



F-135 / F-135 Plus
Service Manual

Minimum Host Computer Specifications

- Pentium III or Athlon CPU, 700 MHz or higher, with MMX support
- 4GB of free hard drive space, capable of a sustained transfer rate of 30 MB/per sec. If IDE, it must either be a **Primary** or **Secondary Master** drive or connected using a serial ATA connection.
- Windows 2000 with (SP2) Minimum and Windows XP with (SP2) Minimum
- 256 MB of RAM
- USB 2.0
- Screen resolution of 1024x768 or higher

Power

F-135 with serial numbers below 500

- External power supply
- 15V, 2.4 amps,
- 50-60 Hz Input voltage frequency
- Plug polarity is plus center, minus outside
- 5.5mm outer diameter, 2.5mm inner diameter

F-135 with serial numbers above 500 and all F-135 Plus's

- External power supply
- 15V, 4.6 amps,
- 50-60 Hz Input voltage frequency
- Plug polarity is plus center, minus outside
- 5.5mm outer diameter, 2.1 mm inner diameter

Contents of Box

- F-135 / F-135 Plus Film Scanner
- 6ft. USB 2.0 Cable
- Software and User Manual CD
- External power supply and power cord

Size

- 6.75" x 8.5" x 14.75" (H x W x D)
- 17.15cm x 21.6cm x 37.5cm (H x W x D)

Resolutions

The F-135 has two supported resolutions:

4Base 1000 x 1500

8Base 1500 x 2250

The F-135 Plus has three supported resolutions:

4Base 1000 x 1500

8Base 1500 x 2250

16Base 2000 x 3000

Scanner Specifications

Light Source

- The F-135 / F-135 Plus uses an LED light source which should outlast the of the scanner itself.

Film Types and Variations

- The F-135 / F-135 Plus are designed to scan 35 MM. color negative film. 35 MM. cut strips are supported in sizes from 3 frames to 40 frames. However, to ensure DX code reading, the strips must be a minimum of 4 frames

DX Code Reading

- 35 MM. DX codes are read using the ISO 1007 specifications and are used by the host manager.

Installing the F-135 / F-135 Plus

The F-135 / F-135 Plus are a peripheral device. It must be connected to a computer that meets the required specifications listed on page 1 of this manual.

1. Install the software for the F-135 / F-135 Plus, if it is not already installed on the PC.
2. Clear a space near your computer system to place the F-135 / F-135 Plus scanner. The USB 2.0 cable must be able to reach the PC, so it cannot be more than 6 feet (2m) from the computer.
3. Connect the power cord to the power supply plug on the back of the scanner. (Fig. 1)
4. Connect the USB 2.0 cable to the back of the scanner. (Fig. 1)
5. Connect the USB 2.0 cable to the back of the computer, in a USB 2.0 port. **Do not plug in to a USB 1.0 connector!** (Fig. 2)
6. While the computer is on and Windows is loaded, turn the scanner power switch into the 'on' position. (Fig. 1)
7. Windows will prompt you to click "Next" to continue the driver installation.
8. Then click on "Finish" to finish the driver installation. (Fig. 3)
9. The process will repeat twice before finishing.
10. After the driver is finished installing, verify that the scanner driver is properly installed, by viewing the scanner properties in the Device Manager under the heading, "Imaging Devices." (Fig. 4)

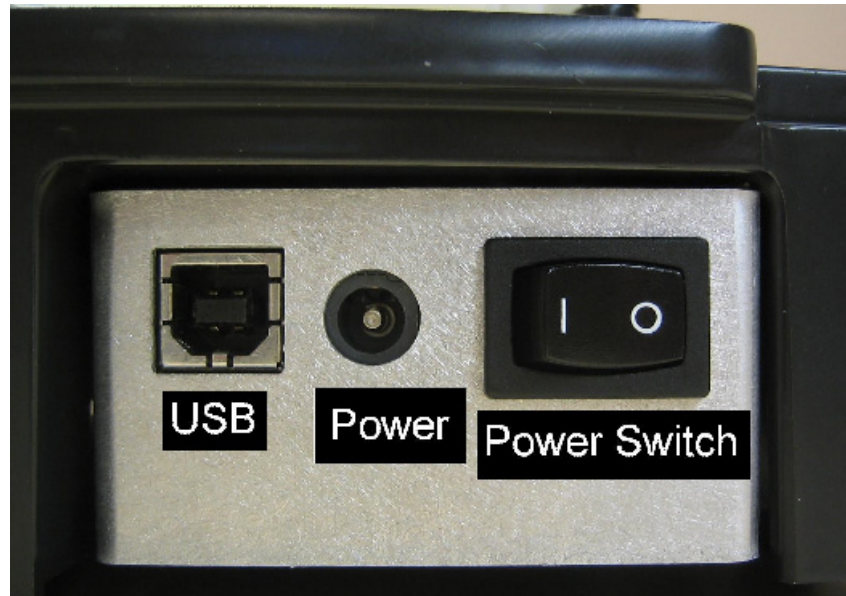


Fig. 1



Fig. 2



Fig. 3



Fig. 4

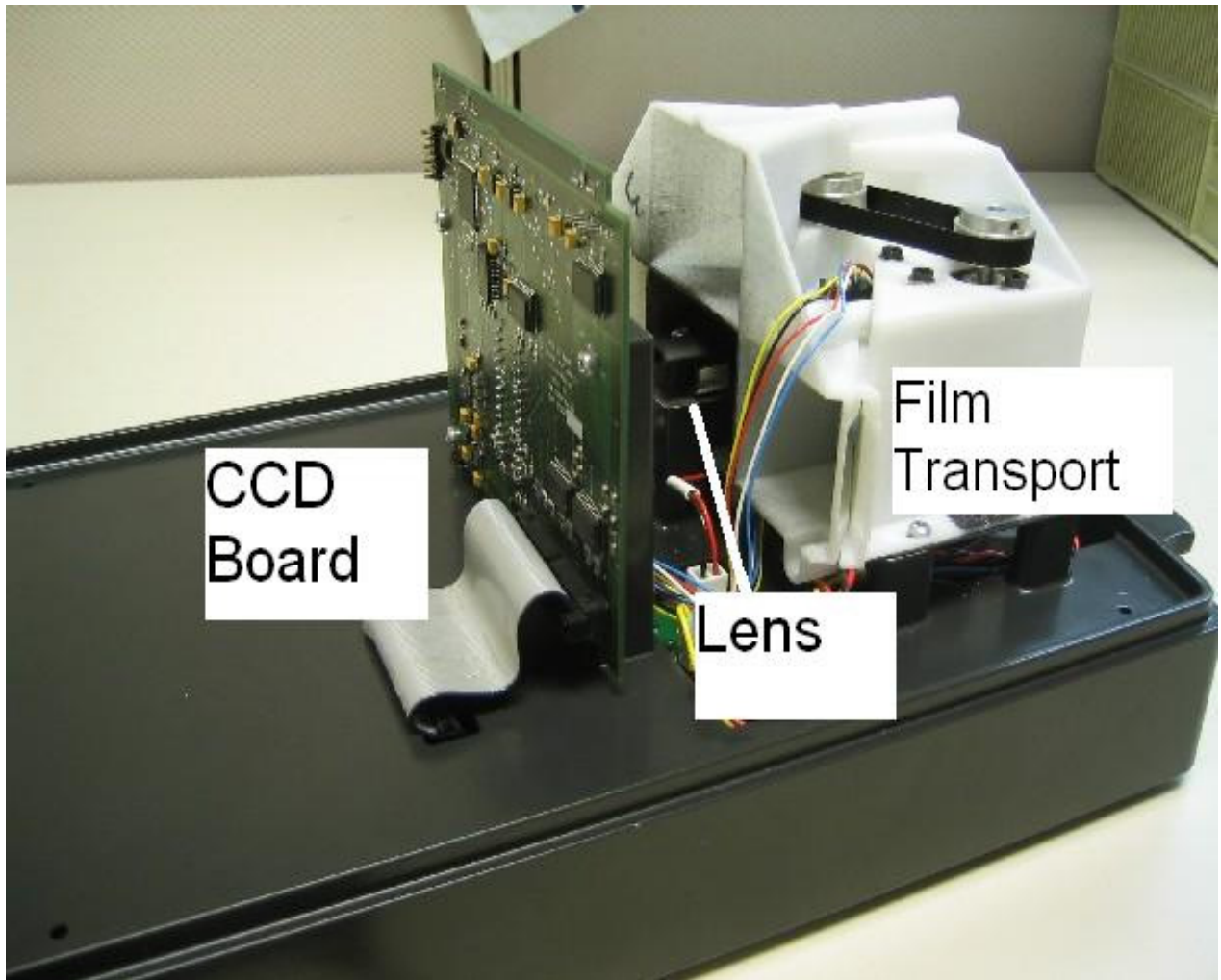
BIOS Configuration

The following BIOS options are used on systems configured by Pakon, and are recommended to be configured as outlined below.

Option	Setting
Plug and Play O/S	Disable
AGP Aperture Size	32MB
PCI Latency Timer	248
ACPI Suspend State	S1 State
USB Boot	Disable
PXE Boot to Lan	Disable
PCI to DRAM Pre-fetch	Disable

Scanner Theory

The F-135 / F-135 Plus film scanner is a stand alone USB 2.0 device, designed to convert 35 MM. films into digital images. It is highly flexible, and can easily be integrated into a larger digital photo processing system, or operated as an independent scanning device, attached to a host computer.



Transport Assembly

The film will be transported through this Film Transport, past the light source which will project the image of the film through the lens to the CCD board. There are two DX sensors that are staggered inside the Film Transport.

A skew in the film transport assembly will cause scanned images to be skewed. The result would turn “Skew” into “*Skew.*” (The image would appear slanted, as the italicized “skew” demonstrates.) A skew adjustment procedure is performed during the scanner’s original manufacturing calibration process to properly align the CCD board. Shims are used to ensure the film transport is in the proper skew position. (Fig. 5)

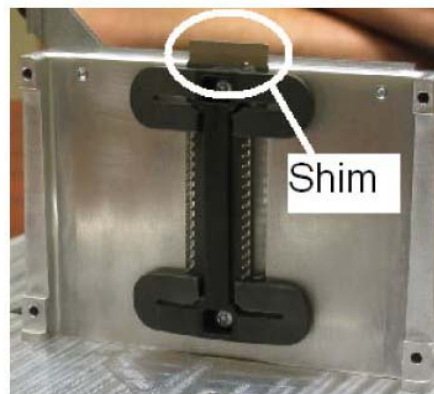


Fig 5

CCD Chip and Assembly

The CCD chip is tri-linear - it senses three colors: red, green, and blue. The CCD chip requires a tilt adjustment be done to ensure that the distance from the Film Transport to one end of the CCD is the same as the distance from the Film Transport to the opposite end of the CCD. If these distances are not equal, then one edge of a scanned picture will be in focus, and the other edge of the picture will be out of focus. Shims are used to ensure proper alignment of the CCD Chip in relation to the film transport. (Fig. 6)

This procedure is performed during the scanner's original manufacturing calibration process. As the film is scanned, the data is converted into raw digital data through the 14 bit A/D chip on the CCD board. This data is transferred from the CCD board to the USB interface board and sent to the host PC.

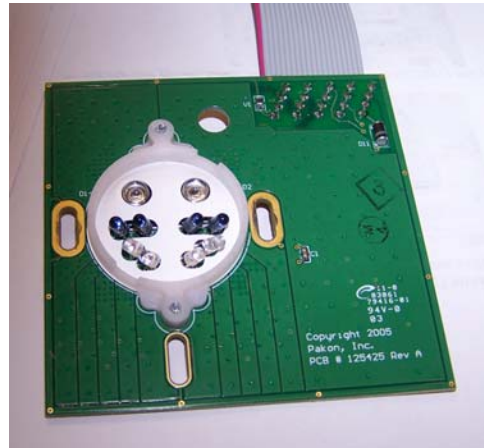


Light Source

The F-135 / F-135 Plus light source is made of LEDs, or Light Emitting Diodes. This light source's life expectancy is longer than that of the scanner's, meaning there is no light bulb to replace in the scanner.



F-135



F-135 Plus

Lens

The lens is mounted to a bracket between the transport assembly and CCD chip. During the manufacturing process, a focus fixture is used to position the lens in the proper alignment with the film track and CCD chip. Once the proper position is determined, the lens clamp is glued so the lens cannot move after the manufacturing calibration process. Once the lens position is set, the focal length of the scanner is fixed, and the scanner should not lose focus unless the optical path is manipulated manually by removing the CCD board, lens, or film transport assembly. (Fig. 7)

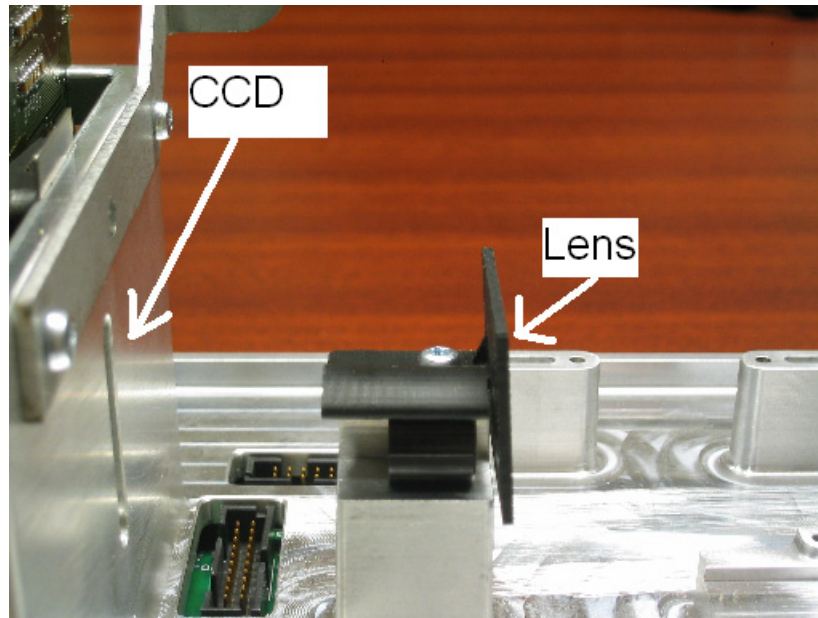


Fig. 7

Scanner Motherboard

The scanner motherboard houses most of the scanner's electronic circuitry. It houses the motor control, DX, USB communication, and power regulation. This board controls all motors, sensors, and communication with the host PC.



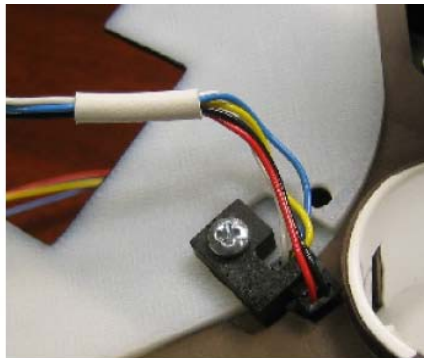
Motor Speed

The calibration wizard sets the film speed in the final phase of the calibration procedure. Each resolution, film type, and 3 channel and 4 channel setting must have its own film speed. These settings, as all calibration settings are stored in the EEPROM of the scanner, on the scanners mother board.

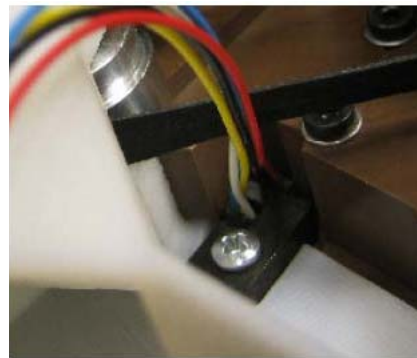
DX Sensors

The film track has DX sensors built into the assembly. These sensors are positioned so they have the ability to read DX code on both sides of the film. The DX codes will report film type and film specifier values. They also determine index numbers for each frame. To see requirements for DX code reading, please refer to the “Scanner Specifications” chapter.

There are two DX sensors that are staggered in the film track. The DX sensor on the film exit side of the scanner also acts as a film sensor, which will warn the operator that there is still film inside the scanner if a new scan is initiated.



Bottom DX Sensor



Top DX Sensor

USB Connection

The F-135 / F-135 Plus scanners communicate to the host PC via a USB 2.0 interface. The scanners have a USB interface built into the scanner motherboard. This board communicates with the scanner, and then relays that information to the host PC.

The motherboard has an EEPROM chip built into it to store calibration information. The Calibration Wizard program writes all calibration data to this EEPROM chip. When the scanner interface software is closed, this calibration data in the EEPROM is written to the Windows registry.

Operational Information

Powering On

Power on the host PC, and allow it to finish loading Windows before turning the F-135 / F-135 Plus scanner on. This will ensure that the scanner can properly communicate with the host computer.

Operation and Film Insertion

When scanning film, do not load film until the film LED is blinking green.

Inserting the film properly will ensure that the DX codes are read and that the framing will be done correctly. Insert the film with the emulsion to the inside of the scanner, DX Code up, and starting with the lowest number first, as shown below:



Do not attempt to remove film from the scanner while the film is under the film drive rollers! This will cause damage to both the film and the scanner. Use the software to advance or reverse the film.

Calibration

There are two types of calibration for the F-135 / F-135 Plus.

Color calibration is set during the manufacturing process, as well as any service that involves the CCD or any optical filter. This is to be performed by trained and authorized service personnel only.

Scanner corrections are performed automatically. They consist of a series of steps performed when the scanner is first turned on, as shown below:

- .• Start-up corrections
- .• Initial LED warm-up
- .• Gain and exposure Control Corrections
- .• Run Time Corrections

LED Indicator Lights

Power LED	Function
Solid Green	+5V is functioning
Off	+5V is not functioning

Status LED	Function
Solid Green	Scanner Ready
Blinking Green	Scanner is Scanning
Blinking Yellow	Scanner is unable to scan at the moment
Blinking Red	Scanner Error
Off	Scanner not Functioning

Film LED	Function
Solid Green	Film is being scanned
Blinking Green	Insert film to be scanned
Blinking Yellow	Remove film from scanner
Off	No film in the scanner

Digital ICE

Digital ICE is designed to assist in removing scratches, dust, and debris artifacts from scanned film. It should be used as a complement to a photo lab's normal cleaning procedures. Customers are still advised to clean the floors and work surfaces regularly to keep the lab environment as dust-free as possible.

It is also recommended to clean all film with a lint-free cloth before attempting to make prints 8"x10" or higher.

If a lab is having persistent dust problems, it is recommended to perform the following regularly:

- Clean all customer film with a lint-free cloth before scanning it.
- When the scanner is turned off, cover it with a plastic or lint-free cover.
- Use a lint-free cloth daily to clean the cover of the scanner and the surface of the table it is positioned on.

Operator Maintenance

Cleaning

Inside Film Path

It is recommended to clean the film path every day. Keeping the film track clean will ensure that DX code reading remains reliable; this cleaning also helps to remove any dust from inside of the illumination cavity. We recommend that the film be clean before putting it into the scanner.

1. Position the tip of the compressed air hose in the film track entrance, and blow, moving the hose up and down while blowing inside. (Fig. 8)
2. Follow the cleaning instructions for cleaning the film path in the scanner cover below.

Note: After cleaning the film track if the DX reads are not correct, run the 'Film Track Test' in the client interface program.



Fig. 8

Cleaning the Scanner Cover

Aim the hose of a can of compressed air into the film path.

1. Blowing the air away from the film entrance. (Fig. 9)
2. On the film exit side, blow the air away from the film exit. (Fig. 10)

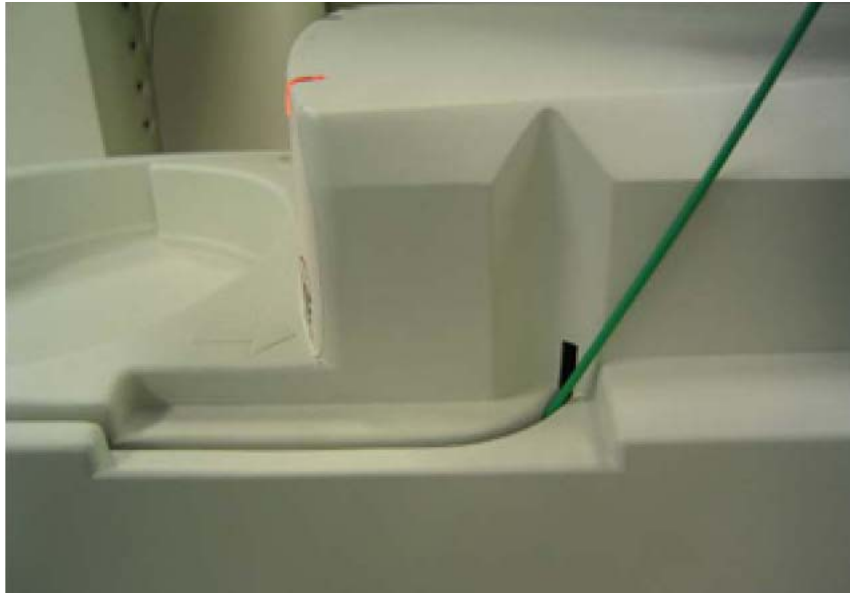


Fig. 9

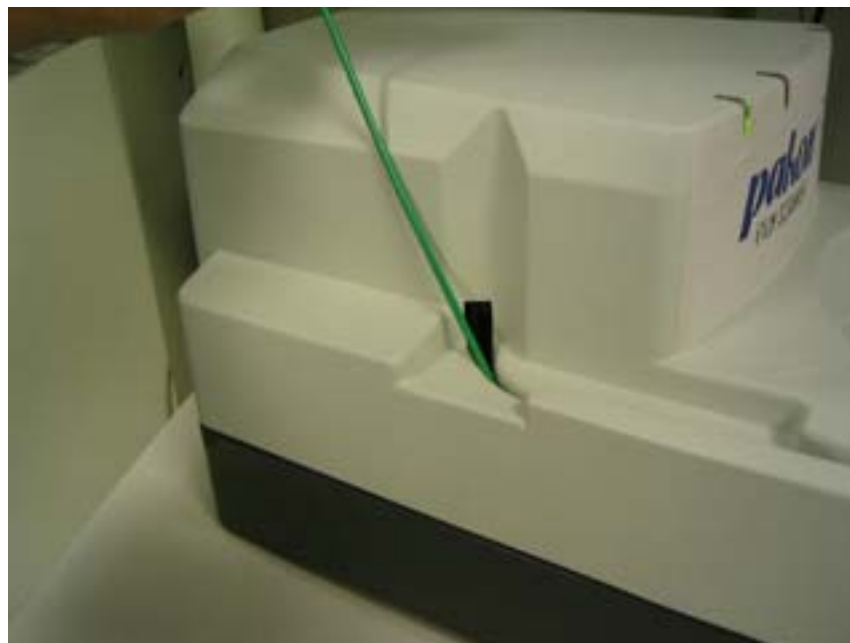


Fig. 10

Troubleshooting

Basics

The scanner will not work properly unless the scanner is turned on after Windows 2000 or XP has finished the loading process. Ensure this is done before attempting more advanced troubleshooting.

Error Logs

There are four primary error logs generated by the scanner software. These error logs are a very important tool to determine the cause of any reported error codes. When contacting technical support, it is advisable to provide these logs to ensure a more informed response. Dealers and distributors can request a list of the error codes with information on troubleshooting them.

These logs are located in the following location.

C:\Program Files\Pakon\F-X35 COM SERVER\Log

These logs include:

PakonErrorLogMain

Logs any errors associated with scanner communications with the host PC.

PakonErrorLogScan

Logs any errors associated with the scan process.

PakonErrorLogSave

Logs any errors associated with the save process.

PakonErrorLogPI

Logs any errors associated with the color correction process.

Scanning stops after one frame

There are 3 different causes to the film stopping after one frame.

1. The film type selected is different from the actual film scanned.
2. The film is faded or washed out.
3. The lamp temperature is out of spec. The Dark Point Correction Interval needs to be set at 2 hours or less.

DX code reading is not working

The film track should be cleaned daily to ensure proper DX code reading. This procedure can be found in the “Operator Maintenance” chapter in this manual. When finished, run the ‘Track Test’ calibration in TLX Client Demo or the PTS program.

This requires a four frame strip of film with DX codes on it. Be sure to insert the film emulsion up, starting with the lowest number first, with the DX codes to the “Top” of the scanner.

If DX code reading does not improve after cleaning and running the client film track test, the film track test should be run using the Service Center version Calibration Wizard program.

Vertical Banding through Images

If images appear to have strange vertical banding through them, position the scanner so that no light is shining directly into the film entrance or exit slots. This banding is caused by light shining directly into the scanner, through the sprocket holes of the film, and onto the CCD chip. The image s would appear as follows:



Contacting Technical Support

When contacting support by phone, please follow these guidelines to ensure timely assistance:

- Have the computer and scanner on.
- Have PSI loaded, if possible.
- Have any reported error codes written down for quick reference.
- Know the version of PSI being used.
- Know the serial number of your scanner.

If you prefer to email support, please include the following information in your email request:

- Any applicable error log files.
- Version number of PSI.
- Serial number of your F-135 scanner.
- A sample image, if helpful.
- Your company name and location.
- Details on the problem and what has been attempted so far to resolve the problem.

Pakon Contact Information

Phone:

Within the United States - 877.217.2566
Outside the United States - 952.936.4390

Email:

support@pakon.com

On the Web:

<http://www.pakon.com>
<ftp://ftp.pakon.com>

Service Policy

Warranty Period

- .•Parts - One year (expendables excluded)
- .•Phone Service & Factory labor - 30 days
- .•OEM Equipment - Remainder of original manufacturer's warranty

Warranty Service

- .•Phone Service - First 30 days, no charge
- .•Defective parts - First year Pakon will send a part replacement (expendables excluded), no charge
- .•Factory Repair / Replacement - First 30 days, following the date of installation. Upon authorization from Pakon will repair or replace, at its discretion, any defective unit. A proper party asserting a claim under this warranty shall prepay all transportation costs and return the equipment to a location specified by Pakon. Any expedited shipping fees are the responsibility of the buyer.

After Warranty Service / OEM Service

- .•Scanner Phone Service - Incident charge of \$35.00 per incident payable via credit card or with pre-approved credit terms
- .•OEM Phone Service - Helping buyer install or service Pakon supported OEM equipment or software is considered an incident and charged accordingly. Pakon does not service unsupported products. (Supported products are those sold or recommended by Pakon.)
- .•Factory Repair / Replacement - Buyer pays freight both ways, plus service labor charges at \$75.00 per hour and packing costs if needed to return unit safely. Beyond one year the buyer is responsible for parts.

Software

Software updates are provided at no charge. Any software offering new features is optional and billable.

Annual Service Contract

Agreement includes scanner telephone technical support. All factory parts (excluding expendables) and factory labor are free. Pakon will pay for all standard freight in case a need for factory repair arises. Any expedited shipping fees are the responsibility of the buyer. The agreement takes effect at the end of the Labor Warranty and is for a 12-month period and may be renewed annually. The price is \$1,000.00 per year payable in advance. If purchased with the unit, the price is \$750.00 and if kept in force can be renewed at the \$750.00 price-an annual savings of \$250.00.

Regulatory Information



Warning:

This is a class 'A' product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Note:

This equipment has been tested and found to comply with the limits for a Class 'A' digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their selves' expense.

Site Conditions:

Not for use in a computer room as defined in the Standard for the Protection of Electronic Computer/Data Processing Equipment, ANSI/NFPA 75.

Ne peut être utilisé dans une salle d'ordinateurs telle que définie dans la norme ANSI/NFPA 75 Standard for Protection of Electronic Computer/Data Processing Equipment.

Temperature	15-29 degrees Celsius
Humidity	30-75% (non-condensing)
Vibration	Not to Exceed 0.05G RMS 5-200Hz
Ventilation	A 4" clearance above and behind the scanners venti- lation duct is necessary
Lighting	<1000 LUX ambient light
Noise	< 70db(A)

Shipping and Storage Conditions

Temperature: -25 to 60 degrees Celsius

Service and Repair

The scanner has the ability to determine failures at or below the FRU (Field Replaceable Unit) level, in most cases. Only qualified service personnel are authorized to service the F-135 scanner.

Filed Replaceable Units – Requires Calibration Wizard

“Mother Board”
“Film Transport”
“Disassembly and Re-assembly of Film Transport”
“Thermoelectric Cooler”
“LED Light Assembly”
“CCD Board”

Removing the Covers

1. Turn off power on scanner.
2. Disconnect all cables from scanner.
3. Turn the scanner on its side.
4. The bottom plate must be removed to access two screws for the top cover.
5. Use the torques head tool located below the film catch bin. (Fig. 11)
6. Remove the four Torques screws holding the bottom plate in place. (Fig. 12)
7. Remove the four Phillips screws holding the top cover in place. (Fig. 13)
8. Turn the scanner back onto its bottom side.
9. Gently lift the top cover from the scanner. (Fig. 14)



Fig. 11

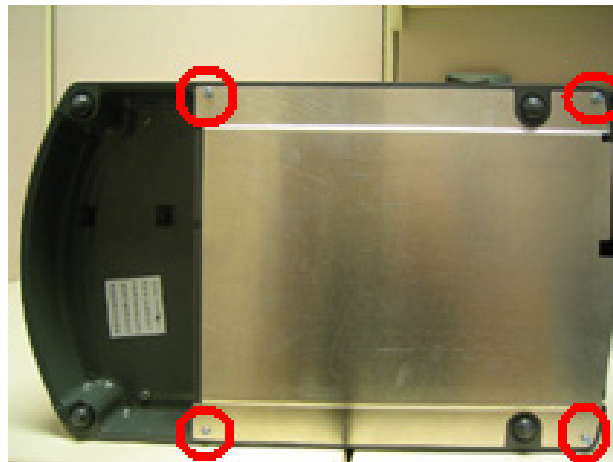


Fig. 12

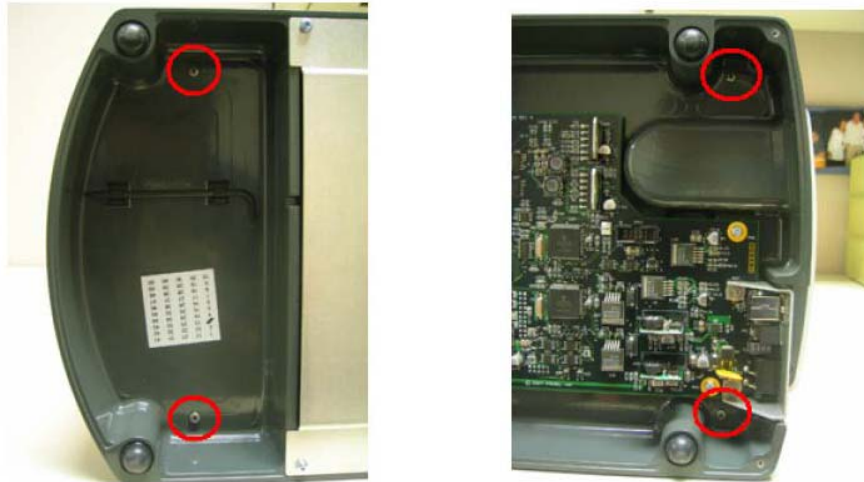


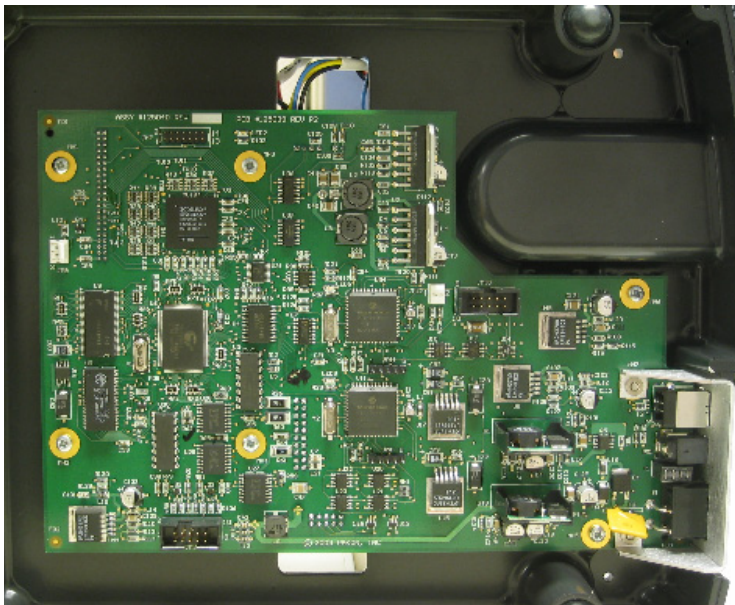
Fig. 13



Fig. 14

Replacing the Motherboard

1. Turn off power on scanner.
2. Disconnect all cables from scanner.
3. Remove the bottom plate of the scanner.
4. Removing the bottom plate will expose the motherboard.
5. Remove the top cover of the scanner.
6. Disconnect the wires on the motherboard from the top side of the scanner
7. Remove all the screws holding the motherboard in place.
8. Remove the motherboard.
9. Mount the new motherboard into place.
10. Plug in all cables.
11. Mount the top cover into position and screw in the bottom plate.
12. Connect USB and power cables, and turn scanner on.
13. In the calibration wizard, run the “Film Track Test,” before attempting a scan.
Repeat if necessary.



Replacing the Film Transport Assembly

WARNING: Do not remove the bar that goes across the balk of the transport!!! (Fig. 15)

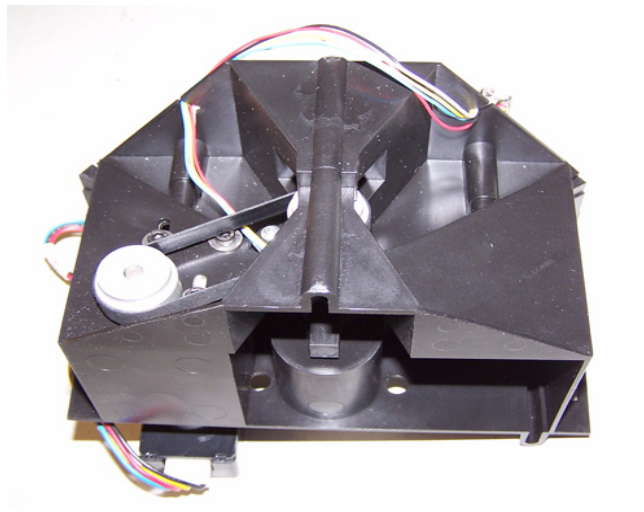
1. Turn the scanner off.
2. Unplug the USB and power cables from the back of the F-135 scanner.
3. Unscrew the four screws holding the bottom plate in place.
4. Remove the bottom plate from scanner.
5. Remove the top cover.
6. Disconnect all film path assembly cables from the motherboard.
7. Unscrew the four screws holding the Film Transport assembly on the scanner frame.
8. Remove the Film Transport from the scanner. (Note where the shims are located. These shims will have to be replaced in the same position later.)
9. Replace the Film Transport assembly. The Film Transport should snap into place inside the raised circle around the LED's.

CAUTION: Be very careful when positioning transport over LED, as the light housing can contact the LED's, causing them to bend.

10. Begin to tighten the four screws into place.
11. Place the shims back in to position to adjust for skew. The shims should be placed between the frame of the scanner and the Film Transport.

NOTE: Make sure that the transport contacts the bar across the back, and tighten the four transport screws. (Fig. 15)

12. Tighten the four screws all the way once the shims are in place.
13. Reconnect all Film Transport cables on the motherboard.
14. Replace the covers.
15. Reconnect the USB and power cables.
16. Run Motor Speed Calibration.



Transport Assembly

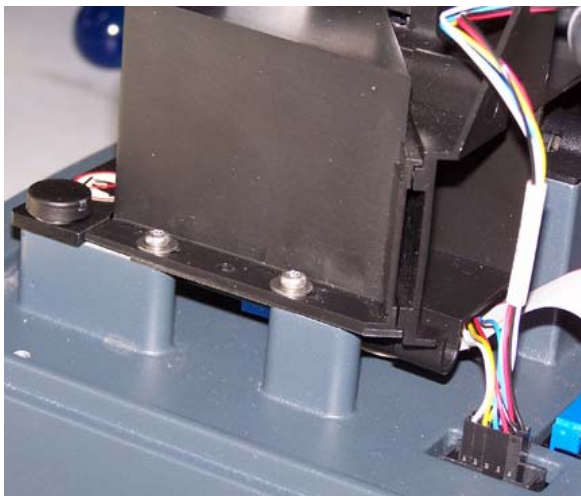


Fig. 15

Disassembly and film jam removal and re-assembly

Caution: Do Not remove the locking bar that goes across the back of the unit!

Tools Needed:

Torx T10 Driver

Phillips Screw Driver (medium)

Disassembly

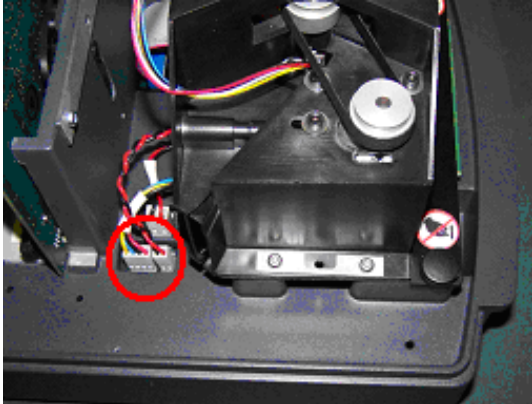
1. Turn scanner over. Remove 4 torx head screws and bottom cover.



2. Remove 4 Phillips head screws.



3. Set scanner on its feet and remove the main cover.
4. Disconnect 3 transport cables from the chassis.
5. Remove 4 torx head screws and 2 rectangular washers from transport.

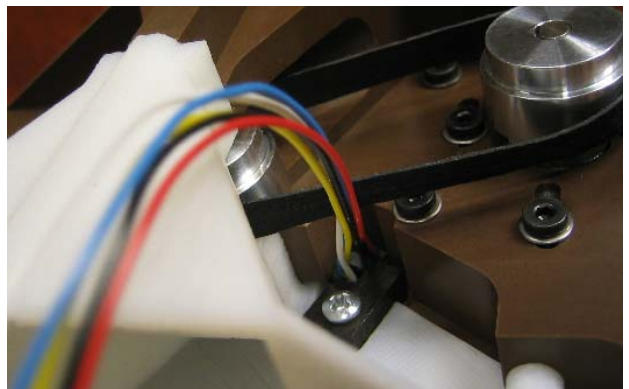


6. Remove 2 rectangular shims from under transport.

Important: Take note of where the shims are located. They must be replaced in the same location when reassembling scanner.

7. Carefully lift the transport assembly from chassis.
8. Remove the 2 Phillips screws, DX holders, and DX sensors from transport assembly.

Be careful not to lose the clear dust covers that are pressed into each sensor. Note cable routing through slots in transport.



9. Remove 5 Phillips head screws from transport. Slowly remove top half of transport.

Take note of the position of the pulley / shaft assembly DO NOT remove.

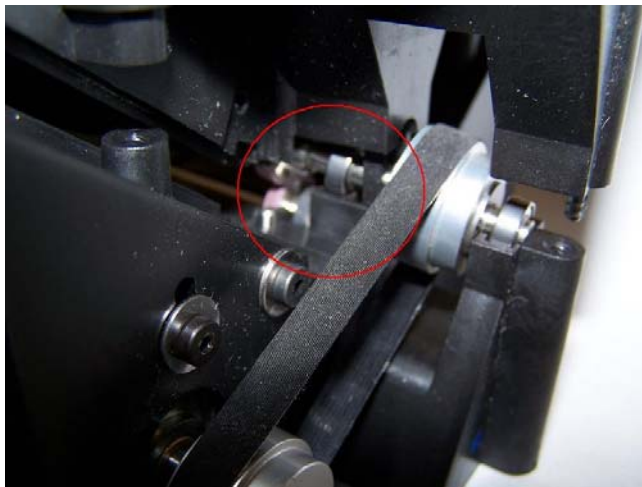


Note: If the pulley assembly does come out be very careful that when you position it back in place that the bearings, washers, and spring are located properly.

10. Clear debris from upper and lower film path and pockets surrounding drive and follower wheels.
11. Clean upper and lower film paths.
12. Use canned air to clean the light cavity, LED board, lens and CCD.

Reassembly

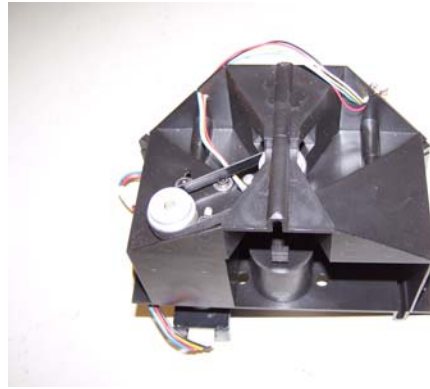
13. Gently place top half of transport into position with two “fingers” straddling the drive shaft and contacting the bearing on the end of the follower shaft.



14. While holding transport halves together, tighten the center 2 Phillips head screws snugly, do not over tighten.
15. Insert 3 remaining Phillips head screws and tighten (do not over tighten)

16. Replace DX sensors (short cable next to light cavity) and holders. Tighten with 2 Phillips head screws. Be sure that clear dust covers remain in place in each of the DX sensors.

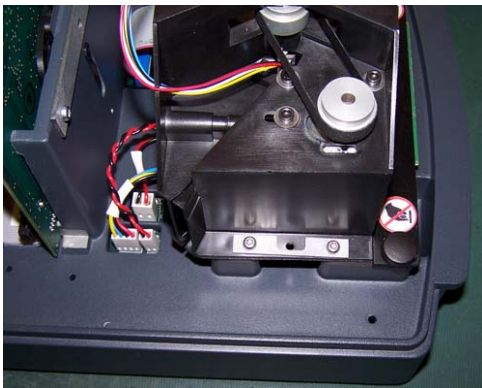
Note: Make sure that the wires from the DX sensor are not pinched by the sensor holders.



17. Place transport and rectangular washers on chassis and start 4 torx head screws.

Note: When setting the transport into position make sure that the light cavity is carefully placed inside the light ring on the LED board.

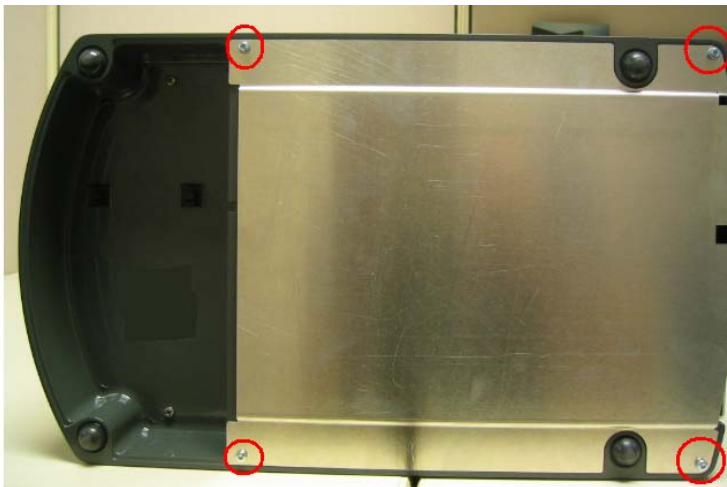
18. Route motor and DX cables inside of the 4 posts that transport rests on. Be sure the ferrite bead is not pinched under transport



19. Place shims under transport in same positions noted during disassembly. Push the transport against locking bar and tighten 4 torx head screws.
20. Reconnect 3 transport cables to chassis.
21. Replace cover and tighten 4 Phillips head screws.



22. Replace bottom cover and tighten 4 torx head screws.



Replacing the LED Assembly

1. Turn the scanner off.
2. Unplug the USB and power cables from the back of the F-135 scanner.
3. Remove the bottom cover.
4. Remove the top cover.
5. Unscrew the four screws holding the film transport in place.
6. The LED board should now be exposed. (Fig. 16)
7. Unscrew the LED board and remove it.
8. Replace the LED assembly on top of the TE cooler. Do not tighten down until the transport is back in place. There are 2 access holes in the transport for access to the screws holding the LED assembly.

NOTE: Be sure that the insulating pad is in place on the top the Thermo Electric Cooler.

NOTE: Make sure that when you place the LED assembly on the top of the TE Cooler that the locating tabs are correctly placed around the TE Cooler.

9. Replace the Film Transport using the instructions listed earlier in this chapter.
10. Tighten the two screws mentioned in step 8 above.
11. Run Motor Speed and Color Calibration.

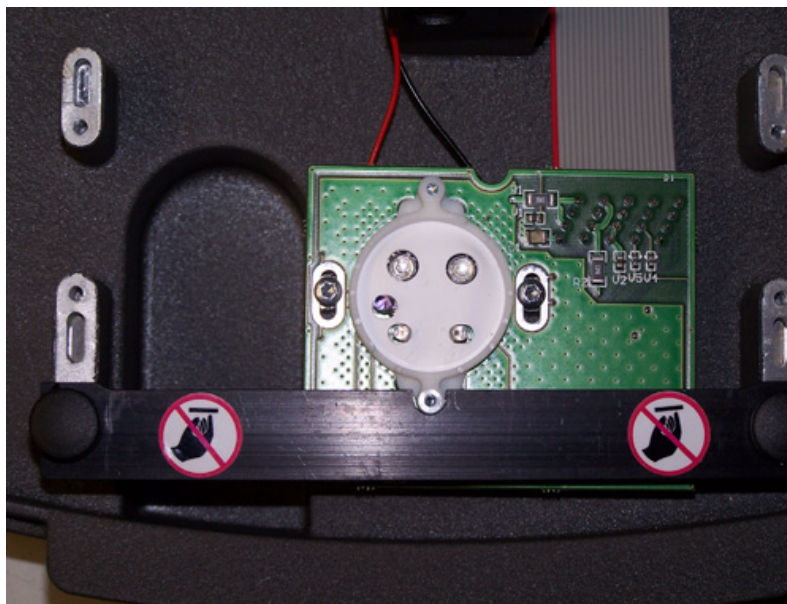


Fig. 16

Replacing the Thermo-electric Cooler

1. Turn the scanner off.
2. Unplug the USB and power cables from the back of the F-135 scanner.
3. Remove the bottom cover.
4. Remove the top cover.
5. Unscrew the four screws holding the film transport in place.
6. The LED board should now be exposed. (Fig. 17)
7. Unscrew the LED board and remove it. One screw on either side.
8. The Thermo-electric (TE) cooler is now exposed. (Fig. 18)
9. Disconnect the TE cooler from the motherboard.
10. Replace the TE cooler into position.
11. Move the TE cooler back and forth several times to ensure the grease is applied evenly to its surface. This is special thermal grease
12. Connect the TE cooler to the motherboard.
13. Replace the LED assembly on top of the TE cooler.
14. Replace the Film Transport using the instructions listed earlier in this chapter.
15. Run Motor Speed Calibration and Color Calibration.

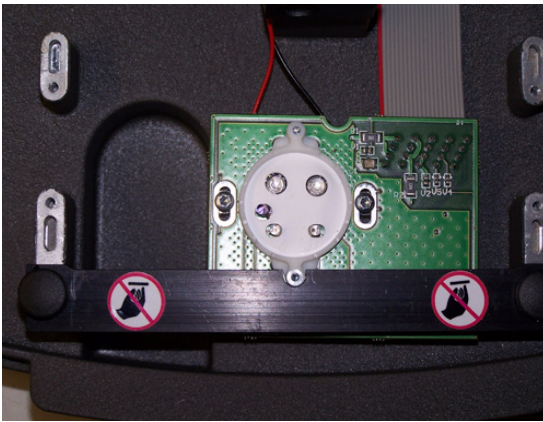


Fig. 17

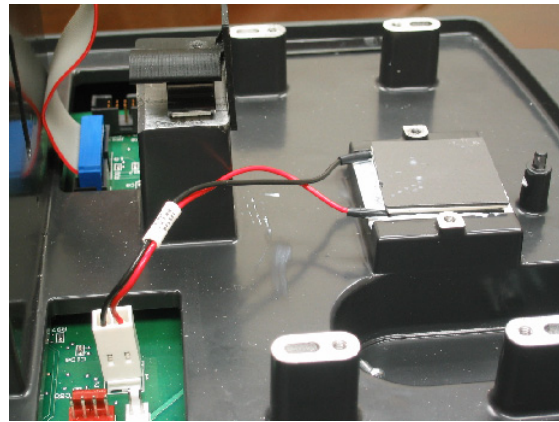


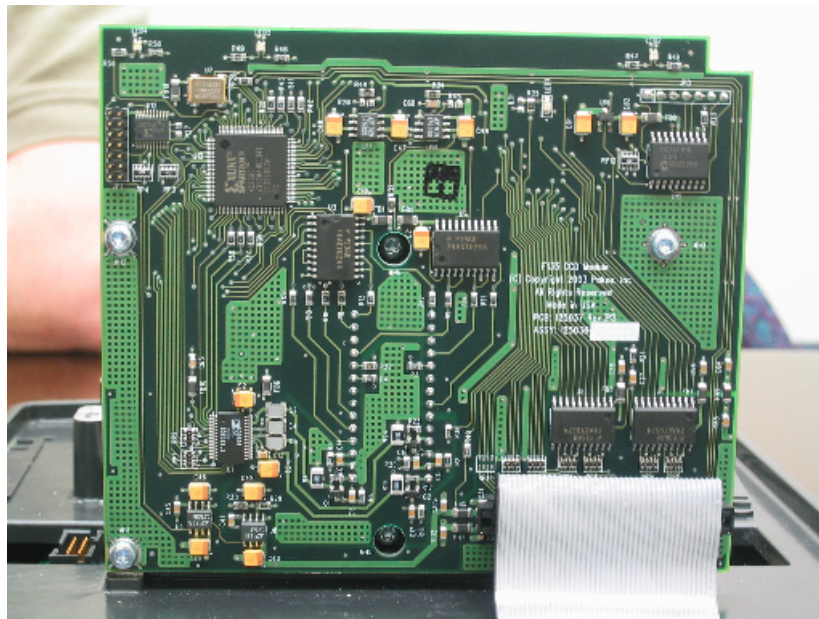
Fig. 18

Replacing the CCD Board

1. Turn the scanner off.
2. Unplug the USB and power cables from the back of the F-135 scanner.
3. Unscrew the four screws holding the bottom plate in place, along with the two middle screws.
4. Remove the bottom plate from scanner.
5. Remove the top cover.
6. Unplug the ribbon cable on the back of the CCD board.
7. Remove the screws on the back of the CCD board.

CAUTION: Do not remove the two center screws!!

8. Carefully remove the CCD board from the mount. Be careful to not bend any pins on the CCD chip.
9. Replace the CCD board carefully--again do not bend any pins on the CCD chip.
10. Mount the CCD board into position with the four screws.
11. Plug in the ribbon cable on the CCD board.
12. Replace the covers.
13. Reconnect the USB and power cables.
14. Run Color Calibration.





Replacing the CCD Chip

WARNING: Removing the CCD Chip requires special Calibration tools Contact Pakon Support