

XEROX

25 ways to improve print quality

A primer from Diablo Systems on techniques that can help office staffs improve the appearance of materials produced by their output writers.



Why Be Concerned About Print Quality?

Twenty years ago, typewriters used fabric ribbons, bar-lever print mechanisms and unassisted manual key-stroking. Small computer output writers consisted principally of teleprinter mechanisms. Both were slow, and both lacked quality.

Somewhat later, technology brought electric typing and a variety of speed options to office printers. But the typewriter sacrificed speed for quality, and the output writers delivered speed without quality. Thus, the office staff still had little choice—typewriter quality at 15 characters per second, or faster output with poor print images.

Today, there is a choice. Modern office output printers can produce copy at speeds more than three times faster than electronic typewriters, while providing impeccable printing quality. The principal product that made this combination of speed and quality possible is the daisy wheel printer.

Daisy wheel printers have become mainstays in tens of thousands of office typing pools, word processing centers, terminal sites and small computer operations in just the past few years. Many users of daisy wheel printers appreciate the speed with which they operate, but are unaware of the very excellent print quality they can produce if properly used.

This booklet was developed by Diablo Systems, Inc., a Xerox company, to provide a few simple suggestions that every user of modern output writers can apply to improving the “look” of the materials his or her office produces.

And “looking good” in your letters, memoranda, manuals, inter-office drafts, and other materials produced by your output writers has a great deal to say about your organization’s standards of excellence.

25 Little Tips That Can Preserve Output Quality

Modern daisy wheel printers are able to deliver to users an exceptionally fine print quality for almost every office application. By substituting electronic precision for many of the mechanical functions previously required in typewriters and small office printers, the daisy wheel can operate within a tolerance level that provides excellent print reproduction.

However, there are many little environmental or consumable resources that can detract from the ultimate quality you obtain. Here are a few suggestions that can help you keep your daisy wheel printer producing at its peak of print impressions.

1 Establish Realistic Quality Standards.

The first step in preserving quality is to define what it means to you in various situations. An executive letter requires better quality than a first draft of an internal manual. Produce a sample of every type of document your office turns out at the quality level you want each to have. Save the copies as a visual standard.

2 Measure Production Work Against the Standard.

Once you have a sample of the quality you want in each type of document, compare production samples against them on a periodic basis. The production comparisons will illustrate major deviations from the standard.

3 Train Your Staff to Spot Problems Early.

Users are often not sensitive to minor variations in print quality. But these are early telltales of major problems. A ribbon that has dried out, the wrong type of paper, a wear spot on a character, miniscule misalignments... all of these conditions will initially cause barely perceptible changes in production copy. Catch them and correct them early.

4 Maintain A Weekly Sample Log.

Once you have begun comparing weekly samples with your master quality print-out, go a step further. Begin to maintain a log on a weekly basis of documents printed on different papers, with different print wheels, and with different types of ribbons. You'll not only help preserve quality, but you'll also discover some optional combinations that work well too.

5 Use the Right Ribbon.

Ribbons can be a major contributor to print quality excellence—or problems. Single- or multi-strike film ribbons are best for jobs that require maximum crispness of impression. Fabric ribbons, because they are textured and have ink wetness, tend to splay characters. Use them where fine quality isn't paramount.

6 Use the Right Print Wheel.

Daisy print wheels are either plastic or metallized. They come in a variety of type styles, including proportionally spaced fonts, fixed pitch, and serif and sans-serif fonts. An executive letter prepared with a proportionally spaced serif type style and a metal-plated wheel—using film ribbon—provides exceptional print quality. Change one or more of those elements, and quality begins to degrade. (The chart summarizes the best combinations of wheels, ribbons and paper to use.)

Type of Document	Ribbon	Paper	Print Wheel
Executive letter or memorandum	Multi-strike film or single strike	Fine-quality rag bond	Metallized, with proportional spacing, or plastic
Draft documents, limited reproduction	Fabric	Fanfold	Plastic
Draft documents, extensive reproduction	Multi-strike	Fine-quality rag bond	Metallized or plastic
Offset masters	Single-strike film	Offset master plate	Metallized, with or without proportional spacing, or plastic wheel
Multi-part forms	Multi-strike or fabric depending on number of parts	Carbonless or carbon pack	Metallized or plastic, depending on number of parts

7 Use the Right Type of Paper.

Paper is critical to the quality reproduction you can obtain. Most fanfold forms are of poor quality sulfite, and will deliver poor quality reproduction consistently. High quality bond, conversely, improves the appearance of all output. Where multilith or other printing reproduction is planned, use a repro master for maximum black-and-white contrast and image crispness. Never use erasable paper with film ribbons, as they are not compatible.

8 Set Manifold Lever for Copies.

When running single copy printing, set the manifold lever to full forward position, and one step back for each additional set of carbon-and-blank paper. That is, for a top sheet with three carbon sets, set the lever three steps back. This will assure the best possible print uniformity.

Serif vs Sans-Serif

The tiny points at the end of the characters on the left are called serifs. They are prone to wear out first, so use sans-serif faces, like the one at the right, when doing high-volume output.

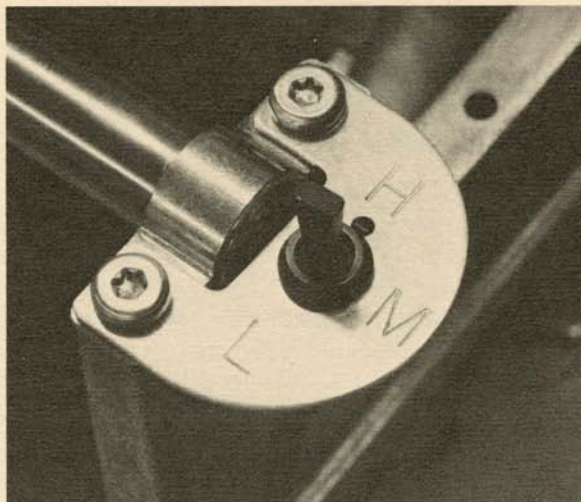
ABCDE ABCDE
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9 Know Where Wheels Wear First.

In addition to serif wear, print wheels also tend to start wearing out at specific characters or symbols. The most common indicators of wear are at periods, commas, hyphens and underscores. You can quickly spot-check a wheel's utility by examining the reproduction quality of these symbols.

10 Double-Check Impact Energy Settings.

A reliable source of poor print quality can be inappropriate settings of the impact energy switch. In addition to automatic energy levels in the print head to assure smooth impact of various-weight characters, daisy wheel printers have three operator-adjustable impact energy settings. Use the LOW setting for 12-pitch, MEDIUM for 10-pitch, and HIGH only for multi-part forms or "special" large typefaces.



Close-up of the impact energy switch showing three positions.

11 Protect the Platen from Damage.

A daisy wheel printer platen is a consumable supply, like paper, ribbon and print wheels. But it should last for two years or more in normal applications. Protecting it from scratches, mars and abrasions is a common sense rule for good print quality. There have been many instances, however, where operators have inserted stapled forms, or printed directly on the platen surface. This severely degrades print quality potential under every output combination.

12 Ribbons Can Degrade Print Wheels.

After extended usage, particularly with fabric ribbons, many of the lower case rounded letters in the wheel will begin to fill in with ribbon contaminants. This causes shading in areas that should be open in the printed characters, and reduces crispness. Periodic washing of wheels in toluene, acetone or naphtha eliminates the problem. Avoid getting the solvent on the vibration damper or cap.

13 Don't Use Wheels for Coasters.

One large Diablo customer recently complained that one of his largest word processing equipment users was getting very poor quality at one major typing pool. Our field engineers discovered the source of the problem quickly. The pool operators were using the wheels as coasters for their coffee and tea cups. Not recommended. When not in use, wheels should be stored in their containers.

Did You Know ...

... that the precision, speed and quality of a daisy wheel printer is in large measure due to the fact that it uses 30 times less parts than "golf-ball" or "bar-link" typewriter mechanisms.

14 Check for Proper Pitch Spacing.

Daisy wheel printers come in 10- and 12-pitch character sizes, and proportional spacing, which require the proper adjustment in both the vertical and horizontal paths. Unless the space setting is matched to the print wheel being used, the result will be crammed letter-spacing in the horizontal plane, too open spacing on each line, or improper line spacing vertically. It takes about three seconds to set the spacing switch properly.

15 Insert and "Start" Your Ribbon Properly.

When you insert a new ribbon into a daisy wheel printer, it is a very simple task. Insert and snap into position. Right? Right. But unless you also add a third step, you will likely lose the first four or five printed characters. So after the ribbon is snapped down, rotate the little knob on the top-left corner of the ribbon box in the direction of the arrow, so it moves the film or fabric into the right position to deliver ink to the system.

16 Understand Character Positioning.

Characters are printed on a page in a form that is intended to provide the most legibility. However, since characters have many different shapes, the printing system must compensate for their different geometry by actually positioning some characters "off line." Rounded characters, for example, are actually made to print slightly below the baseline and above the cap line, so they will appear aligned when surrounding square or straight adjacent characters. When you understand the aesthetic goals of the printing system, you will be able to make better subjective judgments about print quality.

A Subjective Art...

Judging print quality is really a subjective measurement. While there are absolute objective tests that manufacturers such as Diablo conduct, the real test is how pleasing the print looks to you. That's one reason why these 25 tips can be helpful: you'll hone your subjective evaluation skills.

17 Paper Feed Tension—A Major Problem.

One of the more common problems in obtaining good quality—especially when continuous form paper is used—is improper set-up and tensioning of the paper as it passes across the platen. Paper that is misaligned by an operator, or inserted too loosely, will tend to jam or slip, and cause lines to be crammed or wrinkled. This is a simple set-up problem that any operator can overcome.

18 Dappling Causes Gray Scales to Appear.

When your print image appears in varying shades of gray and black, the problem is almost always a worn or dried out ribbon, or a ribbon box that is malfunctioning and not feeding ribbon at the proper rate. A simple fix: change the ribbon.

Poor-Grade Paper Causes Dappling Too.

Often in fanfold applications, gray scales or dappling will occur because the paper is often recycled and of inferior quality. Upgrade the paper quality.

19 How to Eliminate Voids.

A void is simply a part of a character or line that is missing after printing. Most often, the corrective process requires one of two actions: remove the erasable paper you are using (it is a major cause of voiding), or replace the print wheel, which may have a broken typeface. Consider the ribbon/paper combination. Are they compatible?

20 Puncturing Is Easily Avoided.

A common problem with printing mechanisms of all types is to find holes, usually in periods, punched through the paper after printing impact. This puncturing need never occur. It is almost always the result of hammer energy settings that are too high, or very poor quality paper combined with slightly overenergized hammer settings.

21 Fading Impressions? Poor Ribbon.

Often you may encounter output in which the entire copy is a consistent scale of gray, rather than crisp and black. The cause is almost always a dried out ribbon (never store consumables in an area that is too hot, too cold or too humid!) or a ribbon that has been in service too long. Drying fabric ribbons are most often the cause of fading.

22 Proportional Spacing is Easier Than Ever.

Modern word processing systems now make it possible for printed material to be generated using proportional spacing, in which every character size and density are carefully balanced with surrounding white space for maximum aesthetic appearance and readability. Previously, only bar-link typewriters with cumbersome correcting and backspacing features could produce proportionally spaced output on an impact printing device. Many of Diablo's metallized wheels offer the same capability, but with automatic correction and justification circuitry that is built into most word processors.

What's In A Proportionally Spaced Word?

Symmetry, right down to each individual character on the printed page. Shown below are the aesthetic differences between a fixed-pitch and proportionally spaced word.

COMMUNICATION (proportional)

COMMUNICATION (fixed-pitch)

23 Special Fonts for Special Needs.

Often users require special printing capabilities not normally available through their printer suppliers. Printer manufacturers like Diablo specialize in developing type faces, and modifying printer electronics, to meet such needs. For one user, Diablo built a type style capable of printing through an eight-part form in which the top sheet was cardboard. Many printing requirements can be met with today's technology.

24 Develop Your Own Personality.

There are dozens of type styles available for use on daisy wheel printers, and special ones are fabricatable at reasonable costs. Consider daisy wheel printers as a tool that can extend the individual personality of your organization through improved quality graphics. Develop a system and a set of graphic standards that go into formatting, type styles, spacing, paper stock, as well as print quality itself.

25 Learn to Rely on Your Own Staff.

You'll note that not one of the 25 ways to improve print quality mentioned in this booklet involved calling your equipment manufacturer or his service personnel. The facts of modern printing systems are that they are exceedingly reliable and consistent. And they have sufficient built-in corrective techniques that every user – regardless of skill level – can tune the output to a high level of quality. So the 25th tip is perhaps the most significant: it is easier, faster, and less costly if you learn to be responsible for assuring your own high quality of printer output.

A Daisy Wheel Printer Fact:

90 percent of all quality problems in a daisy wheel printer are traceable to operator inefficiencies with one or more of the four major consumables: wheels, ribbons, paper or platens. Daisy wheel printers require few service calls.

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About Diablo

Diablo Systems, a Xerox Company, is the world's leading supplier of daisy wheel printers.

It was Diablo that introduced, in 1972, the first daisy wheel printer—a product that not only doubled the output rate then available on impact printers and typewriters, but also introduced new levels of reliability, electronic substitution and added functions to the office output writer market.

The original daisy wheel printer, HyType® I, operated at 30 characters a second. Today's HyType II second-generation printer operates at up to 55 characters per second. Various models are available in both plastic wheel and metal-plated wheels, with over 100 type styles to select from.

Besides manufacturing daisy wheel printers, Diablo is also one of the world's leading suppliers of moderate capacity disk storage devices, and a supplier of word-processing quality matrix printers.

Diablo products are the choice of hundreds of the world's best-known suppliers of office automation products that include computers, terminals, word processing systems, small business systems and specialized information handling systems.

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