CheXpress® CX30
Remote Capture Check Scanner

Service Manual

V1.1

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Foreword

This service manual has been prepared to provide information necessary for the proper support of the CheXpress® CX30 Branch Office Check Scanner. It is intended for use by qualified service technicians who have been trained in the installation, operation, maintenance, troubleshooting, and repair of this scanner product.

The manual is divided into sections providing all the data required to install, understand, adjust, maintain, repair, and replace parts on the scanner. .

We are confident that this manual will be a useful tool in servicing the CheXpress® CX30 Scanner.

Service Manual Notation Convention:

NOTES: Useful information and tips to help make the manual more useful.

CAUTION: Critical information that if not observed, can cause damage to your unit.

WARNING: Vital information that if not observed, can cause personal harm or injury.

CheXpress® CX30 Remote Capture Check Scanner Service Manual

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1.0 General

1.1 About the CheXpress® CX30 Check Scanner

The CheXpress® CX30 Remote Capture Check Scanner is an easy-to-use, compact check scanner that connects to a Personal Computer (PC). This product is intended for use in the Remote Deposit Capture (RDC) environment, and meets or exceeds all the requirements of the Check Clearing for the 21st Century Act (Check 21).

The CX30 Scanner automatically scans the front and/or back of checks while simultaneously capturing the Magnetic Ink Character Recognition (MICR) code line. The images and data are then transmitted through a high speed Universal Serial Bus Interface (USB2) to the PC. The CX30 is a single item scanner that can handle up to 30 documents per minute, using the drop and slide input feeder. The CX30 also allows for Several modes of operation, including a special two pass function when operating in the Scan, Park & Return mode. This allows for capturing MICR and Image data during the inbound movement and different MICR and Image data during the outbound movement

Scanner Equipment Options:

- Ink-jet endorser – to print characters, logos and/or graphics on the back side of checks up stream of the actual check image acquisition.

Scanner Consumables:

- Replacement Ink Jet cartridge
- Scanner cleaning cards
- Replacement Ink Jet absorbent pads

1.2 Computer System Requirements

To insure proper operation and maximum performance from your CheXpress® CX30 Scanner, the following PC requirements should be observed:

Recommended	Minimum
• 2.8 GHz Pentium IV Processor	• 1.6 GHz Pentium Processor
• 2 MB RAM	• 1 MB RAM
• 1 GB free disk space	• 500 MB free disk space
• Windows Vista (32 & 64 bit), XP Professional, or Windows 2000 Professional.	• Windows Vista (32 & 64 bit), XP Professional, or Windows 2000 Professional.
• 1280 x 1024 XGA Display	• 1024 x 768 XGA Display
• USB2.0 port	• USB2.0 port

1.3 Radio Frequency Interference

The Scanner generates, uses, and can radiate radio frequency energy. If the unit is not installed and used properly, that is in strict accordance with the instructions in this manual, it may cause harmful interference to radio communications. The CheXpress® CX30 Scanners have been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interferences when operated in an industrial, commercial, or residential environment.

The use of a USB2 certified shielded cable is required when connecting this product to any/all peripheral or host devices. Failure to do so may violate FCC rules.

1.4 UL/CSA Listed

The CheXpress® CX30 product has been tested to UL950 Information Technology Equipment Standard and is listed with Underwriters Laboratories, Inc. under File Number E201270. The product has also been tested and conforms to Canadian Standards Association (CSA) requirements as evidenced by its cUL listing.

1.5 CE Compliance

The CheXpress® CX30 is CE compliant and has been tested in accordance with the requirements of ICE Directives 73/23/EEC, and 89/336/EEC.

1.6 RoHS Compliance

The CheXpress® CX30 product complies with European Union Directive 2002/95/EC – Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (RoHS Directive) of the European Parliament and of the Council of 27 January 2003.

2.0 Installation

To set up the CheXpress® CX30 Scanner and verify proper operation: Load the Device Drivers by running the USB driver utility V2.6 or newer and Install the Demo software from the digitalcheck.com web site. Next, physically install the Scanner by connecting the Scanner to the PC via the supplied USB (Universal Serial Bus) cable and the power supply.
http://www.digitalcheck.com/integration_support/drivers_and_demo_programs

WARNING: Do not connect power to the device until the drivers have been loaded.

2.1 Physically Install the Scanner

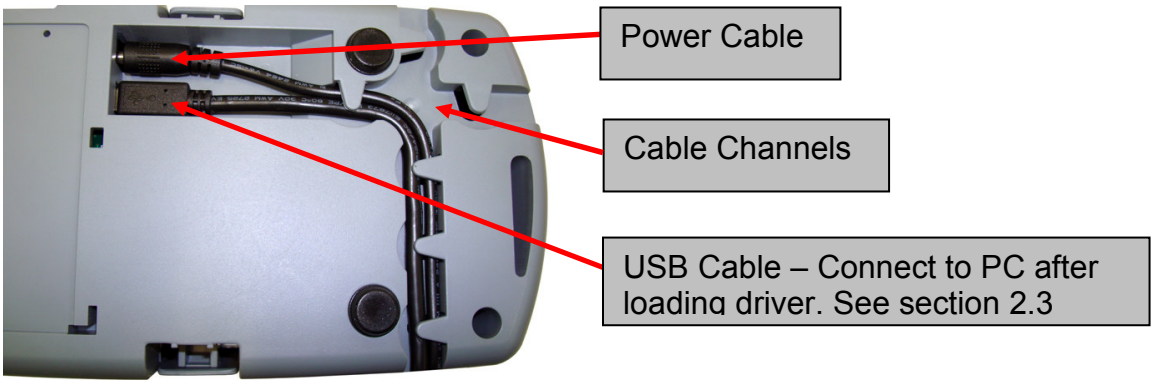
2.1.1 Locate the unit on a flat surface near the PC and away from any direct light.

2.1.2 Connect the power cord from the Modular Power Supply to the Power Connector in the bottom recess. The power connector is a mini style.

2.1.3 Locate the Modular Power Supply in a ventilated area away from the scanner body and connect to an appropriate source of power.

2.1.4 Connect the Modular Power Supply to the AC outlet.

CAUTION: The electric fields created by the transformer in the Modular Power Supply can have an adverse effect on MICR reading accuracy. It is imperative that the supply be separated from the scanner by at least 8 inches (20 cm). Care should also be taken not to locate the scanner too close to a CRT type display terminal, or any other source of magnetism, for the same reason.



(Fig. 1) View of bottom recess and cable channels

Note: Cables can be routed in any of 3 directions as dictated by the user installation.

2.2 Load the Device Drivers

NOTE: The latest version of the Device Drivers and Demo Programs can be found at Digital Check's Web Site at: http://www.digitalcheck.com/integration_support/drivers_and_demo_programs. Look for the USB driver utility, V2.6 or newer.

Click on the appropriate file and copy the target to the PC. From the WinZip program, extract all the files to a new Folder c:\DCC\Drivers, then proceed as follows:

2.2.1 Run the USB driver utility. This launches an Install Shield application.

2.3 Connect the Scanner to the PC

2.3.1 Connect the supplied certified USB2 cable to the Scanner USB connector in the bottom recess.

2.3.2 Connect the other end of the USB2 cable to an available USB2 port on the PC.

2.3.3 The LED indicator should now be showing RED.

2.3.4 Once the device is found, Windows will automatically complete the Installation.

2.3.5 Allow the Windows Installation Wizard to complete installing the new CX30 as a **TSDevice** in Device Manager. Once an application acquires the scanner, it will show as a **Tellerscan** device.

2.4 Install the Demo Software Program

ScanLite is a basic scanning program that allows you to operate the scanner, change different scanner settings, view images, and store them on your PC's hard disk. The Demo program is not the software to run the system. Additional application software, specific to your intended use, is required.

NOTE: The latest version of the ScanLite Program can be found at Digital Check's Web Site at http://www.digitalcheck.com. Pull down V9.05 or newer.

2.4.1 Once at the DCC site, navigate to Integration / Support, then select from the listing under Demo Programs.

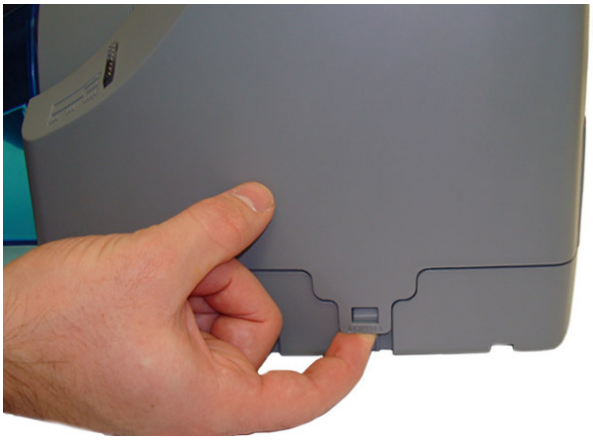
2.4.2 Copy the target to the PC. From the WinZip program, extract all the files to a new Folder c:\DCC\Demo.

2.4.3 From the c:\DCC\Demo sub-directory, double click on the scanlite.exe file to launch the program. The program is user friendly and self explanatory.

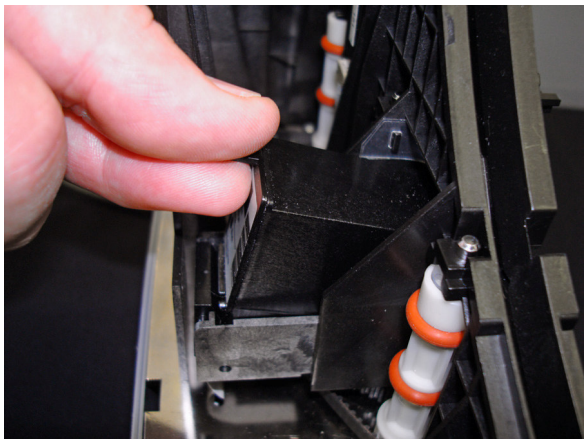
2.4.4 Once the application acquires the scanner, the LED indicator will change from RED to GREEN. It is now ready to scan an item.

2.5 Install the Ink Jet Cartridge

Follow these instructions when installing the inkjet cartridge for the first time, or when replacing an empty cartridge:



(Fig. 3)



(Fig. 2)

1. Remove the center cover and locate the inkjet printer. (Fig. 2 & 3)

2. If replacing an existing cartridge, remove the inkjet cartridge by grasping the small tab at the rear end and gently pulling upward. Discard the used cartridge.

3. Obtain a new inkjet cartridge (HP part number C6602A). For new installations, one new cartridge is included with each inkjet model scanner. Be certain to read the instructions included with the cartridge.

4. Remove the protective tape covering the ink nozzles. Be careful not to touch the ink nozzles with your fingers or allow it to come in contact with any clothing.

5. Insert the nozzle end of the cartridge into the cradle (Fig. 3) in the scanner and slide forward while keeping the reservoir end of the cartridge tilted slightly upward

6. Push the cartridge downward until it snaps into position. The cartridge should be level to the baseplate when fully seated. Replace the top-center scanner cover.

Note: If the scanner has to be transported by common carrier from one place to another or extended periods of inactivity, it's advisable to remove the inkjet cartridge from the scanner and seal in an airtight bag. If the cartridge has not been used for an extended period of time, it may be necessary to clean the inkjet nozzles with a wet towel, and then blot dry.

3.0 Theory of Operation

This section is intended briefly describe the electrical, mechanical, and optical theory of

operation as it pertains to maintenance, support, and repair of the CheXpress® CX30 scanner. A thorough understanding of the CX30 scanner theory of operation is essential to accurate troubleshooting and quick, efficient repairs.

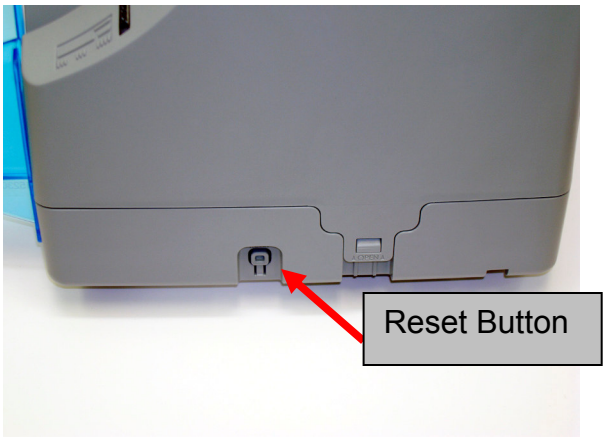
3.1 Startup Sequence

The CX30 is a USB device that does not have resident firmware on board the scanner. Firmware that controls the scanner is located in a file on the PC workstation connected to the scanner, along with various device driver/loader files. Scanner specific data is stored onboard the scanner in a configuration file that resides in non-volatile Electrically Erasable Programmable Read Only Memory (EEPROM). Non scanner specific control parameters (generic to all CX30 scanners) can be found in an initialization file located on the PC workstation.

When power is initially applied to the unit, no firmware is loaded on the scanner. The scanner identifies itself to the PC operating system with a hard coded Product Identification Description (PID) of 18 (which represents a TS100 Device CPU only). The operating system reports this as a TS Device. When the application program loads, the dynamic link library (dll) determines which operating firmware to download to the scanner based on the PID reported, and completes the process of adding intelligence to the scanner automatically. The scanner hardware now assumes a PID of 15 (which represents a fully operational TS100/CX30) and a Device Identification Description of 02 (which represents the current board configuration). The operating system reports this as a TellerScan Device.

This startup sequence is very quick and can be monitored by observing the LED Status Indicator on the top cover of the scanner. The LED is mounted to the sensor board at the base plate level and the light is transmitted to the center cover by means of a translucent plastic light pipe. When the power cord is plugged in AND the USB cable is connected, the LED Status Indicator illuminates immediately as solid RED indicating power is on and there is a physical connection to the PC. When the application program is launched and acquires the scanner the LED Status Indicator turns solid GREEN after the operating firmware completes it's download to the scanner. This process takes approximately 3 seconds. The scanner is now operational, and the LED Status Indicator will turn solid AMBER as an indication of 'Check Present' in the input path.

The CX30 does not have a standard ON / OFF power switch, but requires the USB cable to be connected to a live USB port on the PC and to have the power supply connected to show a 'RED' LED condition. So when the PC is powered off, the CX30 will shut down automatically as well. The CX30 does have a 'Reset Button' on the side under the LED status indicator. This is a momentary button that once pressed and release effectively will reload the scanner and reset an error condition of a blinking red LED.



(Fig. 4)

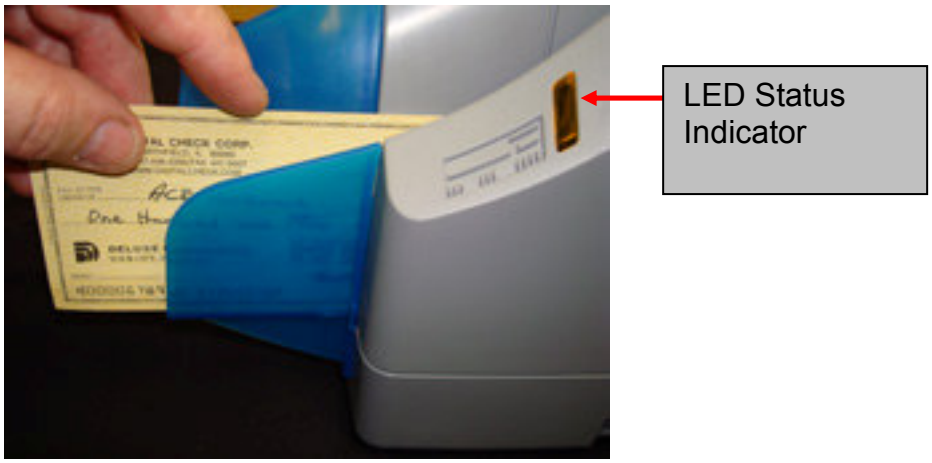
3.2 Check Present Sensor

The presence of checks at the feeder entrance is detected by two infrared (IR) sensors placed just slightly above the surface of the Base Plate. This placement is intended to insure that checks are positioned all the way down flat against the base plate prior to pulling them into the scanner track (see illustrations below).

Note: The scanner motor will not begin to operate until both sensors are interrupted at the same time indicating the check is flush against the Base Plate.

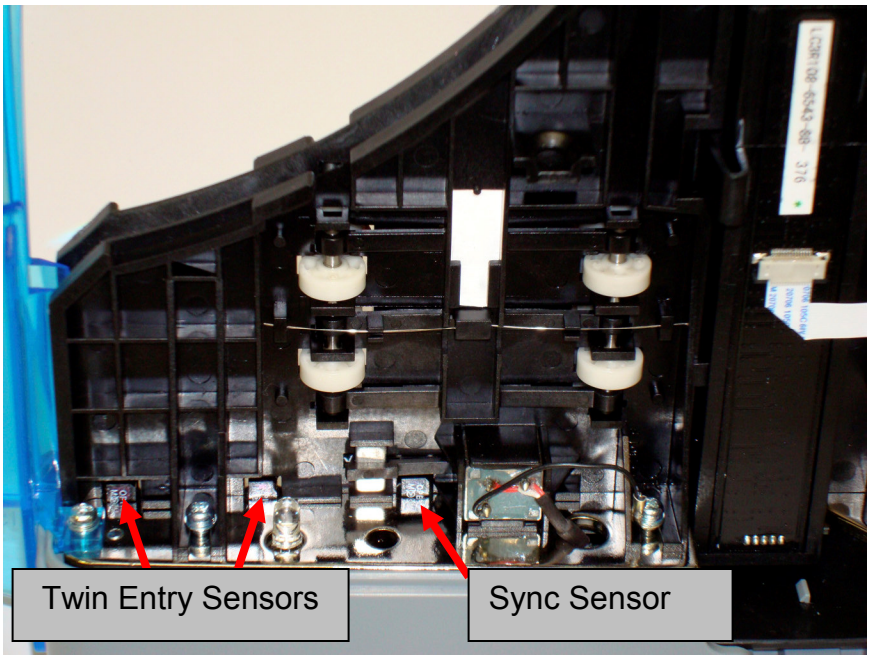
Note: Hold the check along the top as show below, rather than on the left hand end will help insure that checks are loaded without any tilt.

Note: Proper orientation of the check is with the face of the check pointing outward as shown by the check Imprint in the plastic cover adjacent to the input tray (see illustration below).



(Fig. 5)

Inserting a document



(Fig. 6)
First three sensors in the path

3.3 Synchronization Sensor

When the scanner receives an “Enable to Scan” command from the host, the following operations are performed:

- Check that there are no pending errors
- Document inserted trips the first set of sensors which starts the main drive motor.
- The stepper Motor is energized for up to 8 seconds or until a document is sensed

The check is then feed from the input tray into the path. Once the check is captured by the first set of pinch rollers, the leading edge soon arrives at the infrared Synchronization Sensor. This sensor is comprised of an IR LED and matching photo-transistor. See the picture above. The functions of the Synchronization Sensor are as follows:

Synchronization – The primary purpose of this sensor is to define the exact position of the leading edge of the check. From this reference position, all scanner capture functions are synchronized by means of counting stepper motor steps. Various pre-defined parameters contained in an initialization file define the window for reading MICR for instance. Another parameter defines the window for scanning the front side of the check, and another, for the rear. A final parameter defines the overall length of time that the motor must drive to cause the check to completely exit the scanner.

Check Measurement – The sensor also allows the scanner to very accurately measure the length of check by counting the number of motor steps until the sensor no longer sees the

document. This variable parameter then defines the exact end point of each of the capture windows.

3.4 LED Status Indicator

The LED indicator is a multi-color Light Emitting Diode that can provide status based upon different colors (RED, GREEN, or AMBER), and whether the LED is solid or flashing. The LED is mounted to the Sensor Printed Circuit Board Assembly (PCBA) and transmits the light to the indicator on the top cover by means of a translucent plastic light pipe. The LED contains both RED and GREEN discrete devices and when both are turned on simultaneously, the AMBER color is produced.

During any scanner power on initialization cycle, the action of this LED Status Indicator is as described in the Startup Sequence Section (3.1) found previously in this section of the manual.

During normal operation, the AMBER LED functions as an indication of a check present in the entry path. The Indicator LED will flash RED whenever a scanner error has occurred.

NOTE: The flashing RED LED error condition will be reset when an Eject cycle is commanded from the application program. The Power reset button can also be pushed. This is located on the side and has the same effect as unplugging and plugging the scanner back in again.

3.5 Contact Image Sensor Modules

The CheXpress™ CX30 Scanner utilizes the latest Contact Image Sensor (CIS) technology to acquire the raw check images. CIS modules are completely self contained assemblies comprising the three LED light sources (RED, GREEN, BLUE), optical rod lens, signal amplifier, and photo-diode receptors mounted to a ceramic substrate. These components are housed in a molded plastic module and operate from a single voltage power supply (see illustration below). The module has a hardened polished glass faceplate on the viewing side. These devices have an extra long depth of focus specification, providing for optimum focus when the document is anywhere between the vertical walls, and producing the highest quality image definition and contrast.

(Fig. 7)
CIS modules – The door swings open 90 degrees for easy access and cleaning.

3.6 Acquisition of the Check Image

All positioning of the check in relation to the various capture functions is controlled by the stepper motor. The check leading edge is marked at the starting reference position by means of the Synchronization Sensor. From that reference point, all positioning is controlled by a fixed count of stepper motor steps.

The Front CIS Module is located a fixed number of steps from the Synchronization Sensor as defined by a parameter of the initialization file. Once the check is fed this number of steps, its leading edge is at the beginning of the scan window. The front and rear LED arrays illuminate and the check is fed forward at a rate of 50 cm/sec (bitonal mode). The same process with a different count offset is next repeated for the Rear CIS Module.

Raw image data is captured in a single vertical line orientation of 1,296 picture elements (pixels), and in a format defined by the acquisition mode (gray scale, or color), and corresponding resolution. In the gray scale mode (all 3 LED's on = white light), native resolution is 300 dpi vertical by 300 dpi horizontal. In the color mode (sequential RGB LED's), native resolution is 100 dpi vertical RED, 100 dpi vertical GREEN, 100 dpi vertical BLUE by 300 dpi horizontal.

NOTE: Raw image data is always captured by the CX30 scanner at 300 dpi (gray scale or color) and at 50 cm/sec linear track speed. Lower resolution images are produced by an extrapolation algorithm in the dll Therefore, the speed of scanning, and conversely the scanner throughput, are not a function of the resolution or density selected.

The raw image data is then processed and normalized (pixel by pixel) by the internal electronics of the scanner, and sent to the host PC via the Universal Serial Bus (USB) Interface. Under API software control, the PC then converts the raw data to the bitmap format (B/W, 256 levels of gray) and compression (TIFF Group IV, or JPEG) previously selected by the application. This software also rotates the image to a horizontal format and crops all four edges.

As the trailing edge of the check passes the Synchronization Sensor, the end reference point is established thereby defining the overall check length. Scanning continues until the trailing end of the check has progressed the pre-defined number of steps to the end of the front, then rear scan heads. At this point the scan heads are disabled and the LED arrays are switched off to preserve life of the LED's and conserve power.

3.7 Scan & Return Mode/Pass-Thru Mode/Scan, Park & Return Mode

The normal (default) operating mode for the CX30 scanner is Scan & Return. In this mode, the document is first loaded into the entry tray, then driven forward through the scanner, then returned back to the entry tray. In this mode, the document is kept internal to the scanner at all times thereby eliminating the need to have a large area kept clear at the exit side of the scanner in order to accommodate the extension of the document as it exits the unit. For exception documents (i.e. thick documents), the CX30 has an exit door which can be opened to facilitate operation in the Pass-Thru mode. In this mode, the document does not have to bend to wrap around the internal circular guide. The exit door can be manually opened or closed, and its position is monitored by an internal sensor. Thus, the scanner operating mode is automatically selected by the software as a function of the door position. In the open position, the document can pass thru the scanner and into a small exit tray. This tray can hold from 3 to 5 documents. (Fig. 8)

The two pass characteristics of the Scan, Park & Return mode offer some very unique capabilities in the CX30 scanner as follows:

MICR is captured at a default gain setting within the electronics that is pre-defined by a parameter in the configuration file. This first MICR analog waveform is then analyzed by a software algorithm within the dll, the results of which are then used to modify the gain of the electronics by means of a digital potentiometer on the main PCBA. This optimized gain setting is then used to read the MICR a second time during the return pass of the check back to the input tray. This adaptive, redundant MICR read is made possible by the automatic gain control (AGC) feature of the scanner, which produces the best possible MICR read of any check.

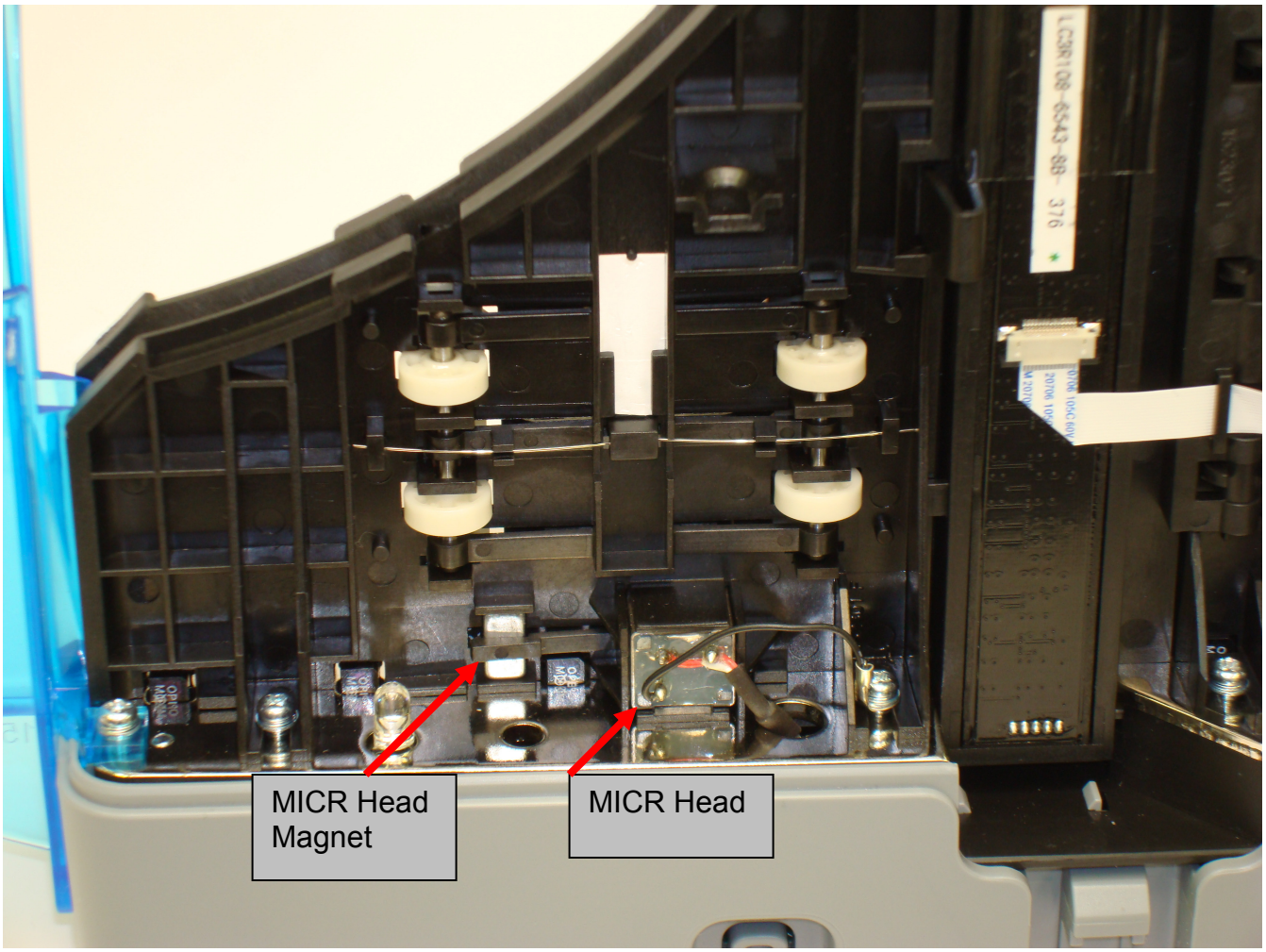
The CX30 scanner also has the ability to capture very different images in both directions. For instance, a 200 dpi gray scale image could be captured in the forward direction, and a 300 dpi color image of the same document could be captured in the reverse direction. This might be desirable for collecting a maximum data image for temporary archiving during a holding period. Any combination of image resolution, endorsing, and various color dropout options are available for use at the discretion of the application program. This feature offers maximum flexibility for any scanning application.

(Fig. 8)
Exit door in the open position

3.8 MICR Reading

The MICR Head is located a fixed number of motor steps from the starting reference mark as defined by another value in the initialization file. Once the check leading edge arrives at the MICR head, the analog electronics are enabled and the raw analog signal from the head is acquired and processed.

The analog head registers the variations of magnetic flux caused by the passage of the characters against the physical head. The check is held against the head in the area of the MICR code line by means of a spring loaded small plastic roller assembly. The check passes the head at a linear speed of 50 cm/sec. The magnetic ink on the check is first polarized by the permanent magnet located immediately before the MICR Head (see illustration below).



(Fig. 9)

MICR head and magnet

The MICR Head, and associated electronics and software, allow for recognition of the numerals printed on the front of the check in magnetic ink. It is possible to read and interpret both CMC7 and E13B type characters.

The recognition is made by the numeric processing of the analog signals produced by the magnetic head. This processing is according to a set of sophisticated proprietary algorithms contained within the DLL software running on the PC.

Characters are read from left to right along the bottom of the check as it passes the MICR Head. A single character at the beginning of the string defines the type to be either CMC7 or E13B. Rejected characters are identified by the software with an @ sign.

The MICR reading electronics is disabled when the check is not present in front of the head to reduce the possibility of picking up stray readings.

3.9 Inkjet Printer (Endorser)

The print endorsement on the back of the check is made using Hewlett Packard ink jet technology. The HP C6602a inkjet printer cartridge was selected because of it's small size, relatively low cost, fast drying ink, and large reservoir capacity. The cartridge is available in black, red, green or blue colors, and prints up to 7,000,000 characters from a single cartridge. This cartridge has 12 nozzles and produces a good quality print with only a single pass while the check is being transported for scanning. The cartridge has an easy snap-in feature to facilitate replacement by the scanner operator (see illustration below).

(Fig. 10)

Ink jet holder - Cartridge must be inserted at a slight downward angle. Then snap the back end down into place. The cartridge should be level with the base plate when properly installed.

The inkjet carriage assembly is run at a fixed height and prints on the rear side of the document prior to passing by the rear camera.

The operating principle is the same as for all the Ink Jet printers. The printer derives its 22VDC power, and is driven by electronics located on the main control board of the scanner. The most significant parameters controlling the printer operation are:

a)Print Position, expressed in pixels beginning from the left side of the check
b)Print Intensity
c)Print Thickness

These parameters are selectable and programmable within the API initialization file, and can be configured from the PC.

Various parameters in the scanner specific configuration file (located onboard the scanner) control the cleaning intervals, duration, and intensity.

The print head is fully under program control. The DCC API offers several options and modes for printing. From a fixed block font to BMP graphical fonts.

The CX30 also offers the ability to do a Bi-Directional endorsement. The document can be endorsed on the way in. The MICR data can tell the application that this style of document now needs to be endorsed with a different print string on the way out when running in Scan, Park & Return Mode. This 2nd endorsement could be done white-on-black to give a distinctive reverse video look to the print.

4.0 Adjustments

The CX30 scanner has only two mechanical adjustments that can be performed in the field. There are no field electrical adjustments. With use of the software Maintenance Program, there is a scanhead software calibration procedure that can be performed in the field as well.

4.1 Mechanical Adjustments

4.1.1 Belt Tension Adjustment

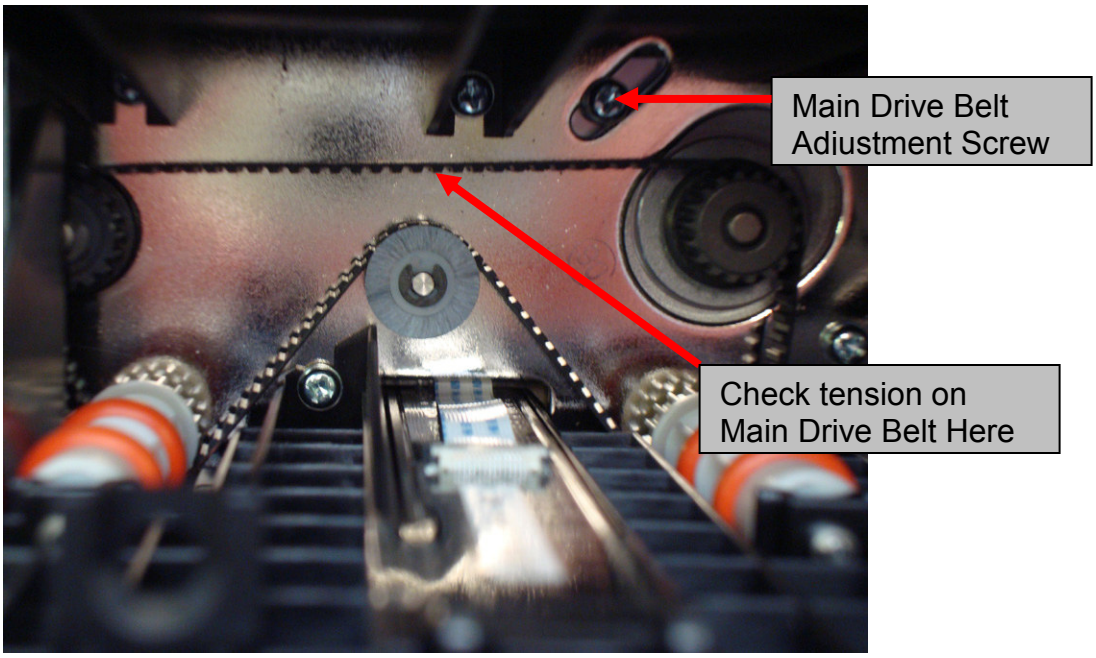
WARNING: Unplug the scanner power connector.

The scanner uses a cleat style timing belt and therefore the belt tension is not so critical for mechanical drive functions. If the belt is too loose, the cleats will skip over the teeth on the drive gears during motor acceleration. If the belt is too tight, there will be too much load on the motor and the drive bearings will wear prematurely.

NOTE: Having the belt tension too tight or too loose can also affect MICR reading accuracy and MICR transposition of numerals.

CAUTION: Belts that are worn, frayed, or show any sign of the cords being exposed or pulling loose need to be replaced immediately.

Proper belt tension is defined as that tension that allows the belt to just have a little flex when pressed in the area indicated, but running, the belt should not jump or skip teeth positions or bind the main drive motor.



(Fig. 11)
Main drive belt adjustment

The adjustment is made with the Belt Tension Adjustment screw (see illustration above). This screw is actually one of the two stepper motor mounting screws which when loosened will allow the motor to pivot on the remaining screw and thus control the amount of tension in the belt.

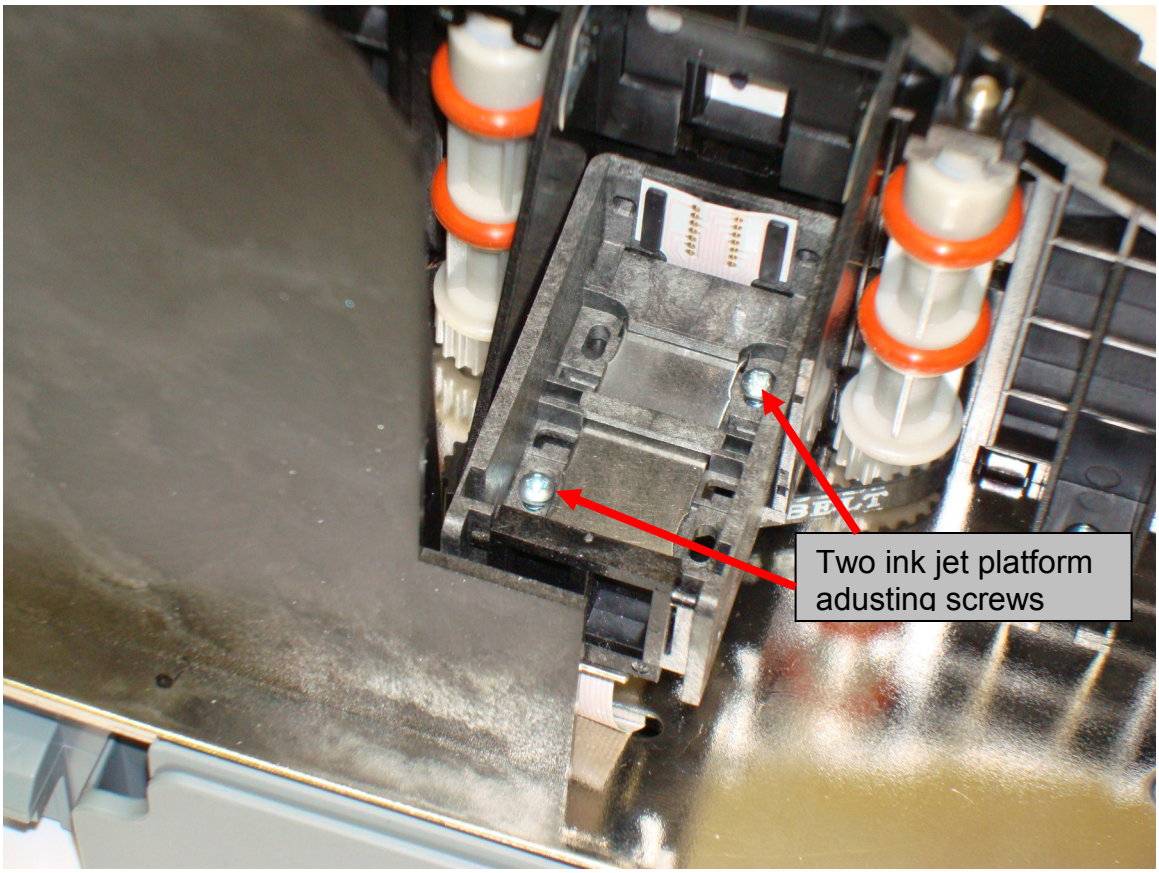
The adjustment sequence is described as follows:

Using a medium Philips blade screwdriver, loosen the locking screw controlling the position of the motor drive pulley. Adjust the tension allowing for some slack, then tighten the screw. Do not over-tighten the belt or the tension can stall the motor.

4.1.2 Adjusting the ink jet platform

Adjust the position (closer or further away from the inner wall) so that the platform is as close as possible to the inner wall, but still allows the cartridge to be easily inserted. If placed too close to the wall, the cartridge will catch on the inner wall during insertion.

There are two small Philips head screws to loosen.
CAUTION: Watch that the ribbon cable does not get pinched.



(Fig. 12)
Ink Jet platform position adjustment

4.2 Software Adjustments

Software calibration of the CIS Modules can only be accomplished by means of a dedicated software tool. The CX30 software Maintenance Program is required to perform these functions.

NOTE: Before starting this program it is necessary to install the appropriate drivers as previously described in the Installation Section of this manual.

The latest version of the Maintenance Program can be found at Digital Check's Web Site at https://www.digitalcheck.com/clientarea. Request a login for the section. Once you have the approval and are logged onto the Client Area, navigate to the CX30 Maintenance program.

Contact Digital Check technical support to get the program if the web site is unavailable. (847) 446-2285.

Under CX30 Service Section, click on Maintenance Program, then select Open to unzip the files. From the WinZip program, Extract all the files to a new Folder c:\DCC\Maintenance Pgrm. From the c:\DCC\Maintenance Pgrm sub-directory, double click on the

CX30_Maintenance.exe file to launch the program.

CAUTION: The Maintenance Program is usually only made available to qualified service technicians. DO NOT accidentally leave this program installed on an end-user's computer as misuse can render the scanner totally inoperative.

4.2.1 Calibrating the Front & Rear CIS Modules

NOTE: This procedure requires a clean, wrinkle-free, calibration target that is 4 ½ inches tall (114 mm) and approximately 8 inches long (210 mm), 28lb, 98% bright white paper.

NOTE: This calibration should be performed away from any direct light as this could adversely affect the outcome. If possible, calibrate with the scanner in the same exact position, and the same environment as is normally found during everyday use.

NOTE: Calibration data is automatically saved to the scanner's non-volatile EEPROM.

Calibration is performed according to the following procedure:

4.2.1.1 Launch the CX30 Maintenance Program as described above under Software Adjustments. After a few seconds, the program will connect to the scanner as shown in the status window under Scanner Info.

4.2.1.2 Click the Front + Rear Button under Image Calibration.

4.2.1.3 Click the Start Calibration Button on the Image Calibration screen.

4.2.1.4 Insert the calibration target into the scanner hopper. The scanner will feed and process the document for RED, GREEN, BLUE, and GRAY. It will write the appropriate data into the EEPROM when finished.

4.2.1.5 The document should exit automatically when the process is complete. If not, carefully remove the target manually by turning the drive rollers.

NOTE: Please be patient, and do not terminate the program in the middle of the process, or you will need to start all over again.

5.0 Cleaning & Maintenance Schedules

5.1 Thoroughly Cleaning the Scanner Unit

NOTE: This procedure is recommended as needed, or when the unit stops grabbing the documents. This should be every 6 to 12 months under normal use. Severe duty where dirt and ink build up quickly may require cleaning the scanner more often.

Debris, paper dust, and lint can get into the track area between the front and rear walls. If you notice build-up in this area, open the front scanhead door and clean this area as follows:

5.1.1 Remove the plastic top cover by lifting up and off.

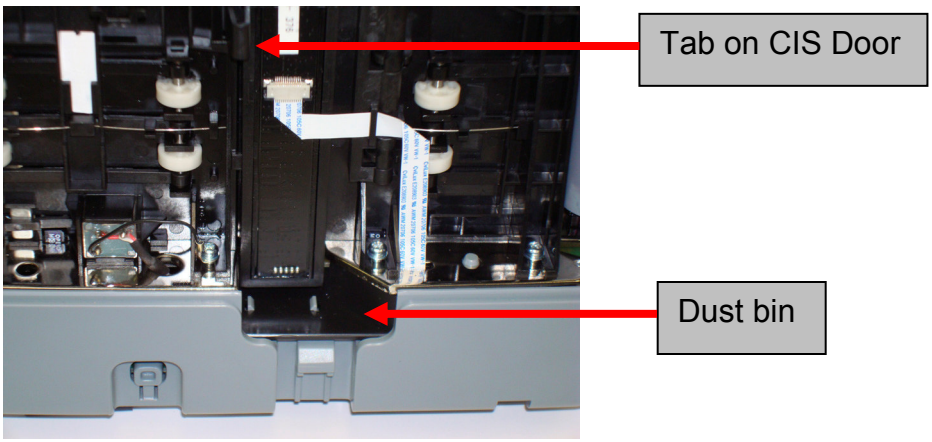
Note: Some CX30 top covers have latching tabs that need to be released in order to remove the cover. Simply pull out on the two tabs located at the bottom of the cover an gently pull upward.

5.1.2 Visually check the track area from beginning to end.

5.1.3 Remove any staples, paper clips, and rubber bands that may have accumulated during use.

5.1.4 Using a container of canned air and nozzle, spray the area around the sensors and check entrance point.

5.1.5 Grasp the tab and gently squeeze to release the latch, then swing the CIS assembly open to gain access to the surface of the modules.



(Fig. 13)

5.1.6 If you notice dust or a build up, spray the area around both CIS modules starting at the top and working downward to remove any debris and dust that may be caught in the track and the lower dust bin area.

5.1.7 Continue to spray around the remainder of the track all the way to the exit.

5.1.8 Using a soft, lint free cloth dampened in isopropyl alcohol, gently wipe the glass face of each CIS module to remove any residue of ink or whiteout that may have accumulated.

5.1.9 Gently swing the CIS assembly closed. A latch holds the door in place.

5.2 Using the CheXpress® Cleaning Card

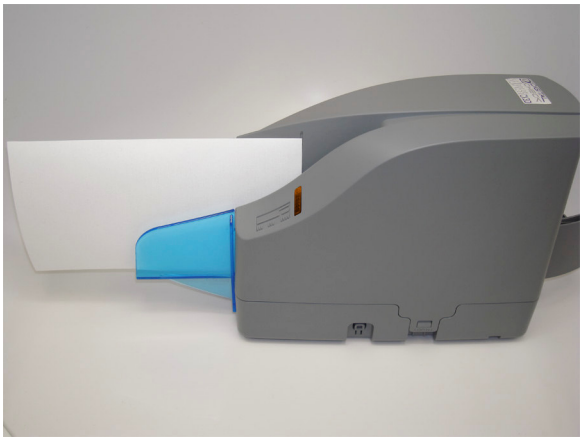
NOTE: Use of the CheXpress® cleaning card is recommended every 6 to 12 months or more often as heavy usage may otherwise dictate.

A specially constructed CheXpress® Cleaning Card is available to facilitate the cleaning process. This pre-saturated, disposable Cleaning Card is extremely effective in cleaning the scanner's MICR magnetic head, track area, and rubber drive ring surfaces. Use immediately after opening so as not to allow the card to dry out.

5.2.1 Carefully tear open the end of the foil pouch so as not to damage the card, then remove the card from the pouch.

5.2.2 To clean the scanner (as illustrated below), open up the exit door and launch an application (like ScanLite). Then insert the CheXpress® Cleaning Card into the hopper entrance so the leading edge is fully inserted into the entry pocket. Initiate a scan cycle and let the card get pulled in and through the scanner.

(Fig. 14)



(Fig. 15)

5.2.3 Repeat the process two or three times flipping the card.

Note: Holding on to the end of the cleaning card and allowing the rubber drive rings to turn against the card may facilitate the cleaning process.

6.0 Part Removal

The CheXpress® CX30 Scanner is assembled with minimal hardware. A handful of Philips head screws hold the bottom cover on and attach the entry tray and walls.

This section will not attempt to describe disassembly of every item in the scanner since it is highly unlikely that all the items will ever need to be removed. Major assemblies are generally covered and, in most instances, the disassembly technique is obvious.

Notes and cautions throughout this section are key to learning the nice-to-know tips that will insure proper operation once the unit is repaired.

In most instances, the reassembly is not described in detail since it is simply the opposite of the disassembly procedure. Most detailed disassembly instructions assume all the plastic covers have already been removed from the unit. These procedures assume a general aptitude and knowledge of hand tools and their use.

Always remember that a little common sense in this area goes a long way.

6.1 Top Cover

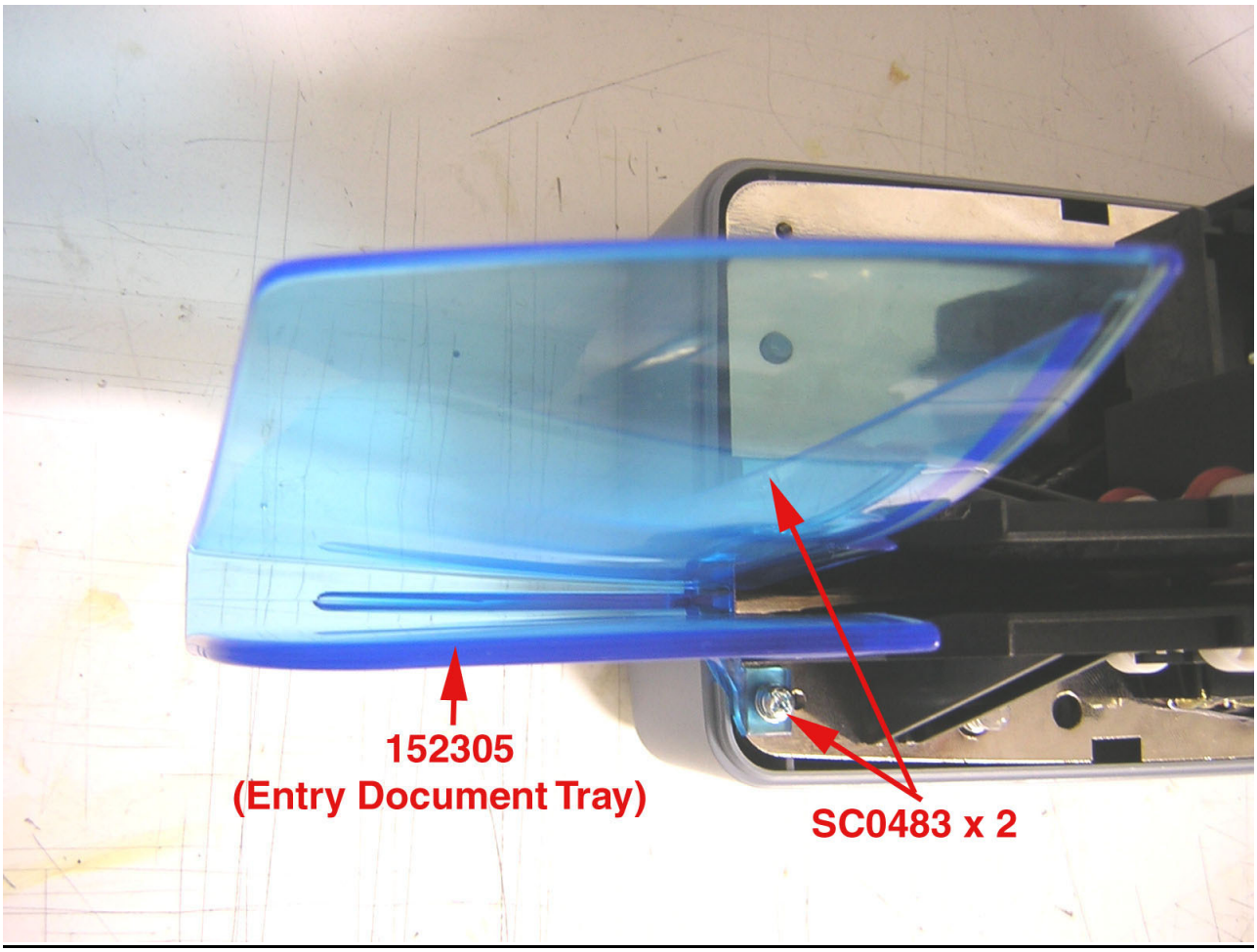
The Top Cover can be removed by simply grasping at the center of the cover and lifting it upward. The cover is held by a center magnet. When the Cover is re-installed, its position is defined by aligning with the plastic Base.

NOTE: Don't attempt to lift the unit by just holding onto the Top Cover. Grasp the unit by the plastic Base when lifting or moving the unit.

NOTE: Some CX30 top covers have latching tabs that need to be released in order to remove the cover. Simply pull out on the two tabs located at the bottom of the cover and gently pull upward.

6.2 Entry Tray

The Entry Tray is attached by two screws to the Base Plate. This technique insures proper alignment of the bottom of the tray to the Base Plate surface and eliminates any check tilt due to misalignment.



(Fig. 16)

Entry tray attachment

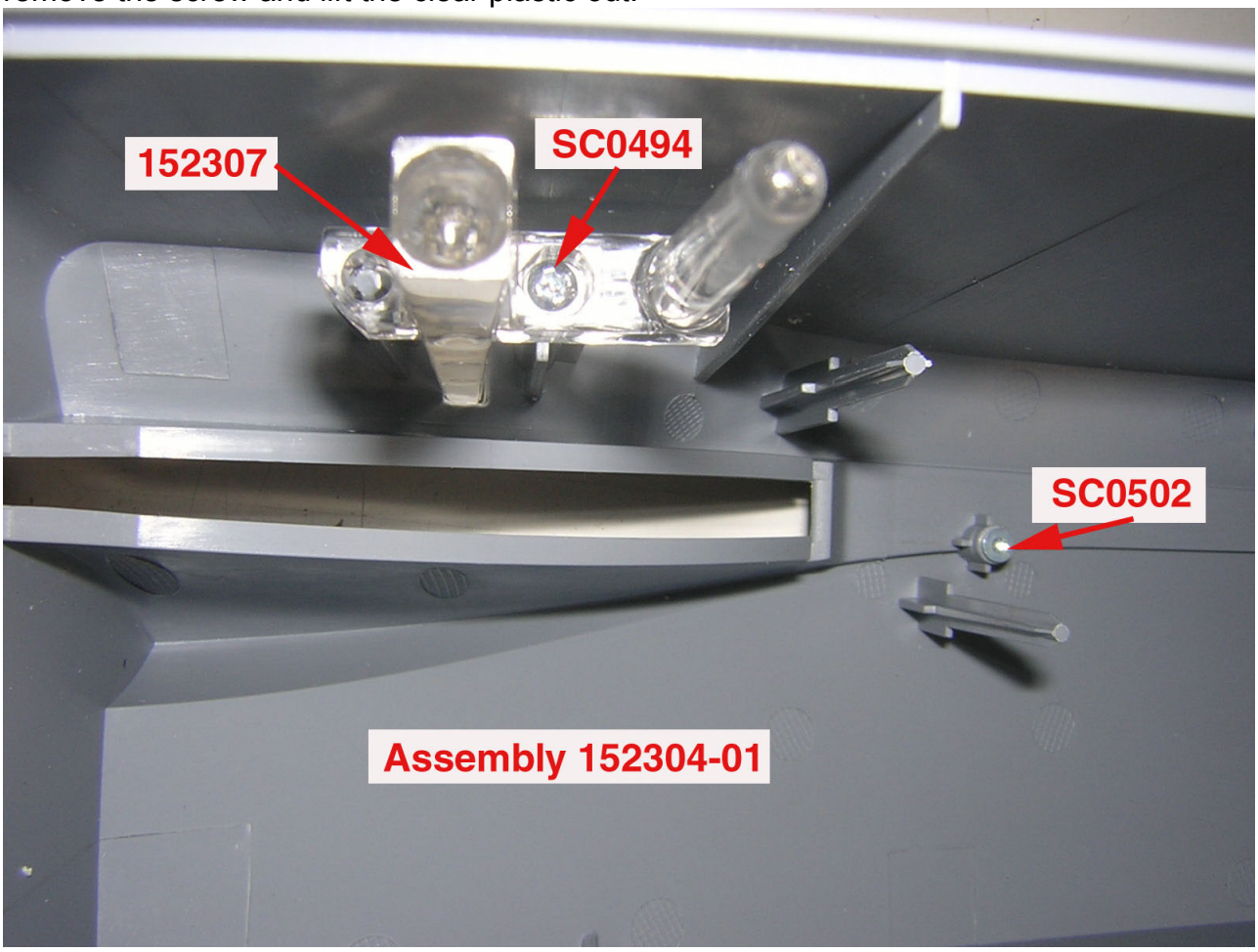
6.3 Base Plate Assembly

First remove the Top Cover as previously described in this section. Be certain the USB cable and power cord are unplugged from the bottom underside of the unit. Remove the four Philip screws in the plastic Base. These secure the Base Plate to the plastic Base. Carefully lift the baseplate assembly up and out of the plastic Base. Several ribbon cables are attached that will need to be disconnected if fully removing the assembly.

CAUTION: Do not set the chassis down such that the main circuit board is contacting any conductive surface. The main circuit board is equipped with surface mount devices on both sides and damage and/or ESD (Electro Static Discharge) may result. Strictly adhere to all standard ESD precautions.

6.4 Light Pipe

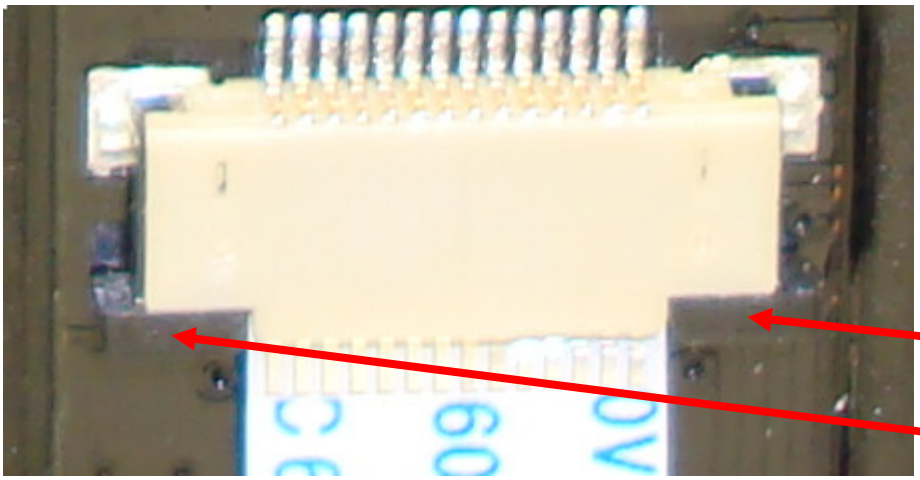
The Light Pipe is secured to the underside of the Top Cover by a single screw. Carefully remove the screw and lift the clear plastic out.



(Fig. 17)

6.5 CIS Modules & Walls

Each of the CIS Modules is mounted to a plastic holder. Carefully unlatch the CIS ribbon cable by sliding the small 'U' shaped retained back away from the connection. See the picture below referencing the retainer. These are very easy to break, so take care not to force it too far.



Black insert that pinches the ribbon cable up and into the connector.

Carefully slide the black insert only about 1/16” away from the connector.

The cable can now be removed. Too much force can break the connector.

(Fig. 18)

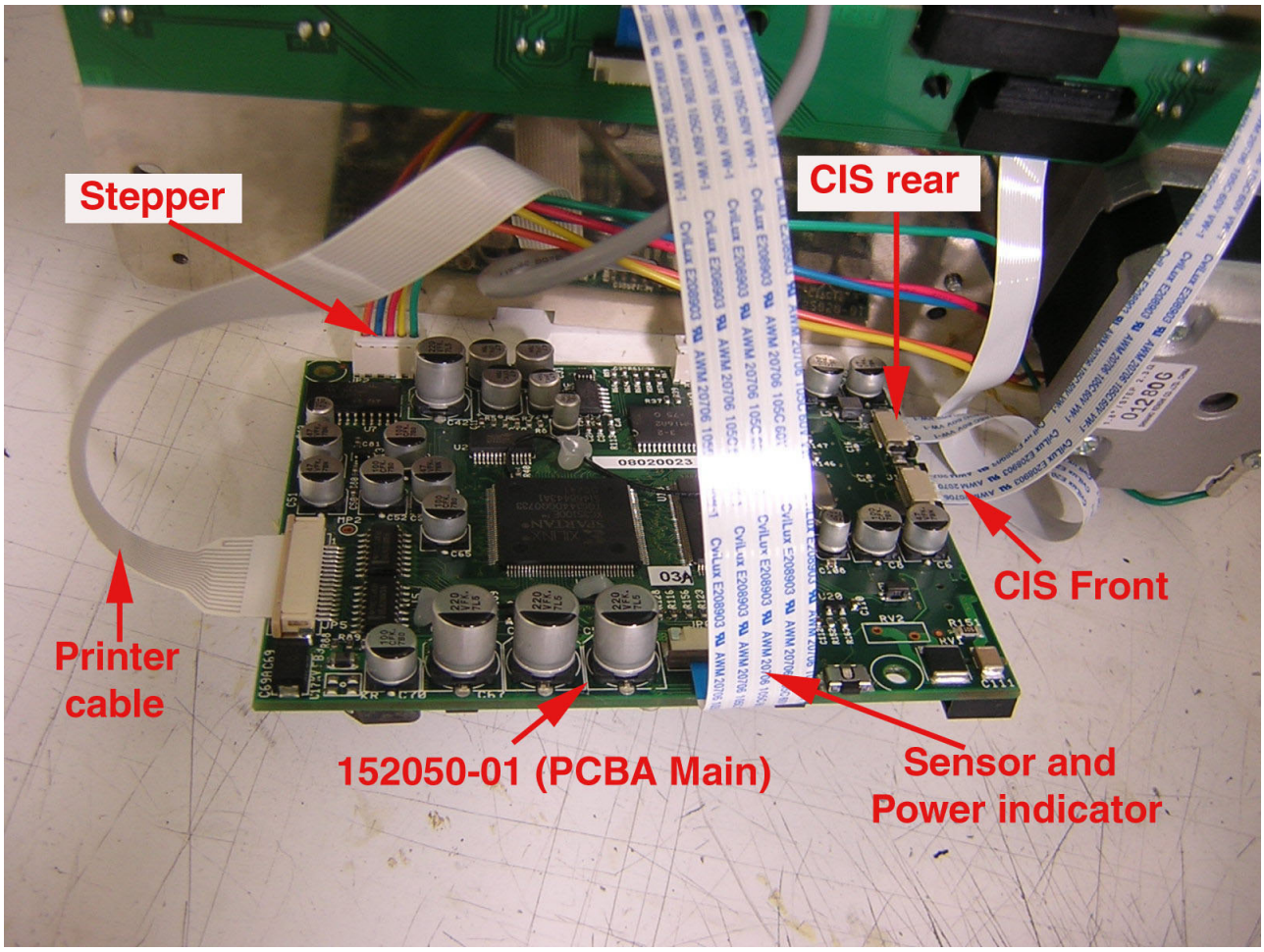
Example - Close up of the slide and latch connector for the CIS

NOTE: The CIS Modules are held in place with a pair of plastic spring fingers built into the rear wall and front door. Do not force the fingers too far or they can break. Very gently pry the plastic finger tips from the holes in the top end of the modules, then simply lift the module off the lower mounting pins in a vertical direction.

The rear CIS module can be removed in a similar way to the front CIS.

NOTE: There is a piece of clear tape used to hold the CIS secure in the plastic frame during shock typically associated with shipping. This tape can be carefully slit or removed, but plan to reattach a piece of clear tape with the replacement CIS.

NOTE: When replacing the CIS modules, be certain to plug the correct CIS into the correct connector on the main circuit board, otherwise the front and rear images will be reversed. For reference purposes, the inboard CIS plugs to the outside connector near to the edge of the board (as illustrated below).



(Fig. 19)

6.6 MICR Read Head Assembly

The MICR Read Head assembly consists of the MICR Head, together with a Permanent magnet.

To remove the MICR Head Assembly, first remove the Top Cover.

The MICR Head snaps into the opening in the outer wall. Gently pry back the plastic locking clips and remove the MICR Head from the outer wall by pulling outward.

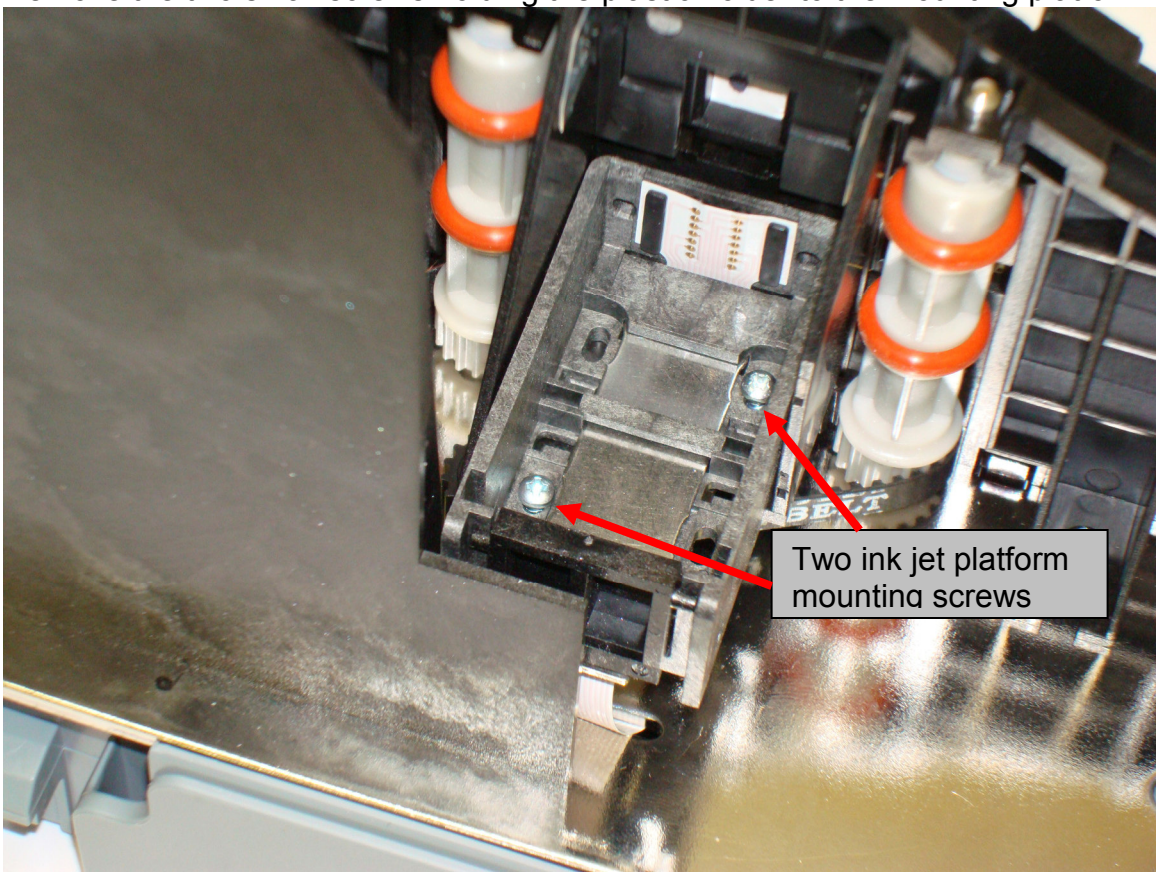
The Permanent Magnet is attached to the outer wall just below the first main driver idler roller. The normal mounting position for the magnet is aligned vertically. To remove the magnet, pry back the plastic release and slide the magnet outward.

6.7 Inkjet Assembly (Optional Equipment)

To remove the Inkjet Assembly, first remove the Inkjet Cartridge (should one be present) from the Carriage Assembly. Refer to the Maintenance Section of this manual for instructions how to remove the cartridge.

Remove the base plate assembly from the plastic base. Follow the ribbon cable to the main board connector from the cartridge platform. Carefully slide the connector retainer away from the fixed side of the connector on the main board and lift it up at a slight angle. The cable should be able to slide out. When installing the cable, be sure to keep it square to the connector and slide it in as far as it will go.

Remove the two small screws holding the plastic holder to the mounting platform.



(Fig. 20)

6.8 Inner Drive Roller O-Rings

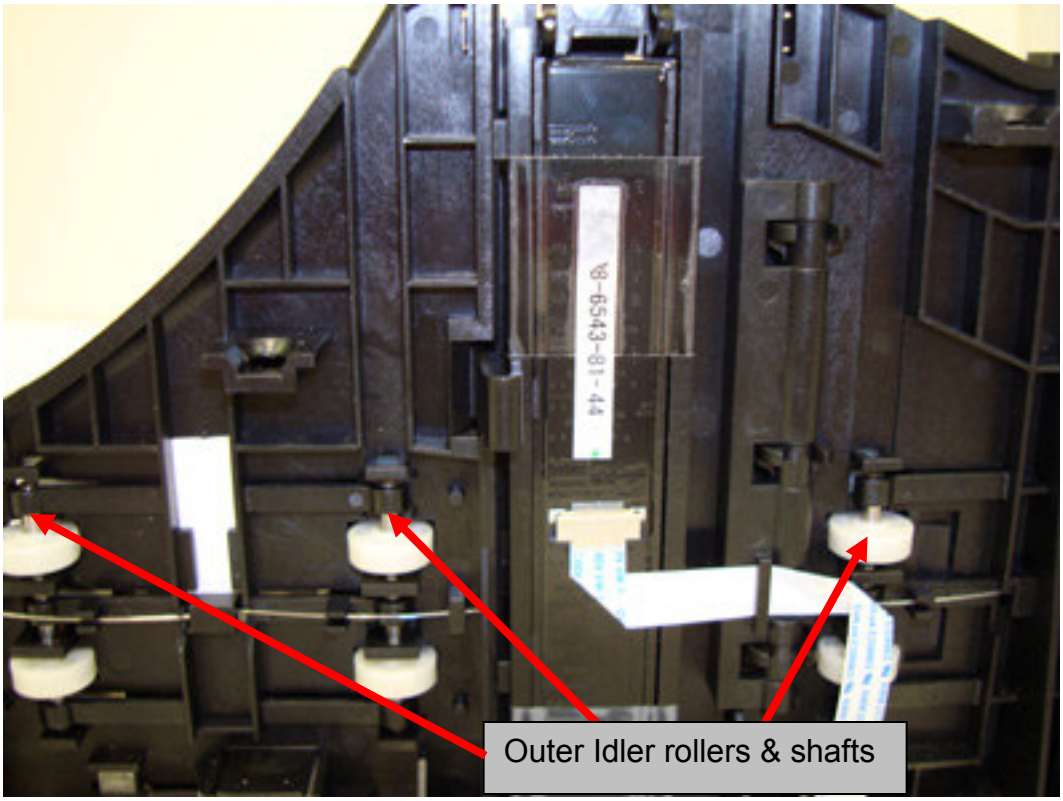
The Drive Rollers use O-rings mounted to the three inside drive shafts. Replace the O-rings as necessary by first removing the inner wall assembly and then carefully removing the roller shaft and rolling the O-ring off of the shaft end.

To remove the walls:
NOTE: All cables and CIS heads can stay attached.

- Remove all cables from the PCBA
- Unscrew and remove the outer walls (152301, 152302, 152303) from the Base Plate
- Unscrew and remove the Rear wall (152311 and 152309)
- Unscrew and remove inner wall (152300)

6.9 Outer Drive Roller Idler Assemblies

Remove the two screws holding in 152301 or 152303 (walls), the idler rollers are held in place with the metal pin. To remove the rollers you would need some type of tools (tweezers or needle nose pliers work great). Grab the pin and slide the pin straight up through the brackets that are holding it in place. The reason why we remove the bracket 152301 or 152303 from the base plate is because the inside idler rollers are putting pressure on the outside rollers keeping them locked in so they can't fall out of the bracket.



(Fig. 21)

6.10 Stepper Motor

To remove the Stepper Motor, first remove the four screws holding the Base Plate to the plastic Base. Remove the Top Cover and then remove the two screws holding the motor to the Base Plate. Unplug the motor connection to the main board and lift the motor out.

6.11 Drive Belt

To remove the Drive Belt, loosen the drive belt adjustment screw. See 4.1.1. It is also necessary to remove some other assemblies.

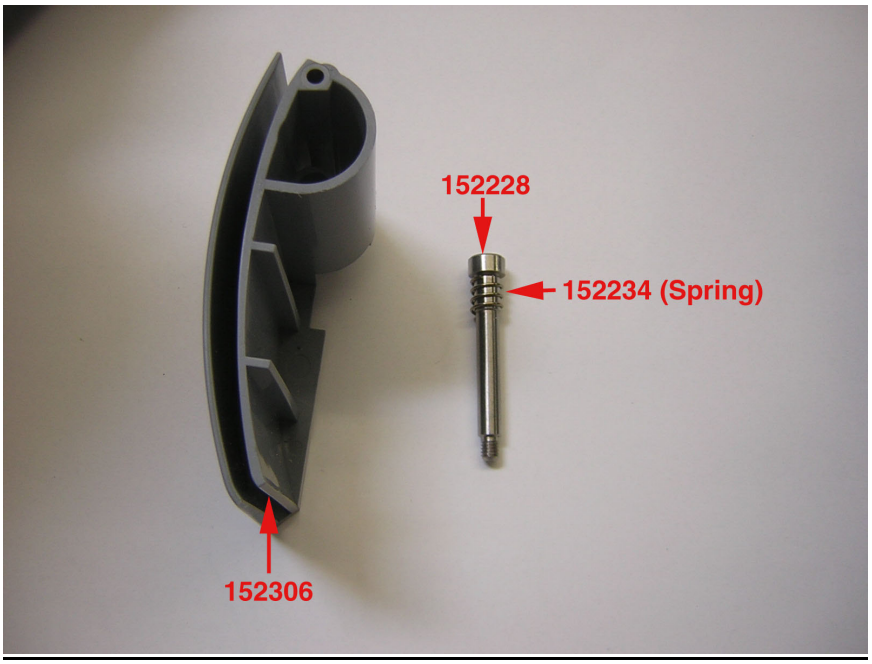
To remove the belt, you must first remove the walls:
NOTE: All cables and CIS heads can stay attached.

- Remove all cables from the PCBA
- Unscrew and remove the outer walls (152301, 152302, 152303) from the base plate
- Unscrew and remove the Rear wall (152311 and 152309)
- Unscrew and remove inner wall (152300)

From here you are able to access the Drive Belt.

6.12 Exit Door Assembly

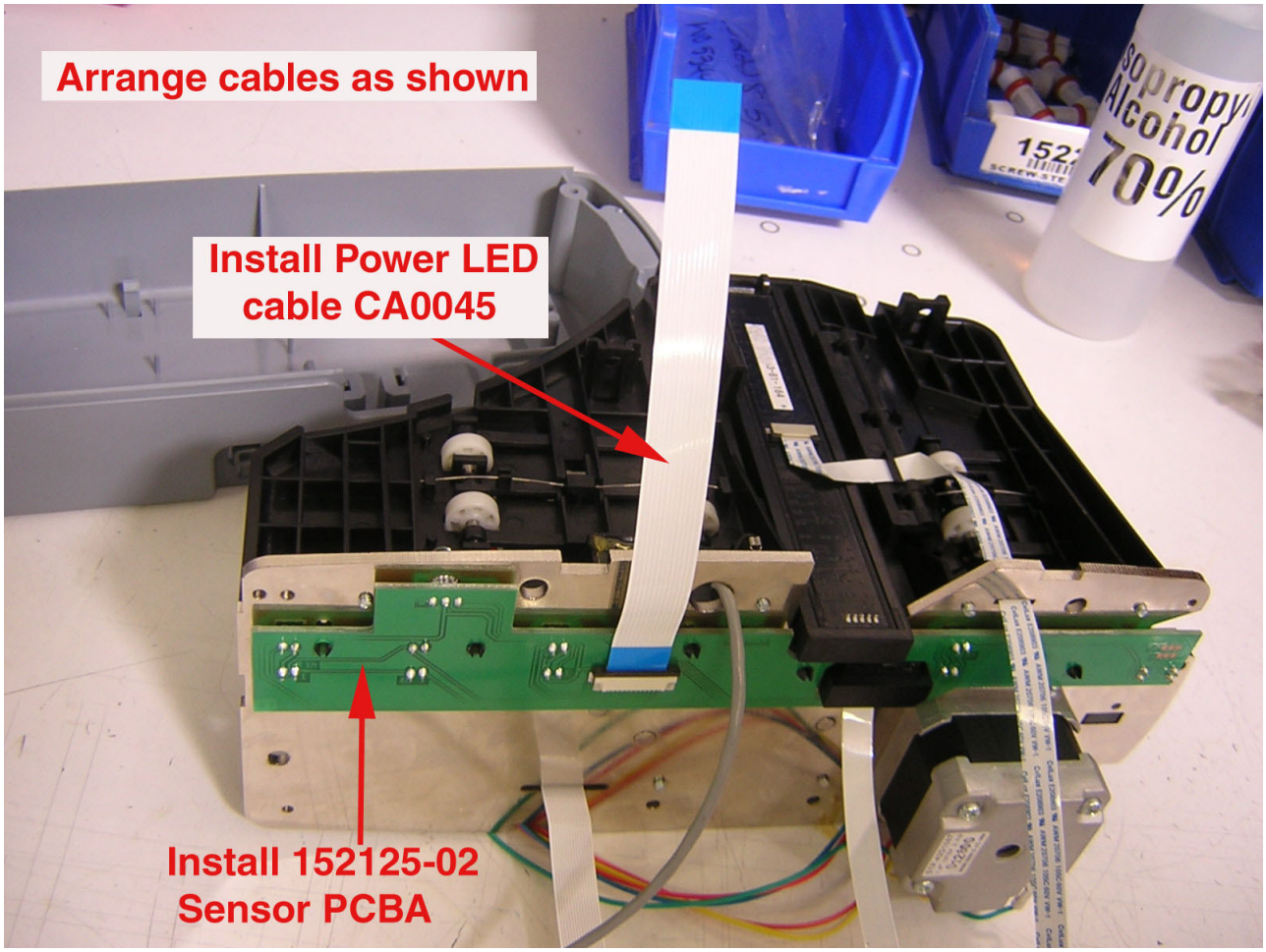
The exit door can be easily removed by loosening the single pivot shaft. Remove the pivot shaft and lift the door out.



(Fig. 22)
Exit door & mounting shaft assembly

6.13 Sensor Board

There is a single Sensor Board that mounts to the underside of the Base Plate. The board mounts on standoffs from the front and rear walls that push through the Base Plate. The Sensor Board connects with ribbon cable using a slide and latch connector similar to the ink jet ribbon cable connection.



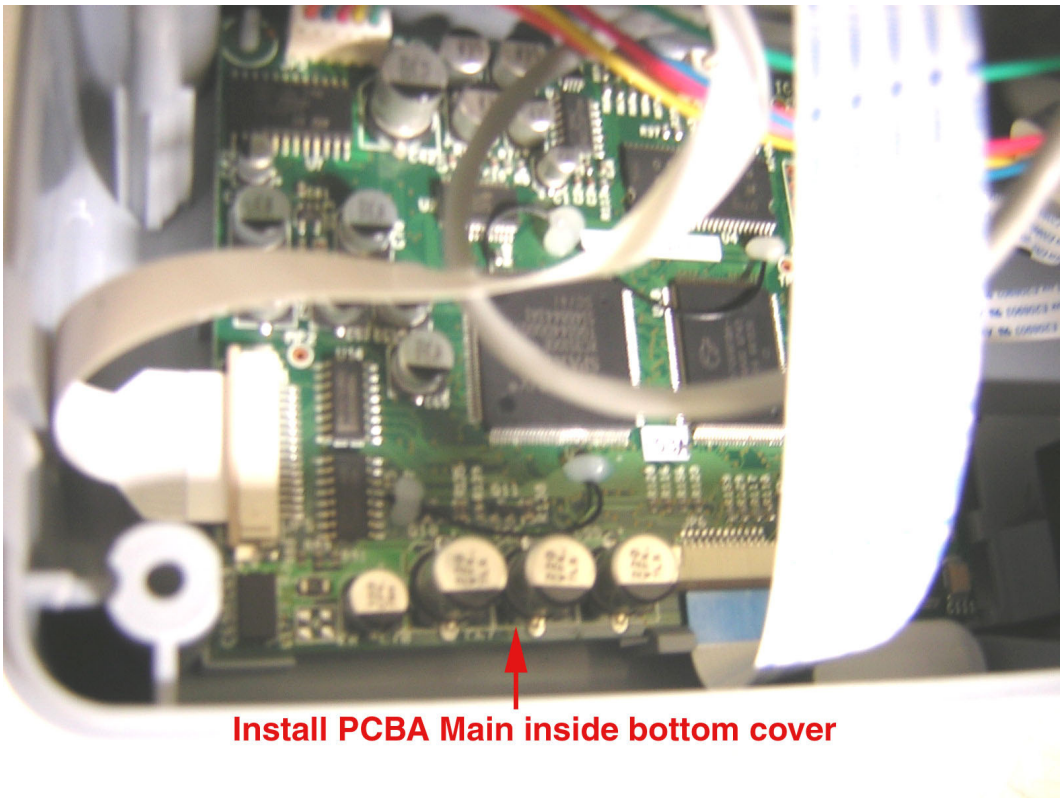
(Fig. 23)
Sensor board mounted on plastic stand-offs from the wall assemblies

6.14 Main Printed Circuit Board Assembly

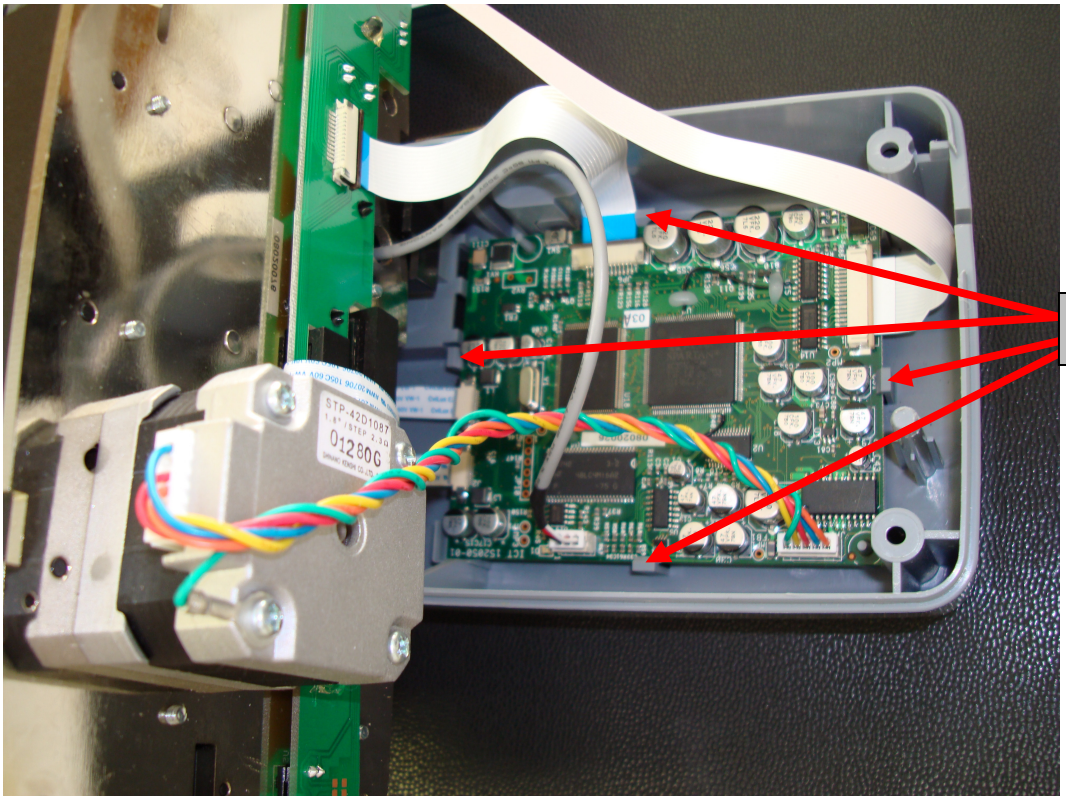
Unplug the six (6) connectors along the sides of the circuit board while it is still secured. Carefully push the four plastic retainer latches holding the board down to the side, one at a time and release the board from the plastic Base.

Unplug the inkjet ribbon cable, Sensor Board and CIS connectors from the Main Board. These are special slide and latch connectors.

CAUTION: The ribbon cable and other slide and latch connectors are very fragile. Exercise patience and a gentle touch when working with this connector so as not to cause any damage and render your main board useless. To unplug the connector, slide your finger nail or an exacto blade between the front and rear sections of the connector, then slide open. The back half of the connector will now tilt up or just slide to the side to allow the ribbon cable to be removed (as illustrated below).



(Fig. 24)



(Fig. 25)
Tabs securing the main circuit board to the base cover

7.0 Assembly Drawings & Parts Lists

7.1 Contact Digital Check Technologies (DCT) for parts information 909.945.5106

7.3 Parts Pictorial Listing (Available from DCT).

8.0 Electrical Components

8.1 This information is available from Digital Check Technologies (DCT). 909.945.5106

9.0 CheXpress® CX30 Scanner Specifications

Scanner Dimensions:
Height: 7.47 inches (18.97 cm)
Depth: 3.92 inches (9.96 cm)
Length: 9.38 (23.83 cm)
Accessory Check Holder: Adds 2.7 inches (6.86 cm) to overall length.

Scanner Weight: 3.95 lbs. (1.8 kg)

Scanning Modes:
Scan & Return (Default)
Pass Through (Exit door open)
Scan, Park & Return (Exit door open or closed)

Document Size

Document Height	2.12 – 4.13 inches (54 – 105 mm)
Document Length	3.19 – 8.98 inches (81 – 228 mm)
Document Weight	

Scan & Return Mode:16 – 28 lb. bond (60 – 105 grams/square meter)
Pass Through Mode: 16 – 54 lb. bond (60 – 203 grams/square meter)

Document Caliper (Thickness):
Scan & Return Mode: 0.0032 – 0.0058 inches (0.081 – 0.147 mm)
Pass Through Mode: 0.0032 – 0.0090 inches (0.081 – 0.229 mm)

Scanning Method:
Concurrent Two-Sided Duplex (2 Scan Modules)
Scan Module: Contact Image Sensor (CIS)
Resolution: 300 dpi (1296 Pixel Linear Array)
Light Source: Tri-Color LED's

Scanning Performance:
Transport Speed:19.69 in/sec (50 cm/sec)
Throughput**:** Manual Single Document Feed up to 30 Documents Per Minute (DPM)
Typical Scan Speed: Approximately 1 second (6 inch document)

Image Capture Resolution (Optical): 300 x 300 dpi (Vertical x Horizontal) – 8 bit (256 levels) Grayscale
300 x 100 dpi (Vertical x Horizontal) – 24 bit (16,777,216) RGB Color

Supported Compression via Application Program Interface (API)

JPEG (24 bit for color and 8 bit for grayscale)
BMP (24 bit for color and 4 and 8 bit for grayscale)
TIFF Group 4 B/W

Image Resolution by API Software Setting:

100 x 100 dpi (Vertical x Horizontal – Interpolated from native 300 dpi scan)
120 x 120 dpi (Vertical x Horizontal – Interpolated from native 300 dpi scan)
200 x 200 dpi (Vertical x Horizontal – Interpolated from native 300 dpi scan)
240 x 240 dpi (Vertical x Horizontal – Interpolated from native 300 dpi scan)
300 x 300 dpi(Vertical x Horizontal Native scan)

Magnetic Ink Character Recognition (MICR):

In-Line Magnetic Read Head
E13B (North America)
CMC7 (Europe)
Optical Character Recognition to enhance Magnetic Read via API
Industry Best MICR Read Rate

Scanner Interface: Standard USB 2.0

Unique Features: Redundant Bi-Directional Adaptive MICR Reading
Automatic Gain Control

Dual Image Capture: Different Formats (Grayscale/Color/Bitonal)
Different Resolutions (100/120/200/240/300 dpi)
Color Filtering (Red/Green/Blue)

Franking (Rear Side): After MICR capture & Image Confirmation
Park document for an indeterminate time

Optional Inkjet Endorser

Endorse back side of checks prior to capturing the scanned Image
12 Nozzle Printing resolution (96 dpi)
Hewlett Packard (HP) Cartridge **C6602A**
Yield is 5,000,000 to 7,000,000 characters

Diagnostic Features: Diagnostic Tools: Allow for full testing of scanner functionality
Serviceability: Firmware can be updated across the network to allow for easy upgrade

Product Life & Recommended Usage Factor:
Designed for a useful life of over 2,000,000 documents
Recommended Usage Factor: 5-500 items per day

Electrical Requirements: Input voltage: 90-240 VAC; 50/60 HZ
Power Consumption: 45 Watts (Peak)

Environmental: Operating Temperature: 60 – 90 degrees F (15-32 degrees C)
Operating Humidity:35 – 85% non-condensing

Certifications: UL, cUL, CE, FCC Class B(Industrial, Business, or home)
EMC: IEC CE
Power Supply Efficiency: CEC (California Energy Commission) IV
RoHS (Reduction of Hazardous Substances)

Software Tools & Support Services:
API Toolkit 32 bit
Required Operating System: Windows2000, Windows XP (32 bit) and Windows Vista (32 or 64 bit)
Recommended PC Configuration: 2.8 GHz; 2 GB Ram
Windows Drivers: Microsoft Certified

Assembled in America

10.0 Sample Configuration File

(Scanner Specific Data Stored Onboard the Scanner)

```
[SCAN]
Path Length=700
EdgeDebounceLen=75
Feed Time Out=4
Motor Start Delay=200
Pos Jam Detector 0=390
Slip Length=28
Operating Mode=0
Back Eject Steps=130
[FRONT IMG]
PosFront=267
[FRONT IMG SENSOR]
Type=2
PelsDirTopDown=0
[FRONT IMG MODULE]
Resolution=300
StartPixel=0
NGoodPixel=1296
TotNpixel=1536
[FRONT IMG ACQ]
Gain_R=3000
Gain_G=3000
Gain_B=3000
Gain_GRAY=1982
Offset_R=1125
Offset_G=1125
Offset_B=1125
Offset_GRAY=1125
Pwm_R=83
Pwm_G=166
Pwm_B=70
[REAR IMG]
PosRear=342
[REAR IMG SENSOR]
Type=2
PelsDirTopDown=0
[REAR IMG MODULE]
Resolution=300
StartPixel=0
NGoodPixel=1296
TotNpixel=1536
[REAR IMG ACQ]
```

Gain_R=3000
Gain_G=3000
Gain_B=3000
Gain_GRAY=2153
Offset_R=750
Offset_G=750
Offset_B=750
Offset_GRAY=750
Pwm_R=81
Pwm_G=176
Pwm_B=75
[MICR HEAD]
Position=68
Gain Calib Factor=128
Offset=1887
[PRINTER]
Position=44
CleanPulse=45
Delay Clean0=3600
Num Clean0=50
Delay Clean1=36000
Num Clean1=100
Delay Clean2=65000
Num Clean2=200
[MOTOR]
Steps Per Meter=4420
Eject Speed Table Index=2
CCW Direction=0
Divisor Offset=9000
Accel.#00 Num=10
Accel.#00 Speed=696
Accel.#01 Num=10
Accel.#01 Speed=727
Accel.#02 Num=10
Accel.#02 Speed=1000
Accel.#03 Num=10
Accel.#03 Speed=1333
Accel.#04 Num=10
Accel.#04 Speed=1714
Accel.#05 Num=10
Accel.#05 Speed=2000
Accel.#06 Num=10
Accel.#06 Speed=2143
Accel.#07 Num=10
Accel.#07 Speed=2243
Accel.#08 Num=10

Accel.#08 Speed=2400
Accel.#09 Num=10
Accel.#09 Speed=2526
Accel.#10 Num=10
Accel.#10 Speed=696
Accel.#11 Num=10
Accel.#11 Speed=696
Accel.#12 Num=10
Accel.#12 Speed=696
Accel.#13 Num=10
Accel.#13 Speed=696
Accel.#14 Num=10
Accel.#14 Speed=696
Accel.#15 Num=10
Accel.#15 Speed=696
Decel.#00 Num=5
Decel.#00 Speed=696
Decel.#01 Num=5
Decel.#01 Speed=696
Decel.#02 Num=5
Decel.#02 Speed=696
Decel.#03 Num=5
Decel.#03 Speed=696
Decel.#04 Num=5
Decel.#04 Speed=696
Decel.#05 Num=5
Decel.#05 Speed=696
Decel.#06 Num=5
Decel.#06 Speed=696
Decel.#07 Num=5
Decel.#07 Speed=696
Decel.#08 Num=5
Decel.#08 Speed=696
Decel.#09 Num=5
Decel.#09 Speed=696

11.0 Sample Initialization File

(Generic Scanner Data Stored in a File on the PC)

```
#       Version 9.00
#
# Digital Check Sample Configuration File for Teller Scan Check Scanners
# Models TS200, TS220, TS2300, TS300, TS350, TS350EBS, TS400, TS400ES
#        TS4080, TS4120, CX30
#
# All Setting in this file can be overridden by making BUICSetParam calls in
# application.  Any line that starts with a "#" is a comment.
#
#DCC Scan Parameters
[DCCSCAN]
#See IQAStatus function instructions (Test Values are added together):
#IQACROP-1,IQACLEAN1-2, IQACLEAN2-4, IQACLEAN3-8, IQACLEAN4-16,
#IQASTANDARDSIZE-32,IQASKEW-64,
#IQACORNERS-128, IQALINES-256, #IQAMICRQUALITY-512,IQADENSITY-2048,
IQACOMPRESSEDSIZE-4096,
#IQACARPRESENT-8192, IQALARPRESENT-16384, IQATOPRESENT-
32768,IQADATEPRESENT-65536,
#IQASIGNPRESENT-131072,IQAMEMOPRESENT-262144,IQABLOB-
524288,IQACARBON-1048576,
#IQASTREAKS-2097152,IQAFOCUS-4194304,IQACOUNTINSIDE-
8388608,IQACLEANSIDES-16777216,
#IQADOUBLETOPEDGE-33554432,IQACLEANSIDES2-67108864
#Performing all recommend tests=10492612
IQATests=10492612
#Edge Detection Contrast should start at 450, 600, and end at 750
StartContrast=450
EndContrast=750
IncrementContrast=150
#All DCCScan function Scanning is done at 200 dpi and JPEGS can be stored at
# 100, 120, or 200 DPI.  If set to 0, no JPEGs are saved.
JPEGEndResolution=200
#Maximum allowable Speckles before image must be rethresholded
MaxSpeckles=1000
#Min allowable MICR Quality based on 1 (Wrong) to 10 (Perfect MICR and MICR Image)
MinMICRQuality=5
#Number of allowable Corner Pixels (60 is 3 tenths of an inch at 200 dpi)
MaxBentCorner=60
#Percent of black pixels to total pixels.
MaxRawDensity=20
#Number of K bytes of allowable compressed Tiff Image Data
MaxTiffImageSize=24
#Options=1 -- Try using multiple Contrast Settings (Depends on StartContrast,
#         EndContrast, and IncrementContrast)
```

```
#Options=2 -- Try a simple thresholding (depends on "Acq: Front B/W threshold")
#Options=4 -- Save the image after despeckling and edge Removal
#Options=8 -- Save the grayscale/color image as BMP
#Options=16 - Group 4 Filter - Smaller Tiffs
#Options=32 - FSThreshold - Return optional Tiff as JPEG
#Options=64 - Force EdgeDetected Images to 3.1% if possible
#options=128- Return uncompressed grayscale/color images as JPEGs (BUICMemHdr)
#Options=256- Return Rear Grayscale Density in iDocStatus[31]
#Options-512- Reduce 300 dpi to 240 dpi
#Options-1024-Check for Upside Down Images
Options=1091
#Min Length is the minimun acceptable image length in 10th of inches (default 30)
Min Length=58
#Scout Path=C:\Program Files\Silver Bullet Technology\ScoutClient\ScoutScannerDLL.dll
#Scout Enable=1

[DCCSCAN EXCEPTION]
#Number of Exception Documents
Count=4

# Postal Money Order
1Routing=:000008002:
1Accout=
1Threshold=3
1Min=50
1Options=15     // Smaller Tiffs, Ignore Speckles, Remove Speckles, Ignore Corners
1Contrast=10

# Western Union Money Order
2Routing=:102100400:
2Accout=
2Threshold=1
2Min=60
2Options=7     // Smaller Tiffs, Ignore Speckles, Remove Speckles
2Contrast=350

# MoneyGram
3Routing=:091900533:
3Accout=
3Threshold=1
3Min=64
3Options=7     // Smaller Tiffs, Ignore Speckles, Remove Speckles
3Contrast=450

# Bank of America Money Order
4Routing=:114000019:
```

```
4Accout=001641
4Threshold=3
4Min=30
4Options=7     // Smaller Tiffs, Ignore Speckles, Remove Speckles
4Contrast=450

[ACQ. SETUP]
#Pipelining or Batch Scanning Enabled =1 (Default), Item Scanning = 0, Only TS230
#and TS4120 support Batch Scanning all other models ignore this setting
SCANBATCH Enable=1

#TS230 and TS4120 Step Down Parameter.  This is normally set to 100 (Default) but can be
set to
#65 or 35 to make a scanner simulate a slower scanner for testing.
TS230_65=100

#USB Type Setting
#USB2.0 Only = 0 (Default), USB1.1 or USB2.0 = 1 (Slightly Slower)
USB1=0

#Simple Thresholding Red Filter Off = 0 (Default), Right Bottom Corner = 1,
#Full Image = 2
Threshold Red Filter=0

#Double Feed Enabled = 1, Double Feed Disabled = 0,
# For 220, 230, 4120 Double Feed Enabled but No Stop in Track = 2 (Default)
# (Double Feed is triggered by the double feed sensor and poor MICR or multiple
#documents in the image.)
#NOTE:  Developers support two calls for backwards compatibility.
#Devices: Double feed detect and Acq: Doc.thickness
#But Devices: Double feed detect is more readable and understandable
Devices: Double feed detect=2

#If Double Feed No Stop is set, then test for and set American MICR rules: One #Routing,
One Amount = 1 (Default)
American MICR Rules=1

#Magnetic MICR Disabled = 0, Magnetic MICR Enabled = 1 (Default)
MICR: Enable=1

#Set Expected MICR Font:  CMC7 = 0, E13B = 1 (Default)
MICR: font=1

#MICR String Format Settings
#Leaving E and no spaces - 0, no spaces = 1, spaces = 2,
#spaces even in amount field if MICR is verified = 3 (Default)
```

```
MICR: Format=3

Printer: Initial pos.=0
Printer: Selection=0
Printer: Double density=0
Printer: Intensity=80
Printer: Intensity12=185
Printer: Xpixeld=8
Printer: 2 rows=0
Printer: Clean 44=1500
Printer: Clean 18=480
Printer: Clean 6=60
Printer: Clean 2=5

#Image Resolution Settings (DPI)
#100x100 = 0, 200x200 = 1 (Default), 200x100 = 2
Acq: Resolution=1

#Use Scanner Internal Sort Algorithms for Sorting = 0, Use Programmatic Sorting = 1
#(Default)
Sorter: Input=1

#Thresholds for Simple Thresholding 2 to 13 (US Default: Front = 10, Back = 9)
Acq: Front B/W threshold=10
Acq: Rear B/W threshold=9

#4 bit grayscale = 0, 8 bit grayscale = 1, Should be 1 for all USB Scanners
Acq: Gray 256 lev.=1

#Top Image Crop Disabled= 0, Top Image Crop Enabled = 1 (Default)
Image: Crop=1
#Grayscale Cropping threshold (Usually 48 to 112, Default = 64)
Crop Threshold=64

#No Image rotation (Not available on all models) = 0, Rotate 90 degrees = 1 (Default)
Image: Rotate=1

Acq: Img Right=0
Acq: Img Left=1500
Acq: Img Bottom=0
Acq: Img Top=864

# No Additional TIFF Micr Tag = 0 (Default), Add a TIFF Micr Tag = 1
TIFF Micr Tag=0

#Reload the Endorsement BMP between scans = 0
```

```
#Reload the Endorsement BMP only on command = 1 (Default)
Printer BMP Load Once=1

#Double Feed Offset - Depending on Scanner Adjust both
Double feed: length=40
Double feed: delay=30

#Scan only on command = 0, Prefeed checks = 1
#If endorsement is changing on every check then prefeed must be turned off
Enable Scan=0

#Millisecond delay for next check in feeder, usually 500 for scanners with
#autofeeder and 2000 to 10000 for drop feed scanners.
Image Wait=500

#JPEG Quality Factor (valid 25 to 75) where 25 is lowest quality and 75 is highest
#Default = 75, lower settings relate to faster scanning and lower quality
JPEG Quality=75

#No debug and no delay = 0, 1 - delay for slow USB and enale debug messages
# which can be viewed using dbgview.exe = 1, more debug detail = 2
Delay TS200=0
#if Log Messages is enabled, debug messages are stored in c:\buicapi.log
Log Messages=0

# 0-Off, 1-Check any micr for multiple routing or amount fields.  Return -227 if found.
MICR Parse Error Test=0

# In milliseconds of additional red light blinking time.  (0 to 2000 is valid).
Additional Blink Time=0

# 0-Off, 1 - When first check of batch is loaded - beep
Input Feeder Beep=1

#0-Off, 1 - Force an Eject on Jam to clear scanner error light
Force Eject=0

#0-off, 1 - test for late jam on a TS4120
Late Jam Test=0

#0-Off, 1 - Log Remote Monitoring Info, 2 - MICR Also
Remote Monitor Log=0

#If using a Remote Monitor, Limit size to xxxx bytes at startup
Remote Monitor Log Size=0
```

```
#Image Padding to force an image to be taller
Pad Bottom=0
Pad Top=0

[DOUBLE LIGHT SOURCE]
Front: 2 light=0
Front: RIDO en.=0
Front: intensity share=50
Front: clip threshold=60
Front: out format=1
Front: B/W threshold=10
Rear: 2 light=0
Rear: RIDO en.=0
Rear: intensity share=50
Rear: clip threshold=60
Rear: out format=1
Rear: B/W threshold=8

[SCSI]
Adapters=6
Target ID=2
Adapter ID=1

[SCANNER]
#200 for USB Scanners, 400 for SCSI Scanners for quicker initialization
Type=200

#Front Red Drop Out on TS210 and TS220 and TS230 Uncomment the following
#[TS200 CONFIG]
#FRONT_IMG RED Intensity=100
#FRONT_IMG GREEN Intensity=0
#FRONT_IMG BLU Intensity=0

[KODAK]
Endorse Offset=1000
Endorse String=***Kodak Test String***Kodak Test String***Kodak Test String

#[SCANDEMO]
#PrintString=Digital Check Test String
#PrintOffset=1000
```

12.0 API Error Codes

12.1 Init Error Codes

BUIC_ERROR
-1

Error while initializing ASPI, unable to find a scanner (DCC Supported Scanner) when scanning SCSI bus.

1. Is ASPI installed correctly? If not, install ASPI. Check SCSI interrogator under WIN95 or check to see if scanner found on SCSI bus when booting.
2. Is the scanner on now and was it on when booting? Try steps listed in 1.
3. Is the scanner properly cabled? Check cables.

BUIC_ERROR_NODEVICE -2

No scanner was found while querying the SCSI bus.

1. Try steps under BUIC_ERROR.

BUIC_ERROR_OLDMANAGER -3

Old version of ASPI installed. Install latest version of ASPI before continuing or ASPI was installed properly in the operating system configuration.

BUIC_ERROR_ILLEGALMODE -4

Illegal mode for ASPI.

1. Verify ASPI is installed correctly.
2. Verify ASPI has not been corrupted.
3. Verify a recent version of ASPI has been installed.

BUIC_ERROR_NOMANAGER -5

No ASPI manager found.

1. Verify ASPI is installed correctly.
2. Verify ASPI has not been corrupted.
3. Verify a recent version of ASPI has been installed.
4. Verify ASPI has been properly configured for operating system.

BUIC_ERROR_NOINIT -100

ASPI SCSI inquiry command was issued before ASPI SCSI was initialized.

1. Call BUICInit before calling other functions.
2. ASPI SCSI inquiry command failed while inquiring scanner.

BUIC_ERROR_BADJOB -101

Job type not in range 0 to 7 for a BUICScan call.

1. Verify job type in a BUICScan, BUICScanMemory, BUICScanGray, or BUICScanGrayMemory.

BUIC_ERROR_BADPARAM -102

Parameter passed in a function call is bad.

1. For BUICSetParam and BUICGetParam verify it is a valid parameter.
2. For BUICSetParam and BUICGetParam verify it is a valid value for the parameter.
3. For Scans, verify memory pointers or file names are valid.
4. For the function called, verify the parameters passed are valid.
5. Verify *.INI values are correct for the situation. Passed parameter and an *.INI file value may conflict.

BUIC_ERROR_BADFILENAME -103

Filename passed is invalid.

1. Verify file exists if reading a file.
2. Verify file attributes are acceptable for action desired.
3. Verify path exists.
4. Verify path and file are properly terminated with a '\0'.

BUIC_ERROR_IMAGE_TYPE -104

Mismatch between scanning and compression. Separate routines for bitonal and gray scale.

1. Verify parameters passed.
2. Verify parameters passed do not conflict with values in *.INI file.

BUIC_ERROR_FILE_OPEN -105

Unable to open file for compression.

1. Verify file exists if reading a file.
2. Verify file attributes are acceptable for action desired.
3. Verify path exists.
4. Verify path and file are properly terminated with a '\0'.

BUIC_ERROR_MEMORY_ALLOC -106

Unable to allocate memory.

1. Shut down other windows and programs running to free memory.
2. Reboot system to see if some memory has been lost.
3. Get more memory for system.
4. Use a dedicated system for the scanner.

BUIC_ERROR_FILE_IO -107

Error while reading/writing file

1. Verify file attributes are acceptable for action desired.
2. Verify disk is not full.
3. Verify device is available and on line.

BUIC_INV_WINDOW -108

Invalid window specification (1 or 2 ONLY).

1. BUIC API supports only two windows.
2. Was the window opened prior to this call?
3. Does the window exist? Has it been closed or error while opening?

BUIC_OPEN_WINDOW -109

Error opening window.

BUIC_CREATE_WINDOW -110

Error creating window.

BUIC_CLOSE_WINDOW -111

Error closing window.

1. Was window previously opened?
2. Was window previously closed?
3. Was the correct window selected for closing?

BUIC_DISPLAY_IMAGE -112

Error displaying image.

1. Does the image exist?
2. Is the image corrupted?
3. Are the scan document sizes correct to allow an image to be scanned?

4. Is the file read protected?

BUIC_ERROR_MEMORY_DEALLOC -113

Unable to de-allocate memory.

1. Was the memory allocated?
2. Was the memory previously de-allocated?

E_OPEN_BMP_FILE -120

Error while trying to open a BMP file.

1. Verify file exists if reading a file.
2. Verify file attributes are acceptable for action desired.
3. Verify path exists.
4. Verify path and file are properly terminated with a '\0'.

E_STRING_TOO_LONG -122

No longer used.

E_TS400_NO_INIT -123

TS400 was not initialized before calling a scan.

1. Call BUICInit before attempting to scan.

BUIC_NOT_INIT -124

Scanner not initialized.

1. Call BUICInit before checking status.
2. Cover was lifted and scanner lost initialization. Re-initialize and/or verify correct settings for scanner.

E_NO_SCANNER

-125

While scanning the SCSI bus with an inquiry command, no DCC Supported Scanner was found.

1. Verify scanner was on when system was booted.
2. Verify scanner is now on.
3. Verify scanner is cabled properly.
4. Check lights on scanner for error condition.

E_NO_DCC_SCANNER -126

Serial number or identification does not match DCC scanners.

B1000_START_ACQ -202

Error during SCSI communication. This problem seems to be more prevalent when running 16-bit applications. It appears to be a communication problem between ASPI and the operating system on fast machines with low power.

1. Try 32-bit API and application.
2. Try running on a slower system.
3. Try running with a different SCSI card.
4. Try running on a non portable system.

B1000_CLR_ERR -203

Error while calling scanner to clear errors. Clear errors is called after a scanner error and to clear the scanner before issuing certain commands to the scanner.

B1000_BADGE -204

Badge reader support has not been added at the current time.

B1000_GET_DOC -205

Error when calling get document. This function starts the scan by requesting the scanner to input a document. An error here is a SCSI communication error and not a scanner malfunction.

B1000_SCSI_ACQ -206

Error while retrieving the scanned data.

1. System is too slow to retrieve data from scanner.
2. Check jammed (unlikely).
3. System too busy to respond to scanner. Close down other applications.
4. Priority of application is too high and does not let ASPI have any time slices.

B1000_TIME_OUT -207

Time out during a SCSI command.

1. Verify cable is good and has a good connection.
2. Verify SCSI time out parameter in *.INI is set high enough for SCSI read to complete and SCSI inquiries to complete.
3. Verify time out in ASPI is sufficient.

B1000_DMA_TRANSFER -208

Time out or error during DMA transfer

1. Verify no other application is attempting to use DMA, conflict.
2. Verify no other applications are running and stealing CPU time.
3. Verify application has a high enough priority.

B1000_MAGN_READER -209

Error from Magnetic reader while reading magnetic code (MICR).

1. Verify MICR exists.
2. Verify MICR is not damaged.

B1000_END_OF_JOB -210

No longer used.

B1000_SEND_CONFIG -211

Error while sending configuration or *.INI parameters to scanner.

1. Verify *.INI file has been read or defaults initialized.
2. Verify configuration parameters are valid and do not conflict.

B1000_NO_CHEQUES -212

No checks in the feeder. Check that checks are past the feed sensor in the input feeder.

B1000_GEN_ERR -213

Error code no longer used.

B1000_NO_CFG -214

Error code no longer used.

B1000_NO_LOOP -215

Loop not terminated. Document did not completely clear end sensor. Remove document from scan path.

B1000_NO_FEED -216

No feeding. Unable to load document.

1. Verify document is not damaged, bent, or for some other reason unable to feed.
2. Remove document and reinsert into input tray.
3. Remove any folds or crinkles in document.

B1000_DOUBLE_FEED -217

Two or more documents in the check path. Double feed problem.

1. Remove checks from document path.
2. Remove any folds or crinkles in the checks.
3. Fan the checks to separate them.
4. Replace them in the input feeder.
5. If double feed thresh holding is set too low, the scanner may be detecting the document as two checks and a double-feed.

B1000_TMPFILE_ERR -218

Error creating temp file.

B1000_DANGEROUS -219

The cover is up on the scanner.

1. Close the scanner cover.
2. See if the scanner cover is properly closed.
3. Check cover switch.

B1000_PAPER_JAM -220

Document is jammed in track.

1. Remove check from document path.
2. Remove any folds or crinkles in the check.
3. Fan checks to separate them.
4. Replace check in the input feeder.

B1000_DISK_READ -222

Disk read/write error.

1. Check attributes on file.
2. Verify removable media is present.
3. Verify operation of media.

B1000_MEM_ALLOC -223

Unable to allocate memory.

1. Shut down other windows and programs running to free memory.
2. Reboot system to see if some memory has been lost.
3. Get more memory for system.
4. Use a dedicated system for the scanner.

B1000_MEM_NOT_AVAILABLE -224

Unable to allocate memory or memory was not allocated previously as expected.

1. Shut down other windows and programs running to free memory.
2. Reboot system to see if some memory has been lost.
3. Get more memory for system.
4. Use a dedicated system for the scanner.
5. Call initialization routine that initializes memory.

MICR_PARSE_ERROR -227

If the user enabled the CFG_REPORT_MICR_PARSE_ERROR, then Magnetic MICR lines are tested for multiple routing and amount fields.

B1000_GRAYFILE -230

Scan to file with gray not supported

B1000_ROTATE -231

Problem with rotation of file

B1000_USI_COMPRESS -232

Problem with UniSoft Imaging compression

B1000_DISK_WRITE -233

Error while writing to file.

1. Check attributes on file.
2. Verify removable media is present.
3. Verify operation of media.

B1000_USI_ROTATE -234

Problem with UniSoft Imaging rotation

BUIC_ERROR_GET_MICR -315

TIFF magnetic code TAG not found.

BUIC_ERROR_IMAGETYPE -316

Not a TIFF file.

1. Verify path and file name.

BUIC_ERROR_SETTING_MICR_TAG –317

Error setting magnetic code TAG.

1. Verify path and file name.
2. Verify file is a TIFF image (bitonal) and not a gray scale image (BMP or JPEG).

BUIC_ERROR_SAME_FILENAME -318

Cannot copy file to itself.

1. Check file names. Input and output file are the same.

BUIC_ERROR_SET_MICR -319

Error setting TIFF magnetic code TAG.

1. Verify path and file name.
2. Verify file is a TIFF image (bitonal) and not a gray scale image (BMP or JPEG).

SCAN_GET_DOC -510

Problem with low level SCSI command Get Document to scanner.

FAIL_PMEC -516

Failure of SCSI command to set mechanical configuration parameters. Scanner was busy or parameters were invalid.

SCSICMD_ERR -517

Failure of SCSI command.

ERR_LIGHTCAL -518

Error with light calibration.

1. Check parameters dealing with light calibration in *.INI file.

ERR_BLACKLEVCAL -519

Error with black level calibration.

1. Check parameters dealing with black level calibration in *.INI file.

ERR_WHITELEVCAL -520

Error with white level calibration.

1. Check parameters dealing with white level calibration in *.INI file.

EXTRD_ERR or MICRRD_ERR -521

Problem reading magnetic code on a TS400 or BUIC1500.

1. Check parameters dealing with reading magnetic code in *.INI file.

BADINSERT_ERR -522

Multiple documents fed at same time.

1. Fan documents before inserting in input pocket.

NO_PRTHEAD -523
Error no longer used.
SCAN_ERRFLASH -524
Scanner cover is open or not correctly latched.
BAD_MICR -525
Magnetic code had an unreadable character or was not found.
CLEARPRT_ERR -526
Error while clearing printer of previous BMP file.
LOADPRT_ERR -527
Error while loading printer with BMP file or print string.
EEREAD_ERR -528
Error reading EEPROM's.
EEUPDATE_ERR -529
Error updating EEPROM's on scanner.
GETDOC_ERR -530
Error getting a document. Error with Get document SCSI command.
ENDDOC_ERR -540
Error with end document SCSI command.
SETDOCPOS_ERR -541
Error with set document position.
EJECT_ERR -542
Error while ejecting a document.
1. Verify document is not stuck in document path.
2. Verify document is not bent or crinkled.
3. Verify output feeder is not full.
FAIL_TMPCFG -543
Failure of temporary configuration command.
TMPCFG_REJECTED -544
Temporary configuration rejected.
FAIL_ACQPAR -545
Configuration failed.
1. Verify configuration parameters.
2. Verify configuration parameters match scanner being configured.
ACQPAR_REJECT -546
Configuration rejected.
1. Verify configuration parameters.
2. Verify configuration parameters match scanner being configured.
PMEC_REJECTED -547
Mechanical configuration rejected.
1. Verify parameters.
GETSTATUS_ERR -548
Error getting status.
CLRERR_ERR -549
Error clearing errors.
ACQTIME_OUT -550
Acquisition time out error.

Make acquisition time out longer.

MICRTIME_OUT -551

MICR has timed out.

BAD_PARAM_ERR -552

Invalid parameter or parameter setting.

E_NO_PRINT_HEAD -553

No printer cartridge detected. Verify printer cartridge is present and properly seated OR turn off printer option (in configuration or *.INI file).

E_NO_DPI100_BW -554

100 DPI Black/white images not currently supported.

E_BITS_PER_PIXEL -555

Requested bits per pixel are invalid.

E_EXCEEDS_MAX -556

Maximum of 3600 lines is exceeded.

1. Probable cause is check jam in front of optical heads.

E_INIFILEPATH -557

Invalid Configuration File

E_CFGFILEPATH -558

Usually unable to create configuration file used to communicate to low level DLL's

E_OPEN_FONT_FILE -600

Error opening the font file for print string.

1. Verify font file path and filename.
2. Verify font file is a valid font file.
3. Verify font file meets format specified for a font file.

FONTFILE_ERR -601

Error reading the font file for print string.

1. Verify font file is a valid font file.
2. Verify font file meets format specified for a font file.

ERR_DESTSELECT -602

Maxtime waiting for host sorting was exceeded. During a Hold and View session, TS400SetPocket was not called within 10 seconds of the completion of a scan.

1. Hold and View is selected when Sorter is ON and Sorter Input is selected as external.
2. After scan, is the application calling set pocket within 10 seconds.

E_ERR_FLASH -603

Error downloading to flash memory. Application should not be downloading to flash memory. Please notify technical support if this error is seen.

E_HOSTSORT_TIMEOUT -604

Application did not notify scanner of pocket selection before timeout. Application should send pocket information more quickly.

NOT_SUPPORTED -605

Function or option no longer supported by this DLL. See if more recent function is available or if option no longer supported by scanner.

ERR_CFGCREATION -606

Error creating configuration. Is disk write protected or does the BUICScan.ini file have invalid parameters.

IMAGE_TOO_LONG -607

Image was too long.

1. Document too long.
2. Two documents fed at once and looked like a very long document.

TS2_CALLBACK_FULL -608

User has been setting too many call back functions and overloaded call back storage area.

1. User fewer calls to funcSetUpCallBack or use same events each time called.

FORMAT_ERR -609

Format error. TIFF images are bitonal (black/white) while JPEG and BMP are gray scale images.

1. Black/White images must be saved as TIFF.
2. Gray scale images must be saved as JPEG or BMP.

NO_DATA_AVAIL -610

Scanner did not save any data when document was scanned. Is at least one of these options set: front, back, or MICR.

1. Set front to ON with BUICSetParam or BUICScan.ini.
2. Set Back to ON with BUICSetParam or BUICScan.ini.
3. Set MICR to ON with BUICSetParam or BUICScan.ini.

UNKNOWN_CAL -611

Not used.

ABORTED_CAL -612

Not used.

ERR_FEEDSTAMP -613

Not used.

E_POST -614

Unable to post a message. Windows error.

TS2_ERR_GENERIC -615

Generic error on TS200.

TS2_ERR_DEVID_NOTVALID -616

Was TS200 connected and initialized.

1. Are more than two scanners on system?
2. Was TS200 properly connected?

TS2_ERR_NOPORTAVAILABLE -617

No USB port available.

TS2_ERR_OPENDEVICE -618

Open port Error.

TS2_ERR_NOCONNECTION -619

Device not connected.

TS2_ERR_INVALID_FUNCTION -620

Incorrect function. Windows error.

TS2_ERR_FILE_NOT_FOUND -621

The system cannot find the file specified. Windows error.

TS2_ERR_ACCESS_DENIED -622

The access is denied. Windows error. Or Command Order Error.

TS2_ERR_INVALID_HANDLE -623
The handle is invalid. Windows error.
TS2_NOT_ENOUGH_MEMORY -624
Not enough storage is available to process this command. Windows error.
TS2_ERR_INVALID_ACCESS -625
The access code is invalid. Windows error.
TS2_ERR_INVALID_DATA -626
The data is invalid. Windows error.
TS2_ERR_BAD_UNIT -627
The system cannot find the device specified. Windows error.
TS2_ERR_NOT_READY -628
The device is not ready. Windows error. Check USB cable and allow a few seconds to reset.
TS2_ERR_BAD_COMMAND -629
The device does not recognize the command. Windows error.
TS2_ERR_BAD_LENGTH - 630
The program issued a command but the command length is incorrect.
TS2_ERR_WRITE_FAULT -631
The system cannot write to the specified device. Windows error.
TS2_ERR_READ_FAULT -632
The system cannot read from the specified device. Windows error.
TS2_ERR_GEN_FAILURE -633
A device attached to the system is not functioning. Windows error.
TS2_ERR_INVALID_PARAMETER -634
The parameter is incorrect.
TS2_ERR_IO_DEVICE -636
The request could not be performed because of an I/O device error. Windows error.
TS2_ERR_INVALID_DLL -637
One of the library files needed to run this application is damaged.
TS2_ERR_DLL_NOT_FOUND -638
One of the library files needed to run this application cannot be found. Windows error.
TS2_ERR_DEVICE_REINITIALIZATION_NEEDED -639
The indicated device requires re-initialization due to hardware errors.
TS2_ERR_DEVICE_NOT_CONNECTED -640
The device is not connected. Windows error.
TS2_ERR_DEVICE_REINITIALIZATION_NEEDED -641
An attempt was made to perform initialization when initialization was already completed.
TS2_ERR_NO_MORE_DEVICES -642
No more local devices. Windows error.
TS4_UNABLE_TO_LOAD_TS4DLL -643
Unable to load TS4 DLL.
CHECKENDORSEMENT_PARAM_ERROR -701
Bad parameter passed to check endorsement functions.
CHECKENDORSEMENT_MEMORY_ERROR -702
Unable to allocate enough memory for check endorsement functions.

CHECKENDORSEMENT_ROTATE_ERROR -703
Error rotating in check endorsement functions.
CHECKENDORSEMENT_BMP_FILE_ERROR -704
BMP File writing error in check endorsement functions.
CHECKENDORSEMENT_MIRROR_ERROR -705
Error while mirroring BMP in check endorsement functions.
CHECKENDORSEMENT_TEXT_CONVERT_ERROR -706
Error while converting text to a BitMap image in check endorsement functions.
E_OPEN_STAT_FILE -707
Could not open a statistics file for the given scanner in system directory.
E_READ_STAT_FILE -708
Could not read statistics from statistics file for given scanner in system directory.
E_WRITE_STAT_FILE -709
Could not write statistics from statistics file for given scanner in system directory.