Essential Technology for Converting Paper Checks into Image Deposits

As distributed check capture applications move from early adopter to widespread, mainstream markets comes the opportunity for greater efficiency or greater disaster. Image quality is the essential component of the check image exchange process, yet is often overlooked. In distributed capture, the image is the negotiable instrument, and if it not captured correctly, costs and risk increase.

Inside the Distributed Check Scanner

Widescale adoption of distributed check capture requires the most cost efficient solution. Mainstream customers look at solutions holistically, examining all of the many drivers of increased costs and risk for distributed check capture. Poor mechanical designs within the scanners and improper software integration can dramatically reduce check image quality. Poor image quality causes the check to be unreadable by CAR/LAR (courtesy amount recognition/legal amount recognition) engines requiring it to be reentered by an operator leading to increased cost and processing delays. If the image quality is bad enough, the clearing institution will reject it, requiring it to be resubmitted which requires more manual processing and payment processing delays.

Equally as important as the image quality is the scanners ability to accurately read the E13B MICR from the check. Substitution errors occur in MICR reading when numbers are incorrectly read and an incorrect number substituted for the correct one (e.g. a 2 instead of a 5). These factors drive the total cost of processing the transaction up and decrease the value and ROI of distributed capture.

For customers of distributed check capture, downstream costs of repair can be 6 to 9 dollars per transaction. Rejected images and suspended batches of transactions at the Federal Reserve or clearing institution can also result in delays in processing, lost funds availability, or even fines for poor image quality. This can have a negative impact on customer experience and reflect poorly on the bank's brand image.

Customer expectations for remote deposit capture or branch/teller capture are also high. Customers want the process as automatic as possible, although higher volume customers are more willing to review and adjust if necessary. They expect more accurate data capture, higher throughput for the scanner, ease of use, lower costs, long scanner life and reliability, both out of the box, and over the longer term.
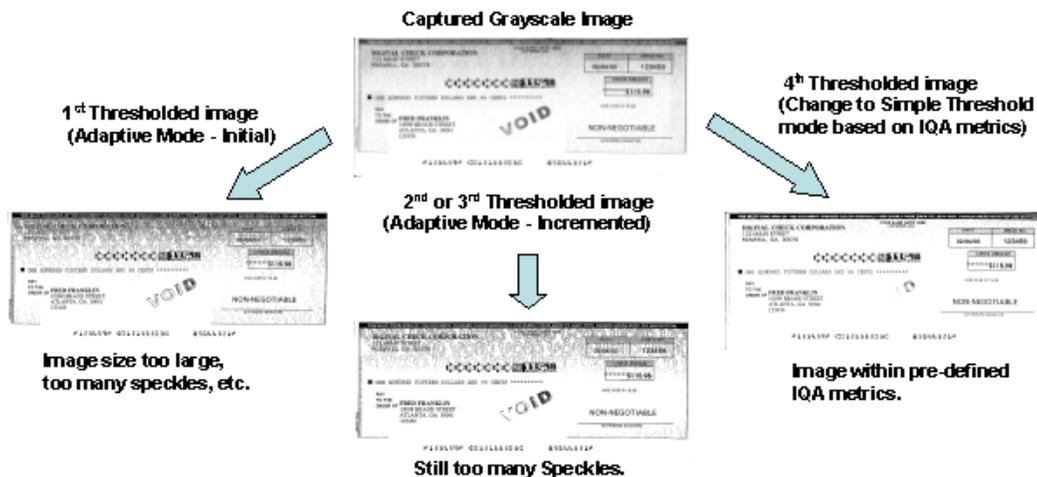
Paper to Image

When a check is scanned to create an electronic image, the image becomes the official replacement for the physical check. Not too long ago, scanners use to fill an entire room to produce accurate check images. The same technology in the present is only about the size of a toaster, but is expected to produce the same quality image as its larger predecessor. The scanner must be easy to use, reliable and produce the highest quality images and MICR, using high quality cameras and MICR read heads. The scanner must provide consistent and accurate transport speeds to insure accurate scanning of the check and MICR capture, and must have consistent out-of-the-box performance.

Digital Check, a leading provider of check scanners for the distributed check industry, has had great success due to technological innovations developed to meet the industry's unique needs. The company understands that simply capturing the check image is not enough for moving the electronic processing of check images out to the point of capture. It requires a system that minimizes user intervention and intelligent enough to distinguish unimportant background noise from the critical check information, including routing numbers and legal and courtesy amounts.

In the market, there are a multitude of check designs and there is no single imaging method that can consistently create a clean quality image. Digital Check's Automatic Adaptive Thresholding was created to analyze alternative imaging approaches and select the highest quality image for each situation.

The Digital Check application programming interface (API) is the critical control program that contains the logic for managing this process. When using Adaptive Thresholding, the scanner captures a gray-scale image of the check, then the API examines all the pixels in the image to determine the points that are not a part of critical lines or characters. The unnecessary pixels are removed to generate a clean, bitonal image. Through this method, more than 98 percent of real-world documents are cleaned up after scanning.

Captured Grayscale Image

1st Thresholded image
(Adaptive Mode - Initial)

4th Thresholded image
(Change to Simple Threshold mode based on IQA metrics)

2nd or 3rd Thresholded image
(Adaptive Mode - Incremented)

Image size too large,
too many speckles, etc.

Image within pre-defined
IQA metrics.

Still too many Speckles.

The company has also developed the Double Feed No Stop capability to address the issue of varying document thicknesses, which can cause problems by incorrectly moving piggybacked checks through the imaging system without alerting the operator. This unique feature can determine if double feeds or piggy backed checks have entered the image scan path versus a single thicker check. This technology can distinguish between thick checks on card stock, and true double feeds. With this capability, deposits can be scanned more easily and the need for operator intervention and manual processing reduced along with the cost attributed to that procedure.

These combined capabilities for check scanners begin the process of image exchange by allowing Check 21 applications to effectively truncate check images.

Scanned Grayscale Image

Thresholded Bitonal TIF Image

Image to Data

For successful CAR/LAR reads, image quality is essential for capturing check amount fields. Generating clean images can be difficult, because check background designs can interfere with the reading process so backgrounds must be removed from the image before submitting it to the CAR/LAR or optical character recognition (OCR) software for data capture. Clean, clear images are essential if the OCR software is to read the handwritten information correctly and convert to data, reducing the need for operator interventions. Customers prefer not to enter the data by hand, but will do so if necessary.

Digital Check has been a pioneer in the distributed check capture industry over the years, providing a number of innovations as a part of its Best Read® IMAGE technology. The industry average of effective CAR/LAR read rates is 65 percent. Digital Check's Best Read IMAGE technology allows the rates to approach 80 percent and maximizes the check image quality.

Digital Check's Best Read MICR technology provides optical character recognition capabilities to verify the output of traditional MICR readers, reducing risk of substitution errors. Optical character recognition is used on an improved scanned image, then through two different algorithms and combined confidence levels, before producing the final data to be delivered to the distributed capture application.

Before Digital Check introduced its Best Read MICR technology, check readers in certain markets often had up to 20 percent error rates in the MICR read rates, caused by poor quality MICR printing. Digital Check's Best Read MICR technology, which integrates MICR optical character recognition capabilities, reduced this error rate to less than one percent. This technology virtually eliminates the need for operator intervention to verify MICR data and error corrections.

Actual MICR line	000067894 12345678
Magnetically read line	000087894 12342673
Optically verified line	000067894012345678

The lowest cost of ownership is created through advanced technology that reduces hidden "downstream" costs of operator interventions, combined with highest reliability machines that minimize downtime and repairs. If anything does go wrong, it must be backed by quality service and support. Digital Check puts each of its scanners through an 85-point computer controlled quality examination prior to shipment of the product, reducing out of box failures while ensuring device durability. Digital Check is also the only U.S. based scanner manufacturer with U.S. based factory depot repair services.

Bringing Technology to Market

Digital Check, headquartered in Northfield, Ill., is the world leader in providing electronic check scanner technology to companies for remote deposit capture and bank/teller capture. The company has a 47 year-old history of being a leader in high tech camera systems, microfilm and digital scanners for a variety of markets. The company was the first to introduce a low-end table top distributed capture check scanner to the Check 21 marketplace, the first to establish U.S. based manufacturing in 2003, and the first to deploy at the teller window in a top 10 U.S. bank in 2004.

Over the course of the past 12 years, Digital Check emerged as a leader in manufacturing and distribution of distributed capture check scanners to financial institutions and their remote deposit capture customers, due to the company's extensive expertise in image, scanner and reader technology. In the past three years, Digital Check has installed more than 150,000 check scanners for distributed capture processes. Currently, there are more than 10,000 locations operating Digital Check check scanners processing more than 200 million items per month.