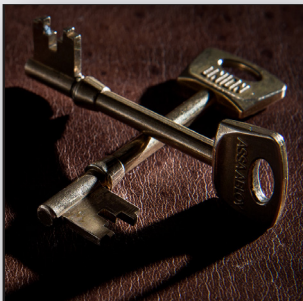# An Ounce...

.... of Prevention

Key Concepts

Effect of dust and debris on scanner performance

Impact on customer experience and your bottom line

Why maintenance is often overlooked

Why the simplest type of scanner maintenance has an outsized payoff

Would you wait for your car's engine to break down before you decided it was time to change the oil?

Most of us probably wouldn't let it get to that point. Yet, we estimate that at least half of the daily "frontline" users of our scanners – bank tellers and branch employees – clean their check scanners infrequently, if ever.

Like any mechanical device, a check scanner needs preventive maintenance to be at its best – and cleaning is both the most effective and the simplest way to keep your device running smoothly. It is also the most often forgotten or even entirely overlooked step until something goes wrong.

DIGITAL CHECK®

Executive Summary

Periodic cleaning is an important but often-overlooked task that dramatically improves the accuracy and effectiveness of your check scanner. In this paper, we will cover the following topics:

- ✦ Why bank equipment maintenance efforts have become more sporadic over the years;

- ✦ Numerical breakdown: Cost of cleaning vs. cost of problems caused by not cleaning;

- ✦ The role of image quality in day-to-day operations;

- ✦ Why scanners actually accumulate *more* dust, dirt and debris now than they used to;

- ✦ Why the discriminator roller is often the single most critical part that decides whether your scanner will run or not.

Why Cleaning Is so Often Forgotten in the Modern Branch
(Or: Your Back-End Operations, Now Front-End Processes On Public Display)

While it's easy to think about cleaning strictly in terms of the dirt and dust buildup on a machine, that's only half the story. What's just as important – but hardly ever talked about – is the way that changes in the check capture process have turned maintenance into a hit-and-miss endeavor. Moreover, the results of that change are on full display for everyone to see.

Two or three decades ago, most checks weren't scanned at the branch. The equipment in use was far too expensive to put in every branch, and transmitting thousands of images a day from each location would have overwhelmed the networks that existed at the time. Therefore, the banks would physically transport their paper checks to a regional operations center, where they were scanned on high-speed reader/sorters – the most famous of which was the IBM 3890.

These machines were incredibly complex, extremely expensive devices ($100,000 to $1,000,000 each) that would be impressive even by today's standards. The 3890, for example, reached a maximum speed of 2,400 documents per minute – several times the speed of the fastest scanners in use today. However, the 3890 was also as big as a room, and needed a dedicated staff of highly trained operators, who also performed continuous maintenance.

Contrast that with today's check-capture environment, which employs smaller and less complicated devices, but has an operating staff consisting mostly of front-line tellers who are – to put it bluntly – relative amateurs when it comes to running and maintaining these machines. This is not intended to be disrespectful: It's an unavoidable fact that tellers have many responsibilities, and operating a scanner is only one small part of their job. Most of them (as well as many branch managers, or retail banking personnel in general) have not even seen a large-scale item processing division in action.

The net effect is that over time, check capture has been pushed from the operations center all the way out to the teller window, and the further from the back office we get, the more inexperienced the operators become. Moreover, that transition has reached the point where scanning a check is now a customer-facing process, in which the skill of the operator and the condition of the machine have a direct impact on the customer experience. (In the case of remote deposit, the customer *IS* the operator.)

Even though the importance of scanner maintenance could be said to be at an all-time high, the amount of time and attention devoted to it does not match; in fact, it's quite the inverse. Though check capture has been simplified, the scanners will not maintain themselves, even though we're trying to achieve as close to that as possible *(see sidebar on the last page of this document).*

By the Numbers: The Cost of Cleaning Your Scanner Regularly

Saying that half of the operators who use our equipment rarely clean their scanners is not an exaggeration; it comes from our field experience with our customers. In fact, probably even fewer than half stick to a regular maintenance schedule, with the rest performing cleanings on an as-needed basis.

In other words, they clean the device when they start noticing problems. Our service partners also report a lack of cleaning as the #1 underlying factor resulting in repair calls. Needless to say, the great majority of those service calls would have been easily preventable.

The cost of cleaning a scanner is straightforward: About $1.80 per cleaning card, plus a few minutes of the operator's time. Divide that by the number of scans between cleanings, and it's easy to figure out the per-item cost.

As it turns out, it also matters a lot what kinds of documents you're scanning, and in what condition they arrive. Under favorable circumstances, a scanner can last 5,000-6,000 items or more before needing maintenance. That means scanning mostly checks printed on normal-weight paper, without a lot of freshly printed ink, and with no particular exposure to outside sources of dirt, debris, or other residues (see sidebar on the next page).

Rough and Tumble

This transit ticket from Mexico is an example of a coarse document that can be harder on scanners than your typical check.

On the other hand, a document mix with the opposite of those properties can mean the device needs cleaning twice as often. The document in the picture immediately below was taken from a customer in Central America. This particular customer was capturing batches of coupons and transit tickets mixed together with checks, and called us for help because of frequent hangups while scanning.

As it turned out, the coarse documents – similar in texture to paper grocery bags – were flaking off so much dust and paper fibers that the scanner could only go about 3,000 items before being overwhelmed. (The paper was also wearing down some of the scanner's internal parts, a problem that couldn't be fixed by cleaning. Fortunately, the modular "snap-in, snap-out" design of our scanners' key components allowed them to be easily swapped out on-site.)

Assuming there are no special circumstances like the case just described, adhering to a regular cleaning schedule of twice per month for an average teller window adds around two to three one-hundredths of a cent to the cost of scanning each check. This will be an important number to remember for comparison as we go forward, as we see what happens when this maintenance is *not* performed.

By the Numbers: The Cost of *NOT* Maintaining Your Scanner

Less obvious than the cost of cleaning cards is the price of *NOT* cleaning your scanner. It's tempting to say, "That's easy – the cost of doing nothing is zero."

That's not quite right, though. Obviously, failing to perform maintenance on almost any mechanical device has consequences. What exactly happens when you let your scanner go without cleaning indefinitely?

The first issue that tends to crop up is that the scanner will appear to jam more often, and the problem will get worse over time. It's easy to mistake this as a mechanical problem with the feeder – in fact, this is what most people do. What's really happening, though, is that dirty feed rollers or disriminator rollers have trouble gripping and separating the paper that is

being pulled through the track, leading either to an apparent misfeed, can't-read, or even a double-feed error, even though the scanner is perfectly fine mechanically.

How much do these misinterpreted feeding problems cost? In one sense, nothing more than a little bit of frustration on the part of your employees – and possibly on the part of the customer if he or she experiences slow or difficult transactions at the teller window. While it's difficult to put a specific price tag on these nuisances, they can certainly have a negative impact on the customer experience.

If we're talking straight dollars and cents, though, some costs are easy to measure, like the number of support and repair requests that turn out to be false alarms.

Out of all the calls to the Digital Check support team, almost one third of all cases – and also around a third of cases that can be resolved over the phone – involve scanners that simply need to be cleaned. At an average of 20 minutes per case spent on the phone, that can be anywhere from $5 to $20 worth of an employee's time, depending on who makes the call. (That's in addition to whatever time was spent trying to troubleshoot the device before it prompted a support call, which is usually much more. And of course, some cases end up taking multiple calls over a period of days or weeks.) In almost every case, regular cleaning costs significantly less than fixing the issues that result from accumulated buildup.

By the Numbers (Continued)

The added maintenance costs we've discussed so far only account for the cases that can be resolved over the phone. Having a technician come on-site for a "No Trouble Found" call can cost the bank anywhere from $50-$150 per incident, depending on the contractual arrangements with the service company. Sending a scanner in for repair might cost up to $200 when accounting for shipping, labor, and downtime (cleaning issues generally result in a "no trouble found" fee to the bank). More than 20% of the scanners that are shipped back for factory service end up having nothing wrong with them; they just need to be cleaned. Most of these tend to be units with 100,000 or fewer items scanned – less than a tenth of the expected lifespan of the scanner.

Let's go back to our estimate of less than two one-hundredths of a cent per check, which is the approximate cost of performing a cleaning once every 10,000 items. If a low-level branch employee makes a support call, maintenance costs go up to one-tenth of a cent per check scanned. If the device is sent back for service, that's an average cost of two cents per check – a hundred times more than using a cleaning card.

> **M**ore than 20% of the scanners that are shipped back for factory service end up having nothing wrong with them; they just need to be cleaned.

In 2016, our partners at KICTeam – the primary manufacturers of our cleaning and maintenance supplies – conducted a study on scanner repair costs with a regional bank that operates 24 branches throughout New England. The bank's employees were asked to clean their scanners once every two weeks with a cleaning card and alcohol swabs, and the monthly service costs were tracked both before and after. By the third month of the project, the cost of repairs on the scanners decreased by more than two-thirds. That's in addition to fringe benefits, such as increased uptime, reduced reject rates, and a more positive customer experience.

Image Is Everything

Take a moment to look at your computer's monitor and keyboard. There's probably some amount of dust on them, but chances are you wipe them off periodically, before the buildup gets to be a real problem.
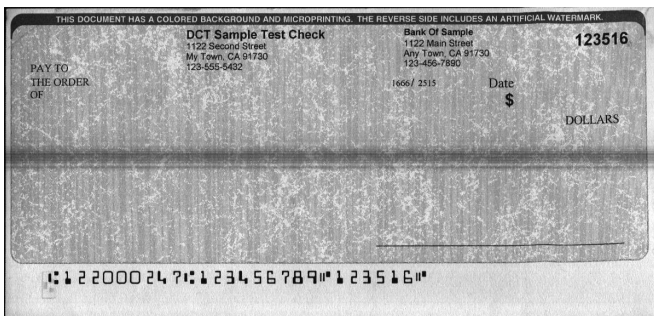
Unexplained "streaks" like this one in your check images are a telltale sign that the scanner's camera needs cleaning.

How much dust do you think would have built up on your monitor by now if you never wiped it off? Now, how do you think that would affect things if we were talking about a camera instead of a monitor?

It sounds silly, but that's what's happening inside your scanner – only with extra dust from the millions of tiny paper particles that rub off from checks as they pass through.

In our 2015 white paper, *Image Quality: The Quiet Problem that Costs Millions,* we took an in-depth look at the most common reasons why check images fail the clearing process, as well as the costs associated with resolving each of them, from about a

Sidebar: Why Your Scanner Gets Dirtier Now Than It Used To

One of the first things discussed in this article was that, as time has gone by, the point of capture for checks has been pushed out of the back office and closer to the customer. While one effect of this is that less-experienced, less-specialized operators are using the scanners, that's not the only thing that's different. Devices at the frontline teller workstations tend to get dirty much faster than their counterparts in the back room, even if they're cleaned just as often.

How could this be? In short, it's because a scanner at the teller window is simply closer to the source, and is exposed to fresher contaminants, than a scanner located in the back office or an operations center.

For example, what happens when an individual forgets to endorse a check that s/he deposits at the teller window? That person has to endorse it right there at the counter. The fresh ink can easily rub off on the scanner's feed rollers – whereas if the check had been taken to an operations center or scanned at the back counter at the end of the day, that ink would've had hours to dry.

Checks brought in by consumers also come with a lot of whatever was inside the owner's wallet or purse (it doesn't take much makeup or Chapstick to foul things up), while those presented by businesses tend to bring along remnants of the company's line of work. In one especially memorable case, a bank in Wisconsin was having problems with what turned out to be cement dust in the rollers; a visit to the site revealed that – wouldn't you know it – there was a cement factory right down the street. We've also seen everything from pizza sauce, to engine grease, to cat hair giving the scanner problems.

In every case, the longer the elapsed time between when the check leaves the customer's hands and when it's passed through a machine, the more it allows for the contamination to dry out, rub off, and otherwise make itself into less of a problem. At the teller window, that's usually just a few seconds – ensuring that the scanner gets the maximum blast of filth every time. So, while more lax maintenance at the branch is one half of the equation, it's only part of the double dose of dirt your devices get when stationed directly in customer-facing positions.

Image is Everything (Continued)

dozen large and mid-sized retail banks. The consensus among participants was that 15% to 20% of checks and money orders failed the initial image quality analysis (IQA) (overwhelmingly because of poor handwriting) and required some sort of manual intervention.

This itself was not a back-breaking expense, as the only consequence was usually that someone needed to spend a few seconds verifying the scanned information. While there is no "visible" cost in terms of wages for these errors (the time is simply absorbed into the tellers' daily activities), the impact on workflow and customer experience is often noticeable.

The real problem, as it turned out, was the roughly one to three checks out of 10,000 that caused serious issues further down the line (i.e., items rejected in the clearing process, incorrect account numbers or dollar amounts that made it through the system, or double-feeds that made a check "disappear" from a batch). The result could be anything from a charge for returning and resubmitting an item, to costly "research and repair" expenses, such as finding the original paper item or making a Day 2 balance adjustment.

Depending on the type of problem and the process used by the bank, resolving these "critical errors" could cost anywhere from $10 all the way up to $30, in certain cases. Particularly expensive mishaps included those in which an item had to be re-submitted as a new Image Cash Letter file; when the original paper document had to be retrieved and transported – for instance, to an off-site operations center; or when the processing was handled by a third-par-ty provider that imposed a fee in addition to the ordinary costs.

Not surprisingly, accumulated dust and residue on the rollers and camera glass directly contribute to the occurrence of each of these types of errors. Dirty rollers pull the paper irregularly, leading mainly to jams and misfeeds – with an occasional double-feed. Buildup on the camera impedes optical character recognition (OCR) or might cause images to be illegible on the receiving end. If that one in 10,000 or three in 10,000 checks causing "critical

Paper Jams vs. Streaks and Blurs

While buildup on the rollers tends to cause jams and paper feeding errors, image-quality issues stem from dust and residue on the camera glass. Older alcohol-based cleaning cards often had trouble reaching this part of the scanner. Newer "waffle" cleaning cards, however, can generally remove most unwanted material even from the lens. As a last resort, manually wiping down the camera glass as shown can fix troubling image-quality problems, although this should be done very carefully.

errors" becomes eight or nine out of 10,000, we're suddenly looking at hundreds of dollars' worth of additional expenses and fees, per month, per teller. The operational cost is about the same as sending the device back for an unneeded factory repair trip.

Another KICTeam study in 2017 backs this up: A group of 20 branches at a major American bank were separated into two groups – one that cleaned their scanners every two weeks, and a control group that did not. The test group reported a 42% lower rate of teller interventions, which generally translates into a corresponding decrease in the incidence of critical errors.

If a scanner was cleaned once every 10,000 items, and that prevented two major errors, the minimum savings from that alone would still be 10 to 20 times more than the cost of the cleaning card.

An Ounce of Prevention

The most important message to take away from this is that none of it needs to happen. A few minutes of preventive maintenance, done once or twice per month, has been unmistakably proven to increase read rates and lower the amount of time spent per transaction. Most importantly, even simple and inexpensive maintenance heads off much more expensive – and entirely preventable – critical errors and major repairs.

We hope that you will take a few minutes out of your day to clean your scanner on a regular basis, or to train your frontline workers how to do so. For a small up-front investment, you will save yourself several times more time and money, and your equipment will perform better in the long run.

Sidebar: The Most Critical Scanner Parts to Keep Clean

We've spent a lot of time talking about erratic training and maintenance schedules, and their contribution to the kind of buildup that causes problems with frontline scanners. As the device manufacturer, it's not as if we can just sit on our hands, wishing the problem would go away. Over the past 20 years, there have been many times where customers have jokingly told us that they wished we could "make a scanner that cleaned itself." As time has gone by, we've been getting closer and closer to making that a reality.

In any multi-feed scanner, one of the most critical pieces in the entire device is the discriminator roller – the small wheel that applies just enough pressure so the feeder pulls one check at a time from the stack, not two or three. In fact, as far as cleaning goes, the first set of rollers are by far the most important to clean; the rest barely matter by comparison. In a cruel twist of fate, the discriminator roller must also be positioned right at the start of the paper track, which means it also gets the lion's share of the dirt, dust, and any other unwanted material brought in with the documents.

Our testing has shown that as much as 90% of all the residue in a scanner is deposited within the first couple inches of the track – meaning, on the first set of rollers, including the discriminator roller. Too much accumulation causes the rollers to stick or slip, leading to errors that look like double-feeds and paper jams.

For that reason, the best way to clean a scanner has always been to hold a cleaning card in place at the start of the track for several seconds before letting it run through, thereby letting it scrub the buildup from the places that need it most. Unfortunately, very few operators know to do that, so they just run the card through the track like a regular check. In the very early days, there actually wasn't even a good way to do this; the cleaning card had to be run through with the user's active deposit program, which would often

The discriminator roller – the part being picked up by the hand in the image above – ensures that only one check at a time can enter the scanner's feed path. A dirty or worn discriminator roller is one of the most common causes of misfeeds, double-feeds, and other related errors while scanning.

Point of Entry

The components at the very beginning of the scanner's paper path tend to pick up the most dirt. For example, this vertical alignment wheel on a nearly brand-new machine already has faint specks of accumulated dust visible.

register a misfeed and stop working if the card was held in place. That was the original reason why we developed utility programs, such as ScanLite, which (in addition to other diagnostic tests) can run the motors continuously, regardless of whether the paper is moving through the track or not. While that was a step in the right direction, there was still the matter of making sure the operators knew to take advantage of it – which, by and large, many did not. So, rather than leaving it to chance, we've been experimenting with ways to make it as easy as possible on the teller.

In our latest TellerScan model, the TS500, we experimented with a self-cleaning mode that uses the input plunger to hold the card in place automatically. We've also begun adding indicators that can tell you how long it's been since the last cleaning and when it's time for maintenance. The results have generally been that the operators remember to clean their scanners more frequently, and spend less time doing it.

Getting everyone up-to-date with routine cleaning may never be a perfect process, but the more we can do to simplify it, the better your machine will run on a day-to-day basis. It's now easier than ever to do the day-to-day maintenance, so we hope you'll think it's worth it to get your staff on board.