Sound > **Devices and Printers**.

- For Windows Server 2008 R2, select **Control Panel** > **Hardware** > **Devices and Printers**.

3. Select the your machine's driver and right-click to open **Properties**.
4. In printer driver properties, select **Device Options**.
5. Select necessary options in the **Printer Language** drop-down list.

Adjusting color

If you feel the color difference between the printout and monitor, you may change the color setting such as color contrast or color level.

The printer driver provides graphic options to adjust the print quality for specific printing needs.

1. To change the print settings from your software application, access **Printing Preferences** (See "Opening printing preferences" on page 57).
2. Click the **Graphics** tab. Refer to the online help for each option's information provided from the **Printing Preferences**.
   - **Color Mode:** You can choose color options between **Color** or **Grayscale**. Setting to **Color** typically produces the best possible print quality for color document. If you want to print a color document in gray scale, select **Grayscale**.

     Black Optimization allows you to print in high quality black. If you use this option, it might take longer to print.

     To adjust color manually, select **Advanced** in **Color Mode**. Simply slide the color balance slider in the **Levels** tab to adjust color, or select **Matching** tab for driver provided color correction for general image processing.
   - **Advanced:** You can set advanced settings by clicking the **Advanced** button. (PCL driver only)
   - **Font/ Text:** Select **Darken Text** to print text darker than on a normal document. Use **All Text Black** to prints solid black, regardless of the color it appears on the screen.
   - **Raster Compression:** This option determines the compression level of images for transferring data from computer to a printer. If you set this option to **Maximum**, the printing speed will be high, but the printing quality will be low. (PCL driver only)
   - **Graphic Controller:** It allows you to emphasize edges of texts and fine lines for improving readability and align each color channel registration in color printing mode.
     - **Grayscale Enhancement:** It allows users to preserve the details of nature photos, and improve contrast and readability among gray scaled colors, when printing color documents in grayscale. (PCL driver only)
     - **Fine Edge:** It allows you to emphasize edges of texts and fine lines for improving readability.
   - **Toner Save:** Adjusting this option extends the life of your toner cartridges and reduces your cost per page without a significant reduction in print quality.
     - You can move the slider from **No Saving** to **Maximum Saving** to reduce toner consumption.
3. Click **OK** or **Print** until you exit the **Print** window.

Adjusting the sharpness and smoothness

Screen options

This option affect the resolution and clarity of your color output. The three screen options are **Normal**, **Enhanced** and **Detailed**.

1. To change the print settings from your software application, access **Printing Preferences** (See "Opening printing preferences" on page 57).
2. Click the **Graphics** tab then select **Advanced** in **Color Mode**.
3. Select the **Matching** tab.
4. Select necessary options in the **Screen**.
   - **Printer default:** Follows the set value of **Screen** mode from the printer.
   - **Normal:** This mode will generate printouts with smooth tone over the entire page.
   - **Enhanced:** This mode will generate printouts with sharp texts and smooth graphic/photo objects in the page.
   - **Detailed:** This mode will generate printouts with sharp details over the entire page.
5. Select **OK**.

CHANGING THE DEFAULT PRINT SETTINGS

Most Windows applications will override settings you specify in the printer driver. Change all print settings available in the software application first, and change any remaining settings using the printer driver.

1. Click the Windows **Start** menu.
2. For Windows 2000, select **Settings** > **Printers**.
   - For Windows XP/Server 2003, select **Printers and Faxes**.
   - For Windows Server 2008/Vista, select **Control Panel** > **Hardware and Sound** > **Printers**.
   - For Windows 7, select **Control Panel** > **Devices and Printers**.
   - For Windows Server 2008 R2, select **Control Panel** > **Hardware** > **Devices and Printers**.
3. Right-click your machine.
4. For Windows XP/Server 2003/Server 2008/Vista, press **Printing Preferences**.

   For Windows 7 or Windows Server 2008 R2, from context menus, select the **Printing preferences**.

   If **Printing preferences** item has a ► mark, you can select other printer drivers connected with the selected printer.
5. Change the settings on each tab.
6. Click **OK**.

If you want to change the settings for each print job, change it in **Printing Preferences**.

SETTING YOUR MACHINE AS A DEFAULT MACHINE

1. Click the Windows **Start** menu.
2. For Windows 2000, select **Settings** > **Printers**.
   - For Windows XP/Server 2003, select **Printers and Faxes**.
   - For Windows Server 2008/Vista, select **Control Panel** > **Hardware and Sound** > **Printers**.
   - For Windows 7, select **Control Panel** > **Devices and Printers**.
   - For Windows Server 2008 R2, select **Control Panel** > **Hardware** > **Devices and Printers**.
3. Select your machine.
4. Right-click your machine and select **Set as Default Printer**.

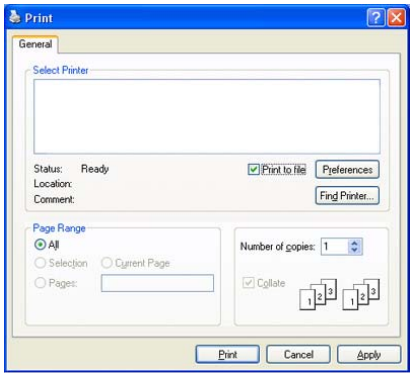
For Windows 7 or Windows Server 2008 R2, if **Set as default printer** item has a ► mark, you can select other printer drivers connected with the selected printer.

PRINTING TO A FILE (PRN)

You will sometimes need to save the print data as a file. You can print the document to a file instead of routing it directly to a printer. The document is saved with the printer formating, such as font selection and color specifications, in a .prn file that can be printed on another printer.

To save a print job as a file:

1. Check the **Print to file** box at the **Print** window.



2. Click **Print**.
3. Type in the destination path and the file name, and then click **OK**.
   For example c:\Temp\file name.

   If you type in only the file name, the file is automatically saved in **My Documents**. The saved folder may differ, depending on your operating system.

MACINTOSH PRINTING

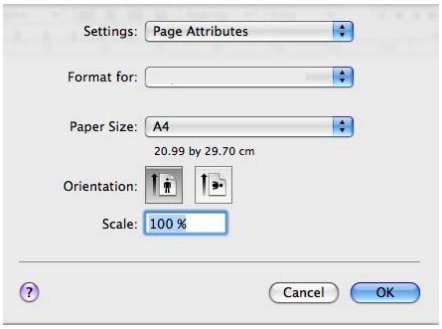
This section explains how to print using a Macintosh. You need to set the print environment before printing.

- USB connected, see "Macintosh" on page 27.
- Network connected, see "Macintosh" on page 34.

Printing a document

When you print with a Macintosh, you need to check the printer driver setting in each application you use. Follow the steps below to print from a Macintosh:

1. Open an application and select the file you want to print.
2. Open the **File** menu and click **Page Setup** (**Document Setup** in some applications).
3. Choose your paper size, orientation, scaling, other options, and make sure that your machine is selected. Click **OK**.



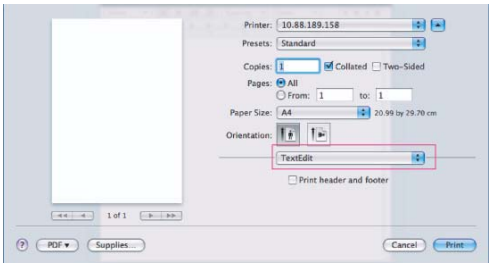
4. Open the **File** menu and click **Print**.
5. Choose the number of copies you want and indicate which pages you want to print.
6. Click **Print**.

Changing printer settings

You can use advanced printing features when using your machine.

Open an application and select **Print** from the **File** menu. The machine name, which appears in the printer properties window may differ depending on the machine in use. Except for the name, the composition of the printer properties window is similar to the following.

- The setting options may differ depending on models and Macintosh OS versions.
- The following panes may differ, depending on your operating system or the application you are using.



Layout

The **Layout** dialog provides options to adjust how the document appears on the printed page. You can print multiple pages on one sheet of paper. Select **Layout** from the drop-down list under **Orientation** to access the following features.

- **Pages per Sheet:** This option determines how many pages to be printed on one page (See "Printing multiple pages on one sheet of paper" on page 63).
- **Layout Direction:** This option allows you to select the printing direction on a page similar to the examples on UI.
- **Border:** This option allows you to print a border around each page on the sheet.
- **Reverse Page Orientation:** This option allows you to rotate paper 180 degrees.

Graphics

The Graphics dialog provides options for selecting **Quality** and **Color Mode**. Select **Graphics** from the drop-down list under **Orientation** to access the graphic features.

- **Quality:** This option allows you to select the printing resolution. The higher the setting, the sharper the clarity of printed characters and graphics. A higher setting will also increase the time it takes to print a document.
- **Color Mode:** You can set the color options. Setting to **Color** typically produces the best possible print quality for color documents. If you want to print a color document in grayscale, select **Grayscale**.

Paper

Set **Paper Type** to correspond to the paper loaded in the tray from which you want to print. This will let you get the best quality printout. If you load a different type of print material, select the corresponding paper type.

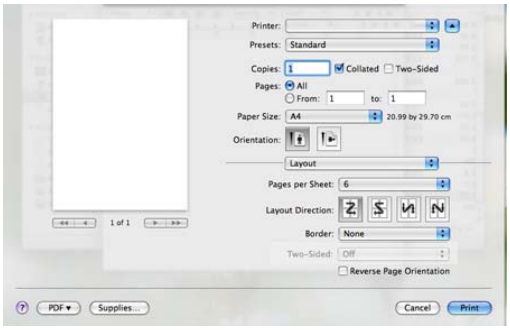
Printer Features

You can adjust the appearance of images by changing the settings in the option. Setting to color typically produces the best possible print quality for color documents.

Printing multiple pages on one sheet of paper

You can print more than one page on a single sheet of paper. This feature provides a cost-effective way to print draft pages.

1. Open an application, and select **Print** from the **File** menu.
2. Select **Layout** from the drop-down list under **Orientation**. In the **Pages per Sheet** drop-down list, select the number of pages you want to print on one sheet of paper.



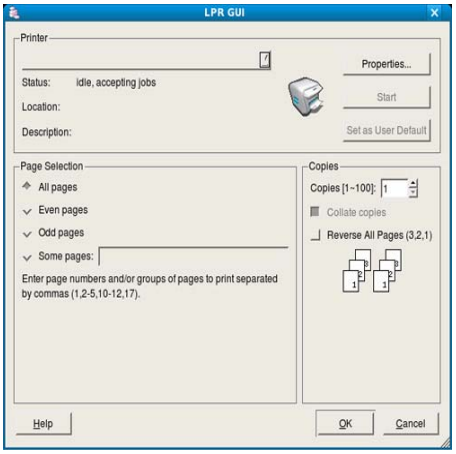
3. Select the other options you want to use.
4. Click **Print**, then the machine prints the selected the number of pages you want to print on one sheet of paper.

LINUX PRINTING

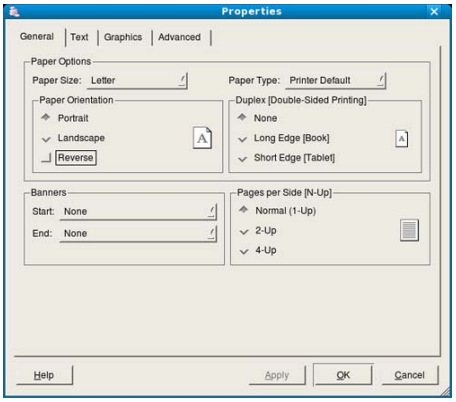
Printing from applications

There are several Linux applications that allow you to print using the Common UNIX Printing System (CUPS). You can print using any of these applications.

1. Open an application, and select **Print** from the **File** menu.
2. Select **Print** directly using LPR.
3. From the LPR GUI window, select the model name of your machine from the printer list and click **Properties**.



4. Change the print job properties using the following four tabs displayed at the top of the window.



- **General:** This option allows you to change the paper size, the paper type, and the orientation of the documents. It enables the duplex feature, adds start and end banners, and changes the number of pages per sheet.
- **Text:** This option allows you to specify the page margins and set the text options such as spacing or columns.
- **Graphics:** This option allows you to set image options that are used when printing images/files such as color options, image size or image position.
- **Advanced:** This option allows you to set the print resolution, paper source and special print features.

If an option is grayed out, it means that the grayed out option is not supported by your machine.

5. Click **Apply** to apply the changes and close the **Properties** window.
6. Click **OK** in the **LPR GUI** window to start printing.
7. The Printing window appears, allowing you to monitor the status of your print job.

   To abort the current job, click **Cancel**.

Printing files

You can print many different types of files on your machine using the standard CUPS way, directly from the command line interface. The CUPS LPR utility allows you to do that. But the drivers package replaces the standard LPR tool by a much more user-friendly LPR GUI program.

To print any document file:

1. Type lpr <file_name> from the Linux shell command line and press Enter. The **LPR GUI** window appears.

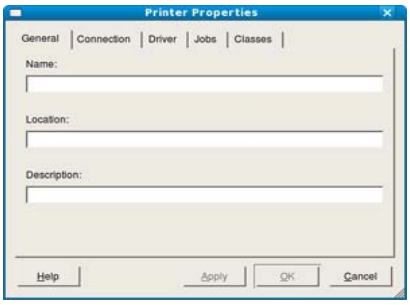
   When you type only lpr and press **Enter**, the **Select file(s) to print** window appears first. Just select any files you want to print and click **Open**.
2. From the **LPR GUI** window, select your machine from the list, and change the print job properties.
3. Click **OK** to start printing.

Configuring printer properties

Using the **Printer Properties** window provided by the **Printers configuration**, you can change the various properties for your printer.

1. Open the **Unified Driver Configurator**.

   If necessary, switch to **Printers configuration**.
2. Select your machine from the available printers list and click **Properties**.
3. The **Printer Properties** window opens.



The following five tabs display at the top of the window:

- **General:** This option allows you to change the printer location and name. The name entered in this tab displays on the printer list in **Printers configuration**.
- **Connection:** This option allows you to view or select another port. If you change the machine port from USB to parallel or vice versa while in use, you must re-configure the machine port in this tab.
- **Driver:** Allows you to view or select another printer driver. By clicking **Options**, you can set the default device options.
- **Jobs:** This option shows the list of print jobs. Click **Cancel job** to cancel the selected job and select the **Show completed jobs** check box to see previous jobs on the job list.
- **Classes:** This option shows the class that your machine is in. Click **Add to Class** to add your machine to a specific class or click **Remove from Class** to remove the machine from the selected class.

4. Click **OK** to apply the changes and close the **Printer Properties** window.

management tools

This chapter introduces management tools provided to help you make full use of your machine.

This chapter includes:

INTRODUCING USEFUL MANAGEMENT TOOLS

The programs below help you to use your machine conveniently.

- "Using SyncThru™ Web Service" on page 65.
- "Using the Smart Panel program" on page 66.
- "Using the Unified Linux Driver Configurator" on page 67.

USING SYNCTHRU™ WEB SERVICE

Internet Explorer 6.0 or higher is the minimum requirement for SyncThru™ Web Service.

If you have connected your machine to a network and set up TCP/IP network parameters correctly, you can manage the machine via SyncThru™ Web Service, an embedded web server. Use SyncThru™ Web Service to:

- View the machine's device information and check its current status.
- Change TCP/IP parameters and set up other network parameters.
- Change printer preference.
- Set the email notifications advising of the machine's status.
- Get support for using the machine.

To access SyncThru™ Web Service

1. Access a web browser, such as Internet Explorer, from Windows.
   Enter the machine IP address (http://xxx.xxx.xxx.xxx) in the address field and press the Enter key or click **Go**.
2. Your machine's embedded website opens.

Logging into SyncThru™ Web Service

Before configuring options in SyncThru™ Web Service, you need to log-in as an administrator. You can still use SyncThru™ Web Service without logging in but you won't have access to **Settings** tab and **Security** tab.

1. Click **Login** on the upper right of the SyncThru™ Web Service website.
   A log-in page appears.
2. Type in the **ID** and **Password** then click **Login**.
   If it's your first time logging into SyncThru™ Web Service, type in the below default ID and password.
   - **ID: admin**
   - **Password: sec00000**

SyncThru™ Web Service overview

Some tabs may not appear depending on your model.

Information tab

This tab gives you general information about your machine. You can check things, such as remaining amount of toner. You can also print reports such as an error report and so on.

- **Active Alerts:** This item allows you to check the alerts occurred in the machine and their severity.
- **Supplies:** This item allows you to check how many pages are printed and amount of toner left in the cartridge.
- **Usage Counters:** This item allows you to check the usage count by print types: simplex, duplex.
- **Current Settings:** This item allows you to check the machine and network information.
- **Print information:** This item allows you to print reports such as system related reports, e-mail address and font reports.

Settings tab

This tab allows you to set configurations provided by your machine and network. You need to log-in as an administrator to view this tab.

- **Machine Settings tab:** This tab allows you to set options provided by your machine.
  - **System:** You can set settings related to your machine.
  - **Printer:** You can set settings related to printing jobs.
  - **E-mail Notification:** You can set e-mail notification feature and e-mail address of recipients who will receive the notification.
- **Network Settings tab:** This tab allows you to view and change the network environment. You can set things, such as TCP/IP, network protocols and so on.
  - **SNMP:** You can exchange of management information between network devices using SNMP.
  - **Outgoing Mail Server(SMTP):** You can set the outgoing e-mail server.
  - **Restore Default:** You can restore default network settings.

Security tab

This tab allows you to set system and network security information. You need to log-in as an administrator to view this tab.

- **System Security:** You can set the system administrator's information and also enable or disable machine features.
- **Network Security:** You can set settings for HTTPs, IPSec, IPv4/IPv6 filtering, 802.1x, Authentication servers.

Maintenance tab

This tab allows you to maintain your machine by upgrading firmware and setting contact information for sending emails. You can also connect to Samsung website or download drivers by selecting the **Link** menu.

- **Firmware Upgrade:** You can upgrade your machine's firmware.

- **Contact Information:** You can view the contact information.
- **Link:** You can view the links to useful sites where you can download or check information.

E-mail notification setup

You can receive emails about your machine's status by setting this option. By setting information such as IP address, host name, e-mail address and SMTP server information, the machine status (toner cartridge shortage or machine error) will be sent to a certain person's e-mail automatically. This option may be used more frequently by a machine administrator.

1. Start a web browser, such as Internet Explorer, from Windows.
   Enter the machine IP address (http://xxx.xxx.xxx.xxx) in the address field and press the Enter key or click **Go**.
2. Your machine's embedded website opens.
3. Click **Login** on the upper right of the SyncThru™ Web Service website.
   A log-in page appears.
4. Type in the **ID** and **Password** then click **Login**.
   If it's your first time logging into SyncThru™ Web Service, type in the below default ID and password.
   - **ID: admin**
   - **Password: sec00000**
5. From the **Settings** tab, select **Machine Settings** > **E-mail Notification**.

   If you haven't configured outgoing server environment, go to **Settings** > **Network Settings** > **Outgoing Mail Server(SMTP)** to configure network environment before setting e-mail notification.
6. Click **Add** button to add e-mail notification user.
   Set the recipient name and e-mail address(es) with notification items you want to receive an alert for.
7. Click **Apply**.

If the firewall is activated, the e-mail may not be sent successfully. In that case, contact the a network administrator.

Setting the system administrator information

Set the system administrator information. This setting is necessary for using the e-mail notification option.

1. Start a web browser, such as Internet Explorer, from Windows.
   Enter the machine IP address (http://xxx.xxx.xxx.xxx) in the address field and press the Enter key or click **Go**.
2. Your machine's embedded website opens.
3. Click **Login** on the upper right of the SyncThru™ Web Service website.
   A log-in page appears.
4. Type in the **ID** and **Password** then click **Login**.
   If it's your first time logging into SyncThru™ Web Service, type in the below default ID and password.
   - **ID: admin**
   - **Password: sec00000**
5. From the **Security** tab, select **System Security** > **System Administrator**
6. Enter the name of the administrator, phone number, location and E-mail address.
7. Click **Apply**.

USING THE SMART PANEL PROGRAM

Smart Panel is a program that monitors and informs you of the machine status, and allows you to customize the machine's settings. For Windows and Macintosh, Smart Panel is installed automatically when you install the machine software. For Linux, you can download Smart Panel from the Samsung website (See "Installing the SmartPanel" on page 28).

To use this program, your computer has to meet the following system requirements:

- Windows. Check that your computer's CPU, RAM and HDD meet or exceed specification (See "System requirements" on page 25).
- Mac OS X 10.3 or higher. Check that your computer's CPU, RAM and HDD meet or exceed specification (See "System requirements" on page 25).
- Linux. Check that your computer's CPU, RAM and HDD meet or exceed specification (See "System requirements" on page 25).
- Internet Explorer version 5.0 or higher for flash animation in HTML Help.

If you need to know the exact model number of your machine, you can check the supplied software CD.

Understanding Smart Panel

If an error occurs while printing, you can check the error from the Smart Panel.

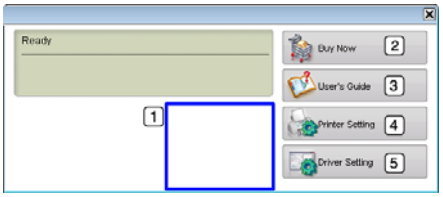
You can also launch Smart Panel manually. Double-click the Smart Panel icon on the Windows task bar (in Windows), or Notification Area (in Linux). You can also click it on the status bar (in Mac OS X).

Windows		Double-click this icon in Windows.
Macintosh		Click this icon in Mac OS X.
Linux		Click this icon in Linux.

Or, if you are a Windows user, you can launch it from the **Start** menu, select **Programs** or **All Programs** > **Samsung Printers** > **your printer driver name** > **Smart Panel**.

- If you have already installed more than one Samsung machine, first select the correct machine model you want in order to access the corresponding Smart Panel.
  Right-click (in Windows or Linux) or click (in Mac OS X) the Smart Panel icon and select your machine.
- The Smart Panel window and its contents shown in this user's guide may differ depending on the machine or operating system in use.

The Smart Panel program displays the current status of the machine, the estimated level of toner remaining in the toner cartridge(s), and various other types of information. You can also change settings.



1	**Toner Level**	View the level of toner remaining in the toner cartridge(s). The machine and the number of toner cartridge(s) shown in the above window may differ depending on the machine in use. Some machines do not have this feature.
2	**Buy Now**	Order replacement toner cartridge(s) online.
3	**User's Guide**	View the User's Guide. This button changes to **Troubleshooting Guide** when error occurs. You can directly open the troubleshooting section in the user's guide.
4	**Printer Setting**	Configure various machine settings in the Printer Settings Utility window. Some machines do not have this feature. If you connect your machine to a network, the SyncThru™ Web Service window appears instead of the Printer Settings Utility window.
5	**Driver Setting**	Set all of the machine options you need in the **Printer Preferences** window. This feature is available only for Windows (See "Opening printing preferences" on page 57).

Changing the Smart Panel Program Settings

Right-click (in Windows or Linux) or click (in Mac OS X) the Smart Panel icon and select **Options**. Select the settings you want from the **Options** window.

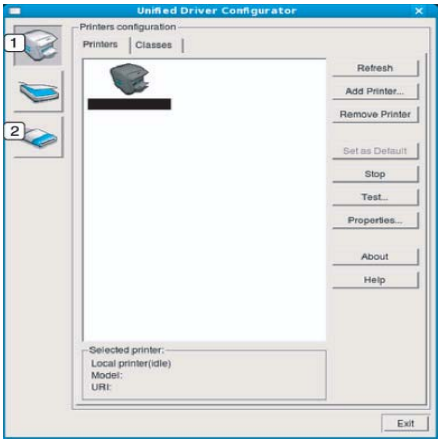
USING THE UNIFIED LINUX DRIVER CONFIGURATOR

The Unified Driver Configurator is a tool primarily intended for configuring machine devices. You need to install Unified Linux Driver to use Unified Driver Configurator (See "Installing the Unified Linux Driver" on page 28).

After the driver is installed on your Linux system, the Unified Driver Configurator icon will automatically be created on your desktop.

Opening the Unified Driver Configurator

1. Double-click the **Unified Driver Configurator** on the desktop.
   You can also click the **Startup** Menu icon and select **Samsung Unified Driver** > **Unified Driver Configurator**.
2. Click each button on the left to switch to the corresponding configuration window.



1	**Printers Configuration**
2	**Ports Configuration**

To use the on screen help, click **Help**.

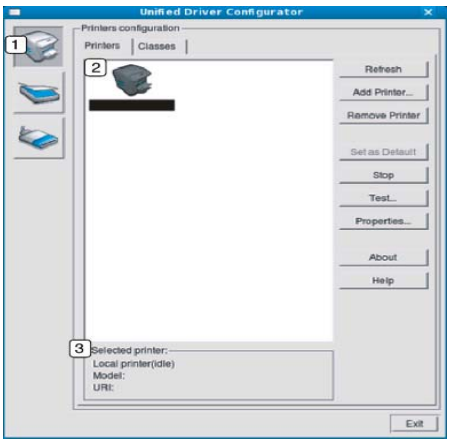
3. After changing the configurations, click **Exit** to close the Unified Driver Configurator.

Printers configuration window

Printers configuration has the two tabs: **Printers** and **Classes**.

Printers tab

View the current system's printer configuration by clicking on the machine icon button on the left side of the Unified Driver Configurator window.



1	Switches to **Printers configuration**.
2	Shows all of the installed machine.
3	Shows the status, model name and URI of your machine.

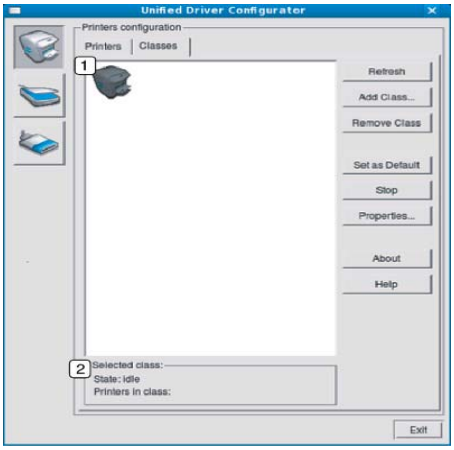
The printer control buttons are, as follows:

- **Refresh:** Renews the available machines list.
- **Add Printer:** Allows you to add a new machines.

- **Remove Printer:** Removes the selected machine.
- **Set as Default:** Sets the current selected machine as a default machine.
- **Stop/Start:** Stops/starts the machine.
- **Test:** Allows you to print a test page to ensure the machine is working properly.
- **Properties:** Allows you to view and change the printer properties.

Classes tab

The Classes tab shows a list of available machine classes.

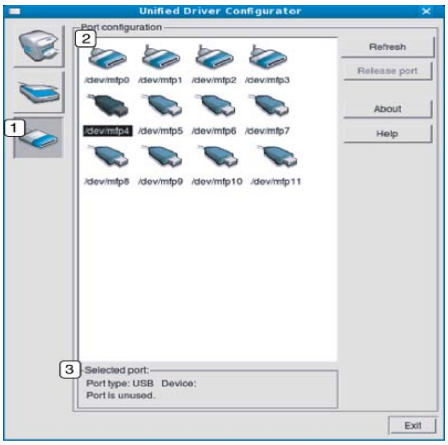


1	Shows all of the machine classes.
2	Shows the status of the class and the number of machines in the class.

- **Refresh:** Renews the classes list.
- **Add Class:** Allows you to add a new machine class.
- **Remove Class:** Removes the selected machine class.

Ports configuration

In this window, you can view the list of available ports, check the status of each port, and release a port that is stalled in a busy state when its owner has terminated the job for any reason.



1	Switches to **Ports configuration**.
2	Shows all of the available ports.
3	Shows the port type, device connected to the port, and status.

- **Refresh:** Renews the available ports list.
- **Release port:** Releases the selected port.

maintenance

This chapter provides information about maintaining your machine and the toner cartridge.

This chapter includes:

- Printing a machine report
- Cleaning a machine
- Storing the toner cartridge
- Tips for moving & storing your machine

PRINTING A MACHINE REPORT

You can print a configuration page to view current printer settings, or to help troubleshoot printer problems.

In ready mode, press and hold the ⊗ (cancel button) for about 5 seconds, then release.

A configuration page prints out.

CLEANING A MACHINE

If printing quality problems occur or if you use your machine in a dusty environment, you need to clean your machine regularly to keep the most optimum printing quality.

⚠
- Cleaning the cabinet of the machine with cleaning materials containing large amounts of alcohol, solvent, or other strong substances can discolor or distort the cabinet.
- If your machine or the surrounding area is contaminated with toner, we recommend that you use a cloth or tissue dampened with water to clean it. If you use a vacuum cleaner, toner blows in the air and might be harmful if inhaled.

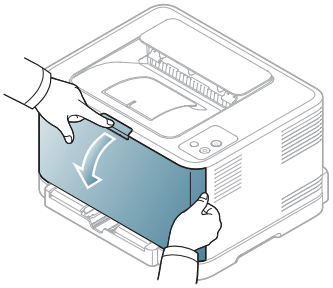
Cleaning the outside

Clean the machine cabinet with a soft, lint-free cloth. Dampen the cloth slightly with water, but be careful not to let any water drip onto or into the machine.

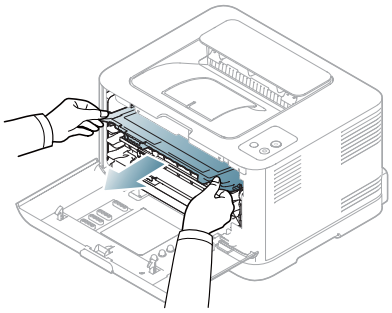
Cleaning the inside

During the printing process, paper, toner and dust particles can accumulate inside the machine. This buildup can cause print quality problems such as toner specks or smearing. Cleaning the inside of the machine clears or reduces these problems.

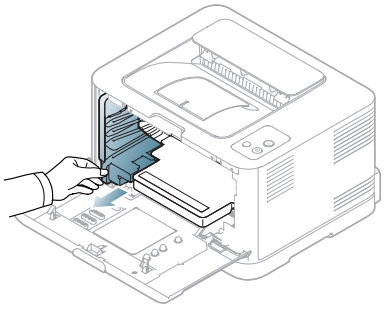
1. Turn the machine off and unplug the power cord. Wait for the machine to cool down.
2. Press the release button, completely open the front cover.



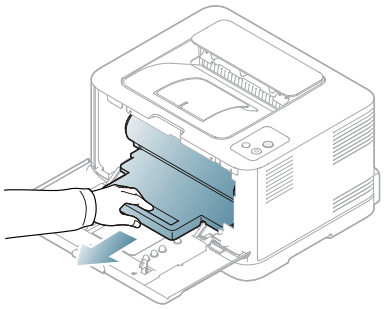
3. Grasp the handles on the toner cartridge and pull to remove the cartridge from the machine.



4. Pull the waste toner container out of the machine using its handle.



5. Pull the imaging unit out of the machine using the groove on the front of the imaging unit.

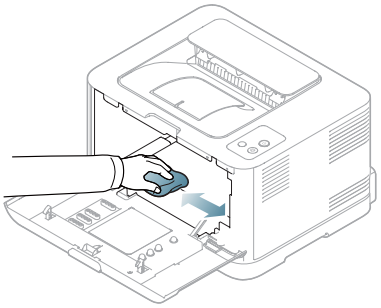


⚠
- Do not touch the green surface of the drum located in the imaging unit. Use the handle on the imaging unit to avoid

touching this area.

- Be careful not to scratch the surface of the imaging unit.
- If you leave the front cover open for more than a few minutes, the imaging unit can be exposed to light. This will cause damage to the imaging unit. Close the front cover should the installation need to be halted for any reason.

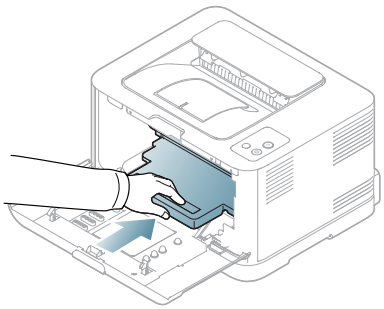
6. With a dry lint-free cloth, wipe away any dust and spilled toner from the toner cartridges area and their cavities.



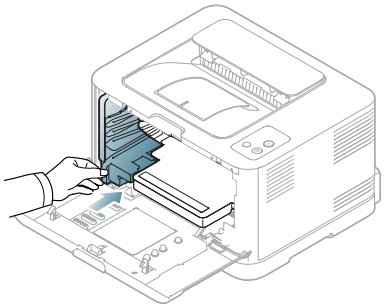
After cleaning, let the machine to dry completely.

- If toner gets on your clothing, wipe it off with a dry cloth and wash it in cold water. Hot water sets toner into fabric.
- If your machine or its surrounding is contaminated with toner, we recommend you to use a cloth or tissue dampened with water to clean it. If you use a vacuum cleaner, toner blows into the air then might be harmful to you.

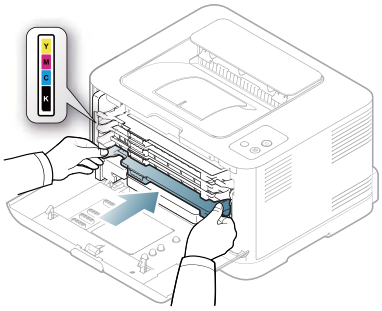
7. Holding the groove on the front of the imaging unit, push imaging unit into the machine.



8. Insert the waste toner container into position and then push it to make sure that it is firmly seated in place.



9. Slide the toner cartridge back into the machine.



10. Reinstall all the compartments into the machine and close the front cover.

If the front cover is not completely closed, the machine will not operate.

11. Plug in the power cord and turn the machine on.

STORING THE TONER CARTRIDGE

Toner cartridge storage

Toner cartridges contain components that are sensitive to light, temperature, and humidity. Samsung suggests users follow the recommendations to ensure the optimum performance, highest quality, and longest life from your new Samsung toner cartridge.

Store this cartridge in the same environment as the printer it will be used in; this should be in controlled office temperature and humidity conditions. The toner cartridge should remain in its original, unopened package until installation – If original packaging is not available, cover the top opening of the cartridge with paper and store in a dark cabinet.

Opening the cartridge package prior to use dramatically shortens its useful shelf and operating life. Do not store on the floor. If the toner cartridge is removed from the printer, always store the cartridge according to the following guidelines:

- Inside the protective bag from the original package.
- Store lying flat (not standing on end) with the same side facing up as if was installed in the machine.
- Do not store consumable in any of the following conditions:
  - Temperature greater than 40°C (104°F).
  - Humidity range less than 20% and not greater than 80%.

- An environment with extreme changes in humidity or temperature.
- Direct sunlight or room light.
- Dusty places.
- A car for a long period of time.
- An environment where corrosive gases are present.
- An environment with salty air.

Handling instructions

- Do not touch the surface of the photoconductive drum in the cartridge.
- Do not expose the cartridge to unnecessary vibrations or shock.
- Never manually rotate the drum, especially in the reverse direction; this can cause internal damage and toner spillage.

Use of non-Samsung and refilled toner cartridge

Samsung Electronics does not recommend or approve the use of non-Samsung brand toner cartridges in your printer including generic, store brand, refilled, or remanufactured toner cartridges.

⚠ Samsung's printer warranty does not cover damage to the machine caused by the use of a refilled, remanufactured, or non-Samsung brand toner cartridge.

Estimated cartridge life

Estimated cartridge life (the life of the toner cartridge yield) depends on the amount of toner that print jobs require. The actual print yield may vary depending on the print density of the pages you print on, operating environment, printing interval, media type, and/or media size. For example, if you print a lot of graphics, the consumption of the toner is high and you may need to change the cartridge more often.

TIPS FOR MOVING & STORING YOUR MACHINE

- When moving the machine, do not tilt or turn it upside down. Otherwise, the inside of the machine may be contaminated by toner, which can cause damage to the machine or reduce print quality.
- When moving the machine, make sure at least two people are holding the machine securely.

troubleshooting

This chapter gives helpful information for what to do if you encounter an error.

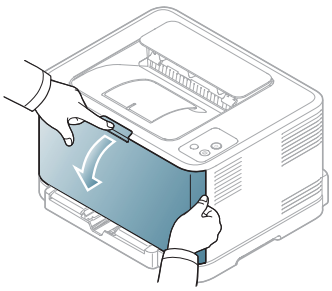
This chapter includes:

REDISTRIBUTING TONER

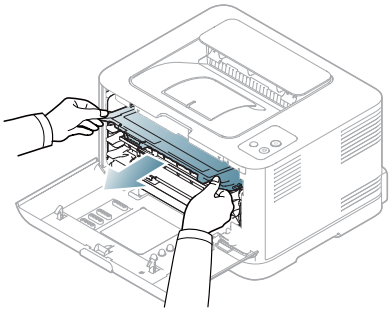
It is possible that colored images may be printed with incorrect colors due to flawed mixing of toner colors when one of the colored toner cartridges is low on toner. You can temporarily improve print quality by redistributing the toner.

The Smart Panel program window appears on the computer telling you which cartridge is low on toner (See "Using the Smart Panel program" on page 66).

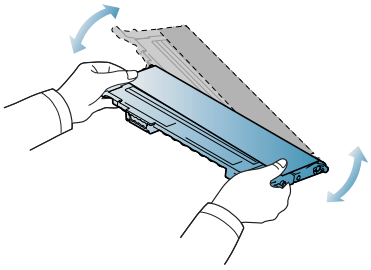
1. Press the release button, completely open the front cover.



2. Grasp the handle on the toner cartridge and pull to remove the cartridge from the machine.

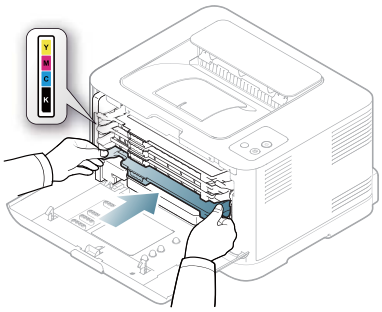


3. Holding both handles on the toner cartridge, thoroughly rock it from side to side to evenly distribute the toner.



If toner gets on your clothing, wipe it off with a dry cloth and wash it in cold water. Hot water sets toner into fabric.

4. Slide the toner cartridge back into the machine.



5. Close the front cover. Make sure the cover is securely latched.

If the front cover is not completely closed, the machine will not operate.

TIPS FOR AVOIDING PAPER JAMS

By selecting the correct media types, most paper jams can be avoided. When a paper jam occurs, refer to the guidelines below (See "Clearing paper jams" on page 73.

- Follow the procedures on "Changing the tray size" on page 49. Ensure that the adjustable guides are positioned correctly.
- Do not overload the tray. Ensure that the paper level is below the paper capacity mark on the inside of the tray.
- Do not remove paper from the tray while your machine is printing.
- Flex, fan, and straighten paper before loading.
- Do not use creased, damp, or highly curled paper.

- Do not mix paper types in a tray.
- Use only recommended print media ("Setting the paper size and type" on page 54).
- Ensure that the recommended side of the print media is facing up in the tray.

CLEARING PAPER JAMS

To avoid tearing the paper, pull the jammed paper out slowly and carefully. Follow the instructions in the following sections to clear the jam.

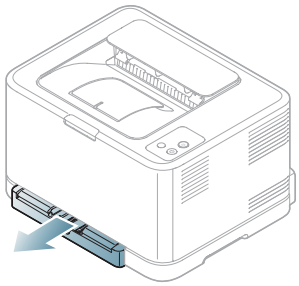
If a paper jam occurs, the status LED on the control panel lights orange. Find and remove the jammed paper.

If paper is jammed in the paper feed area, follow the next steps to release the jammed paper.

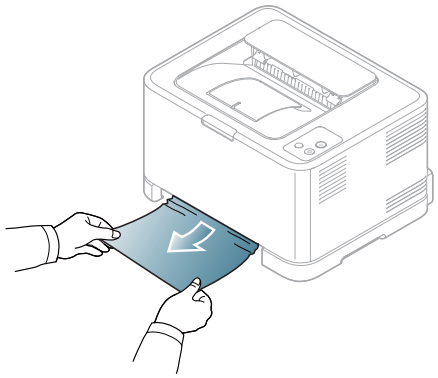
In the tray

Click this link to open an animation about clearing a jam.

1. Open and close the front cover. The jammed paper is automatically ejected from the machine. If the paper does not eject, go to the next step.
2. Pull out the tray.



3. Remove the jammed paper by gently pulling it straight out.



If the paper does not eject when you pull, or if you do not see the paper in this area, check the fuser area around the toner cartridge (See "Inside the machine" on page 73).

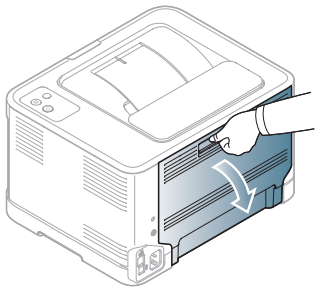
4. Insert the tray back into the machine until it snaps into place. Printing automatically resumes.

Inside the machine

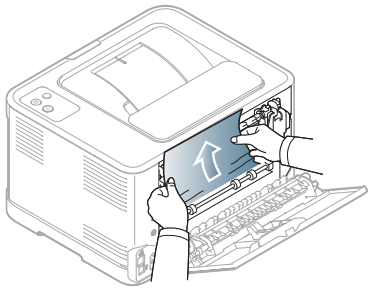
Click this link to open an animation about clearing a jam.

The fuser area is hot. Be careful when removing paper form this area to prevent getting your fingers burnt.

1. Open and close the front cover. The jammed paper is automatically ejected from the machine. If the paper does not eject, go to the next step.
2. To remove the jammed paper, open the rear cover.



3. Carefully remove the jammed paper by pulling in the direction as shown below. Most of the jammed paper can be removed in this step.



Do not touch the fuser inside the inner cover. It is hot and could cause burns. Be careful when removing paper from this area to prevent getting your fingers burnt.

If the paper does not eject when you pull, or if you do not see the paper in this area, check the paper exit area (See "In the paper exit area" on page 73).

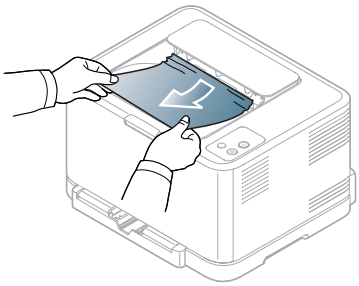
4. Close the rear cover. Make sure that it is securely closed. Printing automatically resumes.

In the paper exit area

Click this link to open an animation about clearing a jam.

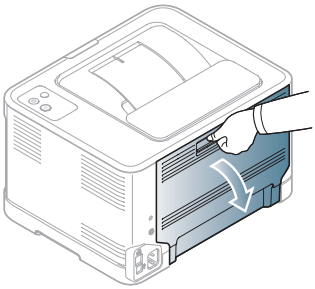
The fuser area is hot. Be careful when removing paper form this area to prevent getting your fingers burnt.

1. Gently pull the paper out the output tray.

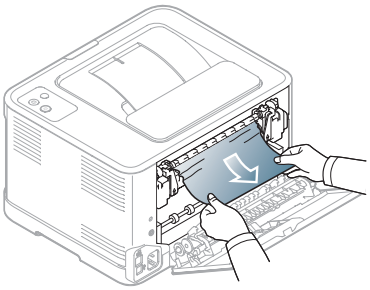


If you do not see the jammed paper or if there is any resistance when you pull, stop and go to the next step.

2. To remove the jammed paper, open the rear cover.



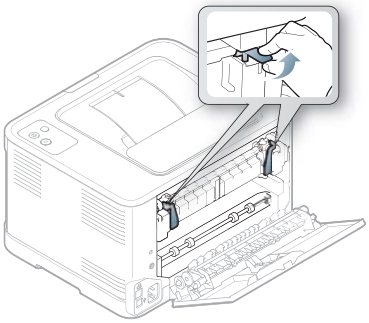
3. Carefully remove the paper by pulling in the direction as shown below. Most of the jammed paper can be removed in this step.



If you cannot find the jammed paper, of if there is any resistance removing the paper, go to the next step.

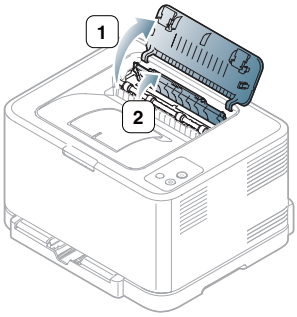
If the paper tears, make sure that all of the paper fragments are removed from the machine.

4. Push the fuser levers upwards.

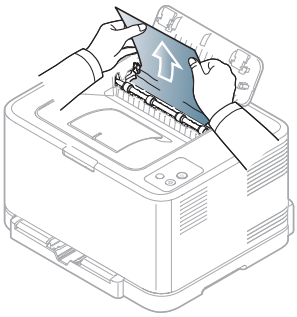


The fuser area is hot. Take care when removing paper form the machine.

5. Open the top cover and inner cover.

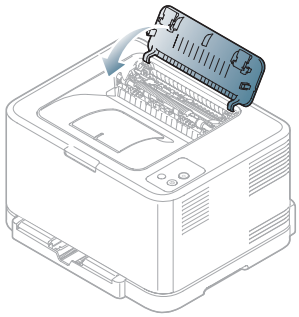


6. Holding the inner cover open, carefully take the jammed paper out the machine. The inner cover will then close automatically.

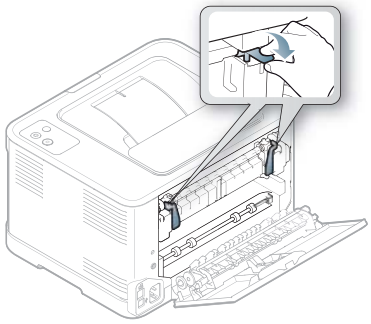


Do not touch the fuser inside the inner cover. It is hot and could cause burns. Be careful when removing paper from this area to prevent getting your fingers burnt.

7. Close the top cover. Make sure that it is securely closed.



8. Push the fuser levers downwards.



9. Open and then close the rear cover or front cover to resume printing.

SOLVING OTHER PROBLEMS

The following chart lists some trouble conditions that may occur and the recommended solutions. Follow the suggested solutions until the problem is corrected. If the problem persists, contact a service representative.

Other problems include:

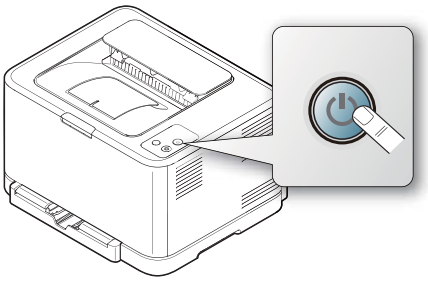
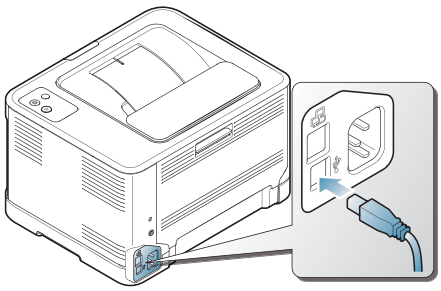
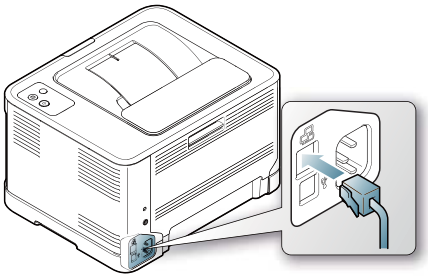
- See "System problems" on page 75.
- See "Power problems" on page 76.
- See "Paper feeding problems" on page 76.
- See "Printing problems" on page 77.
- See "Printing quality problems" on page 78.
- See "Common Windows problems" on page 81.
- See "Common Linux problems" on page 81.
- See "Common Macintosh problems" on page 82.

System problems

CONDITION	SUGGESTED SOLUTIONS
The red error light is on.	Turn the machine on/off. If the problem persists, contact a service representative (See "Contact SAMSUNG worldwide" on page 90”). The machine is experiencing problems that require service such as LSU error or fuser error.

Power problems

Click this link to open an animation about power problems.

CONDITION	SUGGESTED SOLUTIONS
The machine is not receiving power, or the connection cable between the computer and the machine is not connected properly.	• Plug in the power cord and press (**Power** button) on the control panel.  • Disconnect the machine cable and reconnect it. - **For Local Printing**  -For Network (**CLP-320N(K)/CLP-321N** only) 

Paper feeding problems

CONDITION	SUGGESTED SOLUTIONS
Paper jams during printing.	Clear the paper jam (See "Clearing paper jams" on page 73).
Paper sticks together.	• Check the maximum paper capacity of the tray (See "Print media specifications" on page 89). • Make sure that you are using the correct type of paper (See "Print media specifications" on page 89). • Remove paper from the tray and flex or fan the paper. • Humid conditions may cause some paper to stick together, replace with a new stack.
Multiple sheets of paper do not feed.	Different types of paper may be stacked in the tray. Load paper of only one type, size and weight.
Paper does not feed into the machine.	• Remove any obstructions from inside the machine. • Paper has not been loaded correctly. Remove paper from the tray and reload it correctly. • There is too much paper in the tray. Remove excess paper from the tray. • The paper is too thick. Use only paper that meets the specifications required by the machine (See "Print media specifications" on page 89).
The paper keeps jamming.	• There is too much paper in the tray. Remove excess paper from the tray. • An incorrect type of paper is being used. Use only paper that meets the specifications required by the machine (See "Print media specifications" on page 89). • There may be debris inside the machine. Open the front cover and remove any debris.
Transparencies stick together in the paper exit.	Use only transparencies specifically designed for laser printers. Remove each transparency as it exits from the machine.
Envelopes skew or fail to feed correctly.	Ensure that the paper guides are against both sides of the envelopes.

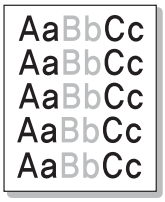
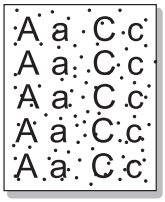
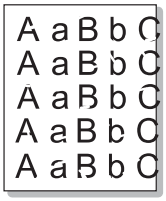
Printing problems

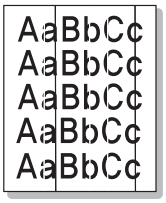
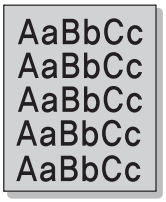
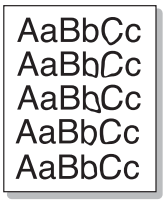
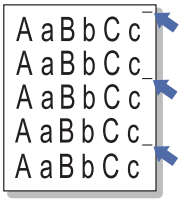
CONDITION	POSSIBLE CAUSE	SUGGESTED SOLUTIONS
The machine does not print.	The machine is not receiving power.	Check the power cord connections.
	The machine is not selected as the default machine.	Select your machine as your default machine in your Windows.
	Check the machine for the following: • The front cover is not closed. Close the front cover. • Paper is jammed. Clear the paper jam (See "Clearing paper jams" on page 73). • No paper is loaded. Load paper (See "Loading paper in the tray" on page 50). • The toner cartridge is not installed. Install the toner cartridge. If a system error occurs, contact a service representative.	
	The connection cable between the computer and the machine is not connected properly.	Disconnect the machine cable and reconnect it.
	The connection cable between the computer and the machine is defective.	If possible, attach the cable to another computer that is working properly and print a job. You can also try using a different machine cable.
	The port setting is incorrect.	Check the Windows printer setting to make sure that the print job is sent to the correct port. If the computer has more than one port, make sure that the machine is attached to the correct one.
	The machine may be configured incorrectly.	Check the **Printing Preferences** to ensure that all of the print settings are correct (See "Opening printing preferences" on page 57).
	The printer driver may be incorrectly installed.	Repair the machine software (See "Installing USB connected machine's driver" on page 26, "Installing network connected machine's driver" on page 33).
	The machine is malfunctioning.	• Check the LEDs on the control panel to see if the machine is indicating a system error. If the error cannot be cleared, contact a service representative. • Checking an error message is also possible from the Smart Panel on your computer (See "Using the Smart Panel program" on page 66).
The machine does not print.	The document size is so big that the hard disk space of the computer is insufficient to access the print job.	Allocate more hard disk space on your computer for spooling, and try printing.
	The output tray is full.	It can hold up to 80 sheets of plain paper. Once the paper is removed from the output tray, the machine resumes printing.
The machine selects print materials from the wrong paper source.	The paper option that was selected in the **Printing Preferences** may be incorrect.	For many software applications, the paper source selection is found under the Paper tab within the **Printing Preferences**. Select the correct paper source. See the printer driver help screen (See "Opening printing preferences" on page 57).
A print job is extremely slow.	The job may be very complex.	Reduce the complexity of the page or try adjusting the print quality settings.
Half the page is blank.	The page orientation setting may be incorrect.	Change the page orientation in your application. See the printer driver help screen.
	The paper size and the paper size settings do not match.	Ensure that the paper size in the printer driver settings matches the paper in the tray. Or, ensure that the paper size in the printer driver settings matches the paper selection in the software application settings you use.
The machine prints, but the text is wrong, garbled, or incomplete.	The machine cable is loose or defective.	Disconnect the machine cable and reconnect. Try a print job that you have already printed successfully. If possible, attach the cable and the machine to another computer that you know works and try a print job. Finally, try a new machine cable.
	The wrong printer driver was selected.	Check the application's printer selection menu to ensure that your machine is selected.
	The software application is malfunctioning.	Try printing a job from another application.
	The operating system is malfunctioning.	Exit Windows and reboot the computer. Turn the machine off and back on again.
	If you are in a DOS environment, the font setting for your machine may be set incorrectly.	See "Changing font setting (CLP-320N(K)/CLP-321N/CLP-325W(K) only)" on page 47.

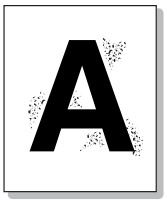
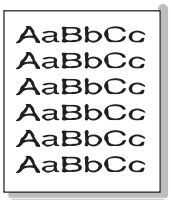
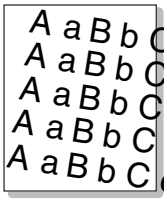
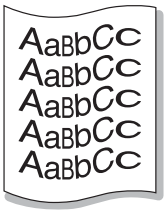
CONDITION	POSSIBLE CAUSE	SUGGESTED SOLUTIONS
Pages print, but they are blank.	The toner cartridge is defective or out of toner.	Redistribute the toner, if necessary. If necessary, replace the toner cartridge.
	The file may have blank pages.	Check the file to ensure that it does not contain blank pages.
	Some parts, such as the controller or the board, may be defective.	Contact a service representative.
The machine does not print PDF file correctly. Some graphics, text, or illustrations are missing.	Incompatibility between the PDF file and the Acrobat products.	Printing the PDF file as an image may enable the file to print. Turn on **Print As Image** from the Acrobat printing options. It will take longer to print when you print a PDF file as an image.
The print quality of photos is not good. Images are not clear.	The resolution of the photo is very low.	Reduce the photo size. If you increase the photo size in the software application, the resolution will be reduced.
Before printing, the machine emits vapor near the output tray.	Using damp paper can cause vapor during printing.	This is not a problem. Just keep printing.
The machine does not print special- sized paper, such as billing paper.	The Paper size and paper size setting do not match.	Set the correct paper size in the **Edit...** in the **Paper** tab in the **Printing Preferences** (See "Opening printing preferences" on page 57).
The printed billing paper.	The paper type setting does not match.	Change the printer option and try again. Go to **Printing Preferences**, click **Paper** tab, and set type to **Thick** (See "Opening printing preferences" on page 57).

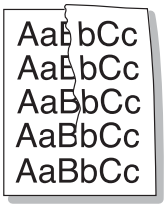
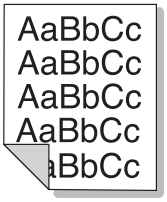
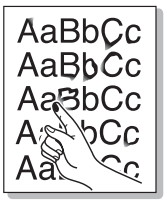
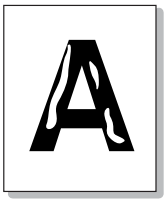
Printing quality problems

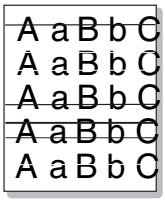
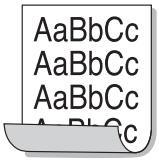
If the inside of the machine is dirty or paper has been loaded improperly, you may notice a reduction in print quality. See the table below to clear the problem.

CONDITION	SUGGESTED SOLUTIONS
Light or faded print 	• If a vertical white streak or faded area appears on the page, the toner supply is low. You may be able to temporarily extend the toner cartridge life (See "Redistributing toner" on page 72). If this does not improve the print quality, install a new toner cartridge. • The paper may not meet paper specification; for example, the paper is too moist or too rough (See "Print media specifications" on page 89). • If the entire page is light, the print resolution setting is too low. Adjust the print resolution. See the help screen of the printer driver. • A combination of faded or smeared defects may indicate that the toner cartridge needs cleaning (See "Cleaning the inside" on page 69). • The surface of the LSU part inside the machine may be dirty. Clean the LSU by opening and closing the front cover several times and if the problem still occurs call the contact a service representative.
Toner specks 	• The paper may not meet specification; for example, the paper is too moist or too rough (See "Print media specifications" on page 89). • The paper path may need cleaning (See "Cleaning the inside" on page 69).
Dropouts 	If faded areas, generally rounded, occur randomly on the page. • A single sheet of paper may be defective. Try reprinting the job. • The moisture content of the paper is uneven or the paper has moist spots on its surface. Try a different brand of paper (See "Print media specifications" on page 89). • The paper lot is bad. The manufacturing processes can cause some areas to reject toner. Try a different kind or brand of paper. • Change the printer option and try again. Go to printer properties, click **Paper** tab and set type to **Thick Paper** (See "Opening printing preferences" on page 57). • If these steps do not correct the problem, contact a service representative.

CONDITION	SUGGESTED SOLUTIONS
White Spots 	White spots appear on the page. • The paper is too rough and a lot of dirt from the paper falls to the inner devices within the machine, which means the transfer belt may be dirty. Clean the inside of your machine. Contact a service representative. • The paper path may need cleaning. Contact a service representative.
Vertical lines 	If black vertical streaks appear on the page: • The imaging unit has probably been scratched. Remove the imaging unit and install a new one (See "Replacing the imaging unit" on page 85). If white vertical streaks appear on the page: • The surface of the LSU part inside the machine may be dirty. Clean the LSU by opening and closing the front cover several times and if the problem still occurs call the contact a service representative.
Color or Black background 	If the amount of background shading becomes unacceptable: • Change to a lighter weight paper (See "Print media specifications" on page 89). • Check the machine's environment: very dry (low humidity) or high humidity (higher than 80% RH) conditions can increase the amount of background shading. • Remove the old toner cartridge and install a new one (See "Replacing the toner cartridge" on page 84).
Toner smear 	• Clean the inside of the machine. See "Cleaning the inside" on page 69. • Check the paper type and quality. See "Print media specifications" on page 89. • Remove the toner cartridge and install a new one. See "Replacing the toner cartridge" on page 84.
Vertical repetitive defects 	If marks repeatedly appear on the printed side of the page at even intervals: • The toner cartridge may be damaged. If a repetitive mark occurs on the page, print a cleaning sheet several times to clean the cartridge. After the printout, if you still have the same problems, remove the toner cartridge and install a new one (See "Replacing the toner cartridge" on page 84). • Parts of the machine may have toner on them. If the defects occur on the back of the page, the problem will likely correct itself after a few more pages. • The fusing assembly may be damaged. Contact a service representative.

CONDITION	SUGGESTED SOLUTIONS
Background scatter 	Background scatter results from bits of toner randomly distributed on the printed page. • The paper may be too damp. Try printing with a fresh ream of paper. Do not open packages of paper until necessary so that the paper does not absorb too much moisture. • If background scatter occurs on an envelope, change the printing layout to avoid printing over areas that have overlapping seams on the reverse side. Printing on seams can cause problems. • If background scatter covers the entire surface area of a printed page, adjust the print resolution through your software application or the printer properties.
Misformed characters 	• If characters are improperly formed and producing hollow images, the paper stock may be too slick. Try a different paper (See "Print media specifications" on page 89).
Page skew 	• Ensure that the paper is loaded properly. • Check the paper type and quality (See "Print media specifications" on page 89). • Ensure that the paper or other material is loaded correctly and the guides are not too tight or too loose against the paper stack.
Curl or wave 	• Ensure that the paper is loaded properly. • Check the paper type and quality. Both high temperature and humidity can cause paper curl (See "Print media specifications" on page 89). • Turn over the stack of paper in the tray. Also try rotating the paper 180° in the tray.

CONDITION	SUGGESTED SOLUTIONS
Wrinkles or creases 	• Ensure that the paper is loaded properly. • Check the paper type and quality (See "Print media specifications" on page 89). • Turn over the stack of paper in the tray. Also try rotating the paper 180° in the tray.
Back of printouts are dirty 	• Check for leaking toner. Clean the inside of the machine (See "Cleaning the inside" on page 69).
Solid Color or Black pages 	• The toner cartridge may not be installed properly. Remove the cartridge and reinsert it. • The toner cartridge may be defective and need replacing. Remove the toner cartridge and install a new one (See "Replacing the toner cartridge" on page 84). • The machine may require repair. Contact a service representative.
Loose toner 	• Clean the inside of the machine (See "Cleaning the inside" on page 69). • Check the paper type and quality (See "Print media specifications" on page 89). • Remove the toner cartridge and install a new one (See "Replacing the toner cartridge" on page 84). • If the problem persists, the machine may require repair. Contact a service representative.
Character Voids 	Character voids are white areas within parts of characters that should be solid black: • If you are using transparencies, try another type of transparency. Because of the composition of transparencies, some character voids are normal. • You may be printing on the wrong surface of the paper. Remove the paper and turn it over. • The paper may not meet paper specifications (See "Print media specifications" on page 89).

CONDITION	SUGGESTED SOLUTIONS
Horizontal stripes 	If horizontally aligned black streaks or smears appear: • The toner cartridge may be installed improperly. Remove the cartridge and reinsert it. • The toner cartridge may be defective. Remove the toner cartridge and install a new one (See "Print media specifications" on page 89). • If the problem persists, the machine may require repair. Contact a service representative.
Curl 	If the printed paper is curled or paper does not feed into the machine: • Turn over the stack of paper in the tray. Also try rotating the paper 180° in the tray. • Change the printer option and try again. Go to printer properties, click **Paper** tab and set type to **Thin Paper**. Refer to the "Opening printing preferences" on page 57 for details.
An unknown image repetitively appears on a next few sheets or loose toner, light print, or contamination occurs.	Your machine is probably being used at an altitude of 1,000 m (3,281 ft.) or above. The high altitude may affect the print quality such as loose toner or light imaging. You can set this option through **Printer Setting Utility** (See "Altitude adjustment" on page 46).

Common Windows problems

CONDITION	SUGGESTED SOLUTIONS
"File in Use" message appears during installation.	Exit all software applications. Remove all software from the startup group, then restart Windows. Reinstall the printer driver.
"General Protection Fault", "Exception OE", "Spool 32", or "Illegal Operation" messages appear.	Close all other applications, reboot Windows and try printing again.
"Fail To Print", "A printer timeout error occurred" messages appear.	These messages may appear during printing. Just keep waiting until the machine finishes printing. If the message appears in ready mode or after printing has been completed, check the connection and/or whether an error has occurred.

Refer to the Microsoft Windows User's Guide that came with your computer for further information on Windows error messages.

Common Linux problems

CONDITION	SUGGESTED SOLUTIONS
The machine does not print.	• Check if the printer driver is installed in your system. Open Unified Driver Configurator and switch to the **Printers** tab in **Printers configuration** window to look at the list of available machines. Make sure that your machine is displayed on the list. If not, open **Add new printer wizard** to set up your device. • Check if the machine is started. Open **Printers configuration** and select your machine on the printers list. Look at the description in the **Selected printer** pane. If its status contains **Stopped** string, press the **Start** button. After that normal operation of the machine should be restored. The "stopped" status might be activated when some problems in printing occur. For instance, this could be an attempt to print a document when the port is claimed by a scanning application. • Ensure the port is not busy. Since functional components of machine (printer and scanner) share the same I/O interface (port), the situation of simultaneous access of different user applications to the same port is possible. To avoid possible conflicts, only one of them at a time is allowed to gain control over the device. The other user will encounter "device busy" response. You should open ports configuration and select the port assigned to your machine. In the **Selected port** pane you can see if the port is occupied by some other application. If this is the case, you should either wait for completion of the current job or press the **Release port** button, if you are sure that the present application is not functioning properly. • Check if your application has special print option such as "-oraw". If "-oraw" is specified in the command line parameter, then remove it to print properly. For Gimp front-end, select "print" -> "Setup printer" and edit command line parameter in the command item. • The CUPS (Common UNIXPrinting System) version distributed with SuSE Linux 9.2 (cups-1.1.21) has a problem with ipp (Internet Printing Protocol) printing.Use the socket printing instead of ipp or install a later version of CUPS (cups-1.1.22 or higher).

CONDITION	SUGGESTED SOLUTIONS
Some color images come out all black.	This is a known bug in Ghostscript (until GNU Ghostscript version 7.05) when the base color space of the document is indexed color space and it is converted through CIE color space. Because Postscript uses CIE color space for Color Matching System, you should upgrade Ghostscript on your system to at least GNU Ghostscript version 7.06 or later. You can find recent Ghostscript versions at www.ghostscript.com.
Some color images come out in unexpected color.	This is a known bug in Ghostscript (until GNU Ghostscript version 7.xx) when the base color space of the document is indexed RGB color space and it is converted through CIE color space. Because Postscript uses CIE color space for Color Matching System, you should upgrade Ghostscript on your system to at least GNU Ghostscript version 8.xx or later. You can find recent Ghostscript versions at www.ghostscript.com.
The machine does not print whole pages, and output is printed on half the page.	It is a known problem that occurs when a color machine is used on version 8.51 or earlier of Ghostscript, 64-bit Linux OS, and has been reported to bugs.ghostscript.com as Ghostscript Bug 688252. The problem is solved in AFPL Ghostscript v. 8.52 or above. Download the latest version of AFPL Ghostscript from http://sourceforge.net/projects/ghostscript/ and install it to solve this problem.
I encounter the "Cannot open port device file" error when printing a document.	Avoid changing print job parameters (via LPR GUI, for example) while a print job is in progress. Known versions of CUPS server break the print job whenever print options are changed and then try to restart the job from the beginning. Since Unified Linux Driver locks the mfp port while printing, the abrupt termination of the driver keeps the port locked and unavailable for subsequent print jobs. If this situation occurs, try to release the mfp port by selecting **Release port** in **Port configuration** window.

Refer to the Linux User's Guide that came with your computer for further information on Linux error messages.

Common Macintosh problems

CONDITION	SUGGESTED SOLUTIONS
The machine does not print PDF files correctly. Some parts of graphics, text, or illustrations are missing.	Printing the PDF file as an image may enable the file to print. Turn on **Print As Image** from the Acrobat printing options. It will take longer to print when you print a PDF file as an image.
The document has printed, but the print job has not disappeared from the spooler in Mac OS X 10.3.2.	Update your Mac OS to OS Mac OS X 10.3.3. or higher.
Some letters are not displayed normally during the Cover page printing.	Mac OS cannot create the font during the Cover page printing. The English alphabet and numbers are displayed normally on the Cover page.
When printing a document in Macintosh with Acrobat Reader 6.0 or higher, colors print incorrectly.	Make sure that the resolution setting in your machine driver matches the one in Acrobat Reader.

Refer to the Macintosh User's Guide that came with your computer for further information on Macintosh error messages.

supplies

This chapter provides information about purchasing supplies and maintenance parts available for your machine.

This chapter includes:

Available accessories may differ from country to country. Contact your sales representatives to obtain the list of available accessories.

HOW TO PURCHASE

To order Genuine Samsung supplies, accessories and, maintenance parts, contact your local Samsung dealer or the authorized retailer where you purchased your machine. You can also visit www.samsung.com/supplies, select your country/region, and obtain information on calling for service.

AVAILABLE SUPPLIES

When supplies reach their lifespan, you can order the following types of supplies for your machine:

TYPE	AVERAGE YIELD[a]	PART NAME
Standard yield toner cartridge	• Average continuous black cartridge yield: 1,500 standard pages (Black) • Average continuous color cartridge yield: 1,000 standard pages (Yellow/Magenta/Cyan)	K407(CLT-K407S): Black C407(CLT-C407S): Cyan M407(CLT-M407S): Magenta Y407(CLT-Y407S): Yellow **Region A**[b] K4072(CLT-K4072S): Black C4072(CLT-C4072S): Cyan M4072(CLT-M4072S): Magenta Y4072(CLT-Y4072S): Yellow **Region B**[c] K4073(CLT-K4073S): Black C4073(CLT-C4073S): Cyan M4073(CLT-M4073S): Magenta Y4073(CLT-Y4073S): Yellow
Standard yield Imaging Unit	Approx. 24,000 images[d]	CLT-R407
Waste toner container	Approx. 10,000 images[d]	CLT-W409

a. Declared yield value in accordance with ISO/IEC 19798.

b. Region A: Albania, Austria, Belgium, Bosnia, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland and UK

c. Region B: China and India

d. Image counts based on one color on each page. If you print documents in full color (Cyan, Magenta, Yellow, Black), the life of this item will be reduced by 25%.

To replace a toner cartridge, see "Replacing the toner cartridge" on page 84.

Depending on the options and percentage of image area, job mode used, the toner cartridge's lifespan may differ.

You must purchase supplies, including toner cartridges, in the same country where you purchased your machine. Otherwise, supplies will be incompatible with your machine since the system configurations vary from country to country.

Samsung does not recommend using non-genuine Samsung toner cartridge such as refilled or remanufactured. Samsung cannot guarantee non-genuine Samsung toner cartridge's quality. Service or repair required as a result of using non-genuine Samsung toner cartridges will not be covered under the machine warranty.

MAINTENANCE PARTS

To purchase maintenance parts, contact the source where you bought the machine.

Replacing maintenance parts can be performed only by an authorized service provider, dealer, or the retailer where you bought the machine. The warranty does not cover the replacement of any maintenance parts once it has reached its "Average Yield".

Maintenance parts are replaced at specific intervals to avoid print quality and paper feed problems resulting from worn parts, see table below. The purpose of which is to maintain your machine in top working condition. The maintenance parts below should be replaced when the life span of each item has been met.

PARTS	AVERAGE YIELD[a]
Fuser unit	Approx. 50,000 pages (B&W)/ 12,500 pages (Color)
Transfer roller	Approx. 50,000 pages (B&W)/ 12,500 pages (Color)
Transfer belt (ITB)	Approx. 50,000 pages (B&W)/ 12,500 pages (Color)
Paper feed roller	Approx. 50,000 pages

a. It will be affected by operating system used, computing performance, application software, connecting method, media type, media size and job complexity.

REPLACING THE TONER CARTRIDGE

Click this link to open an animation about replacing a toner cartridge.

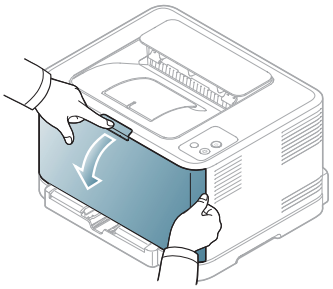
The machine uses four colors and has a different toner cartridge for each one: yellow (Y), magenta (M), cyan (C) and black (K).

A toner cartridge has reached its estimated cartridge life. The printer stops printing. Also, the Smart Panel program window appears on the computer telling you to replace the cartridge (See "Using the Smart Panel program" on page 66).

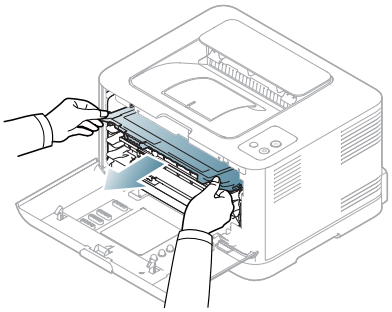
At this stage, the toner cartridge needs to be replaced. Check the model number for the toner cartridge used in your machine (See "Available supplies" on page 83).

Samsung does not recommend using non-genuine Samsung toner cartridge such as refilled or remanufactured. Samsung cannot guarantee non-genuine Samsung toner cartridge's quality or damages it can cause to the machine. Also service or repair required as a result of using non-genuine Samsung toner cartridges will not be covered under the machine warranty.

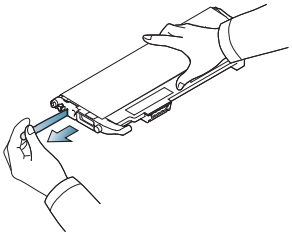
1. Turn the machine off, then wait a few minutes for the machine to cool.
2. Press the release button, completely open the front cover.



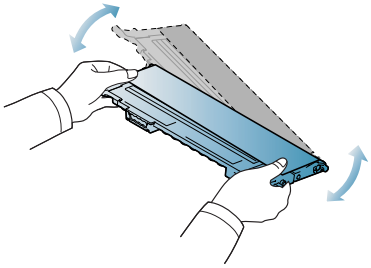
3. Grasp the handles on the toner cartridge and pull to remove the cartridge from the machine.



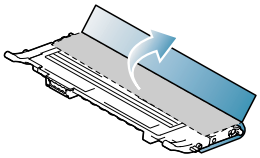
4. Take a new toner cartridge out of its package.
5. Pull out the hopper sheet from a new toner cartridge.



6. Holding both handles a new toner cartridge, thoroughly rock it from side to side to evenly distribute the toner.

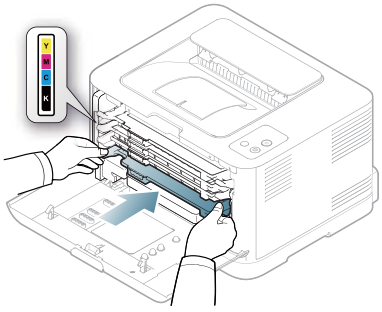


7. Place the toner cartridge on a flat surface as shown below and remove the protecting cover.



If toner gets on your clothing, wipe it off with a dry cloth and wash it in cold water. Hot water sets toner into fabric.

8. Make sure that the color of the toner cartridge matches the color slot and then grasp the handles on the toner cartridge. Insert the cartridge until it clicks into place.



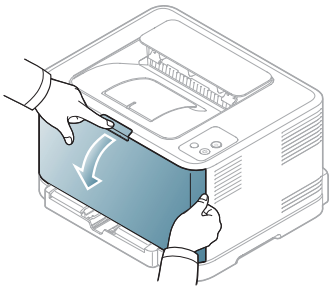
9. Close the front cover. Make sure the cover is securely latched and then turn the machine on.

If the front cover is not completely closed, the machine will not operate.

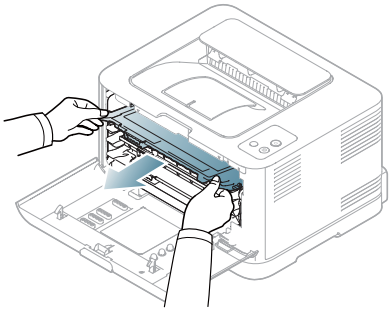
REPLACING THE IMAGING UNIT

When the life span of the imaging unit has expired, the Smart Panel program window appears on the computer, indicating the imaging unit needs to be placed. Otherwise, your machine stops printing.

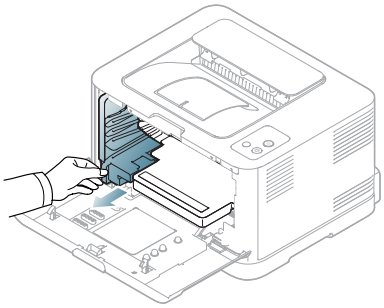
1. Turn the machine off, then wait a few minutes for the machine to cool.
2. Press the release button, completely open the front cover.



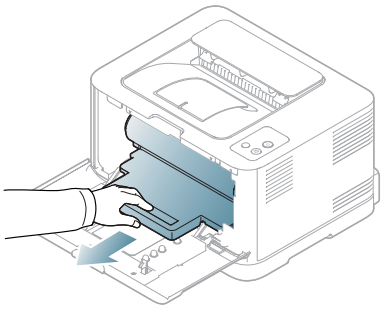
3. Grasp the handles on the toner cartridge and pull to remove the cartridge from the machine.



4. Pull the waste toner container out of the machine using its handle.



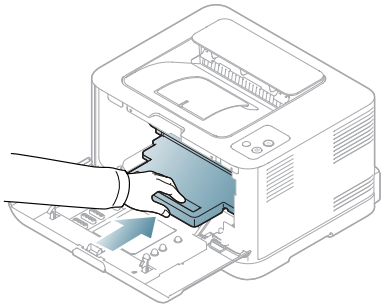
5. Pull the imaging unit out of the machine using the groove on the front of the imaging unit.



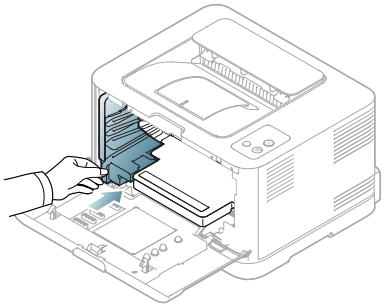
6. Take a new imaging unit out of its package.

- Don't use sharp objects such as a knife or scissors to open the imaging unit package. You could damage the surface of the imaging unit.
- Be careful not to scratch the surface of the imaging unit.
- To prevent damage, do not expose the imaging unit to light for more than a few minutes. Cover it with a piece of paper to protect it if necessary.

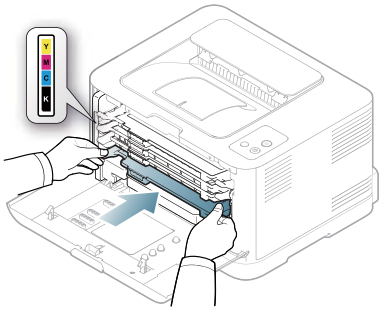
7. Holding the groove on the front of the imaging unit, push imaging unit into the machine.



8. Insert the waste toner container into position and then push it to make sure that it is firmly seated in place.



9. Slide the toner cartridge back into the machine.



10. Close the front cover firmly.

If the front cover is not completely closed, the machine will not operate. Please make sure all toner cartridges are installed properly. If any toner cartridge is installed improperly, the front cover do not close.

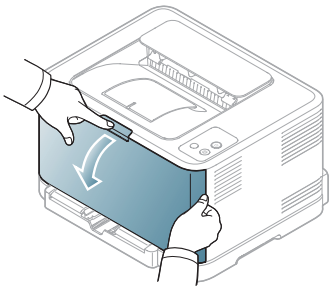
11. Turn the machine on.

Each LED blinks red in a repeated order. Wait for about 1.5 minutes for your machine to get ready.

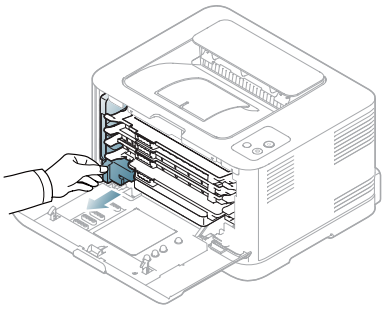
REPLACING THE WASTE TONER CONTAINER

When the life span of the waster toner container has expired, the Smart Panel program window appears on the computer, indicating the waste toner container needs to be replaced. Otherwise, your machine stops printing.

1. Turn the machine off, then wait a few minutes for the machine to cool.
2. Open the front cover.

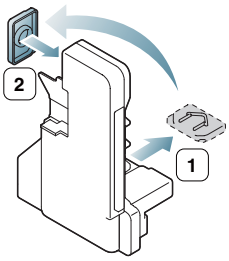


3. Pull the waste toner container out of the machine using its handle.



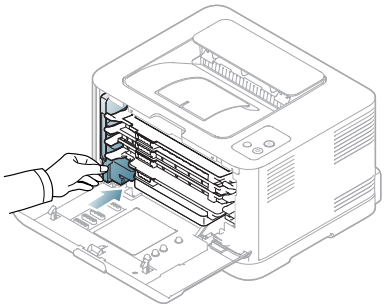
Make sure that you lay the waste toner container on a flat surface so that the toner dose not spill.

4. Remove the container's cap from the container as shown below and use it to close the waste toner container opening.



Do not tilt or turn over the container.

5. Take a new waste toner container out of its package.
6. Insert the new container into position and then push it to make sure that it is firmly seated in place.



7. Close the front cover firmly.

If the front cover is not completely closed, the machine will not operate. Please, make sure all toner cartridges are installed properly. If any toner cartridge is installed improperly, the front cover do not close.

8. Turn the machine on.

specifications

This chapter covers the machine's primary specifications.

This chapter includes:

- Hardware specifications
- Environmental specifications
- Electrical specifications
- Print media specifications

The specification values are listed below: specification are subject to change without notice: See **www.samsung.com/printer** for possible changes in information.

HARDWARE SPECIFICATIONS

ITEM		DESCRIPTION
Dimension	Height	243 mm (9.57 inches)
	Depth	313 mm (12.32 inches)
	Width	388 mm (15.28 inches)
Weight	Machine with consumables	11 Kg (24.25 lbs)
Package weight	Paper	2.2 Kg (4.85 lbs)
	Plastic	0.33 Kg (0.73 lbs)

ENVIRONMENTAL SPECIFICATIONS

ITEM		DESCRIPTION
Noise Level[a]	Ready mode	Background noise level
	Printing mode	Less than 46 dBA (Color printing) Less than 48 dBA (Black and White printing)
Temperature	Operation	10 to 32.5 °C (50 to 90 °F)
	Storage (Packed)	-20 to 50 °C (-4 to 122 °F)
Humidity	Operation	20 to 80% RH
	Storage (Packed)	10 to 90% RH

a. Sound Pressure Level, ISO 7779. Configuration tested: machine basic installation, A4 paper, simplex printing.

ELECTRICAL SPECIFICATIONS

Power requirements are based on the country/region where the device is sold. Do not convert operating voltages. Doing so might damage the device and void the product warranty.

ITEM		DESCRIPTION
Power rating[a]	110 volt models	AC 110 - 127 V
	220 volt models	AC 220 - 240 V

ITEM		DESCRIPTION
Power consumption	Average operating mode	Less than 350 W
	Ready mode	Less than 60 W
	Power save mode	Less than 7 W
	Power off mode	Less than 0.45 W

a. See the rating label on the machine for the correct voltage, frequency (hertz) and type of current for your machine.

PRINT MEDIA SPECIFICATIONS

TYPE	SIZE	DIMENSIONS	WEIGHT[a]	CAPACITY[b]
Plain paper	Letter	216 x 279 mm (8.50 x 11.00 inches)	60 to 90 g/m^2 (16 to 24 lbs bond).	130 sheets of 80 g/m^2 (20 lbs bond) paper for the tray.
	Legal	216 x 356 mm (8.50 x 14.00 inches)		
	US Folio	216 x 330 mm (8.50 x 13.00 inches)		
	A4	210 x 297 mm (8.26 x 11.69 inches)		
	Oficio	216 x 343 mm (8.50 x 13.50 inches)		
	JIS B5	182 x 257 mm (7.17 x 10.12 inches)		
	ISO B5	176 x 250 mm (6.93 x 9.84 inches)		
	Executive	184 x 267 mm (7.25 x 10.5 inches)		
	A5	148 x 210 mm (5.83 x 8.27 inches)		
	A6	105 x 148 mm (4.13 x 5.83 inches)		
Envelope	Monarch	98 x 191 mm (3.87 x 7.50 inches)	75 to 90 g/m^2 (20 to 24 lbs bound) for manual feeding in the tray.	5 sheets for manual feeding in the tray.
	No. 10	105 x 241 mm (4.12 x 9.50 inches)		
	DL	110 x 220 mm (4.33 x 8.66 inches)		
	C5	162 x 229 mm (6.38 x 9.02 inches)		
	C6	114 x 162 mm (4.49 x 6.38 inches)		
	No.9	98 x 225 mm (3.87 x 8.87 inches)		
	6 3/4	92 x 165 mm (3.62 x 6.50 inches)		
Thick paper	Refer to the Plain paper section	Refer to the Plain paper section	90 to 163 g/m^2 (24 to 43 lbs) for manual feeding in the tray.	5 sheets for manual feeding in the tray.
Thin paper	Refer to the Plain paper section	Refer to the Plain paper section	60 to 70 g/m^2 (16 to 19 lbs bond) for manual feeding in the tray.	
Labels[c]	Letter, A4	Refer to the Plain paper section	120 to 150 g/m^2 (32 to 40 lbs bond) for manual feeding in the tray.	
Card stock	PostCard	101.6 x 152.4 mm (4 x 6 inches)	105 to 163 g/m^2 (28 to 43 lbs bond)for manual feeding in the tray.	
Transparency[d] [e]	Letter, A4,	Refer to the Plain paper section	-	1 sheet for manual feeding in the tray
Glossy Photo[f], Matte Photo	Letter, A4, PostCard 4 x 6	Refer to the Pain paper section	111 to 220 g/m^2 (30 to 58 lbs bond) for manual feeding in the tray.	
Matte Photo	Letter, A4, PostCard 4 x 6	Refer to the Pain paper section	111 to 220 g/m^2 (30 to 58 lbs bond) for manual feeding in the tray.	
Minimum size (custom)		76 x 152.4 mm (3.00 x 6.00 inches)	60 to 163 g/m^2 (16 to 43 lbs bond)	
Maximum size (custom)		216 x 356 mm (8.50 x 14.02 inches)		

a. If media weight is over 105 g/m^2 (28 lbs bond), load a paper into the tray one by one.

b. Maximum capacity may differ depending on media weight, thickness and environmental conditions.

c. Smoothness: 100 to 250 (sheffield).

d. Recommended media: Transparency for a color laser printer by **Xerox 3R91331 (A4)**, **Xerox 3R2780 (Letter)**.

e. Recommended media: 0.104 to 0.124 mm (0.004094 to 0.004882 inches) transparency paper.

f. Recommended media: Glossy paper (Letter) for this machine by **HP Brochure Paper** (Product: Q6611A). Glossy paper (A4) for this machine by **HP Superior Paper 160 glossy** (Product: Q6616A).

contact samsung worldwide

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glossary

The following glossary helps you get familiar with the product by understanding the terminologies commonly used with printing as well as mentioned in this user's guide.

802.11

802.11 is a set of standards for wireless local area network (WLAN) communication, developed by the IEEE LAN/MAN Standards Committee (IEEE 802).

802.11b/g/n

802.11b/g/n can share same hardware and use the 2.4 GHz band. 802.11b supports bandwidth up to 11 Mbps, 802.11n supports bandwidth up to 150 Mbps. 802.11b/g/n devices may occasionally suffer interference from microwave ovens, cordless telephones, and Bluetooth devices.

Access point

Access Point or Wireless Access Point (AP or WAP) is a device that connects wireless communication devices together on wireless local area networks (WLAN), and acts as a central transmitter and receiver of WLAN radio signals.

ADF

An Automatic Document Feeder (ADF) is a scanning unit that will automatically feed an original sheet of paper so that the machine can scan some amount of the paper at once.

AppleTalk

AppleTalk is a proprietary suite of protocols developed by Apple, Inc for computer networking. It was included in the original Macintosh (1984) and is now deprecated by Apple in favor of TCP/IP networking.

BIT Depth

A computer graphics term describing the number of bits used to represent the color of a single pixel in a bitmapped image. Higher color depth gives a broader range of distinct colors. As the number of bits increases, the number of possible colors becomes impractically large for a color map. 1-bit color is commonly called as monochrome or black and white.

BMP

A bitmapped graphics format used internally by the Microsoft Windows graphics subsystem (GDI), and used commonly as a simple graphics file format on that platform.

BOOTP

Bootstrap Protocol. A network protocol used by a network client to obtain its IP address automatically. This is usually done in the bootstrap process of computers or operating systems running on them. The BOOTP servers assign the IP address from a pool of addresses to each client. BOOTP enables 'diskless workstation' computers to obtain an IP address prior to loading any advanced operating system.

CCD

Charge Coupled Device (CCD) is a hardware which enables the scan job. CCD Locking mechanism is also used to hold the CCD module to prevent any damage when you move the machine.

Collation

Collation is a process of printing a multiple-copy job in sets. When collation is selected, the device prints an entire set before printing additional copies.

Control Panel

A control panel is a flat, typically vertical, area where control or monitoring instruments are displayed. They are typically found in front of the machine.

Coverage

It is the printing term used for a toner usage measurement on printing. For example, 5% coverage means that an A4 sided paper has about 5% image or text on it. So, if the paper or original has complicated images or lots of text on it, the coverage will be higher and at the same time, a toner usage will be as much as the coverage.

CSV

Comma Separated Values (CSV). A type of file format, CSV is used to exchange data between disparate applications. The file format, as it is used in Microsoft Excel, has become a de facto standard throughout the industry, even among non-Microsoft platforms.

DADF

A Duplex Automatic Document Feeder (DADF) is a scanning unit that will automatically feed and turn over an original sheet of paper so that the machine can scan on both sides of the paper.

Default

The value or setting that is in effect when taking a printer out of its box state, reset, or initialized.

DHCP

A Dynamic Host Configuration Protocol (DHCP) is a client-server networking protocol. A DHCP server provides configuration parameters specific to the DHCP client host requesting, generally, information required by the client host to participate on an IP network. DHCP also provides a mechanism for allocation of IP addresses to client hosts.

DIMM

Dual Inline Memory Module (DIMM), a small circuit board that holds memory. DIMM stores all the data within the machine like printing data, received fax data.

DLNA

The Digital Living Network Alliance (DLNA) is a standard that allows devices on a home network to share information with each other across the network.

DMPr

The Digital Media Printer (DMPr) is a device that allows printing in DLNA home network. The DMPr prints a page by combining images with an Extensible HyperText Markup Language (XHTML) template.

DNS

The Domain Name Server (DNS) is a system that stores information associated with domain names in a distributed database on networks, such as the Internet.

Dot Matrix Printer

A dot matrix printer refers to a type of computer printer with a print head that runs back and forth on the page and prints by impact, striking an ink-soaked cloth ribbon against the paper, much like a typewriter.

DPI

Dots Per Inch (DPI) is a measurement of resolution that is used for scanning and printing. Generally, higher DPI results in a higher resolution, more visible detail in the image, and a larger file size.

DRPD

Distinctive Ring Pattern Detection. Distinctive Ring is a telephone company service which enables a user to use a single telephone line to answer several different telephone numbers.

Duplex

A mechanism that will automatically turn over a sheet of paper so that the machine can print (or scan) on both sides of the paper. A printer equipped with a Duplex Unit can print on both sides of paper during one print cycle.

Duty Cycle

Duty cycle is the page quantity which does not affect printer performance for a month. Generally the printer has the lifespan limitation such as pages per year. The lifespan means the average capacity of print-outs, usually within the warranty period. For example, if the duty cycle is 48,000 pages per month assuming 20 working days, a printer limits 2,400 pages a day.

ECM

Error Correction Mode (ECM) is an optional transmission mode built into Class 1 fax machines or fax modems. It automatically detects and corrects errors in the fax transmission process that are sometimes caused by telephone line noise.

Emulation

Emulation is a technique of one machine obtaining the same results as another.

An emulator duplicates the functions of one system with a different system, so that the second system behaves like the first system. Emulation focuses on exact reproduction of external behavior, which is in contrast to simulation, which concerns an abstract model of the system being simulated, often considering its internal state.

Ethernet

Ethernet is a frame-based computer networking technology for local area networks (LANs). It defines wiring and signaling for the physical layer, and frame formats and protocols for the media access control (MAC)/data link layer of the OSI model. Ethernet is mostly standardized as IEEE 802.3. It has become the most widespread LAN technology in use during the 1990s to the present.

EtherTalk

A suite of protocols developed by Apple Computer for computer networking. It was included in the original Macintosh (1984) and is now deprecated by Apple in favor of TCP/IP networking.

FDI

Foreign Device Interface (FDI) is a card installed inside the machine to allow a third party device such as a coin operated device or a card reader. Those devices allow the pay-for-print service on your machine.

FTP

A File Transfer Protocol (FTP) is a commonly used protocol for exchanging files over any network that supports the TCP/IP protocol (such as the Internet or an intranet).

Fuser Unit

The part of a laser printer that fuses the toner onto the print media. It consists of a heat roller and a pressure roller. After toner is transferred onto the paper, the fuser unit applies heat and pressure to ensure that the toner stays on the paper permanently, which is why paper is warm when it comes out of a laser printer.

Gateway

A connection between computer networks, or between a computer network and a telephone line. It is very popular, as it is a computer or a network that allows access to another computer or network.

Grayscale

A shades of gray that represent light and dark portions of an image when color images are converted to grayscale; colors are represented by various shades of gray.

Halftone

An image type that simulates grayscale by varying the number of dots. Highly colored areas consist of a large number of dots, while lighter areas consist of a smaller number of dots.

HDD

Hard Disk Drive (HDD), commonly referred to as a hard drive or hard disk, is a non-volatile storage device which stores digitally-encoded data on rapidly rotating platters with magnetic surfaces.

IEEE

The Institute of Electrical and Electronics Engineers (IEEE) is an international non-profit, professional organization for the advancement of technology related to electricity.

IEEE 1284

The 1284 parallel port standard was developed by the Institute of Electrical and Electronics Engineers (IEEE). The term "1284-B" refers to a specific connector type on the end of the parallel cable that attaches to the peripheral (for example, a printer).

Intranet

A private network that uses Internet Protocols, network connectivity, and possibly the public telecommunication system to securely share part of an organization's information or operations with its employees. Sometimes the term refers only to the most visible service, the internal website.

IP address

An Internet Protocol (IP) address is a unique number that devices use in order to identify and communicate with each other on a network utilizing the Internet Protocol standard.

IPM

The Images Per Minute (IPM) is a way of measuring the speed of a printer. An IPM rate indicates the number of single-sided sheets a printer can complete within one minute.

IPP

The Internet Printing Protocol (IPP) defines a standard protocol for printing as well as managing print jobs, media size, resolution, and so forth. IPP can be used locally or over the Internet to hundreds of printers, and also supports access control, authentication, and encryption, making it a much more capable and secure printing solution than older ones.

IPX/SPX

IPX/SPX stands for Internet Packet Exchange/Sequenced Packet Exchange. It is a networking protocol used by the Novell NetWare operating systems. IPX and SPX both provide connection services similar to TCP/IP, with the IPX protocol having similarities to IP, and SPX having similarities to TCP. IPX/SPX was primarily designed for local area networks (LANs), and is a very efficient protocol for this purpose (typically its performance exceeds that of TCP/IP on a LAN).

ISO

The International Organization for Standardization (ISO) is an international standard-setting body composed of representatives from national standards bodies. It produces world-wide industrial and commercial standards.

ITU-T

The International Telecommunication Union is an international organization established to standardize and regulate international radio and telecommunications. Its main tasks include standardization, allocation of the radio spectrum, and organizing interconnection arrangements between different countries to allow international phone calls. A -T out of ITU-T indicates telecommunication.

ITU-T No. 1 chart

Standardized test chart published by ITU-T for document facsimile transmissions.

JBIG

Joint Bi-level Image Experts Group (JBIG) is an image compression standard with no loss of accuracy or quality, which was designed for compression of binary images, particularly for faxes, but can also be used on other images.

JPEG

Joint Photographic Experts Group (JPEG) is a most commonly used standard method of lossy compression for photographic images. It is the format used for storing and transmitting photographs on the World Wide Web.

LDAP

The Lightweight Directory Access Protocol (LDAP) is a networking protocol for querying and modifying directory services running over TCP/IP.

LED

A Light-Emitting Diode (LED) is a semiconductor device that indicates the status of a machine.

MAC address

Media Access Control (MAC) address is a unique identifier associated with a network adapter. MAC address is a unique 48-bit identifier usually written as 12 hexadecimal characters grouped in pairs (e. g., 00-00-0c-34-11-4e). This address is usually hard-coded into a Network Interface Card (NIC) by its manufacturer, and used as an aid for routers trying to locate machines on large networks.

MFP

Multi Function Peripheral (MFP) is an office machine that includes the following functionality in one physical body, so as to have a printer, a copier, a fax, a scanner and etc.

MH

Modified Huffman (MH) is a compression method for decreasing the amount of data that needs to be transmitted between the fax machines to transfer the image recommended by ITU-T T.4. MH is a codebook-based run-length encoding scheme optimized to efficiently compress white space. As most faxes consist mostly of white space, this minimizes the transmission time of most faxes.

MMR

Modified Modified READ (MMR) is a compression method recommended by ITU-T T.6.

Modem

A device that modulates a carrier signal to encode digital information, and also demodulates such a carrier signal to decode transmitted information.

MR

Modified Read (MR) is a compression method recommended by ITU-T T.4. MR encodes the first scanned line using MH. The next line is compared to the first, the differences determined, and then the differences are encoded and transmitted.

NetWare

A network operating system developed by Novell, Inc. It initially used cooperative multitasking to run various services on a PC, and the network protocols were based on the archetypal Xerox XNS stack. Today NetWare supports TCP/IP as well as IPX/SPX.

OPC

Organic Photo Conductor (OPC) is a mechanism that makes a virtual image for print using a laser beam emitted from a laser printer, and it is usually green or rust colored and has a cylinder shape.

An imaging unit containing a drum slowly wears the drum surface by its usage in the printer, and it should be replaced appropriately since it gets worn from contact with the cartridge development brush, cleaning mechanism, and paper.

Originals

The first example of something, such as a document, photograph or text, etc, which is copied, reproduced or translated to produce others, but which is not itself copied or derived from something else.

OSI

Open Systems Interconnection (OSI) is a model developed by the International Organization for Standardization (ISO) for communications. OSI offers a standard, modular approach to network design that divides the required set of complex functions into manageable, self-contained, functional layers. The layers are, from top to bottom, Application, Presentation, Session, Transport, Network, Data Link and Physical.

PABX

A private automatic branch exchange (PABX) is an automatic telephone switching system within a private enterprise.

PCL

Printer Command Language (PCL) is a Page Description Language (PDL) developed by HP as a printer protocol and has become an industry standard. Originally developed for early inkjet printers, PCL has been released in varying levels for thermal, dot matrix printer, and laser printers.

PDF

Portable Document Format (PDF) is a proprietary file format developed by Adobe Systems for representing two dimensional documents in a device independent and resolution independent format.

PostScript

PostScript (PS) is a page description language and programming language used primarily in the electronic and desktop publishing areas. - that is run in an interpreter to generate an image.

Printer Driver

A program used to send commands and transfer data from the computer to the printer.

Print Media

The media like paper, envelopes, labels, and transparencies which can be used in a printer, a scanner, a fax or, a copier.

PPM

Pages Per Minute (PPM) is a method of measurement for determining how fast a printer works, meaning the number of pages a printer can produce in one minute.

PRN file

An interface for a device driver, this allows software to interact with the device driver using standard input/output system calls, which simplifies many tasks.

Protocol

A convention or standard that controls or enables the connection, communication, and data transfer between two computing endpoints.

PS

See PostScript.

PSTN

The Public-Switched Telephone Network (PSTN) is the network of the world's public circuit-switched telephone networks which, on industrial premises, is usually routed through the switchboard.

RADIUS

Remote Authentication Dial In User Service (RADIUS) is a protocol for remote user authentication and accounting. RADIUS enables centralized management of authentication data such as usernames and passwords using an AAA (authentication, authorization, and accounting) concept to manage network access.

Resolution

The sharpness of an image, measured in Dots Per Inch (DPI). The higher the dpi, the greater the resolution.

SMB

Server Message Block (SMB) is a network protocol mainly applied to share files, printers, serial ports, and miscellaneous communications

between nodes on a network. It also provides an authenticated Inter-process communication mechanism.

SMTP

Simple Mail Transfer Protocol (SMTP) is the standard for e-mail transmissions across the Internet. SMTP is a relatively simple, text-based protocol, where one or more recipients of a message are specified, and then the message text is transferred. It is a client-server protocol, where the client transmits an email message to the server.

SSID

Service Set Identifier (SSID) is a name of a wireless local area network (WLAN). All wireless devices in a WLAN use the same SSID in order to communicate with each other. The SSIDs are case-sensitive and have a maximum length of 32 characters.

Subnet Mask

The subnet mask is used in conjunction with the network address to determine which part of the address is the network address and which part is the host address.

TCP/IP

The Transmission Control Protocol (TCP) and the Internet Protocol (IP); the set of communications protocols that implement the protocol stack on which the Internet and most commercial networks run.

TCR

Transmission Confirmation Report (TCR) provides details of each transmission such as job status, transmission result and number of pages sent. This report can be set to print after each job or only after failed transmissions.

TIFF

Tagged Image File Format (TIFF) is a variable-resolution bitmapped image format. TIFF describes image data that typically come from scanners. TIFF images make use of tags, keywords defining the characteristics of the image that is included in the file. This flexible and platform-independent format can be used for pictures that have been made by various image processing applications.

Toner Cartridge

A kind of bottle or container used in a machine like a printer which contains toner. Toner is a powder used in laser printers and photocopiers, which forms the text and images on the printed paper. Toner can be fused by by a combination of heat/pressure from the fuser, causing it to bind to the fibers in the paper.

TWAIN

An industry standard for scanners and software. By using a TWAIN-compliant scanner with a TWAIN-compliant program, a scan can be initiated from within the program. It is an image capture API for Microsoft Windows and Apple Macintosh operating systems.

UNC Path

Uniform Naming Convention (UNC) is a standard way to access network shares in Window NT and other Microsoft products. The format of a UNC path is: \\<servername>\<sharename>\<Additional directory>

URL

Uniform Resource Locator (URL) is the global address of documents and resources on the Internet. The first part of the address indicates what protocol to use, the second part specifies the IP address or the domain name where the resource is located.

USB

Universal Serial Bus (USB) is a standard that was developed by the USB Implementers Forum, Inc., to connect computers and peripherals. Unlike the parallel port, USB is designed to concurrently connect a single computer USB port to multiple peripherals.

Watermark

A watermark is a recognizable image or pattern in paper that appears lighter when viewed by transmitted light. Watermarks were first introduced in Bologna, Italy in 1282; they have been used by papermakers to identify their product, and also on postage stamps, currency, and other government documents to discourage counterfeiting.

WEP

Wired Equivalent Privacy (WEP) is a security protocol specified in IEEE 802.11 to provide the same level of security as that of a wired LAN. WEP provides security by encrypting data over radio so that it is protected as it is transmitted from one end point to another.

WIA

Windows Imaging Architecture (WIA) is an imaging architecture that is originally introduced in Windows Me and Windows XP. A scan can be initiated from within these operating systems by using a WIA-compliant scanner.

WPA

Wi-Fi Protected Access (WPA) is a class of systems to secure wireless (Wi-Fi) computer networks, which was created to improve upon the security features of WEP.

WPA-PSK

WPA-PSK (WPA Pre-Shared Key) is special mode of WPA for small business or home users. A shared key, or password, is configured in the wireless access point (WAP) and any wireless laptop or desktop devices. WPA-PSK generates a unique key for each session between a wireless client and the associated WAP for more advanced security.

WPS

The Wi-Fi Protected Setup (WPS) is a standard for establishing a wireless home network. If your wireless access point supports WPS, you can configure the wireless network connection easily without a computer.

XPS

XML Paper Specification (XPS) is a specification for a Page Description Language (PDL) and a new document format, which has benefits for portable document and electronic document, developed by Microsoft. It is an XML-based specification, based on a new print path and a vector-based device-independent document format.