJet 870C	pcl-870	HP-DeskJet_870C	
HP DeskJet 880C	hp-dj_880c	HP-DeskJet_880C	
HP DeskJet 882C	hp-dj_882c	HP-DeskJet_882C	
HP DeskJet 890C	pcl-890	HP-DeskJet_890C	
HP DeskJet 895C	pcl-895	HP-DeskJet_895C	
HP DeskJet 916C	pcl-900	HP-DeskJet_916C	
HP DeskJet 920C	hp-dj_920c	HP-DeskJet_920C	
HP DeskJet 9300	hp-dj_9300	HP-DeskJet_9300	
HP DeskJet 930C	hp-dj_930c	HP-DeskJet_930C	
HP DeskJet 932C	hp-dj_932c	HP-DeskJet_932C	
HP DeskJet 933C	hp-dj_933c	HP-DeskJet_933C	
HP DeskJet 934C	hp-dj_934c	HP-DeskJet_934C	
HP DeskJet 935C	hp-dj_935c	HP-DeskJet_935C	
HP DeskJet 940C	hp-dj_940c	HP-DeskJet_940C	
HP DeskJet 948C	hp-dj_948c	HP-DeskJet_948C	
HP DeskJet 950C	hp-dj_950c	HP-DeskJet_950C	
HP DeskJet 952C	hp-dj_952c	HP-DeskJet_952C	
HP DeskJet 955C	hp-dj_955c	HP-DeskJet_955C	
HP DeskJet 957C	hp-dj_957c	HP-DeskJet_957C	
HP DeskJet 959C	hp-dj_959c	HP-DeskJet_959C	
HP DeskJet 960C	hp-dj_960c	HP-DeskJet_960C	
HP DeskJet 970C	hp-dj_970c	HP-DeskJet_970C	
HP DeskJet 975C	hp-dj_975c	HP-DeskJet_975C	
HP DeskJet 980C	hp-dj_980c	HP-DeskJet_980C	
HP DeskJet 990C	hp-dj_990c	HP-DeskJet_990C	
HP DeskJet 995C	hp-dj_995c	HP-DeskJet_995C	
HP e-printer e20	hp-e-printer_e20	HP-e-printer_e20	
HP LaserJet 1010	hp-lj_1010	HP-LaserJet_1010	
HP LaserJet 1012	hp-lj_1012	HP-LaserJet_1012	
HP LaserJet 1015	hp-lj_1015	HP-LaserJet_1015	
HP LaserJet 1100	hp-lj_1100	HP-LaserJet_1100	

Printer Model	Driver Name	Foomatic Name	Notes
HP LaserJet 1100A	hp-lj_1100a	HP-LaserJet_1100A	
HP LaserJet 1150	hp-lj_1150	HP-LaserJet_1150	
HP LaserJet 1200	hp-lj_1200	HP-LaserJet_1200	
HP LaserJet 1220	hp-lj_1220	HP-LaserJet_1220	
HP LaserJet 1300	hp-lj_1300	HP-LaserJet_1300	
HP LaserJet 2	pcl-2	HP-LaserJet_2	
HP LaserJet 2100	hp-lj_2100	HP-LaserJet_2100	
HP LaserJet 2100M	hp-lj_2100m	HP-LaserJet_2100M	
HP LaserJet 2200	hp-lj_2200	HP-LaserJet_2200	
HP LaserJet 2300	hp-lj_2300	HP-LaserJet_2300	
HP LaserJet 2D	hp-lj_2d	HP-LaserJet_2D	
HP LaserJet 2P	pcl-2p	HP-LaserJet_2P	
HP LaserJet 2P Plus	hp-lj_2p_plus	HP-LaserJet_2P_Plus	
HP LaserJet 3	pcl-3	HP-LaserJet_3	
HP LaserJet 3200	hp-lj_3200	HP-LaserJet_3200	
HP LaserJet 3200m	hp-lj_3200m	HP-LaserJet_3200m	
HP LaserJet 3200se	hp-lj_3200se	HP-LaserJet_3200se	
HP LaserJet 3300 MFP	hp-lj_3300_mfp	HP-LaserJet_3300_MFP	
HP LaserJet 3310 MFP	hp-lj_3310_mfp	HP-LaserJet_3310_MFP	
HP LaserJet 3320 MFP	hp-lj_3320_mfp	HP-LaserJet_3320_MFP	
HP LaserJet 3320N MFP	hp-lj_3320n_mfp	HP-LaserJet_3320N_MFP	
HP LaserJet 3330 MFP	hp-lj_3330_mfp	HP-LaserJet_3330_MFP	
HP LaserJet 3D	hp-lj_3d	HP-LaserJet_3D	
HP LaserJet 3P w/ PCL5	hp-lj_3p_w_pcl5	HP-LaserJet_3P_w_PCL5	
HP LaserJet 3P w/PS	hp-lj_3p_w_ps	HP-LaserJet_3P_w_PS	
HP LaserJet 4	pcl-4	HP-LaserJet_4	
HP LaserJet 4 Plus	hp-lj_4_plus	HP-LaserJet_4_Plus	
HP LaserJet 4000	hp-lj_4000	HP-LaserJet_4000	
HP LaserJet 4050	hp-lj_4050	HP-LaserJet_4050	
HP LaserJet 4100	hp-lj_4100	HP-LaserJet_4100	
HP LaserJet 4200	hp-lj_4200	HP-LaserJet_4200	
HP LaserJet 4300	hp-lj_4300	HP-LaserJet_4300	
HP LaserJet 4L	pcl-4l	HP-LaserJet_4L	
HP LaserJet 4M	hp-lj_4m	HP-LaserJet_4M	
HP LaserJet 4ML	hp-lj_4ml	HP-LaserJet_4ML	
HP LaserJet 4P	hp-lj_4p	HP-LaserJet_4P	
HP LaserJet 4Si	pcl-4si	HP-LaserJet_4Si	
HP LaserJet 4V	pcl-4v	HP-LaserJet_4V	
HP LaserJet 5	pcl-5	HP-LaserJet_5	
HP LaserJet 5000	hp-lj_5000	HP-LaserJet_5000	
HP LaserJet 5100	hp-lj_5100	HP-LaserJet_5100	
HP LaserJet 5L	hp-lj_5l	HP-LaserJet_5L	
HP LaserJet 5M	hp-lj_5m	HP-LaserJet_5M	
HP LaserJet 5MP	hp-lj_5mp	HP-LaserJet_5MP	
HP LaserJet 5P	hp-lj_5p	HP-LaserJet_5P	
HP LaserJet 5Si	pcl-5si	HP-LaserJet_5Si	
HP LaserJet 6	pcl-6	HP-LaserJet_6	
HP LaserJet 6L	hp-lj_6l	HP-LaserJet_6L	
HP LaserJet 6MP	hp-lj_6mp	HP-LaserJet_6MP	
HP LaserJet 6P	hp-lj_6p	HP-LaserJet_6P	

Printer Model	Driver Name	Foomatic Name	Notes
HP LaserJet 8000	hp-lj_8000	HP-LaserJet_8000	
HP LaserJet 8100	hp-lj_8100	HP-LaserJet_8100	
HP LaserJet 8150	hp-lj_8150	HP-LaserJet_8150	
HP LaserJet 9000	hp-lj_9000	HP-LaserJet_9000	
HP Mopier 240	hp-mopier_240	HP-Mopier_240	
HP Mopier 320	hp-mopier_320	HP-Mopier_320	
HP OfficeJet	hp-oj	HP-OfficeJet	
HP OfficeJet 300	hp-oj_300	HP-OfficeJet_300	
HP OfficeJet 330	hp-oj_330	HP-OfficeJet_330	
HP OfficeJet 350	hp-oj_350	HP-OfficeJet_350	
HP OfficeJet 500	hp-oj_500	HP-OfficeJet_500	
HP OfficeJet 5105	hp-oj_5105	HP-OfficeJet_5105	
HP OfficeJet 5110	hp-oj_5110	HP-OfficeJet_5110	
HP OfficeJet 5110xi	hp-oj_5110xi	HP-OfficeJet_5110xi	
HP OfficeJet 520	hp-oj_520	HP-OfficeJet_520	
HP OfficeJet 570	hp-oj_570	HP-OfficeJet_570	
HP OfficeJet 580	hp-oj_580	HP-OfficeJet_580	
HP OfficeJet 590	hp-oj_590	HP-OfficeJet_590	
HP OfficeJet 600	hp-oj_600	HP-OfficeJet_600	
HP OfficeJet 610	hp-oj_610	HP-OfficeJet_610	
HP OfficeJet 6105	hp-oj_6105	HP-OfficeJet_6105	
HP OfficeJet 6110	hp-oj_6110	HP-OfficeJet_6110	
HP OfficeJet 625	hp-oj_625	HP-OfficeJet_625	
HP OfficeJet 630	hp-oj_630	HP-OfficeJet_630	
HP OfficeJet 635	hp-oj_635	HP-OfficeJet_635	
HP OfficeJet 700	hp-oj_700	HP-OfficeJet_700	
HP OfficeJet 710	hp-oj_710	HP-OfficeJet_710	
HP OfficeJet 7110	hp-oj_7110	HP-OfficeJet_7110	
HP OfficeJet 7130	hp-oj_7130	HP-OfficeJet_7130	
HP OfficeJet 7140	hp-oj_7140	HP-OfficeJet_7140	
HP OfficeJet 720	hp-oj_720	HP-OfficeJet_720	
HP OfficeJet 725	hp-oj_725	HP-OfficeJet_725	
HP OfficeJet D125	hp-oj_d125	HP-OfficeJet_D125	
HP OfficeJet D135	hp-oj_d135	HP-OfficeJet_D135	
HP OfficeJet D145	hp-oj_d145	HP-OfficeJet_D145	
HP OfficeJet D155	hp-oj_d155	HP-OfficeJet_D155	
HP OfficeJet G55	hp-oj_g55	HP-OfficeJet_G55	
HP OfficeJet G85	hp-oj_g85	HP-OfficeJet_G85	
HP OfficeJet G95	hp-oj_g95	HP-OfficeJet_G95	
HP OfficeJet K60	hp-oj_k60	HP-OfficeJet_K60	
HP OfficeJet K60xi	hp-oj_k60xi	HP-OfficeJet_K60xi	
HP OfficeJet K80	hp-oj_k80	HP-OfficeJet_K80	
HP OfficeJet K80xi	hp-oj_k80xi	HP-OfficeJet_K80xi	
HP OfficeJet LX	hp-oj_lx	HP-OfficeJet_LX	
HP OfficeJet Pro 1150C	hp-oj_pro_1150c	HP-OfficeJet_Pro_1150C	
HP OfficeJet Pro 1170C	hp-oj_pro_1170c	HP-OfficeJet_Pro_1170C	
HP OfficeJet Pro 1175C	hp-oj_pro_1175c	HP-OfficeJet_Pro_1175C	
HP OfficeJet R40	hp-oj_r40	HP-OfficeJet_R40	
HP OfficeJet R45	hp-oj_r45	HP-OfficeJet_R45	
HP OfficeJet R60	hp-oj_r60	HP-OfficeJet_R60	

Printer Model	Driver Name	Foomatic Name	Notes
HP OfficeJet R65	hp-oj_r65	HP-OfficeJet_R65	
HP OfficeJet R80	hp-oj_r80	HP-OfficeJet_R80	
HP OfficeJet T45	hp-oj_t45	HP-OfficeJet_T45	
HP OfficeJet T65	hp-oj_t65	HP-OfficeJet_T65	
HP OfficeJet V40	hp-oj_v40	HP-OfficeJet_V40	
HP OfficeJet V40xi	hp-oj_v40xi	HP-OfficeJet_V40xi	
HP PhotoSmart 7150	hp-psc_7150	HP-PhotoSmart_7150	
HP PhotoSmart 7345	hp-psc_7345	HP-PhotoSmart_7345	
HP PhotoSmart 7350	hp-psc_7350	HP-PhotoSmart_7350	
HP PhotoSmart 7550	hp-psc_7550	HP-PhotoSmart_7550	
HP PhotoSmart P100	hp-psc_p100	HP-PhotoSmart_P100	
HP PhotoSmart P1000	pcl-P1000	HP-PhotoSmart_P1000	
HP PhotoSmart P1100	pcl-P1100	HP-PhotoSmart_P1100	
HP PhotoSmart P1115	hp-psc_p1115	HP-PhotoSmart_P1115	
HP PhotoSmart P1215	hp-psc_p1215	HP-PhotoSmart_P1215	
HP PhotoSmart P1218	hp-psc_p1218	HP-PhotoSmart_P1218	
HP PhotoSmart P130	hp-psc_p130	HP-PhotoSmart_P130	
HP PhotoSmart P1315	hp-psc_p1315	HP-PhotoSmart_P1315	
HP PhotoSmart P230	hp-psc_p230	HP-PhotoSmart_P230	
HP PSC 2110	hp-psc_2110	HP-PSC_2110	
HP PSC 2150	hp-psc_2150	HP-PSC_2150	
HP PSC 2210	hp-psc_2210	HP-PSC_2210	
HP PSC 370	hp-psc_370	HP-PSC_370	
HP PSC 380	hp-psc_380	HP-PSC_380	
HP PSC 500	hp-psc_500	HP-PSC_500	
HP PSC 750	hp-psc_750	HP-PSC_750	
HP PSC 950	hp-psc_950	HP-PSC_950	
HP PSC 950xi	hp-psc_950xi	HP-PSC_950xi	
IBM 4019	ibm-4019	IBM-4019	
IBM 4029 030 LaserPrinter 10	ibm-4029_030_lp_10	IBM-4029_030_LaserPrinter_10	
IBM 4312	ibm-4312	IBM-4312	
IBM Infoprint 12	ibm-infoprint_12	IBM-Infoprint_12	
IBM Page Printer 3112	ibm-pp_3112	IBM-Page_Printer_3112	
Infotec 4651 MF	infotec-4651_mf	Infotec-4651_MF	
Kyocera F-1010	kyocera-f-1010	Kyocera-F-1010	
Kyocera FS-1000	kyocera-fs-1000	Kyocera-FS-1000	
Kyocera FS-1000+	kyocera-fs-1000plus	Kyocera-FS-1000plus	
Kyocera FS-1010	kyocera-fs-1010	Kyocera-FS-1010	
Kyocera FS-1050	kyocera-fs-1050	Kyocera-FS-1050	
Kyocera FS-1200	kyocera-fs-1200	Kyocera-FS-1200	
Kyocera FS-1600	kyocera-fs-1600	Kyocera-FS-1600	
Kyocera FS-1600+	kyocera-fs-1600plus	Kyocera-FS-1600plus	
Kyocera FS-1700	kyocera-fs-1700	Kyocera-FS-1700	
Kyocera FS-1700+	kyocera-fs-1700plus	Kyocera-FS-1700plus	
Kyocera FS-1750	kyocera-fs-1750	Kyocera-FS-1750	
Kyocera FS-1800	kyocera-fs-1800	Kyocera-FS-1800	
Kyocera FS-1800+	kyocera-fs-1800plus	Kyocera-FS-1800plus	
Kyocera FS-1900	kyocera-fs-1900	Kyocera-FS-1900	
Kyocera FS-3500	kyocera-fs-3500	Kyocera-FS-3500	
Kyocera FS-3600	kyocera-fs-3600	Kyocera-FS-3600	

Printer Model	Driver Name	Foomatic Name	Notes
Kyocera FS-3600+	kyocera-fs-3600plus	Kyocera-FS-3600plus	
Kyocera FS-3700	kyocera-fs-3700	Kyocera-FS-3700	
Kyocera FS-3700+	kyocera-fs-3700plus	Kyocera-FS-3700plus	
Kyocera FS-3750	kyocera-fs-3750	Kyocera-FS-3750	
Kyocera FS-3800	kyocera-fs-3800	Kyocera-FS-3800	
Kyocera FS-5800C	kyocera-fs-5800c	Kyocera-FS-5800C	
Kyocera FS-5900C	kyocera-fs-5900c	Kyocera-FS-5900C	
Kyocera FS-600	kyocera-fs-600	Kyocera-FS-600	
Kyocera FS-600 (KPDL-2)	kyocera-fs-600_kpdl-2	Kyocera-FS-600_KPDL-2	
Kyocera FS-6500	kyocera-fs-6500	Kyocera-FS-6500	
Kyocera FS-6500+	kyocera-fs-6500plus	Kyocera-FS-6500plus	
Kyocera FS-6700	kyocera-fs-6700	Kyocera-FS-6700	
Kyocera FS-680	kyocera-fs-680	Kyocera-FS-680	
Kyocera FS-7000	kyocera-fs-7000	Kyocera-FS-7000	
Kyocera FS-7000+	kyocera-fs-7000plus	Kyocera-FS-7000plus	
Kyocera FS-800	kyocera-fs-800	Kyocera-FS-800	
Kyocera FS-8000C	kyocera-fs-8000c	Kyocera-FS-8000C	
Kyocera FS-9000	kyocera-fs-9000	Kyocera-FS-9000	
Kyocera FS-9100DN	kyocera-fs-9100dn	Kyocera-FS-9100DN	
Kyocera FS-9500DN	kyocera-fs-9500dn	Kyocera-FS-9500DN	
Kyocera KM-1530	kyocera-km-1530	Kyocera-KM-1530	
Kyocera KM-1810	kyocera-km-1810	Kyocera-KM-1810	
Kyocera KM-2030	kyocera-km-2030	Kyocera-KM-2030	
Kyocera KM-2530	kyocera-km-2530	Kyocera-KM-2530	
Kyocera KM-3530	kyocera-km-3530	Kyocera-KM-3530	
Kyocera KM-4230	kyocera-km-4230	Kyocera-KM-4230	
Kyocera KM-4530	kyocera-km-4530	Kyocera-KM-4530	
Kyocera KM-5230	kyocera-km-5230	Kyocera-KM-5230	
Kyocera KM-5530	kyocera-km-5530	Kyocera-KM-5530	
Kyocera KM-6230	kyocera-km-6230	Kyocera-KM-6230	
Lexmark 4076	lexmark-4076	Lexmark-4076	
Lexmark Optra E	lexmark-optra_e	Lexmark-Optra_E	
Lexmark Optra E+	lexmark-optra_eplus	Lexmark-Optra_Eplus	
Lexmark Valuewriter 300	lexmark-vw_300	Lexmark-Valuewriter_300	
Lexmark Z42	lexmark-z42	Lexmark-Z42	
Lexmark Z43	lexmark-z43	Lexmark-Z43	
Lexmark Z52	lexmark-z52	Lexmark-Z52	
Lexmark Z53	lexmark-z53	Lexmark-Z53	
Minolta PagePro 1100	minolta-pp_1100	Minolta-PagePro_1100	
Minolta PagePro 6	minolta-pp_6	Minolta-PagePro_6	
Minolta PagePro 6e	minolta-pp_6e	Minolta-PagePro_6e	
Minolta PagePro 6ex	minolta-pp_6ex	Minolta-PagePro_6ex	
Minolta PagePro 8	minolta-pp_8	Minolta-PagePro_8	
Minolta PagePro 8L	minolta-pp_8l	Minolta-PagePro_8L	
NEC SuperScript 1260	nec-ssc_1260	NEC-SuperScript_1260	
NEC SuperScript 1400	nec-ssc_1400	NEC-SuperScript_1400	
NEC SuperScript 1800	nec-ssc_1800	NEC-SuperScript_1800	
NEC SuperScript 660i	nec-ssc_660i	NEC-SuperScript_660i	
NEC SuperScript 860	nec-ssc_860	NEC-SuperScript_860	
NEC SuperScript 870	nec-ssc_870	NEC-SuperScript_870	

Printer Model	Driver Name	Foomatic Name	Notes
Okidata Okipage 10e	okidata-okp_10e	Okidata-Okipage_10e	
Okidata Okipage 10ex	okidata-okp_10ex	Okidata-Okipage_10ex	
Okidata Okipage 14ex	okidata-okp_14ex	Okidata-Okipage_14ex	
Okidata Okipage 6e	okidata-okp_6e	Okidata-Okipage_6e	
Okidata Okipage 6ex	okidata-okp_6ex	Okidata-Okipage_6ex	
Okidata Okipage 8p	okidata-okp_8p	Okidata-Okipage_8p	
Okidata OL400	okidata-ol400	Okidata-OL400	
Okidata OL400e	okidata-ol400e	Okidata-OL400e	
Okidata OL400ex	okidata-ol400ex	Okidata-OL400ex	
Okidata OL410e	okidata-ol410e	Okidata-OL410e	
Okidata OL600e	okidata-ol600e	Okidata-OL600e	
Okidata OL610e/S	okidata-ol610e_s	Okidata-OL610e_S	
Okidata OL800	okidata-ol800	Okidata-OL800	
Okidata OL810ex	okidata-ol810ex	Okidata-OL810ex	
Okidata Super 6e	okidata-super_6e	Okidata-Super_6e	
Olivetti JP350S	olivetti-jp350s	Olivetti-JP350S	
Olivetti PG 306	olivetti-pg_306	Olivetti-PG_306	
Olympus P-10	olympus-p10	Olympus-P-10	
Olympus P-11	olympus-p11	Olympus-P-11	
Olympus P-200	olympus-p200	Olympus-P-200	
Olympus P-300	olympus-p300	Olympus-P-300	
Olympus P-300E	olympus-p300e	Olympus-P-300E	
Olympus P-300U	olympus-p300u	Olympus-P-300U	
Olympus P-330E	olympus-p330e	Olympus-P-330E	
Olympus P-330NE	olympus-p330ne	Olympus-P-330NE	
Olympus P-400	olympus-p400	Olympus-P-400	
Olympus P-440	olympus-p440	Olympus-P-440	
Panasonic KX-P4410	panasonic-kx-p4410	Panasonic-KX-P4410	
Panasonic KX-P4450	panasonic-kx-p4450	Panasonic-KX-P4450	
Panasonic KX-P6150	panasonic-kx-p6150	Panasonic-KX-P6150	
Panasonic KX-P6500	panasonic-kx-p6500	Panasonic-KX-P6500	
PCPI 1030	pcpi-1030	PCPI-1030	
Raven LP-410	raven-lp-410	Raven-LP-410	
Ricoh Aficio 220	ricoh-afc_220	Ricoh-Aficio_220	
Ricoh Aficio 401	ricoh-afc_401	Ricoh-Aficio_401	
Ricoh Aficio 700	ricoh-afc_700	Ricoh-Aficio_700	
Samsung ML-4600	samsung-ml-4600	Samsung-ML-4600	
Samsung ML-5000a	samsung-ml-5000a	Samsung-ML-5000a	
Samsung ML-6000	samsung-ml-6000	Samsung-ML-6000	
Samsung ML-6100	samsung-ml-6100	Samsung-ML-6100	
Samsung ML-7000	samsung-ml-7000	Samsung-ML-7000	
Samsung ML-7000N	samsung-ml-7000n	Samsung-ML-7000N	
Samsung ML-7000P	samsung-ml-7000p	Samsung-ML-7000P	
Samsung ML-7050	samsung-ml-7050	Samsung-ML-7050	
Samsung ML-85	samsung-ml-85	Samsung-ML-85	
Samsung QL-5100A	samsung-ql-5100a	Samsung-QL-5100A	
Samsung QL-6050	samsung-ql-6050	Samsung-QL-6050	
Seiko SpeedJET 200	seiko-sj_200	Seiko-SpeedJET_200	
Sharp AR-161	sharp-ar-161	Sharp-AR-161	
Sony IJP-V100	sony-ijp-v100	Sony-IJP-V100	

Printer Model	Driver Name	Foomatic Name	Notes
Sony UP-DP10	sony-updp10	Sony-UP-DP10	Experimental
Sony UP-DR150	sony-updr150	Sony-UP-DR150	Experimental
Star LaserPrinter 8	star-lp_8	Star-LaserPrinter_8	
Star LS-04	star-ls-04	Star-LS-04	
Tally MT908	tally-mt908	Tally-MT908	
Xerox Able 1406	xerox-able_1406	Xerox-Able_1406	
Xerox Document Centre 400	xerox-dc_400	Xerox-Document_Centre_400	
Xerox DocuPrint 4508	xerox-dp_4508	Xerox-DocuPrint_4508	
Xerox DocuPrint C20	xerox-dp_c20	Xerox-DocuPrint_C20	
Xerox DocuPrint N4512	xerox-dp_n4512	Xerox-DocuPrint_N4512	
Xerox DocuPrint N4512PS	xerox-dp_n4512ps	Xerox-DocuPrint_N4512PS	
Xerox DocuPrint P12	xerox-dp_p12	Xerox-DocuPrint_P12	
Xerox DocuPrint P1202	xerox-dp_p1202	Xerox-DocuPrint_P1202	
Xerox DocuPrint P8e	xerox-dp_p8e	Xerox-DocuPrint_P8e	

8) List of Supported Options

This section details the options available in this release of Gutenprint 5.0. More advanced options are subject to change between releases, and existing options may acquire additional choices as new capabilities are added.

These options are not supported by all printers; depending upon the functionality of the driver and printer, different capabilities are available for different printers.

8.1) Printer Options

These options control aspects of printer behavior, including choice of media type, media size, paper feed, and so forth.

8.1.1) Basic Printer Options

These options control basic printer functions.

Printer Model

Select the printer to use. It must always be supplied. When using CUPS or Foomatic, the printer will automatically be selected via the chosen PPD file; with the Print plugin for the GIMP, it is selected in the Setup Printer dialog.

Page Size

Select the paper (media) size to print to. Some printers support custom paper sizes, while others only support certain preset sizes. This must always be supplied.

Note that this option refers to the actual size of the media, not the printable area. For example, selecting A4 refers to actual A4 paper, whatever the margins may be.

Double-Sided Printing

Otherwise known as "duplex" printing, this is offered for printers capable of printing on both sides of the page. In addition to single-sided printing, there are two modes of duplex operation: the page may be flipped over its long edge (like a book), or over the short edge (like a note pad; this is sometimes referred to as Tumble).

This option is new to Gutenprint 5.0.

Media Type

Select the kind of paper or other media being printed to. This enables the printer and driver to be set up appropriately for the kind of paper in use. Most printers offer a choice of supported media types.

It is important to set the Media Type to the correct value if possible, or if not to a closely related medium. The printer may need to know what kind of media is in use to determine how to feed the paper correctly; the driver needs to know in order to select the right output settings.

Media Source

Select the source of the paper or other media. This option is offered with printers that have multiple feeds, for example multiple paper bins, manual feed, printing directly to a CD, etc.

Ink Set

Select the kind of ink in use in the printer, for printers offering different optional inks (for example, ink designed for matte paper vs. ink designed for glossy paper).

This option is new to Gutenprint 5.0.

Borderless

Select whether to print with borders or not, for printers with the capability to print to the edge of the page. This is otherwise known as "full bleed".

This option is new to Gutenprint 5.0.

Resolution

Select the resolution to print at (dots per inch). In general, higher resolutions produce better quality, at the expense of additional time.

As a general rule of thumb, on laser printers and older inkjet printers resolutions of 300 DPI or thereabouts provide draft quality; lower resolutions provide economy draft quality and cannot produce solid black. Resolutions of 600 or 720 DPI produce good quality output; higher resolutions are useful for very high quality image or graphic output. Newer inkjet printers, with smaller ink drop sizes, typically require higher resolutions to produce acceptable output; in some cases even 1440x720 DPI does not produce good quality.

Users of Epson inkjet printers have another setting available: the Quality option can be used to indirectly control the printer resolution, among other things. This offers a simpler way to control output quality.

8.1.2) Advanced Printer Options

These options control less frequently used printer options. All of these options are new to Gutenprint 5.0.

CD Hub Size

This setting may be used on printers with the capability to print directly to a CD. Depending upon your choice of media, you may be able to safely print all the way to the inner hole of the CD, or you may not be able to print any closer than the hub about an inch from the center.

CD Horizontal Fine Adjustment
CD Vertical Fine Adjustment

These settings allow you to shift the position of the print while printing to a CD. If you find that your print is not centered on the CD surface, you may need to adjust these setting to compensate.

Enhanced Gloss

Some newer printers have a cartridge of "gloss enhancer", which helps solve the problem of pigment inks having an inconsistent lustre on glossy paper. Use this option to enable use of the gloss enhancer.

Laminate Pattern

Some dye sublimation printers are able achieve better durability of output by covering it with transparent laminate surface. This surface can be of different patterns: common are matte, glossy or texture.

8.1.3) Specialized Printer Options

These options control unusual printer features. They may be useful in certain circumstances; generally the default settings will work optimally.

Ink Type

Select which subset of inks to use for printing. For example, on a photo printer with additional light cyan and light magenta inks, it's possible to print with only the standard cyan, magenta, yellow, and black inks.

Normally there is no reason to use any setting other than the default. Reasons why one might want to use it include:

1. Some black inks are not compatible with certain glossy papers. If the black ink smudges on your paper, you may elect to use an option without black ink (a "composite" setting).

2. Some inks or paper/ink combinations produce color shifts when the light inks are used. If your chosen combination produces unacceptable color shifts or color casts, you may prefer to use the Four Color Standard option, which will generally yield more consistent color at the expense of "grainier" output.

Printing Direction

Most inkjet printers can print either unidirectionally (the head prints only when moving in one direction) or bidirectionally (the head prints when moving in both directions). Bidirectional printing is generally faster, since the printer is printing at all times rather than wasting much of the time returning the head to the starting position. On many printers, however, unidirectional printing produces better quality output than bidirectional printing.

The standard setting for this option adapts to the printing resolution.

This option is new to Gutenprint 5.0, but Gimp-Print 4.2 offered this option in the form of extra resolution choices.

Interleave Method

Most inkjet printers create the printed image using multiple overlapping passes of the print head. On many printers this function is performed within the printer itself and cannot be adjusted, but with many Epson inkjet printers (and some others), this is performed by the driver

or may be specified to the printer. One advantage of the multiple overlapping passes is that it can hide small differences between the individual print head nozzles, which would otherwise be visible as banding. The different interleave methods are different strategies for for performing this overlapping; some are better at hiding the banding than others. They all require the same amount of time to print.

Generally it is not necessary to adjust this; in some cases, depending upon your printer, you may find that one pattern or another performs better.

On Epson Stylus Pro printers, this option allows specifying different overlap patterns within the printer. In this case, the choice of overlap pattern may affect both the printing time and the quality to a significant degree.

This option is new to Gutenprint 5.0.

Adjust dot size as necessary

This option is provided on many Epson inkjet printers to allow you to use larger ink drops than those normally used for the resolution chosen. This may be necessary if you use certain kinds of media or for some reason wish to use much more ink (higher density) than the default. It should not be necessary to use this option.

This option is new to Gutenprint 5.0.

8.2) Output Controls

These adjustments control how Gutenprint generates output.

8.2.1) Basic Output Controls

Output Type

This option specifies whether to print in color or black and white/grayscale (using only black inks). Black and white printing is generally faster than color printing, even if the item being printed is entirely black and white. However, printing with only black ink may yield a "grainy" appearance.

This option was present in Gutenprint 4.2, but it offered an additional option of "black and white", which printed everything as either black or white (no grayscale). The Gutenprint 5.0 equivalent is to set Color Correction to Threshold.

Color Correction

This selects the choice of color correction method within Gutenprint. The following options are presently offered:

- **Default** Select a color correction mode appropriate for the document type being printed.

- **High Accuracy** Apply optimum color correction to the output to produce the best color quality. This corrects the hue, brightness, and saturation (brilliance of color). This is the normal setting to use for printing photographs or graphics if you are not using any external color management.

- **Bright Colors** Apply color correction to the output, but generate more brilliant colors in some cases.

- **Correct Hue Only** Apply color correction to the output, but correct only the hue. This option does not correct brightness and saturation.

- **Uncorrected** Do not apply any color correction to the output beyond generating linear output. This is the best setting to use when utilizing external color management; the high accuracy modes employ correction algorithms that may not work well with color management.

  Note that if you use color management you should use profiles created with Gutenprint and with the exact settings that you plan to print with. Profiles provided by the printer vendor are calibrated for the vendor's driver, which may not be identical to Gutenprint's calibration. In addition, profiles created using Gimp-Print 4.2 or earlier will generally not perform well with Gutenprint 5.0.

- **Desaturated** Print in pure grayscale, but using color inks. The result is somewhat different from printing in black and white using the Output Type option — the driver may use color ink, which generates smoother output and may yield better results on many papers.

- **Threshold** Convert all colors to fully on or fully off, eliminating all gradual tonal gradations. The result is that the output will consist of all very pure colors.

- **Density** Correct only the amount of ink ("density"), otherwise performing no correction at all, even for linearity. Prints made with this option will usually be very dark if no other color management is used. This may be useful if you are printing in 16 bit precision or are using your own linearization curves.

- **Raw** Perform no correction at all, even for density. Prints made with this option will be very dark and may bleed (or even puddle!) ink if not used with external color management and linearization. This option may be useful if you are using external color management and linearization to get extremely saturated dark colors by using more ink in individual channels. It should be used with extreme caution, as it is very easy to damage the printer if you are not careful.

- **Pre-Dithered** Interpret each pixel as the actual size of each drop to be printed. Legal values of the drop sizes differ between printers; all printers support 0 (no droplet) and 1 (the largest droplet). Some printers support four levels (0, 1, 2, and 3).

This option is new to Gutenprint 5.0, but its function was partially encompassed by the Image Type option.

Image Type

Specify the option that best describes your print job. Your choice here will affect the processing of the print job. Currently available settings are:

- **Text** Optimize the output for printing black text with no graphics. This option results in crisp output and is very fast, but will yield very poor results with any color or grayscale graphics.

- **Graphics** Optimize the output for printing color graphics. This option will generate smooth, bright output.

- **Mixed Text and Graphics** Optimize the output for printing a mixture of text and graphics.

- **Photograph** Optimize the output for printing photographs. This option will generate smooth tones and high quality colors, but will be slower than the other options.

- **Line Art** Optimize the output for printing black and white line art with intricate detail.

- **Manual Control** Do not bias the output at all; use only the settings specified by the user.

This option was present in Gimp-Print 4.2, but with fewer choices and more restrictions on their use. Its functioned more like the Color Correction option in Gutenprint 5.0.

Print Quality

Specify the desired output quality using convenient presets. Where this option is available, Gutenprint will automatically adjust the printing resolution and other options to generate the desired quality. Settings chosen with this option may be overridden by explicitly setting other settings, such as resolution. Not all printers offer all of these options. Currently available settings, in increasing order of quality, include:

- **Fast Economy** Use the fastest printing mode available on the printer to print with a minimum amount of ink. This option will produce very washed out colors and grays, and will typically be extremely grainy and streaky.

- **Economy** Print very rapidly with a reduced amount of ink. This option will produce washed out colors and grays and will typically be quite grainy and streaky.

- **Draft** Print low quality draft output quickly. This option will typically produce acceptable colors with some amount of grain on plain paper, but will typically produce washed out and grainy output on high quality papers. On some printers this may employ a special draft mode to print especially quickly at the expense of color fidelity.

- **Standard** Print at a normal quality level for text or text/graphics on plain paper or basic inkjet paper. This option will typically produce acceptable colors, but on high quality papers the output may be grainy or somewhat washed out. This option may also be useful for printing draft copies of photographs on coated inkjet paper.

- **High** Print final copies of text or text/graphics on plain paper or inkjet paper. This option will typically produce good color quality, but the quality may not be optimal for photographs on glossy paper. This option may also be useful for printing draft copies of photographs on glossy paper.

- **Photo** Print photographs on glossy paper or very high quality text, text/graphics, or line art on high quality paper. In the latter application this will produce output close to laser printer quality. On the highest quality premium papers the result may still be a bit grainy.

- **Super Photo** Print photographs on glossy paper with very high quality. This will generally yield very good results on high quality premium paper but may be overkill on

other papers. This option is only offered on printers capable of producing very high quality output rivaling traditional photographic printing. This option may also be appropriate for very intricate line art, where the required resolution may exceed the capabilities of laser printers.

- **Ultra Photo** Print photographs on premium papers with extremely high quality. This option is only offered on printers capable of producing extremely high quality output matching or exceeding traditional photographic printing.

- **Best** Print with the best quality available on the printer for the application chosen. This may be equivalent to one of the other settings; on a very few printers the resolution may exceed that of Ultra Photo mode.

- **Manual Control** Do not adjust the settings at all; use only the settings specified by the user.

This option is new to Gutenprint 5.0.

8.2.2) Basic Output Adjustments

Saturation

This option controls the vividness of the output color; higher values produce more vivid colors. Very low values produce muted colors; setting this to zero produces gray.

Contrast

This controls the contrast of the output. Lower values produce less tonal range in the midtones (lighter colors become darker, and darker colors become lighter), which may allow for more definition in the highlights and shadows. Higher values do the opposite: lighter colors become even lighter, while darker colors become even darker.

This option behaves differently from its equivalent in Gimp-Print 4.2. In Gimp-Print 4.2, setting contrast less than 1 changed the white point and black point: white became light gray and black became dark gray. In Gutenprint 5.0 this control changes the shape of the curve, but the black and white points remain the same. The Linear Contrast Adjustment option described below restores the Gimp-Print 4.2 behavior.

Brightness

This control adjusts the general brightness of the print; higher values produce generally lighter output, while lower values produce generally darker output. White and black are not changed; colors also retain their hue and saturation.

This option behaves differently from its equivalent in Gimp-Print 4.2. In Gimp-Print 4.2, setting brightness greater than 1 caused black to print as gray, while setting brightness to less than 1 caused white to print as gray. In Gutenprint 5.0 this control changes the shape of the curve, but the black and white points remain the same.

8.2.3) Advanced Output Adjustments

These controls adjust more specialized settings.

Dither Algorithm

Since inkjet printers have a limited set of ink colors (normally cyan, magenta, yellow, and black), most colors have to be produced by mixing the available inks. This is done by printing patterns of very small dots, fooling the eye into seeing many different shades. This process is called "dithering"; several different patterns are available, with trade-offs between speed and quality. The following dither algorithms are currently available. If no algorithm is selected, the driver chooses an appropriate one based on other option settings. The following algorithms are currently available, generally in increasing order of quality.

- **Very Fast** This algorithm produces very rough, patterned output, but is extremely fast. This generally yields poor results on modern inkjet printers, particularly models that offer multiple drop sizes, but it can yield very good results on laser printers. It is a good choice for printing text or line art where no grayscale or color is used, and also works very well when Threshold color correction is used.

- **Fast** This algorithm also produces output with very strong diagonal patterns, and is also quite fast. It produces somewhat better results on modern inkjet printers that offer multiple drop sizes, but offers no advantages on laser printers or old (generally pre-1999) inkjet printers.

- **Ordered** This algorithm produces much smoother output than Fast or Very Fast. It is somewhat slower than those algorithms. It utilizes a fixed pattern that is generally free of artifacts, but it has some noise (roughness of texture) that may be objectionable with smooth-toned images. It is an excellent choice for printing draft copies of business graphics or photographs (charts, etc.) due to its lack of artifacts.

- **Adaptive Hybrid** This algorithm produces slightly smoother output than Ordered dithering, at some cost in performance. It uses a fixed pattern in highlights to avoid artifacts, and error diffusion at higher densities to reduce noise. It is an excellent choice for printing business graphics due to its lack of artifacts and smooth texture in darker tones.

- **EvenTone** This relatively new algorithm yields excellent smoothness in all tones (light, midtone, and shadow), but is considerably slower than most of the other algorithms. It is somewhat prone to artifacts, including "tearing", at sharp boundaries. This algorithm is well-suited for printing photographs, but is not as suitable for printing solid-tone graphics.

- **Hybrid EvenTone** This algorithm combines Even Tone and Ordered dithering to yield smooth results with fewer artifacts than Even Tone dithering, but is even slower than standard Even Tone. It uses the fixed pattern of Ordered dithering to break up the artifacts of Even Tone dithering. The result is not quite as smooth as pure Even Tone, but the reduction of artifacts makes this an excellent choice for photographs or photographs mixed with other graphics.

- **Predithered** This is used in combination with dithering performed outside of Gutenprint or with printers that perform their own dithering. It assumes that the output is already dithered and generates the appropriate drops based only on the values provided.

Linear Contrast Adjustment

The standard contrast control does not adjust the black and white points of the output; black in the input becomes black in the output, for example. The result is that if contrast is reduced below 1, the contrast in the highlights and shadows is actually increased to keep the same total tonal range.

Gimp-Print 4.2 used a different kind of contrast control. In Gimp-Print 4.2, reducing the contrast reduced the contrast throughout the tonal range, resulting in white being printed as a light gray and black as a dark gray (reducing the contrast all the way to zero resulted in a uniform gray). If contrast was increased, the contrast was stretched until the output reached either black or white; anything lighter always printed as white and anything darker as black.

Turning this control on selects the old Gimp-Print 4.2 behavior. This control is normally turned off.

8.2.4) Output Density (Ink Quantity) Controls

These controls adjust the amount of ink printed on the page. These controls may be used to darken a solid, pure black, or eliminate puddling (wet ink left on the paper that does not dry in the printer) if needed. They may also be useful for adjusting the behavior of non-standard inks. They should not be used to lighten or darken the print if the black level is correct.

These controls are adjustments — they adjust the amount of ink relative to the amount selected by the driver for the paper and resolution chosen.

Density Value

This control adjusts the total amount of ink used in all channels (ink colors).

Black Density Value
Blue Density Value
Cyan Density Value
Magenta Density Value
Yellow Density Value
Red Density Value

These controls adjust the amount of ink used by each channel separately. They may be used to correct the amount of ink if needed to strengthen or weaken particular colors (e. g. if yellow is too strong or too weak). They should not be used to correct gray balance (to produce neutral gray) — the gray balance controls described below should be used for that purpose.

These options are new to Gutenprint 5.0.

Ink Limit Value

This control adjusts the maximum amount of ink that the driver will use to print with. This may be used if you want to use large amounts of particular inks to achieve saturated dark colors,

without using excessive ink overall that will result in ink puddling or spilling within the printer. This control should be used only by people very experienced in inkjet printing.

This option is new to Gutenprint 5.0.

8.2.5) Gray Balance Controls

These controls adjust the gray balance by changing the amount of each color of ink used to produce gray. For example, if gray prints somewhat greenish, it can be corrected by increasing the magenta balance. These options are new to Gutenprint 5.0.

Magenta Balance Value
Yellow Balance Value
Cyan Balance Value

8.2.6) Output Gamma Controls

These controls permit adjusting the gamma (exponent) of the transfer curves of the individual channels. On most printers, using a linear ink scale (that is, the amount of ink is directly proportional to the input value) will produce very dark highlights, as even quite small amounts of ink produce very strong colors or gray. Therefore, the driver uses less ink to produce lighter colors. This does not affect the darkest tones.

Setting these controls to larger values results in lighter highlights and midtones and increase contrast in the dark tones, while lower values result in darker midtones and highlights with reduced dark tone contrast. These controls are adjustments — they adjust the gamma relative to the gamma chosen by the driver by multiplying them together. For example, if the driver uses a gamma value of 2.0 for a particular printer, and you specify a gamma of 0.75, the actual gamma used to print will be 1.5.

Composite Gamma Value

This control adjusts the gamma of all available ink channels when printing in color. This option is equivalent to the Gamma option in Gimp-Print 4.2.

Black Gamma Value

This control adjusts the gamma of the black channel when printing in grayscale. This option is new to Gutenprint 5.0.

Cyan Gamma Value
Magenta Gamma Value
Yellow Gamma Value

These controls adjust the gamma of individual channels when printing on printers that use cyan, magenta, and yellow inks (all inkjet printers use CMY inks). These gamma values are multiplied by the composite gamma value and the gamma chosen by the driver.

Note that the black gamma value is not used when printing in color. That is because the amount of gray is computed after the gamma transformation has been applied to each channel, and the black channel is synthesized from this value. The GCR Transition Value serves as a gamma

value for the black channel. In addition, there are no gamma values for the special channels for printers that offer additional inks (such as red and blue) for similar reasons.

These controls are equivalent to the Cyan, Magenta, and Yellow controls in Gimp-Print 4.2.

Red Gamma Value
Green Gamma Value
Blue Gamma Value

These controls adjust the gamma of individual channels when printing on printers that use red, green, and blue inks (Postscript printers and many dye sublimation printers use red, green, and blue colors). These gamma values are multiplied by the composite gamma value and the gamma chosen by the driver.

These options are new to Gutenprint 5.0; Gimp-Print 4.2 referred to them as Cyan, Magenta, and Yellow even if the output was RGB.

8.3) *Specialized Adjustments*

These adjustments control highly specialized output behavior, and are intended for advanced users only.

8.3.1) Gray Generation Controls

These controls adjust the conversion of gray into black ink and composite (CMY) components. When printing in color, light grays are often printed using composite inks rather than black ink to reduce the speckling effect of dark black dots, while dark grays and black are usually printed using black ink to achieve a darker black. With some ink and paper combinations it is necessary to use a mixture of black and composite components to achieve maximum density and in some cases to achieve neutral grays (some pigment black inks are actually brown).

The effect of using too much or too little black ink varies. Typically if too much black ink is used light colors and grays will have noticeable speckling from the black drops, while if too little black ink is used the midtones and dark tones will be washed out and in some cases too much ink will be used leading to puddles on the page. In some cases very large amounts of composite ink cause color shifts (darker grays are not neutral). Epson Premium Glossy Photo Paper seems to be particularly prone to this problem, particularly with dye inks.

In general, lower-quality papers require more black ink (composite inks generally cannot create very dark tones), while higher quality papers require less black ink (the composite inks can create much darker grays, and the black dots appear much sharper).

Setting these controls effectively requires a good understanding of gray generation and a fair amount of experimentation. Normally it's only necessary to set the paper type correctly to get good results.

These options are all new to Gutenprint 5.0.

GCR Lower Bound Value

This control specifies the darkest shade of gray at which no black ink will be used (i. e. any lighter gray component will be printed using only composite inks). Setting this control to zero

means that some amount of black ink will always be used; setting it to 1 means that no black ink will ever be used.

GCR Upper Bound Value

This control specifies the lightest shade of gray at which no composite CMY ink will be used (i. e. this level of gray and higher will be printed using only black ink). This control should never be set any lower than the GCR Lower Bound Value. Setting this control to zero means that only black ink is used to print any gray value; setting this control to a value greater than one means that some composite ink will be used even when printing black. The upper limit for this control is 5 (in which case black will be printed with no more than 20% black ink).

If you use an ink set requiring use of color inks to produce neutral grayscale, you should set the GCR Lower Bound Value to zero or a value very close to zero and the GCR Upper Bound Value should be greater than 1, along with a GCR Transition Value (below) of 1. This will ensure that the proportion of black and color inks will be close to constant throughout the gray range. With this kind of inkset, it's often possible to produce cool or warm toned grayscale prints by selecting Desaturated color correction and adjusting the GCR Upper Bound Value appropriately. For example, if the black ink has a brown (warm) cast, increasing the GCR Upper Bound Value will yield a cooler tone (less black ink) while decreasing it will yield a warmer tone (more black ink).

GCR Transition Value

This control specifies the gamma of the GCR transition curve. Setting this control to a smaller value results in less black ink being used in the lighter portion of the transition region. This control is useful if the black ink is much darker than the composite inks in order to produce a smoother transition.

GCR Curve

This control (only available through the Print plugin for the GIMP or other Gutenprint-based applications that provide curve capability) allows you to specify the conversion curve from gray to black/composite precisely. The horizontal axis of this curve represents the gray level (between 0, or no gray at all, and 1, or pure black); the vertical axis represents the fraction of gray that is converted to black (0 means only composite inks, and 1 means only black ink).

8.3.2) Output Linearization Controls

These controls permit adjusting the transfer (linearization) curves of each channel precisely. They are only available through the Print plugin for the GIMP or other Gutenprint-based applications that provide curve capability. All of these controls are considered to be for very advanced use only. These options are all new to Gutenprint 5.0.

Black Curve
Blue Curve
Cyan Curve
Magenta Curve
Yellow Curve
Red Curve
Green Curve

8.3.3) Advanced Color Correction Curves

These controls permit adjusting precise characteristics of color generation/correction. They are only available through the Print plugin for the GIMP or other Gutenprint-based applications that provide curve capability. All of these controls are considered to be for very advanced use only.

The horizontal axis of all of these curves represents the hue of the output. Hue is measured as an angle, where 0 and 360 degrees represent cyan (or red, if the output inks are RGB). Conventionally, these angles are represented as a number between 0 and 6 (each full number in this scale represents 60 degrees). The specific hue angles for CMY and RGB outputs are as follows:

	Ink Type	
Angle	*RGB*	*CMY*
0	Red	Cyan
1	Yellow	Blue
2	Green	Magenta
3	Cyan	Red
4	Blue	Yellow
5	Magenta	Green
6	Red	Cyan

These options are all new to Gutenprint 5.0.

Hue Adjustment Curve
Luminosity Adjustment Curve
Saturation Adjustment Curve

These controls adjust the color correction in High Accuracy, Bright Colors, and Correct Hue Only color correction modes. These color correction modes work by adjusting the hue, saturation, and luminosity (HSL) of the output inks to achieve a more accurate color than the color created by simply converting the red, green, and blue inputs to cyan, magenta, and yellow (or red, green, and blue) inks. Note that in this printing context luminosity represents darkness (amount of light subtracted) rather than brightness.

The saturation and hue adjustments are first applied. The luminosity correction operates on only the color component of the output. Before this correction is applied, any gray value is removed, and added back after the correction is completed.

The vertical axis of the Hue Adjustment Curve represents an angular difference that is added to the base hue value to generate the desired output. For example, if the blue output is purple (too

close to magenta), adding a negative value to that range of the output will bring the blue value more toward cyan (less magenta).

The vertical axis of the Saturation Adjustment Curve represents an amount by which the saturation is multiplied. At any given hue point it may take on any value between 0 (eliminate all color saturation, which is equivalent to converting to pure gray) and 4 (dramatically boost the saturation). Therefore, this adjustment may be used to tone down excessively brilliant colors (e. g. if the reds are overly brilliant) or brighten up dull colors (e. g. if the greens are somewhat dull). This control has no effect if Correct Hue Only is used. If the saturation value is greater than 1, the effect differs depending upon whether High Accuracy or Bright Colors mode is selected: if Bright Colors is selected, the saturation is simply multiplied by the desired value and then set to 1 if it would exceed unity. If High Accuracy mode is selected, the amount of saturation boost is decreased if the starting saturation is high.

The vertical axis of the Luminosity Adjustment Curve represents an amount by which the luminosity is multiplied. At any given hue point it may take on any value between 0 (remove the color component altogether) and 1 (leave it as is). Therefore, the function of the Luminosity Adjustment Curve is to lighten excessively dark colors rather than to darken light colors. This control has no effect if Correct Hue Only mode is used.

Blue Map
Cyan Map
Magenta Map
Yellow Map
Red Map

These curves control how the auxiliary red and blue inks are used on the Epson Stylus Photo R800, Stylus Photo R1800, and PictureMate family of printers. These printers use auxiliary inks to achieve more brilliance in the red and blue. Other printers in the future may use other auxiliary channels, which will be made available in similar fashion.

The vertical axis of each of these controls specifies the amount of each ink that should be used to print colors of that hue. These curves are used only to generate color; any gray component is removed prior to the color generation and added back later. For example, it is possible to specify that a certain shade of purple is printed using .2 red ink, .6 magenta ink, and .5 blue ink (hypothetically).

8.3.4) Transition Controls

These controls adjust the level at which light inks (such as the light cyan and magenta inks used on many "photo printers") are used in place of the dark inks. The light inks are used to produce a smoother texture (less speckling); the light cyan droplets, for example, are individually much less visible than the normal dark cyan droplets.

Dark Yellow Transition Value
Light Gray Transition Value
Mid Gray Transition Value
Dark Gray Transition Value
Gray Transition Value
Light Cyan Transition Value
Light Magenta Transition Value
Light Yellow Transition Value

The ink substitution works by replacing a certain amount of ink by a mixture of the light and dark inks. For example, the dark cyan ink may be about 3 times as dark as the light cyan ink, so in light areas the cyan may be replaced by 3 times as much light cyan. However, this only works up to a certain point; beyond that point, adding more light ink does not significantly increase the darkness of the ink. These transition values adjust the limits at which the ink substitution is done; the lower these limits are set, the lighter the output at which dark ink is introduced. Setting these values lower will generally yield more accurate midtone colors at the expense of more speckling in the light midtones and highlights. Generally these values need to be lower on low-quality paper than on high quality glossy paper.

These options are all new to Gutenprint 5.0.

8.3.5) Miscellaneous Output Controls

These controls are used to modify the output in very printer-specific ways. These options are all new to Gutenprint 5.0.

Gloss Level Value

This control is provided on printers such as the Epson Stylus Photo R800 and R1800 that offer a special gloss enhancer to produce an even degree of gloss on glossy papers regardless of the amount of ink used. On certain glossy papers, areas with high ink coverage are a lot glossier than areas with little ink coverage (highlights); the gloss enhancer is basically a transparent ink that increases the gloss of these areas. This control specifies the desired total amount of ink to be printed, including both the normal color and black inks and the gloss enhancer. If the amount of normal inks is less than this amount, gloss enhancer is used to increase the total amount of ink used.

8.4) Foomatic-Only Options

These controls are available only when using the Foomatic interface.

Output Type

Specify how to print. The following options are available:

- **Color** Print in color

- **Gray Scale** Print in grayscale (black and white, with gray)

- **Black and White** Print in pure black and white only (no tonal gradations)

- **Raw CMYK** Send CMYK data to Gutenprint. Normally you should use Color.

Printout Mode

Specify the desired printout mode. Printout mode is a combination of desired quality and grayscale or color.

In addition, many numeric options have a corresponding "Enable" option. The Enable option controls whether the option value will actually be used or not. If you wish to set the value of a numeric option, determine whether there is a corresponding "Enable" option; if you do not set the Enable option, the value will be ignored.

8.5) CUPS-Only Options

These controls are available only when using the CUPS interface to Gutenprint. They control CUPS-specific behavior.

Color Model

Select the desired color model in which to send data to Gutenprint. The following options are available:

- **Grayscale** Send gray data to Gutenprint. This is the normal choice when printing in black and white.

- **RGB Color** Send RGB (red/green/blue) data to Gutenprint. This is the normal choice when printing in color. While most color printers are actually CMYK devices, it is normally best to send RGB color to Gutenprint to allow Gutenprint to most effectively determine the CMYK output.

- **CMYK** Send CMYK (cyan/magenta/yellow/black) data to Gutenprint. This is useful if you have generated CMYK output based on your own knowledge of the printer or a CMYK output profile, otherwise it will yield inferior results.

- **CMY Color** Send CMY (cyan/magenta/yellow) data to Gutenprint. This is not normally useful.

- **KCMY** Send KCMY (black/cyan/magenta/yellow) data to Gutenprint. This is essentially the same as CMYK, but the ordering is different. If your source is KCMY, this will be slightly more efficient. Normally it is not useful.

- **Inverted Grayscale** Send gray data to Gutenprint, but inverted from the normal (sometimes this is called "whitescale"). This is normally not useful.

Color Precision

Select the color precision you wish to use. **Normal** color precision is 8-bit; **Best** color precision is 16 bit. This only works with recent versions of CUPS (generally 1.2 and above). It is only useful if your source is 16-bit; it's otherwise less efficient than 8-bit and offers no benefit, since Gutenprint will convert 8-bit data to 16-bit itself.

In addition, all numeric options have a corresponding Fine Adjustment option to permit finer adjustment of the numerical value. The Fine Adjustment value (which is normally available in increments of 0.005) is added to the primary adjustment value (which is available in increments of 0.1) to create the final output value.

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