



## ***Combining Remote Capture and IRD Printing***

A Check 21 Strategy For Community and  
Regional Banks

by Bill Lange

## Contents

<b>Executive Summary</b>	3
<b>Introduction</b>	4
Objective	4
Target Audience	4
The Geographic Advantage Of Regional Banks Is Gone	4
The Best Defense is a Good Offense	4
Who is All My Papers?	5
X9 Voting Committee Member	5
Why Did All My Papers Write This White Paper?	5
Visit Our Web Site To Find Our Check 21 Business Partners	5
<b>The Problem</b>	6
The big banks are moving outside their “Footprint”	6
What is Check 21?	8
What is an IRD?	8
Implications of Check 21	8
Fully Imaging Enabling a Bank Can Be a Major Change	8
<b>The Solution</b>	9
Partially Image Enabling – a better alternative?	9
Advantages of a Remote Capture and IRD Printing System	9
Three Processes	10
1. Remote Check ImageCapture Process	11
a) MICR	12
b) Verifying the MICR Data	12
c) Substitution Errors	13
d) Technology That Verifies the Data from the Check Image	14
e) Image Repair	15
2. Creating, Editing and Using X9.37 Files	16
a) X9.37 File or Image Cash Letter–Introduction and definition	16
b) Converting Check and Image Data to a X9.37 File	16
c) Generate X9.37 Files	16
d) X9.37 File Viewer and Analyzer	16
e) X9.37 to Database File Conversion	17
f) X9.37 File Format Converters	17
g) Generate Return X9.37 from Forward X9.37	17
h) Edit X9.37 Files	17
i) Sorting and Routing X9.37 Files	18
j) X9.37 File Utilities	18
3. Printing Valid IRDs	19
a) Conforming to the X9.100-140 standard	19
b) Hardware For Printing Valid IRDs	19
c) Special Fonts	20
d) AD HOC or Back Office IRD printing	20
e) Verifying MCIR Data at the Time of IRD Print	21
f) Types of IRDs	21
g) Summary of IRD Printing Process	22
h) Toolkits vs Applications	22
i) All My Papers Business Partners	22
<b>Summary</b>	23
<b>Appendix</b>	24

First Edition August 2005

Copyright © 2005 AllMyPapers

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information retrieval system, without permission in writing from All My Papers.

## Executive Summary

This paper will show how non-image enabled financial institutions can take advantage of the Check 21 Law by partnering with Independent Software Vendors (ISVs) and VARs. Rural, regional and community banks can compete with the large, fully image enabled banks.

Until now, the regional and community banks had a geographic advantage. That local geographic advantage is going away. The larger banks are moving outside of their geographic “footprint” and pursuing customers that currently have their business with local financial institutions. Now a corporate customer, retail establishment, non-profit or small business can scan their checks and send the electronic file to any financial institution that is set up to accept that type of file. This paper will describe the three simple processes the non-image enabled financial institution can implement to compete against predatory competition without the cost of becoming fully image enabled.

The practical implementation of Check 21 is that bank customers can remotely scan paper checks, convert them to electronic files, and transmit those electronic files to the bank via various means. Fully imaging enabling a financial institution can be a major change in the operations of the bank.

A financial institution can be partially image enabled and quickly, easily and economically reap the benefits and achieve a quick Return On Investment (ROI) by implementing three processes:

1. Remote check image capture
2. X9.37 file, Image Cash Letter creation
3. Valid IRD printing

First, it is very important to capture and verify the information at the time of capture when imaging checks. Banks should focus on the accurate reading of MICR data from check images verifying the captured data is accurate at the time of capture.

Second, a cash letter is an inter-bank transmittal letter that accompanies cash items sent from one bank to another. The X9.37 file is the electronic image version of the cash letter. A bank may be receiving X9.37 files from many different remote capture sites. These files must be checked for format and content validity.

The third and final process for the non-imaged enabled bank is to convert the Image Cash Letter (X9.37 file) into valid IRD. The paper IRD can be processed as a normal paper check. Software composes the IRD by assembling the data, creates the MICR line, fulfills the static endorsements, graphically lays out the components, ensures the alignment and sends the information to the printer.

A bank does not have to be fully image enabled to take advantage of the Check 21 law to provide better service to their customers. By implementing three processes any financial institution can take advantage of the Check 21 law. These processes and applications are available through All My Papers business partners.

## Introduction

### Objective

This paper will show how non-image enabled financial institutions can take advantage of the Check 21 Law by partnering with Independent Software Vendors (ISVs) and VARs. Rural, regional and community banks can compete with the large, fully image enabled banks. The local banks can retain and gain customers by offering services that are equivalent or better than their competitors.

### Target Audience

The primary audience for this paper is the financial institutions who are not yet fully image enabled. These financial institutions could be a:

- Regional and rural bank
- Community bank
- Credit Unions
- Bank Intermediary (clearing house or exchange or lock-box service)

### The Geographic Advantage Of Regional Banks Is Gone

Until now, the regional and community banks had a geographic advantage. Their customers needed a convenient, local institution to physically deposit their checks in a timely manner so that funds would be credited to their accounts expeditiously.

That local geographic advantage is going away. Now a corporate customer, retail establishment, non-profit or small business can scan their checks and send the electronic file to any financial institution that is set up to accept that type of file. This means that the bank that receives this new electronic file could be on the next street, in the next town, in the next state or even across the country.

The banks and financial institutions who have invested heavily in image enabling can offer their customers the ability to scan their checks for deposit. This means they can now go after what used to be the captive audience of the regional and rural banks - the businesses in their local geographic area.

### The Best Defense is a Good Offense

This paper will describe the three simple processes the non-image enabled financial institution can implement to compete against predatory competition without the cost of becoming fully image enabled. Distributed check capture and local IRD printing can let a financial institution take advantage of the current law without the burden of all the costs of a full imaging system. In order to keep current customers and gain new ones, the best defense against competitive banks is a good offense.

## Introduction

### Who is All My Papers?

All My Papers is the developer and distributor of software toolkits and applications that image process, extract data, and print image replacement documents. All My Papers products are primarily sold to Independent Software Vendors (ISVs) for incorporation in their own branded applications and toolkits. All My Papers also sells to system integrators and value added resellers and large corporations for inclusion of imaging technology in custom developed applications.

### X9 Voting Committee Member

Larry Krummel, the founder of All My Papers, is a voting member of X9B, the banking standards committee responsible for both X9.37 and the IRD printing standard. This committee develops the practical frame work and specifications that are the ANSI standards. By being involved in the basic architecture of the standards, All My Papers understands the fundamental technology and how it should apply to practical and pragmatic solutions of check imaging. Other members of X9B include representatives from many financial institutions such as Bank of America, Wells Fargo and Wachovia. The X9 Committee does not endorse products from any of its members.

### Why Did All My Papers Write This White Paper?

All My Papers believes that there is a large potential market for licensing the fundamental tools needed to build bank imaging software applications. The applications provided by the All My Papers business partners will allow many financial organizations to quickly, efficiently and cost effectively offer competitive services without going down the fully image enabled path.

Many regional financial institutions have put off investing in check imaging technology because of the complexity, expense and impact of a fully imaged enabled system on their current business processes.

All My Papers believes that a partial imaging solution is relatively simple and inexpensive to acquire and implement. This system will pay for itself quickly without changing the fundamental processes already in use.

### Visit Our Web Site To Find Our Check 21 Business Partners

All My Papers develops the tools that our business partners use to make applications. Visit our web site to find our partners that can help you meet your goals and keep your customers.

**[www.allmypapers.com](http://www.allmypapers.com)**.

## The Problem

### The big banks are moving outside their “Footprint”

The larger banks are moving outside of their geographic “footprint” and pursuing customers that currently have their business with local financial institutions. Recent announcements by JP Morgan Chase and Wells Fargo indicate that this is part of their strategy to increase their business and customer base. The following are quotes from recent articles in financial publications.

*JPMorgan Chase (New York, \$1.16 trillion in assets) has introduced ACH Distributed Payment Capture, a remote deposit capture solution that allows businesses to convert consumer payments to either Automated Clearinghouse (ACH) transactions or to substitute checks.... Furthermore, JPMorgan Chase’s ability to offer a single solution for both ACH and check conversion has its advantages in head-to-head competition with other banks... With banks such as JPMorgan now having the ability to go “out-of-footprint” to serve business customers, smaller banks face a difficult decision: Either invest in the imaging and ACH technology required to compete, or outsource. <sup>1</sup>*

Another publication goes on to say:

*“This is absolutely the hot product,” says Bob Hunt, a senior analyst at TowerGroup. While significant image-exchange volumes probably will not occur until mid-2006, remote check deposit—a service that simplifies the way business customers deposit checks—is ready now.*

*The floodgates opened at the end of 2004 when a number of big banks began announcing they would take advantage of Check 21 to let businesses transmit checks electronically from their own back offices, eliminating the need to go to a branch to deposit checks. Most recently, Wells Fargo & Co. has tweaked the basic formula by making the service available through an Internet portal, rather than through software installed at the customer site.*

*Regional, rural and community financial institutions feel caught between the proverbial rock and a hard place. Neither implementing an ACH process nor fully image enabling their organization nor outsourcing to a third party seem like good business alternatives. What does a regional financial institution do? <sup>2</sup>*

---

<sup>1</sup> Bank Systems & Technology April 25, 2005

<sup>2</sup> Remote Check Deposit: Wells Captures A New Checking Twist. A pair of offerings provides fast remote capture without adding software on the user end and eliminating time-consuming trips to the branch, all through a Web portal By Chris Costanzo Ma, 2005

## The Problem

These organizations can now provide many of the services offered by the fully imaged enabled banks. They can have their customers scan and truncate the checks remotely, transmit them electronically, print IRDs at the bank and then process as they would a standard paper check.

### Partial List of Banks Offering This Service

As of May 1st, 2005, some of the top 20 banks have announced they have gone “live” with a Remote Deposit Capture service<sup>3</sup>:

- Bank of America
- Bank of New York
- First Horizon
- NetBank
- US Bank
- Zions Bank

---

<sup>3</sup> <http://www.remotedepositcapture.com/>

## The Problem

### What is Check 21?

The Check Clearing Act for the 21st Century or “Check 21” is the federal law that allows for the creation of a substitute check. The Check 21 Act was enacted on October 28, 2003, and became effective on October 28, 2004. The goal of the law was to facilitate check truncation by authorizing substitute checks, to foster innovation in the check collection system without mandating receipt of checks in electronic form, and to improve the overall efficiency of the nation’s payments system, and for other purposes.<sup>4</sup>

### What is an IRD?

The Check 21 Act makes a Substitute Check the legal equivalent of the original check. The X9.100-140-2004 standard for printing Substitute Checks includes a broader range of items called Image Replacement Documents (IRDs). For the purposes of this presentation, an IRD and a Substitute Check are considered the same.

An Image Replacement Document (IRD) is defined, as a printed, machine-readable image copy of a check that may under certain legal arrangements be the practical and legal equivalent of the original check.<sup>5</sup> Once an IRD has been created then all parties must accept them as the legal equivalent of the original check.

### Implications of Check 21

What is implied by the Check 21 law is that any of a bank’s customers, under arrangement with the bank, can image and truncate a paper check and send the images to a bank as a desposit. Then, as long as all the requirements are met for printing an IRD, a printed IRD can and must be accepted as the legal equivalent of the original check.

The practical implementation is that bank customers can remotely scan paper checks, convert them to electronic files, and transmit those electronic files to the bank via various means. The bank can take those electronic files and convert them into a valid IRD and then the bank can process the printed IRDs as they would a normal paper check on the same equipment and with the same processes they currently have in place. This means that a bank does not have to be fully image-enabled to take advantage of the Check 21 Law.

### Fully Imaging Enabling a Bank Can Be a Major Change

Fully imaging enabling a financial institution can be a major change in the operations of the bank. Many banks will have to re-engineer their processes for dealing with returns, archives, exception processing, fraud issues, adjustments and research. Then there is the consideration of integration with existing systems, developing requirements, choosing a vendors, negotiating, implementation plans, choosing hardware, software, communication systems, training, etc.

---

<sup>4</sup> H.R. 1474 – The Check 21 Act

<sup>5</sup> DSTU X9.37 - 2003

## The Solution

### Partially Image Enabling – a better alternative?

A financial institution can be partially image enabled and quickly, easily and economically reap the benefits and achieve a quick Return On Investment (ROI) by implementing or changing three processes. In the next section we will review these processes in more detail:

1. Remote check image capture
2. Image cash letter creation
3. Valid IRD printing

### Advantages of a Remote Capture and IRD Printing System

There are a number of benefits and advantages of installing a partial check imaging system that capture checks remotely and print IRDs to process as a standard paper check.

#### For the financial institution some of those advantages and benefits are:

- Retain customers with this service (the more services the financial institution customer's use the more likely they are to remain customers.)
- Find new customers that want to deposit remotely
- Accelerated clearings
- Earlier fraud detection
- Enable better float management
- Reduce dependence on couriers
- Reduced transportation costs
- Reduced return item risk
- Expand later cut off times
- Reduce risk of lost or stolen paper checks
- Gain new revenue streams from image based services

#### For the corporate customer some advantages are:

- Accelerated clearings
- Faster availability
- Enhanced cash flow from cash management operations
- Reduced return item risk
- Reduced transportation costs
- Reduced processing costs
- Consolidation of banking relationships

## The Solution

### Three Processes

---

There are only three processes that need be implemented for a financial institution to provide remote corporate capture and to take advantage of Check 21 Law:

1. Remote check image capture
2. X9.37 (Image Cash Letter) creation
3. Valid IRD printing

The objective of this paper is not to go into the detail of these systems. With this paper, the goal is to give an overview of these systems and explain how All My Papers technology can make these processes reliable, accurate and automatic.

All My Papers business partners will supply the detailed information. There is a list of our partners at the end of this paper in the Appendix.

## The Solution

### Three Processes: 1. Remote Check Image Capture Process

---

The basic process flow is as follows;

- A. XYZ Corporation (current bank customer that could be a merchant, a manufacturing company, church, or apartment house company) receives payments by check at their office.
- B. XYZ Corporation Prepares a deposit (deposit ticket with total and accompanying checks) which would normally be taken to the bank for deposit.
- C. Instead of physically going to the bank to deposit the checks, XYZ Corp. scans the deposit ticket and checks using a check image scanner.
- D. Once the check images are captured and the image-based deposit is prepared, the remote deposit capture system can transmit the deposit to XYZ Corp's bank via an electronic file (x9.37).
- E. The bank receives the image deposit in X9.37 file format and prints an IRD that is processed just like a standard paper check. <sup>6</sup>

A remote check image capture solution is a combination of hardware and software. The primary hardware devices are the scanner, that will convert the paper check into an electronic image, and it's associated PC. The PC will have the usual capabilities of a standard PC plus a connection via some type of communications interface so that the captured files can then be transmitted. All My Papers provides the Visual Basic source code for ISVs to generate X9.37 files

There are a wide variety of check scanners on the market. Check scanning equipment varies in size and price based on the functionality and check volume required. These scanners convert the paper checks to image files. Most scanners include the ability to read the MICR data encoded on the check magnetically and report that information electronically. Consult with your vendor for more details about the type of scanner that will suit your needs.

### The remote capture software will usually perform the following functions:

- Control the scanner <sup>7</sup>
- Capture and save the check images (front and back) for later retrieval
- Store check images in variety of formats
- Generate the X9.37 file.
- Find and read and extract the courtesy amount fields and legal amount fields (CAR/LAR). This may be a manual or semi-automatic process.

---

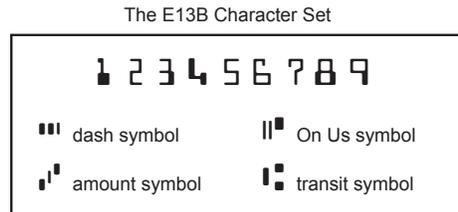
<sup>7</sup> Check scanner interface software is available from vendors such as Silver Bullet, <http://www.sbullet.com/>

<sup>6</sup> Paraphrased from [http://www.remotedepositcapture.com/Overview/RDC\\_Overview.htm](http://www.remotedepositcapture.com/Overview/RDC_Overview.htm)

## The Solution

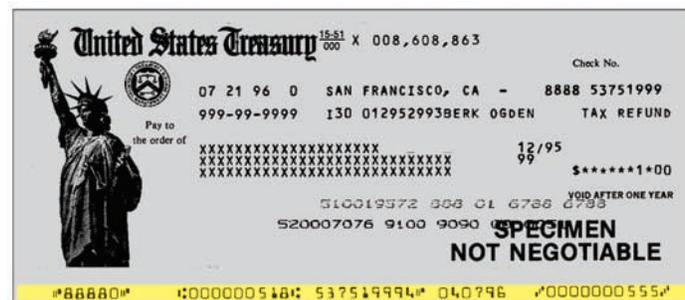
### a) MICR

All checks contain one MICR, Magnetic Ink Character Recognition, line embedded within the check. MICR data uses a particular font called E13B.



**Figure 1 - Example of MICR Font**

MICR characters are printed in magnetic ink or toner that when magnetized will emit a magnetic signal that identifies each unique character. The shape of the signal is developed from the character's horizontal and vertical attributes, and the amount and distribution of magnetic material in the ink or toner from which the character is formed. MICR check readers measure the strength of the magnetic signal emitted, and reject the check if the shape and/or magnetic properties of the characters do not meet the specified standard.



**Figure 2 - MICR LINE**

### b) Verifying the MICR Data

In traditional paper check processing. Paper checks are scanned for their data multiple times throughout the process:

- Scanned at the time of presentment.
- Scanned again when going through batch processing for posting and other standard back office processes
- Scanned again at each bank along the chain
- Scanned with a variety of different scanners at each of the processing stops

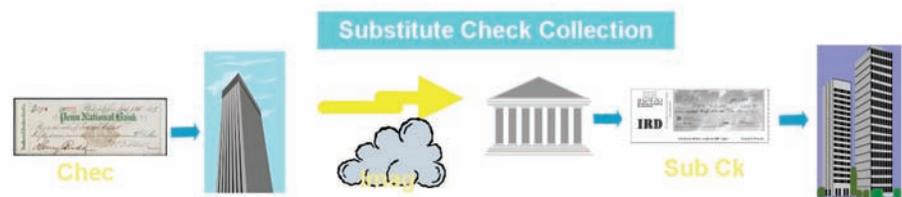
This means that data is verified and corrected multiple times.

## The Solution



**Figure 3 - Paper checks are sorted and the data verified multiple times during the standard check clearing process**

With check imaging the entire process is changed. The only time the check image data is verified is at the time of original scan. A mistake here will follow the check image and the extracted data all the way through the check image clearing process. The data is captured from the check either magnetically or keyed in by people viewing the check image. There are no verification processes or minimal ones at best.



**Figure 4 - The only time the check data is verified is at the time of original scan**

It is very important to capture and verify the information at the time of capture when imaging checks. That is because of the possible introduction of substitution errors. A substitution error in the ONUS field will often mean the item is posted to the wrong account.

### c) Substitution Errors

The magnetic readers that are in some scanners are subject to substitution errors. The magnetic reader may read a "8" for a "3". All My Papers has found on average, approximately a 1% substitution error rate from low speed capture devices.

## The Solution

### d) Technology That Verifies the Data from the Check Image

All My Papers MICR OCR technology is focused on the accurate reading of MICR data from check images. The All My Papers tools are not just MICR OCR engines but “check readers”. They analyze the entire check, searching for the MICR data and then image processing the image to obtain the best results from all types of check images:

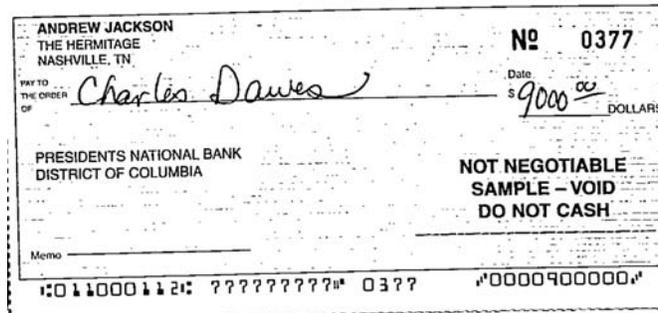


Figure 5 - Typical Check Image

All My Papers will read the MICR line even if the MICR line is obscured by signature descenders or background patterns and lines. The MICR OCR tools were designed to mask the complexity of the processing and deliver accurate reads with high confidence. The output of the MICR OCR will have confidence values assigned to each character.

All My Papers toolkit has a function to compare the MICR OCR data with magnetic read data and flag those images where there is a discrepancy. This way any errors can be eliminated at the time of capture before the check gets truncated or the check image bounces back as a mistake. This function generates a suspect list of possible MICR line errors that need to be examined in the Reject, Repair and Reentry software of the ISV.

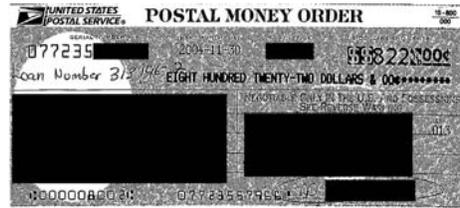
Image processing preparation is done automatically in the background. Functions such as automatic image rotation, skew detection and correction, black edge removal, speckle removal are all done automatically to obtain the best and most accurate data read.

But there are many potentially problematic checks out there. These checks may have patterns that interfere with the ability of OCR and ICR software to automatically extract the data. All My Papers has developed a set of functions called Image Repair that will automatically correct and clean up these types of check images.

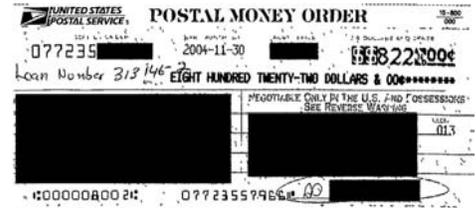
## The Solution

### e) Image Repair

Many check images have background patterns on them. These background patterns interfere with the software's ability to extract accurate data. Here are some examples.



Before



After

Figure 6 - Background Removal

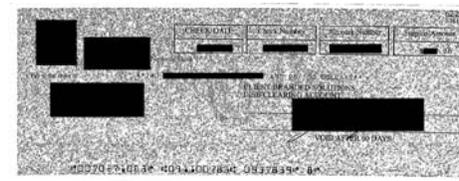


Before

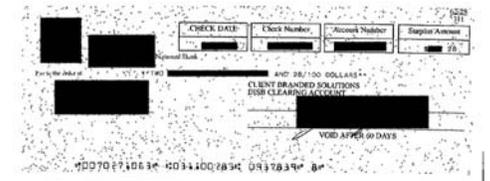


After

Figure 7 - Void Lines



Before



After

Figure 8 - Background Patterns

All My Papers has a set of sophisticated filters that will automatically analyze and repair check images that interfere with OCR and ICR processes. The results are more accurate and reliable read rates.

This will reduce the number of returns and manual reject and repairs. Automating the system and reducing manual labor costs.

Using the Image Repair not only improves MICR line OCR but can greatly improve the CAR/LAR read rates as well.

## The Solution

### Three Processes: 2. *Creating, Editing and Using X9.37 Files*

---

#### **a) X9.37 File or Image Cash Letter – Introduction and definition**

A cash letter is an inter-bank transmittal letter that accompanies cash items sent from one bank to another. The X9.37 file is the electronic image version of the cash letter. A X9.37 or Image Cash Letter (ICL) is the transmission of an electronic file to a Federal Reserve Bank or other financial institution, containing cash letter totals and individual items drawn on eligible endpoints. The electronic transmission contains the MICR information from the checks and total information for reconciling in standard format. The X9.37 image cash letter files may have multiple uses. They can be used to exchange funds with another institution or to print IRDs. In Remote Capture, they provide a standardized way of sending check image and deposit information from the capture site to the depositing institution.

#### **b) Converting Check and Image Data to a X9.37 File**

A key process in taking advantage of the Check 21 law is converting the captured check data into an Image Cash Letter File also known as an X9.37 File. After the check image data is captured and the data extracted, the information is usually loaded into a database. Each database system or application stores data using its particular method. The database information including the pointers to the check image files and the extracted data can easily be formatted into a Comma Separated Value (CSV) format file. All My Papers Visual Basic source code will generate CSV files from generic data types. An ISV can easily adapt this code to their database format.

#### **c) Generate X9.37 Files**

All My Papers has function calls to generate a valid X9.37 file using data stored in a Comma Separated Value (CSV) file. The appropriate fields containing the data are mapped to the standard specifications.

#### **d) X9.37 File Viewer and Analyzer**

A bank may be receiving X9.37 files from many different remote capture sites. These files must be checked for format and content validity. All My Papers developed an application for X9.37 viewing and analysis. It is a .NET application that allows the viewing of the content of X9.37 files such as the check image, field values and record values. One can easily toggle between the check image (front and back) and the associated data fields to verify that they are correct and correlate. It is also easy to move through even large X9.37 files of several megabytes with the tree structure navigation pane that lets you pass quickly from bundle to item to record.

The licensed version of the X9.37 VIEWER, in addition to viewing check images in a X9.37 image cash image file, analyzes the contents for compliance with the ANSI X9.37 DSTU standard. Errors are highlighted in red, and detailed in a report at the bottom of the screen. The viewer will analyze the file for file level syntax (format) errors and at the record and field level it will analyze syntactic errors and some semantic errors.

## The Solution

### **e) X9.37 to Database File Conversion**

All My Papers software is able to take a X9.37 file and extract the data from the cash letter, bundles, items and records and convert that into a Comma Separated Value (CSV) file. This CSV file can then be uploaded to an application, text editor or database.

### **f) X9.37 File Format Converters**

Different computer systems and environments will require different file formats. All My Paper has a set of utility function to convert:

- X9.37 to CSV
- CSV to X9.37 files
- EBCDIC to ASCII or ASCII to EBCDIC
- X9.37 file to/from Motorola/Intel

All My Papers makes software work in the format or environment of your choice.

### **g) Generate Return X9.37 from Forward X9.37**

To support return processing, All My Papers, uses a “pick list” to select items from a forward X9.37 and convert it to a Return X9.37 file. The “pick list” includes the return reason. Selecting a few dozen items from a 100 Megabyte file and creating a return takes only a few seconds.

### **h) Edit X9.37 Files**

Similar to the process of generating a Return X9.37 file, the toolkit provides the functionality to edit a X9.37 file. This allows the user to select the items that are not valid and remove them from the X9.37 file. The X9.37 file totals are then recalculated.

The removed items can be processed as a return X9.37 file that we discussed previously or converted into CSV for upload into a database for other processes, depending on the architecture of the application.

## The Solution

### **i) Sorting and Routing X9.37 Files**

All the check images in a group of X9.37 files can be sorted using a sorting function from All My Papers. This software for sorting and merging X9.37 files. It replaces all the sorting pockets on a hardware transport with a number of virtual payor bank routing pockets. The results are image cash letter bundles (that would have been bundles of paper checks given to a courier) except now they are X9.37 files for each payor bank. At the payor bank, the ICLs are simply printed as an IRD and processed via the normal check paper process.

### **j) X9.37 File Utilities**

All My Papers supplies a suite of functions to work with X9.37 files in a variety of ways. The ISV can make an elaborate or simple set of functions for their application

### Three Processes: 3. Printing Valid IRDs

---

The third and final process for the non-imaged enabled bank is to convert the Image Cash Letter (X9.37 file) into valid IRD. The paper IRD can be processed as a normal paper check. By the Check 21 Law, the IRD must be accepted by everyone in the check clearing process as they would a standard paper check. Let's examine some of the hardware and software requirements.

#### a) Conforming to the X9.100-140 standard

The ANSI standard X9.100-140 specifies exactly all the components necessary to print a valid IRD. See the Appendix for an example of an IRD and the necessary components. All My Papers software composes the IRD by assembling the data, creates the MICR line, fulfills the static endorsements, graphically lays out the components, ensures the alignment and sends the information to the printer. The IRDs printed using All My Papers software conforms to the X9.100-140 standard and is a valid IRD.

#### b) Hardware For Printing Valid IRDs

Here is a short list of required hardware components to print a valid IRD:

- Duplex (double-sided) laser printer <sup>8</sup>
- Host computer for controlling printer
- MICR Toner
- IRD paper stock

Standard duplex printers from vendors like Hewlett-Packard, Lexmark, Ricoh-Hitachi will work for printing valid IRDs. Duplex functionality is required because information must be printed on the front as well as the back of the substitute check or IRD. The printers need the magnetic based toner cartridges to correctly print the MICR data on the IRD for most with some exceptions noted below. There are various speed printers available for almost any requirement.

Specialized IRD printers from companies such as Troy<sup>9</sup> and Source<sup>10</sup> are also available at additional cost over the basic print engine. These printers are based on HP or Lexmark engines and come with special paper trays and security electronics for fraud prevention and other specialized features.

A dedicated host computer will minimize security risks and provide the greatest throughput and processing speed. Many banks may want to print the IRDs near the close of their business day. They may need to print as fast as possible in a short as time as possible.

---

<sup>8</sup> PCL5e compatible to work with All My Papers software

<sup>9</sup> <http://www.troypgroup.com/index.asp>

<sup>10</sup> <http://www.sourcetech.com/default.asp>

## Solution

MICR Toner will work well in the above printers. A special case that is important for small banks since it effects cost. “If the IRD is created for a paid item that is to be returned to the issuing institution’s customer as a properly paid item, the E-13B MICR characters in Region 5F may be printed in non-magnetic ink. An IRD used for this purpose shall conform to all other requirements of this standard including the size defined in Clause 7.1.”<sup>11</sup>

All My Papers business partners have end-user customers printing thousands of IRDs per day using standard duplex laser printers. The toner is available from a variety of suppliers such as Relyco .

IRD paper stock is also available in either single IRD format or multiple IRDs per page. For multiple IRDS, this paper is perforated and is available in 3-up or 4-up configurations. The paper is also available from vendors such as Relyco.<sup>12</sup>

### c) Special Fonts

IRDs require special fonts to print a valid IRD. All My Papers downloads these fonts at the time of printing and unloads them after the IRD is printed. This is an extra security feature. Some of the specialty printers have these fonts installed in the hardware of the printer.

### d) AD HOC or Back Office IRD printing

There are two common scenarios implemented for IRD printing.

1. Ad Hoc or occasional on-demand IRD printing.
2. Back-office volume IRD printing.

Both methods support distributed printing. By distributed printing, we mean that the workstations composing the IRDs can be in a variety of network configurations remote from the IRD printer. These workstations can be connected to a Local Area Network or they can be located in remote branch offices. As long as the network supports remote printing, the host PC controlling the printer can be in the next room, the next city or across the country.

Depending on the volume of IRDs printed, there is another issue that may arise when printing remotely. The more IRDs, the more image files you have. All My Papers business partners’ end-user customers have printed IRDs from X9.37 files with over 500 hundred million bytes of data and thousands of check images. A 500MB file sent over the LAN or communication system can slow the network because of all the traffic. All My Papers Software addresses this issue by keeping the printed output in a compressed form until sent to the printer. The compressed image files are only expanded at the host PC controlling the printer. Thus, you can have multiple workstation PCs composing IRDs, but sending the smallest file possible over the network. When the files are about to printed, then and only then, are the image files expanded.

---

<sup>11</sup> DTSU X9.90-2004, Rev. A Standard

<sup>12</sup> <http://www.relyco.com/>

## Solution

Back-office volume printing can be done at regional centers. High speed printers are generally used to print hundreds or thousands of IRDs in a very short time near the close of the banking business day.

Ad Hoc IRD printing is useful for small IRD quantities and can be printed on demand as business requirements dictate.

### e) Verifying MICR Data at the Time of IRD Print

The liability for a non-valid IRD resides with the institution printing the IRD. Since the usual priority is to convert and print high-dollar amount checks into IRDs, liability exposure is real. Many times the data in the fields in the X9.37 file and the data on the check image are different. This could result in the printing of a non-valid IRD.

One of the quality control functions built into All My Papers software is the capability to verify that the data in the X9.37 file is the same as on the check image. If you are managing the capture of the check image and data, this data is already captured and can be verified at the time of scan, but you may not always have control of the creation of the X9.37 file.

The bank that is not yet fully imaged enabled may receive X9.37, image cash letters from other financial institutions which did not verify the data at the time of scan or whose data bases do not have all the information from the original check. This is especially true of the ONUS field in the MICR data line. ONUS data is information that the original bank wants to track such as the check number. Some bank data bases cannot accommodate the data from the ONUS fields; sometimes the data bases leave out the dashes in the ONUS field. If this ONUS data is missing from the IRD, it may be returned as invalid.

All My Papers software reads the MICR data off the check image and compares it to the data in the X9.37 file and verifies it as accurate, fixes missing dashes or flags it as a “suspect” that should be reviewed. Enabling MICR Verify from All My Papers will ensure you that you are printing valid IRDs.

### f) Types of IRDs

There are a variety of IRDs. All My Papers software supports all of these types of IRDs:

- Forward Original
- Return Original
- Forward Subsequent
- Return Subsequent
- Qualified Return Original
- Qualified Return Subsequent

## Solution

### **g) Summary of IRD Printing Process**

Printing an IRD from the information captured at the time of remotely scanning the check or from an X9.37 file is straightforward. Standard duplex laser printers with MICR toner and special fonts can produce single or large quantities of IRDs as needed. Verifying the data by reading the data from the check image ensures accurate and valid IRDs.

### **h) Toolkits vs Applications**

All My Papers provides the core technology, the building blocks, to develop software applications. These applications provide the easy to use functions and features of the three component processes that can provide a financial institution with a jump start into Check 21 imaging:

1. Verifying the MICR line on remote captured check images
2. Creating, viewing, editing and manipulating X9.37 Image Cash Letter files
3. Printing valid IRDs

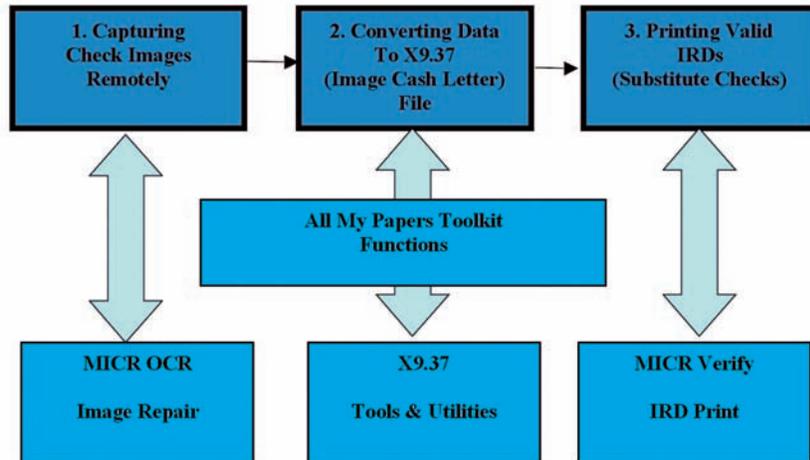
Banks and other financial institutions can now take advantage of the Check 21 law which encourages early check truncation without the expensive and time consuming conversion to being fully image enabled.

### **i) All My Papers Business Partners**

These applications are available through All My Papers business partners. These business partners listed in the Appendix gear their applications towards different types of financial customers. Contact them directly for further information.

## Summary

A bank or bank intermediary does not have to be fully image enabled to take advantage of the Check 21 law to provide better service to their customers.



**Figure 9 - By implementing three processes any financial institution can take advantage of the Check 21 law**

### Three Processes

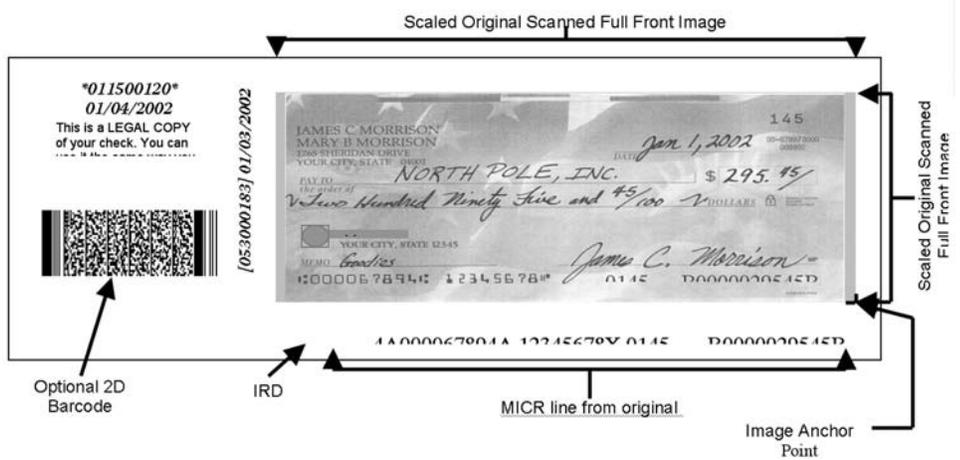
Following these simple steps to take advantage of the Check 21 Law:

1. Scan and capture check image data remotely
2. Repair images automatically
3. Verify data by MICR OCR
4. Convert check image data to X9.37 file
5. View X9.37 for conformance
6. Edit, sort, merge and generate new or return X9.37 file
7. Verify MICR data on check image matches database data
8. Print valid IRD

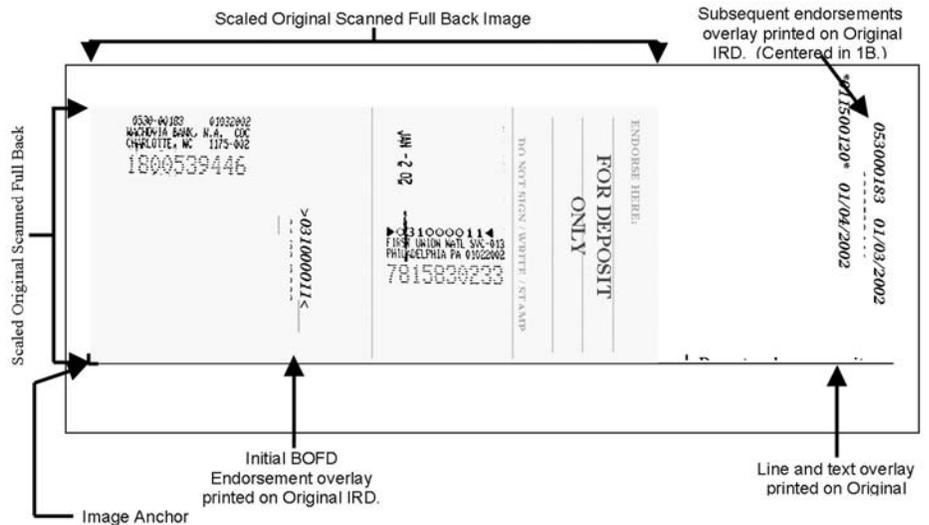
**Appendix**

**Example IRD**

Here is an example of a Forward Original IRD from the DTSU X9.90-2004, Rev. A Standard.



**Figure 10 - Forward Original IRD of Personal-Sized Check, Front**<sup>13</sup>



**Figure 11 - Forward Original IRD of Personal-Sized Check, Back**<sup>14</sup>  
(Not to scale)

<sup>13</sup> DTSU X9.90-2004, Rev.4

<sup>14</sup> 14 DTSU X9.90-2004, Rev.4

**Appendix****All My Papers Check 21 Business Partners**

---

<b>Aquracy LLC</b>	Web:	www.aquracy.com
	Contact:	Harold Smith haroldsmith@aquracy.com 877-427-8748

---

<b>Avalon</b>	Web:	www.avalonintl.com
	Contact:	Dan Damron Dan.damron@avalonintl.com 770-740-2211 x 307

---

<b>CONIX Systems, Inc.</b>	Web:	www.Conix.com
	Contact:	Robert Merkle Ram@conix.com 610-347-2214

---

<b>Enterprise Payment Solutions</b>	Web:	www.epaysol.com
	Contact:	Joel Moo-Young joel@epaysol.com 877-685-5500

---

<b>Goldleaf Technologies, Inc.</b>	Web:	www.goldleaf.com
	Contact:	Bruce Krajewski bruce@goldleaf.com 630-466-4087

---

<b>Intactis Software Inc.</b>	Web:	www.intactis.com
	Contact:	Marc Gilman info@intactis.com 888-774-9250