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Scanner Maintenance 101

There are three pieces of hardware that are important to the workflow and document management systems of a professional tax preparation or accounting firm – an image scanner at the front end, a computer to perform calculations and system management, and a printer at the back end. Each of these is mission critical, in that the loss of any one essentially brings workflow to a halt. But while there is extensive information about the care and cleaning of computers and printers, there is little information available about maintenance of the image scanner.

This white paper is based on the best information from multiple vendors of image scanners, and from other sources, to provide tax and accounting professionals with the information they need to keep their scanners in trouble-free condition.

The Image Scanner

The image scanner, usually shortened to just "scanner," grew out of two separate devices – the pantelegraph, a form of facsimile machine invented in the 1860s to send images over telegraph lines; and Édouard Belin's Belinograph of 1913, which scanned using a photocell and transmitted over ordinary phone lines.

Today, there are four major categories of scanners – flat-bed, sheet-fed, drum, and hand-held. For tax and accounting offices, the one that counts is the sheet-fed scanner. This device is similar to flatbed scanners, except that in reverse of the flat-bed scanner, the document moves through a document feeder and the scan head stays immobile. A sheet-fed scanner looks a lot like a small portable printer, but has an automated document feeder to make the input of documents into the system smoother and faster.

Scanners operate by shining light at the document being digitized and reflecting that light through a series of mirrors and lenses onto a photosensitive element. In most scanners, this sensitive element is an electronic, light-sensing integrated circuit known as a charged coupled device (CCD). Light-sensitive receptors arrayed along the CCD convert levels of brightness into electronic signals that are then processed into a digital image.

CCD is the most common light-sensing technology used in modern scanners. Two other technologies, CIS (Contact Image Sensor), and PMT (photomultiplier tube) are found in the low and high ends of the scanner market, respectively. CIS is a newer technology that allows scanners to be smaller and lighter, but sacrifices dynamic range, depth-of-field, and resolution. PMT-based drum scanners produce very high-quality images, but have limited application due to their cost.

By shining a light through the document and interpreting the differences between light and shadow, special software can interpret the words and numbers on a document (through optical character recognition) or images (by scanning the colors, or the shades of grey in dots that make up the image.)

Here's the basic diagram of the scanner:

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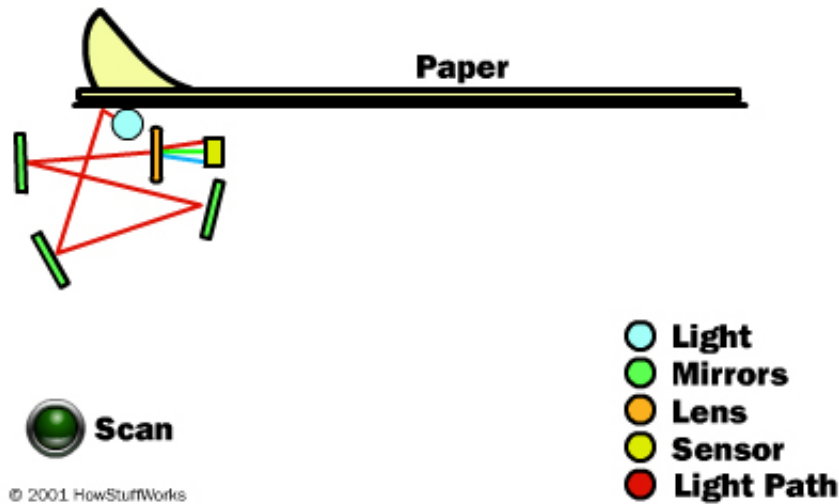
From this diagram, it is easy to see that the primary problems encountered with scanners are the things that block the light from striking the paper, or which interfere with the system of mirrors and receptors that interpret the document. That is, dust and dirt.

Picking A Scanner

The first step in scanner maintenance is to select the scanner in the first place. Major manufacturers of scanners include Fujitsu, Epson, Hewlett-Packard, Microtek, and Relisys. These devices are generally the same and use the same construction, there are substantial differences in cost, performance, and maintenance requirements from one model or manufacturer to another.

In general, look for a sheet-fed scanner capable of a minimum of 50 scanned pages per minute. It should be of quality construction, from a recognized manufacturer. And perhaps most critical in terms of maintenance, it should have specific cleaning products for routine maintenance and local providers for annual maintenance.

Avoid scanners only sold through computer stores unless they also have trained support technicians capable of cleaning and overhauling the device. Also, look for TWAIN compatibility if possible, as this is the standard for document scanning that is supported by the majority of PCs and Macs in use by professional offices.

Though the cost of scanning documents tends to vary from $.05 to $.15 per page, this cost generally does not include the cost of maintenance but rather cost of the time of support staff. In calculating the total lifetime costs of a scanner, the cost of routine and annual maintenance should also be considered.

Routine Maintenance

The most critical maintenance that can be performed is to clean the glass below the document and the white background above the document inside the scanner. With most devices, this can be done by raising the cover of the scanner and cleaning both sides (glass and white layer) with a cleaning liquid.

Paper, no matter how high it may be in quality, is made of tiny threads of wood or cloth. Though not visible to the naked eyed, these threads separate from the paper surface as it is fed through the scanner. This, over time, coats the glass and rollers and degrades the quality of the scans – or the accuracy of the OCR system that translates words and numbers.

Here are the basic procedures:

1. Turn off the scanner and unplug it before performing any maintenance.
2. Use a cleaning fluid from the scanner manufacturer that is designed for the machine. Do not use water (which may contain impurities that can leave spots on the glass.) Do not use rubbing alcohol or glass cleaner, both of which may streak or attract dust.
3. Place the cleaning fluid on a clean soft cloth and wipe down the surfaces. Do not spray the fluid on the machine, as this may cause fluid to drip into the electronic elements of the scanner.
4. Some cleaning fluids are also suitable for use on the feed rollers of the automatic document feeder, the pick rollers, pads, and other rubber components, as well as the input and output trays.
5. Allow the scanner to dry thoroughly before resuming operations.

There are other items that may be used for this cleaning. Some scanner manufacturers sell cleaning pads that are pre-soaked with cleaning fluid. Other items of interest are scanning sheets and pads that can be fed through the automatic document feeder to clean all of the elements on the outside of the scanner.

This maintenance should be performed on every scanner at least once per week. During periods of peak use, during tax season, increase the frequency to twice per week. Fujitsu, a leading manufacturer of scanning devices recommended by GruntWorx, suggests that these elements should be cleaned after every 5,000 pages scanned.

More Serious Maintenance

Scanners are not airtight. This means that, no matter how diligent the support staff is in cleaning the scanner, dust and dirt will find its way into the mechanism. Over time, this dirt will coat the underside of the glass where the document is read, the mirrors, and even the photosensitive receptors that digitize the information.

If anyone in the office smokes cigars or cigarettes, it is almost certain that the smoke has permeated the inside of the scanner. Even if this is not the case, the plastic parts inside the scanner may exude chemicals over time that will affect the scanner.

The end result is again the potential for small imperfections in the scan that will cause the document to either have OCR errors or exhibit problems with images and photos. While some technical forums dedicated to scanners may include directions for opening up the scanner to clean these elements, this is a very bad idea for three reasons:

1. Opening the machine and exposing it to the elements could make the problem worse, as dirt and dust could enter the system.
2. Keeping track of all the parts and pieces is a daunting effort, and getting even one piece wrong when the scanner is put back together can turn an expensive piece of hardware into a paper-weight.
3. The CCD array that interprets the light from the document scan is made up of capacitors – tiny electrical elements that store electrical charges even after the scanner is unplugged. Touching a capacitor may not cause an electric shock, but could cause a short in the system that will, again, turn the scanner into a paperweight or boat anchor.

Once a year, and generally during the summer and fall months when scanner requirements may be lower, the firm should invest in a professional cleaning of all of the scanners and a replacement of critical parts – the pad assembly, pick roller, separator, and brake roller.

Fujitsu recommends that these parts be replaced every year, or between 10,000 pages scanned and 600,000 pages scanned, depending on the model of scanner.

Annual maintenance should be contracted to a professional experienced with the scanner used by the tax or accounting firm. General rules for selecting the scanner maintenance firm include:

1. Get references. A professional maintenance firm should be able to provide a list of other clients who have the same or similar scanning devices.
2. Understand how pricing works. There are differences between flat-rate and cost-plus pricing that could be critical to the cost of the maintenance project. In particular, look for discounts for multiple scanners at the same site and hourly rates for travel and troubleshooting.
3. Consider the vendor's reputation and record. Check the vendor's complaint rate with the local Better Business Bureau, and consider whether the vendor handles only reputable scanner brands.

Having a professional clean the inside of the scanner and overhaul critical parts may cost, but that cost is certainly less than the loss of business if the scanner fails at a critical moment during busy season.

Basics of Troubleshooting

Outside of routine maintenance and annual refurbishment, there are few major scanner problems that can be resolved by the user. But to save time and money before calling in a professional, here are some steps that may help:

1. Verify that the cables are connected properly to the back of the scanner. Ridiculous as it may seem, a multitude of scanner problems are caused by loose connections either on the scanner or the PC side.

2. Ensure that the scanner is getting power. If the scanner is not getting power, check the connections to ensure they are connected properly to the back of the computer and from the scanner to the wall. Temporarily bypass power strips and plug directly into the wall outlet. If the scanner is getting power, the inside light will come on when the power is first received by the scanner. After checking the connections, if there is still no power, contact the manufacturer of the scanner.

3. If another device is connected in between the scanner and the computer, turn off the computer and temporally disconnect the devices connected to or from the scanner. If, after disconnecting these devices, the scanner works, it is likely that another device may have issues or may be unable to work with other installed devices.

4. PC Windows users need to verify that no programs are running in the background. Press CTRL + ALT + DEL and end tasks currently running software except explorer and Systray and scan again. If this resolves the issue it's possible that an application in the background, such as a virus or utility, is preventing the scanner from scanning.

5. Update the drivers. Verify that the latest drivers are installed for the operating system being used on your computer. Contact the manufacturer to determine that all drivers and software are up to date.

The care and maintenance of the scanner is mission critical to accounting and tax firms due to its key roles in workflow and document management. The work and money required to keep the scanner in top condition are small, but are critically important to the firm's performance.

By Dave McClure
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