ST 9612

SourceTechnologies™
Innovate. Inspire. Achieve.

Secure MICR Printer

User's Guide

Copyright

Notice

This manual serves as a reference for a Source Technologies Secure MICR Printer. This manual should be used as a reference for learning more about MICR technology and developing MICR printing applications. This guide was produced to assist IS Technicians and Engineers in the integration of Source Technologies' programmed printers with their custom MICR applications. The guide also contains information on MICR related error messages that post to the operator panel.

To the best of our knowledge, the information in this publication is accurate: however, neither Source Technologies, LLC, its dealers or affiliates assume any responsibility or liability for the accuracy or completeness of, or consequences arising from, such information. Changes, typos, and technical inaccuracies will be corrected in subsequent publications. This publication is subject to change without notice. The information and descriptions contained in this manual cannot be copied, disseminated, or distributed without the express written consent of Source Technologies, LLC. This document is intended for informational purposes only. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by Source Technologies, LLC. Final determination of the suitability of any information or product for use contemplated by any user, and the manner of that use is the sole responsibility of the user. We recommend that anyone intending to rely on any recommendation of materials or procedures mentioned in this publication should satisfy himself as to such suitability, and that he can meet all applicable safety and health standards.

All trade names or products used in this manual are for identification purposes only and may be trademarks or registered trademarks of their respective companies.

Document Number: 104048

Revision: A

Table of Contents

NOTE: To maintain a high resolution, Source Technologies recommends printing all documents in color.

1. Printer and Driver Installation

Note: **To access Source Technologies' secure fonts loaded on the printer, such as the E13B MICR font, download the universal driver as described in the next section. The printer drivers on this CD may be used for general office printing but do not facilitate using secure fonts.**

For complete information on how to unpack and setup your printer, see your printer's user's guide.

1. Locate the CD that was shipped with your printer and load into CD drive. The CD should auto-run and the following screen will be displayed. If auto-run is disabled on your computer, *browse* to the CD and *click* Setup.exe to run
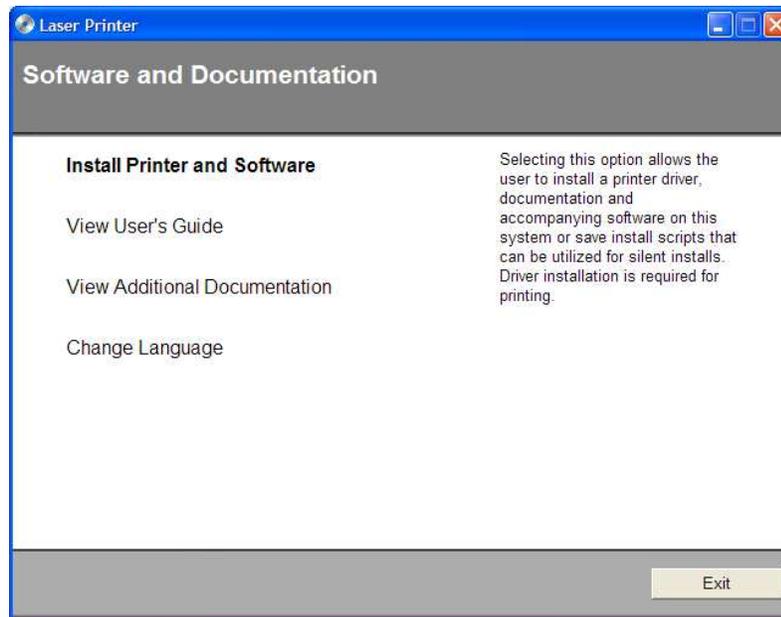
2. *Click* on View User's Guide for information on unpacking, installing, and operating your printer.

Driver Overview

Your new MICR printer requires specific PCL 5 commands to load and print secure fonts such as the MICR E13B font. These specific commands may be coded in to your custom application, or if you use a software program such as Source Technologies' CheckPartner™ Enterprise, these commands are automatically sent to the printer as needed. To print checks or other documents requiring secure fonts from other Windows applications please download the universal driver— designed specifically to allow access to your printer's secured resources—using the following steps:

1. *Select* the Driver Zip file matching your operating system and printer model.
2. *Download* this file to a location, such as the Windows Desktop.
3. *Unzip* this file and make sure the "Use Saved path" option is selected.
4. *Browse* to the Source Tech Driver folder extracted from the zip file.
5. *Run* the driver install program. For example:
   Printer_UDO_2KXP03_x86_PCL_Emul_sys_en.exe
6. Follow the instructions to install the driver.
7. Configure the driver to use MICR_on.sep page separator file (used to select MICR mode).
8. Configure the driver to "Update the Font list" using the 96XXfont.pcm file. This will enable Windows applications to recognize the printer's secure fonts.
9. From the Windows application, *select* the installed printer.
10. From a Windows application, *select* the specific text to be printed. Then *select* the secure font name and point size using the capabilities of the particular Windows application.

The following fonts and point size are supported.

Font Name	Point Size	Font Sample
MICR E13B	8	MICR E13B 8 pt. 0123456789
MICR CMC7	8	MICR CMC7 8 pt. 0123456789
SECURE	36	SECURE 36 pt. 0123456789 ZERO ONE TWO THREE FOUR FIVE SIX SEVEN EIGHT NINE
ICR Secure	12	ICR Secure 12 pt. 0123456789 *
MicroPrint	1	MicroPrint 1pt. MP

Note: The fonts illustrated above may not match the size or appearance of those printed by the MICR printer. The characters are enhanced for illustration purposes only.

Downloading the Universal Driver

1. *Browse* to the URL below from your web browser.

   http://www.sourcetech.com/support/drivers.asp

2. From this page go to the section for the particular operating system you are using such as Widows 2000, XP, etc.

3. *Click* on your specific model such ST9612, ST9620 etc.

4. When the File Security dialog box appears, *select* **Save**.

5. When the Save As file dialog box appears *browse* to a folder you have created or to the Desktop and save the driver zip file.

6. Once the file is downloaded *browse* to the folder where saved and *double-click* the zip file to extract the driver contents. For example, the zip file for Windows 2000, XP, and Windows Server 2003 is:

   ```
   Universal_Driver_2KXP03_x86.zip
   ```

Note: The remainder of the instructions applies to Windows XP. The exact steps may vary depending on the particular operating system you are using.

Unzipping the Driver

1. *Double-click* the driver zip file to launch the unzip program installed on your computer.

2. Follow the steps for your particular unzip program to extract the files. Make sure the **"Save with Paths"** option is selected.

3. *Browse* to the location where you wish to extract the files, such as the Desktop, and then *extract* the files.

4. The extracted zip files will be saved to the location selected in the previous step. For example, if you saved the file to the Desktop you should now find a new folder on the Desktop named:

   Source Tech Driver

Installing the Driver

Note: Do not connect the printer at this time.

1. From the Source Tech Driver folder, *double-click* the driver installation program.

   Note: The name of the driver's .exe program will vary depending on the operating system being used. There will only be one executable file included with the driver.
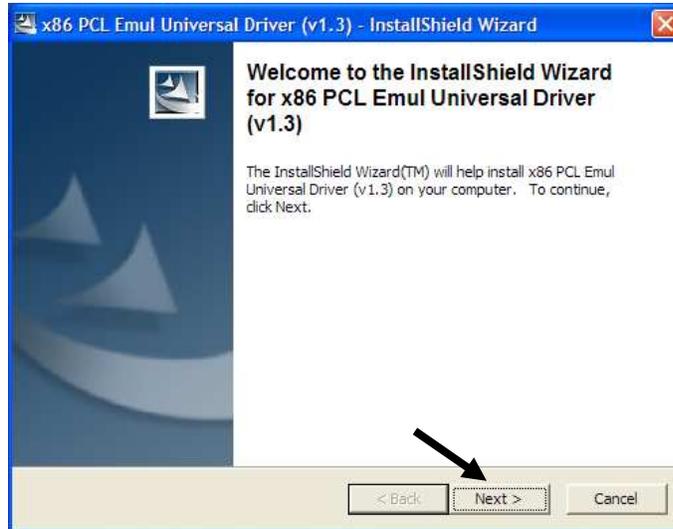
2. *Click* **Next >**.
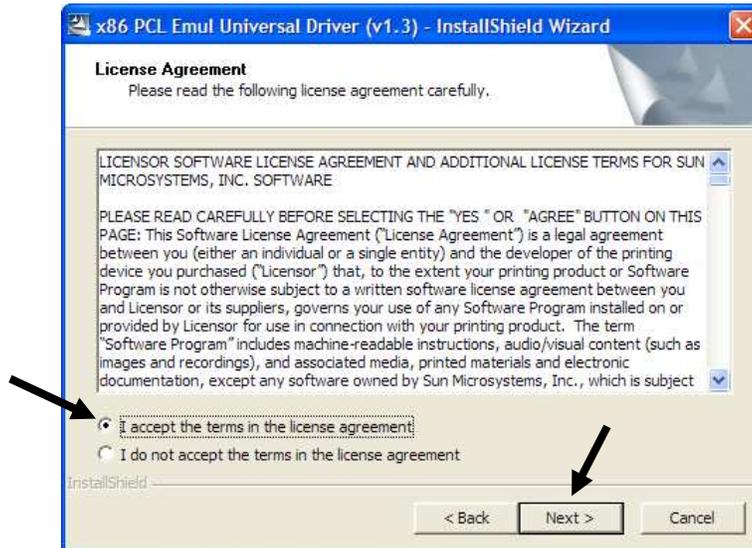
3. *Click* **I accept the terms,** and then *click* **Next >**.

4. Leave the **"Save files in folder"** option as shown above then *click* **Next >**.

5. After the installation program installs the necessary files, the following message will be displayed revealing the next steps required to install the driver. At the same time, an "Add Printer Wizard" will run as shown in the next step.
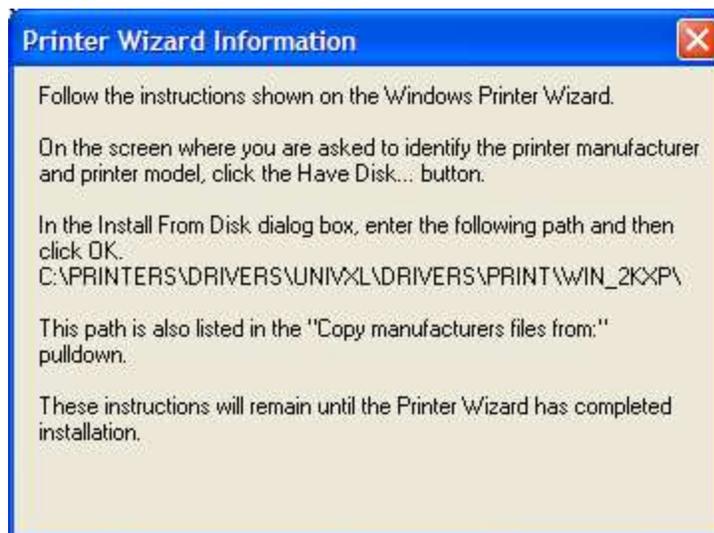
6. *Click* **Cancel** if connecting through USB.

7. *Power on* the printer and wait for the New Hardware Wizard to appear.

8. *Select* "**No**, **not this time**," then **Next >**.

9. *Select* **Install from a list or specific location** (Advanced).

10. *Click* **Next >**.

11. *Click* **Don't search, I will choose the driver to install**.

12. *Click* **Next >**.

13. *Scroll* down the list and *select* **Printers**.
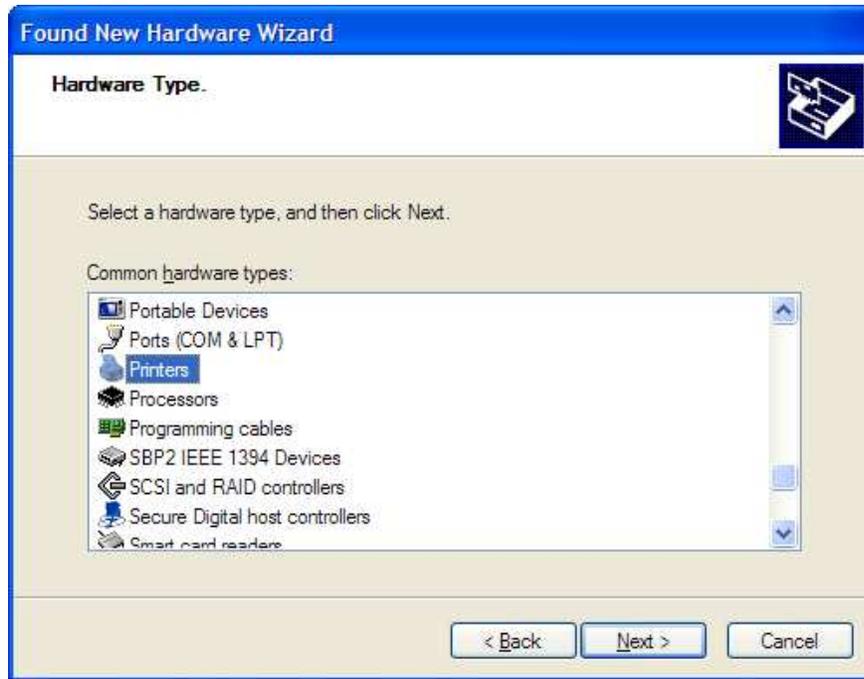
14. *Click* **Next >**.
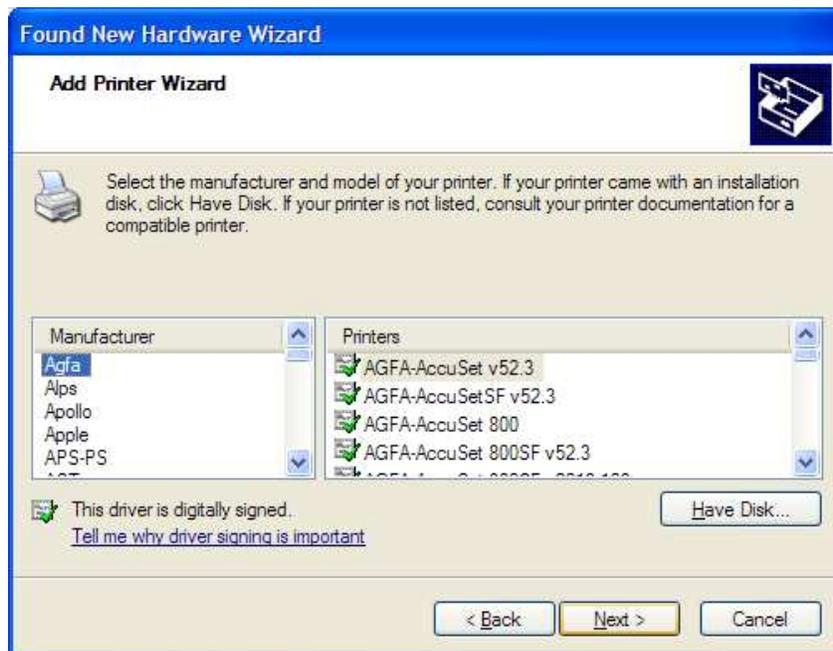
15. *Click* **Have Disk**.

16. *Select* **Browse**. *Browse* to the driver files on your disk and then *select* **Open**.

17. *Select* **OK**.

18. *Select* **Source Technologies** from the Manufacturer list and then *click* **Next >**.

19. *Select* **Yes** to continue.

20. Once the files have copied, *select* **Finish** to close the Wizard.

Configure the Driver to enable MICR Mode

To unlock the secure font resources located in the printer, the driver must be configured to send down a separator page before each print job. The separator page contains the necessary commands to unlock the resources.

1. *Click* **Start** then *select* the **Printer and Faxes** folder.

2. Locate the printer you just installed and *right-click* the icon. Then *select* **Properties**.

3. From the General tab, *type* a descriptive name for the printer, such as ST9620 MICR.
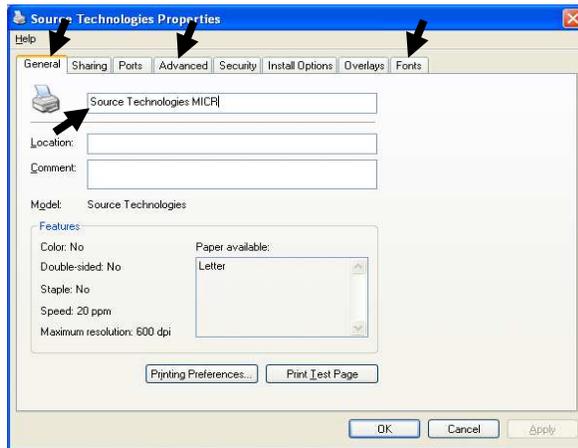
4. *Click* the **Advanced** tab.
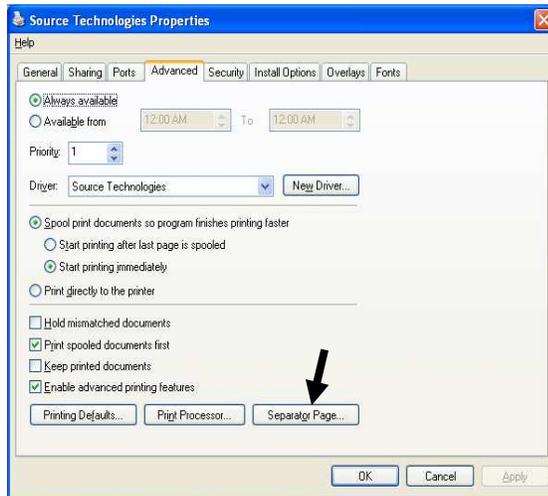
5. *Click* the **Separator Page** button. Then *select* **Browse** and locate the MICR_on.sep file in the **Windows\system32** folder.

Configure the Driver to Recognize the Printer Secure Fonts

1. *Select* the **Fonts** tab. *Select* **Update List**.

2. *Select* the upper **Browse** button. Locate the directory that contains the **96XXfont.pcm** file and *select* **OK**.

3. *Select* the **Search Path** button.

4. *Select* **ST 96XX Font Collection**. Then *select* the **Add to driver** button.

5. *Select* the **Done**.

6. When you have made all of the desired changes *choose* **OK** to save your settings.
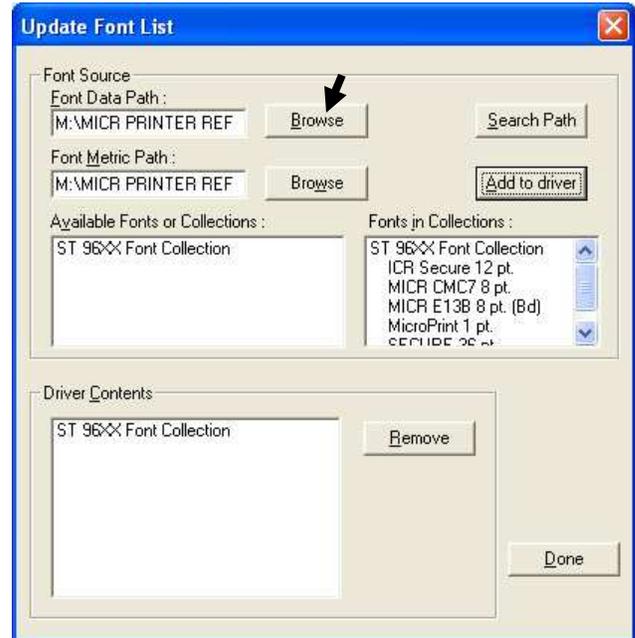
Configure another driver to print without MICR toner

If you plan to use your printer for normal office printing (without MICR toner or fonts) you must add a second instance of the printer driver. Switching between MICR and non-MICR modes alters settings which are stored in the printer's NVRAM. It is recommended not to switch between the modes more than a few times per day to avoid wearing out the NVRAM part.

1. In the Printers folder, *select* **Add a Printer**.

2. *Select* the **Local printer** option, then *select* **Next >**.

3. *Choose* the port to which your MICR printer is connected and then *select* **Next >**.
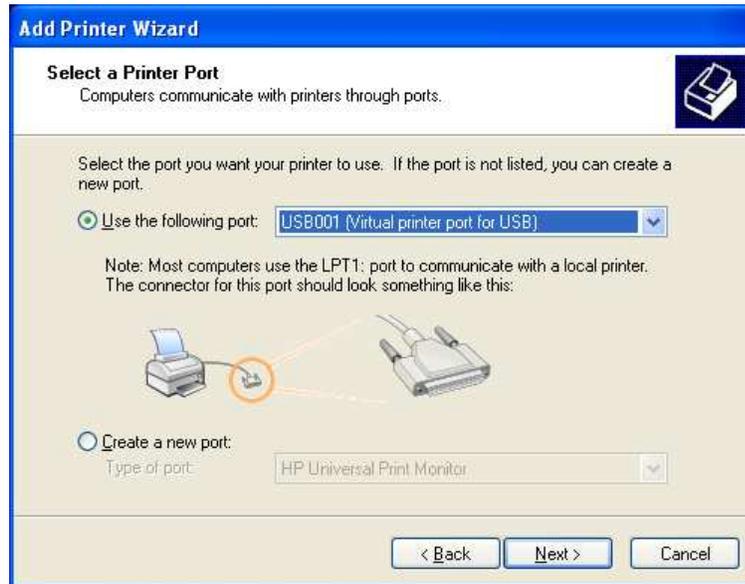
4. *Select* the **Have Disk** button and the **Browse** button and locate the driver files. *Select* **Source Technologies** as the Manufacturer and *select* **Next >**.

5. *Choose* **Keep existing driver** and *select* **Next >**.

6. *Enter* a Printer name to differentiate it from the MICR instance of the driver and then decide if it is to be the default printer. *Select* **Next >**.

Add Printer Wizard

Name Your Printer
You must assign a name to this printer.

Type a name for this printer. Because some programs do not support printer and server name combinations of more than 31 characters, it is best to keep the name as short as possible.

Printer name:

Source Technologies non-MICR

Do you want to use this printer as the default printer?

○ Yes
◉ No

< Back   Next >   Cancel

7. If you do not wish to share your printer on a network, leave the "Do Not share this printer" button marked and *choose* "Next". Otherwise, *select* the "Share as" radio button and *enter* the name you wish to assign to this shared printer. Then *choose* **Next >**. If you wish, you may enter the location of this printer and/or any comments to associate with the printer and *choose* **Next >**.

8. You now have the option to print a test page to test the configuration of your printer. *Click* **Next >**.

9. *Select* **Finish** to complete the installation.

10. You can now setup your printer by *browsing* to the Printers folder and *right-clicking* on your printer's icon. From the menu, *click* **Properties**.

    □ *Select* the **Advanced** tab.

    □ *Select* the **Separator Page** button.

    □ *Select* **Browse** and locate the MICR_off.sep file.

11. When you have made all of the desired changes *choose* **OK** to save your settings.

Selecting the Printer

Printing Secure font resources from a Windows Application
First, set the MICR printer as the active printer – in most applications this is done by selecting Print from the File menu. This is not necessary if the MICR printer is the default printer.

Source Technologies' fonts should appear in the application's font formatting options. The fonts are named:

> ICR Secure 12 pt.
> MICR CMC7 8 pt.
> MicroPrint 1 pt.
> MICR E13B 8 pt.
> SECURE 36 pt.

They will usually appear in alphabetical order among all other available fonts.

The font size must be selected as indicated in the font name. The font displayed on the screen will not resemble the printed font.

Comparison of printer drivers configured as MICR and non-MICR

CONFIGURED FOR MICR	CONFIGURED FOR NON-MICR
Source Technologies MICR 0 Ready	Source Technologies non-MICR 0 Ready
MICR_on.sep separator page used Unlocks Secure Resources (fonts) Copy Count = 1 Jam Recovery = Off MICR Toner ONly DEFAULT MICRJOB=ON	**MICR_off.sep separator page used** Locks Secure Resources (fonts) DEFAULT MICRJOB=OFF
Secure Fonts enabled by 96xxFont.pcm ICR Secure 12 pt. MICR CMC7 8 pt. MICR E13B 8 pt. MicroPrint 1 pt. SECURE 36 pt.	**No Secure Fonts**
Universal Driver Options to set on the driver Install Options tab Base printer Automatic duplex Multipurpose feeder Flash memory card (optional, if installed) Tray 2 (optional)	

2. MICR Overview

MICR stands for Magnetic Ink Character Recognition. All MICR documents have a MICR line with numbers and symbols printed in a unique MICR font with magnetically chargeable ink or toner. Each character of the MICR font has a unique waveform when sensed magnetically. Financial institutions and the Federal Reserve use the MICR line to identify and sort checks. The high-speed automated processing of checks and other financial documents depends on the accuracy and the integrity of the data printed in the MICR line. Your new Source Technologies Secure MICR Printer is specifically designed to produce high quality MICR documents.

The Check Clearing System
The Check Clearing for the 21st Century Act (Check 21) was signed into law October 28, 2003. Prior to Check 21, checks traveled through the bank's high speed reader/sorter equipment an average of near seven times in the Check Clearing process. Some checks could be read up to 30 times or more by these machines.

In today's environment high and low speed check readers can capture a picture or image of the check allowing for images to be exchanged between financial institutions, the Federal Reserve, and other clearing houses. This new law, Check 21, defines what is called a "Substitute Check", and removed barriers that existed in converting physical checks to check images for clearing. The original physical check can now be truncated by the first institution that converts the check to image. The original check can now be destroyed.

United States and International MICR Standards still require the printed MICR line information to be of the highest quality and durability. Additionally, issues related to check fraud continue to place high importance on print quality. For these reasons, the quality and durability of information printed with Source Technologies Secure MICR Printers remains a key new product development criterion.

MICR Printing Standards in the United States Today
Congress established the Federal Reserve System (FRS) in 1913. Today most commercial banks in the United States belong to the FRS. Many other depository institutions provide banking and checking account services to the public. These other institutions, such as some credit unions, savings and loan associations and non-member banks, are not formally part of the FRS. However, they have access to the payment services it provides and are subject to many of the FRS regulations.

In 1958, because of the explosive growth of check usage, the American Bankers Association selected the E-13B MICR font and the MICR system as the technology for high-speed check processing. Today, check standards are determined by the Accredited Standards Committee X9AB Payments Subcommittee of which Source Technologies is a voting member. The latest versions of the standards and technical guidelines are available from:

<div align="center">Hardcopy:</div>

Global Engineering Documents
Phone 800-854-7179 or 303-397-7956
Fax 303-397-2740
global@ihs.com
http://global.ihs.com

<div align="center">Softcopy:</div>

X9 Electronic Bookstore
www.X9.org - click ESS
www.ansi.org - click ESS
or
http://webstore.ansi.org

The key standards that address check documents are as follows:

ANS X9.7 Specifications for Bank Check Background and Convenience Amount Field
ANS X9.100-160 Specifications for Placement and Location of MICR Printing
ANS X9.100-10 Paper Specifications for Checks
ANS X9.100-20 Print and Test Specifications for Magnetic Ink Character Recognition (MICR)

For those with an interest or need there are also US standards that address Deposit Tickets, Check Endorsements (the back of the check), image interchange file formats, and other MICR areas.

Users of our Secure MICR Printers are not required to have access to the above standards. Our Technical Support staff maintains current knowledge of the standards and changes that affect the check industry in the US and other countries with unique requirements.

3. MICR Check Design

General Features of Check Design
To be a legal and negotiable document, the necessary data elements required on a check are the date, amount, payee name, payer's bank name, and payer's signature.

Other elements included in a good check design are: the amount in words, account title, check serial number, fractional routing number and MICR line.

A good check design contains security features and is formatted to be easily read by both machines and the human eye. If the format is complicated, the depositor, bank employee or reader/sorter machine may make an error in reading the data.

Position and Dimension Gauge
A MICR position and dimension gauge, like the one available from Source Technologies (part number 205-1000MGE or 220-M1027-34, is an important tool for use in designing checks. During check design, check your output against this gauge to determine if the data elements (date, amount, payee name, payer's bank name, and payer's signature) are correctly positioned on your document.

Design Elements in Detail
Paper
The ideal paper for check production is 24 to 28 lb. laser bond. Source Technologies' MICR lab has tested paper stock from most major manufacturers and has compiled a list of products that produce superior results. Contact your sales representative for this information. For a fee, Source Technologies will test your paper for proper MICR adherence and check reader/sorter performance. There are also many security features available to aid in the overall security of your MICR documents. Please refer to Chapter 5, Security Issues, for more information on check stock specifications and security features.

Size
The size of check documents must be:
> 6.00 inches to 8.75 inches in length
> 2.75 inches to 3.66 inches in height

We recommend standard 8.5" X 11" letter size stock or 8.5" X 14" legal size stock for proper feeding through your ST Secure MICR Printer. The number of checks per page is determined by your application. Custom size stock other than letter or legal can be done with proper planning and application programming within the paper size specifications for the base printer.

MICR Clear Band
The MICR clear band is an area at the bottom of the check where the MICR line prints. No other magnetic printing should appear in this area on both the front and back of the document. The clear band is an area 0.625 (5/8) inches high from the bottom of the check running the entire length of the check. Exact MICR line placement in this area is very important. Please refer to Figure 3.1 for more information on MICR line placement.

Data Elements

Date

The date is a required data element for a check. It represents the day upon which or after which the transfer of the check amount may take place. The date is usually placed in the upper right portion of the check so it does not interfere with the convenience amount field. The common format is Month, Day and Year, however, the military format of Day, Month and Year is also acceptable.

Amount

The amount of the check is a required data element for negotiation. The amount usually appears at least twice on the check. The amount printed in numbers is called the convenience amount. The amount printed in words is sometimes referred to as the legal amount; this is the amount that applies if there is a difference between the two amount fields. The amount may also be printed a third time on the check in a secure font, intended to make alteration of the amount field difficult. Please refer to Chapter 6 and Appendix B for information on Source Technologies' Secure Numeric Font.

Convenience Amount

The convenience amount location is specified in ANSI X9.7. The basic location is illustrated in Figure 3.1. Since this amount can be machine scanned, its location and design should be kept within the specifications. The amount beginning with the dollar sign should be left justified within the scan area with numbers spaced normally to the right. The dollars and cents should be separated by a decimal point with the cents printed in the same size font as the rest of the field. Embedded commas should not be used. The convenience amount background should have good reflectance so it does not interfere with optical scanning (see ANSI X9.7).

The convenience amount should be printed in a simple, fixed pitch font. We recommend our ICR Secure Numeric Font (see Appendix C). It was designed to be easily read by image capture equipment and is also a fraud deterrent. A fixed pitch courier font, or if available, OCR-B, are also acceptable fonts to print the convenience amount.

Note: The Source Technologies' Secure Numeric Font (see Appendix B) should not be used in the convenience amount since it is not a machine readable font.

Amount in Words

The amount in words (sometimes called the legal amount) is normally located either above or below and to the left of the convenience amount. The area for the amount in words should be entirely filled to make alterations difficult. The amount should start at the far left of the line with the words placed immediately adjacent to each other. The cents need not be written out. They may be expressed as a fraction (60/100), and should be placed immediately to the right of the dollar amount and followed by a line or other space filler to inhibit alteration.

Example: One hundred forty-four and 62/100---------------DOLLARS

Given the available area on the document, you may need to use a smaller font when printing larger value amounts.

Payee Area
The payee is a necessary data element for a negotiable document. The payee area is generally to the left side of the document either above or below the amount in words. It is often preceded by the words "Pay to the Order Of." The payee data should not enter the MICR clear band which extends 5/8 of an inch above the bottom of the check. Some financial institutions have established specific print requirements for the Payee Name and optional address. Consult your bank for details on their print requirements.

Signature Area
A signature is a required data element for a negotiable document. The signature or signatures authorize the bank to honor the check; therefore, it must match the bank's records. The signature area should be beneath the convenience amount area but the signatures should not enter the convenience amount area nor the MICR clear band. This is especially true if you print the signature with MICR toner.

Drawee Institution Name
The name of the institution where the maker's account is located is referred to as the drawee institution. The bank's name, city, and state are required.

Account Title
The account title is normally printed in the upper left corner of the check. It includes the name of the account holder and other information such as addresses, telephone numbers, and logos. The data in the title should be legible and sufficiently complete so that if the MICR data account number is destroyed, the drawee institution can refer to the account title in order to trace the account number.

Memo Line
This line is located in the lower left quadrant of the check, and is not required. Data printed here does not contain any legal significance. Printing in this area with magnetic toner should not extend downward into the MICR clear band which is 5/8 of an inch above the bottom of the check.

Check Serial Number
The check serial number is generally printed in the upper right quadrant of the check. Although the check number is not required for the check to be negotiable, the account holder and financial institution use these numbers to reconcile statements and execute stop payments. The check serial number should also appear a second time in the MICR line, and these numbers should match. The number of digits in the check serial number is controlled by the financial institution and the MICR line format. Consult your banking institution for their requirements.

Fractional Routing Number
The fractional routing number should be printed in a fractional format in the upper right quadrant of the check. This number is assigned to identify the Federal

Reserve District and drawee institution. Consult with your bank for the proper routing number and format for each of your accounts.

MICR Line

Accurate high-speed processing of your checks by financial institutions is enabled by the accuracy and integrity of the data in the MICR line. Refer to figure 3.1 for the location of the following MICR line fields. The MICR line is read from **right-to-left** with position one being the right most position proceeding to position sixty-five on the left. The MICR line must be printed at exactly eight characters per inch.

Auxiliary On-Us Field—Positions 65 to 45

This field usually contains the check serial number for commercial size checks and possibly account control information. It is bounded by On-Us symbols. ⑂ (). It is not included on personal, small size checks.

External Processing Code (EPC) Field—Position 44

This one digit field is position 44 of the MICR line. This field is usually left blank. The use of this field is reserved and is controlled by the ASC X9AB Standards Committee.

Routing Field—Positions 43 to 33

The routing field is bounded by Transit symbols ⑆ in positions 43 and 33. It contains fixed format information about the drawee institution. Consult with your bank for the specific data field to be placed here for each of your accounts.

On-Us Field—Positions 32 to 14

The On-Us field contains the makers' account number. The structure and content of this field is left to the drawee bank. On personal checks this field also contains the check serial numbers. The On-Us field may not consist of more than 19 characters. An On-Us symbol ⑂ must appear immediately to the right of the account number.

Blank Field—Position 13

Position 13 is always left blank.

Amount Field—Positions 1 to 12

The amount field is the right most field in the MICR line. It remains blank until it is printed by the bank of first deposit. When the check enters the banking system, the bank of first deposit encodes this field from data in the convenience amount field. It will be bounded by Amount symbols ⑈ .

Figure 3.1: Sample Check
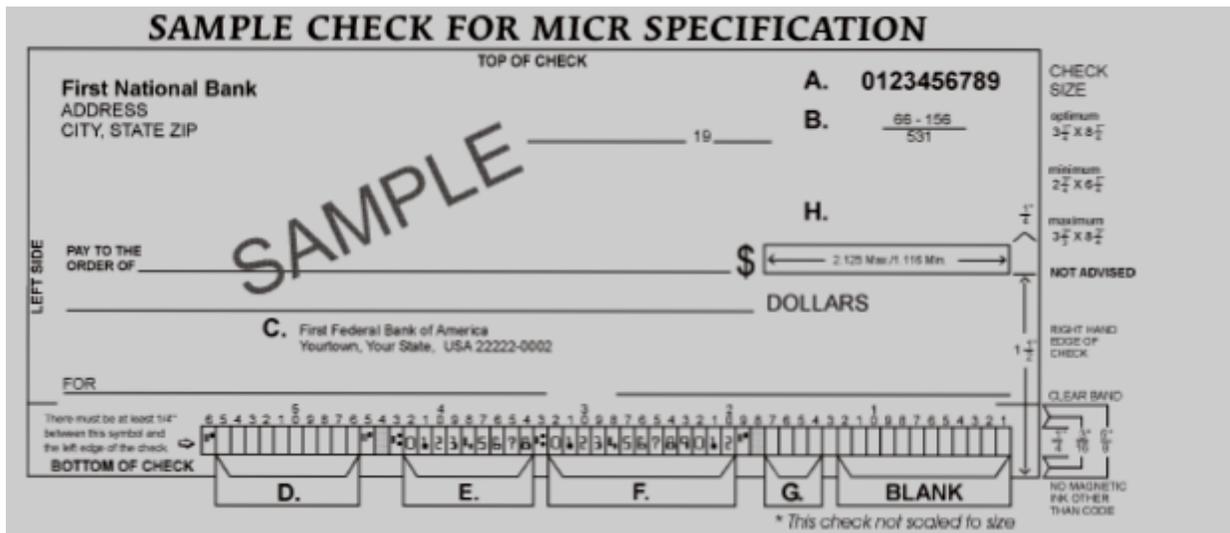
A. **Serial Number:** Must be in the upper right corner and match the serial number in the MICR line (see D for further explanation).

B. **Fractional Routing Transit Number:** Should be in the upper right corner and must match the routing transit number in the MICR line with the exception of the state prefix number (ex. 66 = NC, 67 = SC, 64 = GA, etc.) and the preceding zeros.

C. **Bank Name, State, City:** The bank logo is optional. Name of bank, city and state where the account will be assigned/opened are required fields.

D. **Aux On-Us (46-55):** This is a required field if the customer desires services offered by the bank which require a serial number. The serial number format is controlled by the payer's bank. A & D should match.

E. **Routing Number (34-42):** Designates the Federal Reserve district and financial institution. Each city, state or region that the bank serves has a unique institution identifier. **IMPORTANT:** positions 35-42 are the Routing Numbers; position 34 is the check digit.

F. **Account Number:** This is a unique number assigned to the customer's account.

G. **Optional Serial Number:** Used for personal accounts (checks only). This should be a 4-digit, zero-filled field that matches the serial number in the upper right corner.

H. **Convenience Amount Area:** should be in the general location shown above in the diagram. The illustrated box in the diagram is optional and if used, should conform to ANS X9.7. A single stroke dollar sign is required.

4. Quality Issues

A high quality MICR document can be read by bank reader/sorter equipment many times with no readability issues and does not result in damage to bank equipment. This quality is the result of a well designed printer, an originally manufactured MICR toner cartridge and high quality check stock.

Printer Features
Your Secure MICR Printer is equipped with some features to ensure high quality MICR documents.

Paper Type
When the printer senses the presence of the ST MICR cartridge, internal operating points that affect the print engine and fuse grade are optimized for MICR documents and Source Technologies' MICR toner. Paper type settings, if selected through a printer driver (ex. Transparency) do not affect operating points so that the printer remains optimized for MICR printing.

Print Density
When the printer senses the presence of the ST MICR cartridge, the internal print density is controlled for MICR printing. Darker density settings of 9 and 10 do print darker, but settings below the default value of 8 do not change print density.

MICR Toner Low
When MICR toner is low, the printer stops and the user is prompted. We recommend shaking the cartridge to prolong its life. When low toner is sensed, there is enough toner left to print additional quality MICR documents. Low toner occurs at approximately the 90% point of cartridge life.

MICR Toner Empty
When the toner in the cartridge is determined to be too low to continue, the printer stops. To continue printing, a new cartridge will need to be installed.

MICR Toner
Use only Source Technologies' MICR toner when printing MICR documents. It is specifically engineered to print quality MICR documents with your printer. The printer's MICR toner sensor is designed to work with the Source Technologies' MICR toner cartridge to prevent printing checks with regular toner present. Your Source Technologies MICR printer can be used for general office printing. If a MICR print job begins and the printer has a regular toner cartridge present, the printer will stop and prompt the operator to install a MICR toner cartridge.

Source Technologies does not recommend the use of refilled MICR toner cartridges. Refilled cartridges may result in expensive printer repairs and bank check reject fees due to inferior MICR toner formulation.

MICR Check Stock

Check stock has a significant impact on the resulting quality and security of your MICR document. Here are a few features that should be considered when selecting a check stock. Please see Chapter 5: *Security Issues* for more information on check stock security features.

Quality

Quality MICR check printing with your Source Technologies' secure MICR printer requires check stock that matches the printer's requirements. Source Technologies can supply paper specifically made for our printers. If you wish to order check stock from other suppliers, please show the following requirements to your sales representative. We will test other suppliers' paper for a nominal fee.

Layout

Layout your check design before any paper is purchased or layout your design to existing check stock. Keep perforations, orientation, special logos and any color elements in mind. The printer can print just about anything as long as it is black.

Weight

We recommend 24 lb. - 29 lb. paper.

Stiffness

We recommend Taber M.D. 2.5 and C.D. 1.1 minimum.

Smoothness

For best toner fusing, we recommend rougher surfaces within the base printers' specifications, and the Paper Specifications for Checks, X9.100.10. We recommend a smoothness range of 150 to 200, Sheffield.

Paper Grain Direction

When using 24 lb. - 29 lb. bond paper we generally support either long or short paper grain. Overall performance in the bank's reader/sorters is best when the resultant grain direction is left to right when viewing the check.

Perforations

All perforations in the stock should be Laser-Cut or Micro-Perfs (20 or more cuts per inch). Larger perforations can produce excessive paper chaff and result in damage to the toner cartridge. Perforations should be ironed by the paper supplier to reduce nesting and potential double feeding.

Moisture

The paper moisture content should be between 4.7 and 5.5%. Storage conditions have much to do with the final moisture content of most papers. Store your check stock in a cool, dry, environmentally stable and secure area. Protective wrappings should be removed just prior to use.

5. Security Issues

Printing negotiable documents from blank paper on desktop MICR laser printers makes security a top priority for any company embarking on a desktop check printing project.

Combating fraud is a moving target. As soon as a new weapon is developed, malicious forces are at work to devise workarounds to it. Good security programs integrate hardware, software, your employees, processes, and your financial institution into a secure check production system. The ultimate liability for fraudulent documents rests with the banks and their customers, and there can be many vulnerable points throughout the overall system. Customers must have systems designed and documented to show "Ordinary Care and Good Faith Effort" is in place to avoid liability. In the past, financial institutions generally credited corporations when fraud was discovered. Today, regulations attempt to define who may have been negligent in the transaction and put the liability on that party or parties. If a fraudulent occurrence can be traced to a corporation's lack of security procedures or the design of their negotiable documents, the regulations will protect the banks, or at best case the loss will be shared.

The following internal and external security measures will help minimize your risk of check fraud.

1. Stay abreast of current check fraud methods and the latest in fraud detection. Many financial institutions offer seminars to educate corporate clients.

2. Financial institutions should train tellers to look at the check, not the person presenting the check. The check, not the person, is the item that must be verified.

3. Incorporate security features into your base check stock and utilize printed security features that address both alteration and counterfeiting of original items. We have found the following check stock security features to be of merit:

   Artificial Watermarks - White on white printing generally on the back reveals words or patterns when held at an angle. You should state on the front of the check that this feature is present. True watermarks are valuable but more costly.

   Laid Lines - Background lines that make cut and paste alteration difficult. These are normally on the back of the check.

   Fuse Enhancing Additive - Coatings or additives to the paper that improve the bonding of toner to the paper. This helps prevent altering of critical data such as the amount, or payee name.

   Chemical Additives - If an ink eradicator (bleach, acetone, etc.) is applied to the document, the eradicator creates a permanent stain.

   Numbered Check Stock - Sequential numbering printed in dye that penetrates to the reverse side of the check can be used to verify authenticity.

This also provides for inventory control of blank check stock. This number should not be linked or be equal to the check serial number due to the potential of double feeding in laser printers.

Note: These features serve as a general guide for check security. You should not consider these features as an all inclusive list. We recommend consulting with your paper supplier for any additional comments or suggestions.

4. Firms accepting checks should be aware of damaged MICR lines. Intentionally damaging the MICR line can increase the time necessary to process an item, giving the forger enough time to leave town. Also be sensitive to discoloration, this could be an indication of alteration.

5. Safeguard check stock paper, and limit access only to necessary employees.

6. When generating final negotiable items:
    - The document always includes the amount value in words
    - The document should not include information that limits the value range, i.e. "Not valid over $500." This only guides the fraudulent attempt. Use your application software to detect out of range items
    - All levels of hardware and software password protection should be utilized

7. Understand and approve the security procedures of your check stock suppliers to safeguard stock in their custody.

8. Use "Positive Pay" check services from your financial institution. You should provide the check number, check date, dollar amounts, and sometimes the payee name to your bank when checks are issued. The bank will match these values and alert you to mismatches before clearing the check to your account. Financial institutions should encourage full participation of corporate clients.

9. Move methods of fraud detection to the item's point of entry into the clearing system. For example, low cost readers can detect low magnetic strength in the MICR line which is a good indication of attempts to copy an original.

10. Review and document your internal negotiable document printing procedures. Investigate employee backgrounds before assigning security authority. Split the responsibilities. For example, an accounts payable production/security officer should not also balance the account.

6. MICR Features

Source Technologies' secure MICR printers are designed to allow both general office document printing and secure MICR document printing. You may print a variety of conventional jobs with MICR toner using all of the printer features available. These printers come standard with PCL5e, PCL6, and PostScript Level 2 emulation. Source Technologies has designed features to enhance the base printer for MICR specific printing that allows you to securely print high quality negotiable documents.

Secure MICR

Source Technologies' secure MICR printers have resident fonts for printing MICR documents, password secured in Flash memory. Specific PJL commands are required to unlock and relock these font resources. While unlocked, they can be accessed with standard PCL5e commands. Please refer to Chapter 7 for more information. In addition to the secured font resources, the printer has been internally modified to ensure high quality printing with MICR toner. Specific print densities, transfer voltages and fusing temperatures are factory pre-set. Source Technologies' secure MICR printers only support Source Technologies MICR toner cartridges.

MICR Fonts

The E-13B MICR font, designed specifically for the printer, is resident in your printer. Examples of the font characters are in Appendix A of this manual. The font can only be activated after the appropriate PJL commands with the correct password have been sent to the printer. The alternative MICR Font used in some countries, CMC7, is also resident in your printer.

Secure Fonts

Two Source Technologies' designed numeric secure fonts, Secure Numeric and ICR Secure Numeric, are resident and password protected in Flash memory in your printer. Examples of these fonts can be found in Appendix B of this manual. Like the MICR font, these fonts can only be accessed after sending PJL commands with the correct password from your application software.

The ICR Secure Numeric Font is designed for use in the Convenience Amount area of a check. This area contains the numeric dollar value and is located on the right side of the check approximately 2 inches up from the bottom edge. The imaging recognition features available in today's check reader/sorter equipment can optically read it. The Secure Numeric Font should not be used in this area of the check. It is a reverse image font and cannot be read automatically by the equipment.

It is recommended that both fonts are used as they are designed to deter check fraud.

MicroPrint

Your secure MICR printer also contains the MicroPrint font. MicroPrint text, being less than .010" tall, can be easily read with a magnifying glass but appears as a solid line to the unaided eye. This font provides protection against reproduction by most scanners and copiers because they cannot successfully print the tiny letters.

Most check printers use this font in the signature area of their preprinted checks. It is recommended that this font be used to help deter check fraud. The text in this font can be either fixed (such as the name of your organization) or it can be variable (such as the check amount and payee name). The use of variable text provides an additional method of protection against check counterfeiters.

Use of the "MP" designate symbol to identify the line as MicroPrint is optional. The MicroPrint font only contains alphanumeric characters. Punctuation marks and spaces are ignored by this font and do not print.

Resource Storage

The Flash memory in the printer contains five Source Technologies' secured fonts but can be loaded with additional resources for check or non-check printing. The Flash can be loaded with signature fonts, overlay Macros, or other custom resources limited only by the available space. Flash memory in the ST-9612 is read/write password protected. To load additional resources to Flash requires the proper PJL commands to unlock the Flash memory device. This will be detailed in Chapter 7.

Storing resources (fonts, Macros, etc.) in RAM is also an option. Resources in RAM are deleted when the printer is powered off and cannot be password protected in the printer.

MICR Toner Cartridge

A Source Technologies' secure MICR printer only supports Source Technologies' MICR Toner Cartridges. The printer will display an error condition when a standard cartridge is installed. When a MICR toner cartridge is installed the following occurs:

> Control of image density or print density is set to optimum levels for MICR printing.

When the PJL "MICRJOB" command is sent, the following occurs:

1. The printer forces internal copies to 1. Downloaded copy commands are ignored.

2. Automatic reprint of jammed documents is disabled, forcing the application to reprint any jammed documents. This provides an audit trail to the application of the jam event.

The PJL commands to unlock the fonts must precede all PCL commands. The re-lock PJL commands must follow the PCL commands and final form feed command. The PCL commands can print an unlimited number of pages between the unlock and re-lock sequences. The following examples will use <ESC> to indicate the Escape character, ASCII 27. Values shown in parentheses () are hexadecimal.

PJL Unlock Sequence

```
<ESC>%-12345X@PJL LDECLARE LRESOURCE:"flash:" LRWLOCK="PASSWORD"
(0D)(0A)@PJL ENTER LANGUAGE=PCL(0A)
```

The sequence contains a UEL (Universal Exit Language) command followed by the unlock and enter language commands. These commands are case sensitive. PASSWORD is the initial default password value. The command delimiter is a Line Feed (hex 0A) with Carriage Return (hex 0D) being optional. Spaces are required as shown. The ENTER LANGUAGE command is optional but recommended. The command should also end with a LF (hex 0A). At this time all secured resources including any resources that are customer unique in Flash are unlocked and available to PCL.

The password value is limited to no more than 8 alphanumeric, case-sensitive characters.

PJL Re-Lock Sequence

```
<ESC>%-12345X@PJL LDELETEPASSWORD LRESOURCE:"flash:"(0D)(0A)
<ESC>%-12345X
```

This sequence re-locks the resources with no change in the password value. The PJL syntax of LDELETEPASSWORD is ***not*** the password. The command sequence terminates with the UEL command (Universal Exit Language). This is optional but recommended.

PJL Re-Lock Sequence With A New Password Value

```
<ESC>%-12345X@PJL DEFAULT LRESOURCE:"flash:" LRWLOCK="xxxxxxxx"
(0D)(0A)<ESC>%-12345X
```

This command requires the resources to be previously unlocked. The new password is represented by the value xxxxxxxx. The UEL is again optional but recommended.

After consulting Lexmark Technical Reference materials you may wish to expand the PJL sequences to include more than the examples above. To chain multiple PJL commands, follow the following format:

```
(UEL)(PJL COMMAND)(0A)(PJL COMMAND)(0A)(PJL COMMAND)(0A)(UEL or
ENTER LANGUAGE)
```

The normal printer action to any format problems or missing or extra symbols is to ignore the PJL command. This may make it difficult to troubleshoot format errors.

PCL Font Call Commands

After PJL has unlocked the MICR Flash resources, the ST9612 uses standard PCL5e commands to print. The five resident Source Technologies MICR font resources are all

bitmapped fonts and therefore cannot be scaled larger or smaller than the bitmapped images. These fonts can be called by either a PCL Font Selection String or by their ID. The commands are:

E13B MICR FONT	<ESC>(10O<ESC>(s0p8h8v0s7b360T	The Selection String
	<ESC>(30802X	The ID Call
SECURE NUMERIC	<ESC>(16C<ESC>(s0p5h36v0s112T	The Selection String
	<ESC>(30043X	The ID Call
ICR SECURE	<ESC>(1O<ESC>(s1p12v0s0b110T	The Selection String
	<ESC>(30066X	The ID Call
CMC7 MICR FONT	<ESC>14Y<ESC>(s0p8h8v0s0b361T	The Selection String
	<ESC>(30803X	The ID Call
MicroPrint	<ESC>(2Q<ESC>(s1p1v0s0b112T	The Selection String
	<ESC>(30055X	The ID Call

MICR FONT NOTE – The E-13B and CMC7 Fonts are 8 characters per inch. To position correctly at an exact 8 characters per inch, the printer must be set to an internal Unit of Measure of 600 DPI or greater or must have a horizontal motion index command at 8 CPI be issued after the font call. This is true even if the base printer is set at 600 DPI. The default character positioning is at 300 DPI, and 300 divided by 8 equals 37.5 pixels. The printer will either round down to 37 or up to 38 pixels causing characters to creep. There are multiple ways to resolve this:

1. If you are using a printer driver set to 600 DPI, the printer data stream should include a Unit of Measure PCL command set to 600. The command is <ESC>&u600D

2. If the application controls the printer data stream, add the Unit of Measure command early in the data stream. The command also affects X & Y positioning commands. Add <ESC>&u600D

3. After calling the E-13B MICR font, issue an HMI (Horizontal Motion Index) command set to 8 characters per inch.
   <ESC>&k15H

The command must be included with every E-13B MICR font call using either the Selection String or ID call. The command string is:

<ESC>(10O<ESC>(s0p8h8v0s7b360T<ESC>&k15H font data——The Selection String

<ESC>(30802X<ESC>&k15H font data——The ID Call

Refer to the Font Mapping Appendix pages for specific character set data for each font.

PJL INFO MICR COMMAND

Source Technologies' secure MICR printers support an optional custom bi-directional PJL Inquiry Command. The command provides printer and cartridge information for network management. The command format is: @PJL INFO MICR.

The command should be sent with UEL (Universal Exit Language) commands.
Example:

```
<ESC>%-12345X        UEL
@PJL INFO MICR        INFO MICR Command
<ESC>%-12345X        UEL
```

The following data is returned

```
@PJL INFO MICR
PRINTER STATE    = READY
                 = BUSY
                 = NOT READY
SERIAL NUMBER    = XXXXXXXX
PAGECOUNT        = 123456
CARTRIDGE TYPE   = NORMAL
                 = MICR

CARTRIDGE STATUS  = UNKNOWN
                  = OK
                  = LOW
                  = EMPTY
CARTRIDGE SERIAL# = XXXXXXXX
TONER LEVEL       = 0-9
                  = UNKNOWN
CARTRIDGE COUNT   = XXXX
LOW THRESHOLD     = XXXX
EMPTY THRESHOLD   = XXXX
```

- Printer State
    "Ready" is the expected return
- Serial Number = Printer Serial Number
- Page Count = Printer Page Count
- Cartridge Type
    "MICR" is the expected return. "Normal" could mean the command was sent to a non-MICR printer
- Cartridge Status
    "OK, Low, and Empty" are the expected returns. "Unknown" is possible if the cartridge had just been installed.
- Cartridge Serial = Cartridge Serial Number
- Toner Level
    A single digit return giving a rough estimate of toner remaining

9 = Full, 0 = Empty
- Cartridge Count = xxxx
    Data indicating toner usage by counting pixels printed
- Low Threshold = xxxx
    The Toner Low point based on cartridge count value
- Empty Threshold = xxxx
    A cartridge count value that determines when printing must stop to ensure
        quality MICR documents

Toner Cartridge and Photoconductor Units

The ST9612 MICR Print Cartridge is comprised of two components: the toner cartridge and the photoconductor unit.

Toner cartridges are available in two models depending on the yield: a 1.5K page and a 3K page. The 1.5K model ships with new printers. The 3K model is the normal replacement model. The projected life in terms of page count is based on a typical 5% print coverage and continuous print mode. These projected values of 1,500 and 3,000 were certified using the ISO 19752 Yield Testing Methodology. The standard requires continuous print mode. The projected life is reduced somewhat dependent on the actual average print-job page count.

The photoconductor unit has a projected life in terms of page count of 20,000 to 30,000 dependent on average pages per print job. The 20,000 life is projected for 100% 1 page print jobs. The 25,000 life is projected for an average print job being at or near 3 pages. The photoconductor life for average print jobs being above 3 pages would exceed the 25,000 forecast.

The ST9612 MICR printer keeps record of the actual printing modes in terms of average print job size and the actual average print coverage percentage. The printer internally adjusts when either the toner cartridge or photoconductor unit needs to be replaced. The following error messages pertain to the toner and photoconductor unit.

Toner Low

The printer will stop with the Toner Low / Replace PC light and the Continue button ON steady. Press the Continue button and the printer will return to Ready and continue printing. The Toner Low light will remain ON, steady. While in the toner low state, the printer will stop again on power cycles and other operating situations such as jams or paper out conditions. Simply press the button to continue printing. The Toner Low light will remain ON until the cartridge is replaced or Toner Out is reached.

Toner Out
After approximately 300 pages beyond the first Toner Low condition the printer will stop printing and display the Toner Out condition. The Toner Low light will be ON steady and the Error light will blink. All other lights will be off. You must replace the toner cartridge to continue printing.

Photoconductor Unit Life Warning
As mentioned above, the printer internally calculates the average print-job size and actual average print coverage percentage. Once the photoconductor unit reaches approximately 85% of it usable life, the printer will stop with the Continue button ON. The Toner Low / Replace PC will be BLINK. Press Continue and the printer returns to Ready and printing will continue. This early warning is intended to provide a reasonable time for scheduling and obtaining a new unit for replacement.

When 100% of the usable life has been reached, the Menus Page will indicate the photoconductor life is "Exhausted". The printer will still continue to print, but it is recommended the Photoconductor be replaced soon. The exposure for print quality related problems may be close due to printing beyond the projected usable life.

Replace Photoconductor (printer hard stop)

After the photoconductor unit exceeds 15% beyond the usable life point, the printer will hard stop with the Error and Toner Low / Replace PC lights BLINKING and the Continue button ON. If you press Continue, one page will print with instructions in multiple languages to replace the Photoconductor Unit referring to Appendix F.

Load MICR Toner

The Source Technologies' Secure MICR Printer only supports MICR toner cartridges in its normal configuration. This prevents the printing of MICR documents with standard toner. If configured to support both MICR and standard cartridges, the PJL MICRJOB command checks the cartridge type and will prompt the operator with the following pattern to load MICR toner if not present.

PJL Re-Lock Sequence
The last two lines re-lock the secured fonts. The password is not changed in this example.

FIGURE 8.1 SAMPLE ACCOUNTS PAYABLE CHECK

PJL and PCL commands used to print the sample check:

<ESC>%-12345X@PJL LDECLARE LRESOURCE:"flash:" LRWLOCK="PASSWORD"

@PJL MICRJOB

@PJL ENTER LANGUAGE = PCL

<ESC>&l2a1h6d1e64F

<ESC>&u600D

<ESC>&f100y3X

<ESC>(s4099t0b10H

<ESC>*p300x600Y xxxxxxxxx   xx/xx/xxxx $x,xxx.xx   3% $x,xxx.xx

<ESC>*p300x2775Y xxxxxxxxx   xx/xx/xxxx $x,xxx.xx   3% $x,xxx.xx

<ESC>*p3250x75Y<ESC>(s4099t3b8H 123456

<ESC>*p3250x2200Y 123456

<ESC>*p4250x4450Y 123456

<ESC>*p3650x4775Y xx/xx/xxxx
<ESC>*p400x5225Y<ESC>(s4099t0b15H xxxxx Thousand xxxxx Hundred xxxxx Dollars and xx/100 Cents

<ESC>*p600x5600Y<ESC>(s10H ABC TOOL & DIE

<ESC>*p600x5700Y 123 Main Street

<ESC>*p600x5800Y Yourcity, ST 12345-6789

<ESC>*p900x6325Y<ESC>(30802X<ESC>&k15H O123456O T123456780T 12345D67890O
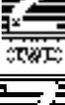
<ESC>*p1500x5100Y<ESC>(30043X ($**1,234.56)

<ESC>*p3650x5400Y<ESC>(30066X $**1,234.56

<0C> Form Feed

<ESC>%-12345X@PJL LDELETEPASSWORD LRESOURCE:"flash:"

<ESC>%-12345X

Appendix B: Secure Numeric Font Mapping

Description	Alpha/Numeric Character	Hex Value	Secure Font Character
Dollar Sign	$	23	
Left Bracket	(	28	
Right Bracket	)	29	
Asterisk	*	2A	
Comma	,	2C	
Dash	-	2D	
Period	.	2E	
Slash	/	2F	
Zero	0	30	
One	1	31	
Two	2	32	
Three	3	33	
Four	4	34	

Appendix B continued: Secure Numeric Font Mapping

Description	Alpha/Numeric Character	Hex Value	Secure Font Character
Five	5	35	
Six	6	36	
Seven	7	37	
Eight	8	38	
Nine	9	39	
Arrow	>	3E	

Example:
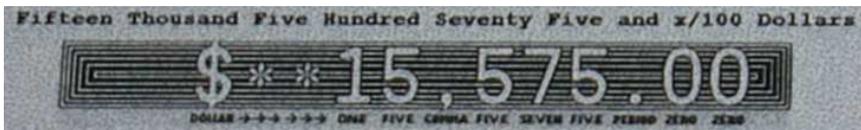
Note: ***The secure fonts in the example are magnified for purposes of clarity.***

Semi-Colon	;	3B	
Less Than	<	3C	
Equal	=	3D	
Greater Than	>	3E	

Note: **The CMC7 Font in the example above is magnified for purposes of clarity.**

Appendix E: Contact

For more information, contact:

Source Technologies LLC.
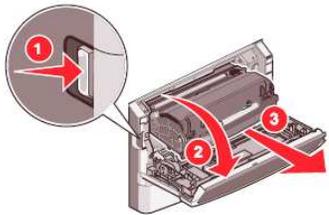2910 Whitehall Park Drive
Charlotte, NC 28273

www.sourcetech.com

techsupport@sourcetech.com

800.922.8501

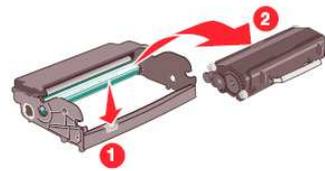# Appendix F: Photoconductor Replacement
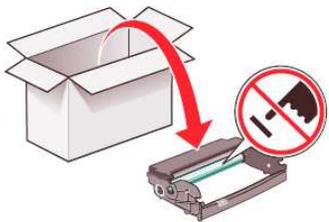
Replacing the photoconductor kit

1

2

3
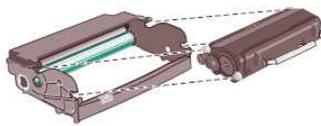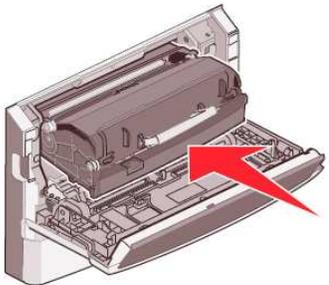

4

5

6

7

Do *not* close the front door.
Ne fermez pas la porte avant.
Non chiudere lo sportello anteriore.
Schließen Sie *nicht* die vordere Klappe.
No cierre la puerta frontal.
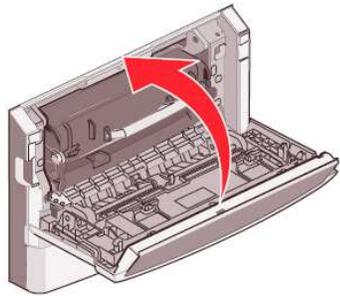*Não* feche a porta frontal.
请勿关闭前部盖门。
請勿 關上前門。
전면 덮개를 닫지 마십시오 .

8

- Press and hold the button shown for five seconds.
- Maintenez le bouton indiqué enfoncé pendant cinq secondes.
- Tenere premuto il pulsante per cinque secondi.
- Drücken Sie mindestens fünf Sekunden lang die dargestellte Taste.
- Pulse y mantenga pulsado el botón mostrado durante cinco segundos.
- Pressione e segure o botão exibido por cinco segundos.
- 按下所示按钮并保持 5 秒钟。
- 按住如圖所示的按鈕約五秒鐘。
- 5 초 동안 표시된 버튼을 누르십시오 .

- Depending on your printer model, the following occurs:
  - For the model with only lights, all the lights cycle.
  - For the other models, **Resetting PC Counter** appears on the display. The power light blinks.
- Selon le modèle de votre imprimante, les événements suivants se produisent :
  - Pour les modèles comportant uniquement des voyants, tous les voyants s'allument tour à tour.
  - Pour les autres modèles, **Réinitialisation du compteur PC** apparaît à l'écran. Le voyant d'alimentation clignote.
- A seconda del modello della stampante, possono verificarsi i seguenti eventi:
  - Per il modello con solo delle spie, tutte le spie si accendono in sequenza.
  - Per gli altri modelli, viene visualizzato **Azzeramento contatore fotoconduttore in corso**. La spia di accensione lampeggia.
- Je nach Druckermodell geschieht Folgendes:
  - Bei Modellen, die nur über Kontrollleuchten verfügen, leuchten alle Kontrollleuchten nacheinander auf.
  - Bei den anderen Modellen wird **Fotoleiter-Zähler wird zurückgesetzt** angezeigt. Die Netzkontrollleuchte blinkt.
- Dependiendo de su modelo de impresora, ocurre lo siguiente:
  - para el modelo que sólo tiene luces, todas las luces se encienden y se apagan.
  - para los otros modelos, **Restablecimiento del contador del PC** aparece en la pantalla. La luz de encendido parpadea.
- Dependendo do modelo da sua impressora, o seguinte pode ocorrer:
  - Para o modelo que possui somente luzes, todos os ciclos de luzes.
  - Para outros modelos, **Redefini Contador PC** aparece no visor. A luz que indica ligado, pisca.
- 根据您的打印机型号，会出现下列情况：
  - 对于只有指示灯的型号，所有指示灯循环变亮。
  - 对于其他型号，显示屏上出现正在重置感光鼓计数器。电源指示灯闪烁。
- 依不同的印表機機種，可能會出現下列情形：
  - 若是只有指示燈的機種，則所有的指示燈會重複依序閃爍。
  - 至於其他機種，顯示幕上會出現 **Resetting PC Counter** （重設感光計數器）訊息。電源指示燈呈現閃爍情形。
- 프린터 모델에 따라 다음 사항이 발생합니다 .
  - 표시등만 있는 모델의 경우 , 모든 표시등이 순환합니다 .
  - 다른 모델의 경우 , PC 카운터 초기화가 디스플레이에 표시됩니다 . 전원 표시등이 깜박입니다 .

9

10