

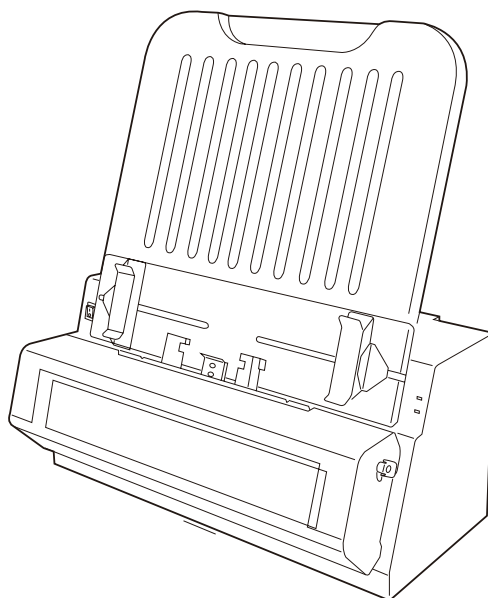


# NDT/RT Industrial Film Digitizer

 ***NDT-2000***

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## User's Manual



## **Preface**

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### **Disclaimer**

The contents of this manual have been checked carefully for accuracy, and every effort has been made to ensure that there are no errors. However, Microtek makes no guarantee as to the accuracy of the contents of this document and reserves the right to make changes to the contents without prior warning.

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Microtek International, Inc.  
No. 6, Industry East Road 3, Science Based Industrial Park, Hsinchu, 30075, Taiwan  
Tel: 886-3-5772155, Fax: 886-3-5772598, <http://www.microtek.com>

## FCC Compliance Statement

### FCC NOTICE (Class A)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment (Model: MSS-1200XU2LF) has been verified 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. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by tuning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the equipment.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced technician for help.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



## Safety Precautions

Before using your digitizer, read the following safety guides carefully, which detail the proper operation of the digitizer and its accessories to prevent injuries or damage to users or equipment.

### Meanings of Symbol Signs



CAUTION

This indicates hazardous situation which, if not paid attention, could result injury or damage to users or equipment.



WARNING

This indicates hazardous situation which, if not paid attention, could result serious injury or death to users.

### Power Supply:



- Use a power source only with a power rating specified on the marking label.



- Ensure to turn off the power of each device before connecting or disconnecting the cables.



- Insert the plug completely into the outlet, as a loose connection may cause arcing and result in fire.

- Ensure to hold the plug or connector to disconnect the cable; otherwise, if you pull the cable only, it may damage the core wire and result in fire or electric shock.



- Place and route the power supply cord such that it is not likely to be walked on or pinched by items placed upon or against them, paying particular attention to the cord near the power plugs, convenience receptacles, and at the point where it exits from the outlet.



- When the digitizer is left unattended and unused for long periods of time, unplug it from the wall outlet.

### Moving and Storing the Film Digitizer:



- Always ensure that the digitizer is stored properly before shipping or moving it. Quick stops, excessive force, and uneven surfaces may cause the product to overturn when moving.



- Do not hit or drop the digitizer. The digitizer may be damaged if it receives a strong jolt, which may result in fire or electric shock if the digitizer is used without being repaired.



- Do not place the digitizer on any slippery, slanted, or unstable surface. The product may slide or fall, causing serious injury to people as well as serious damage to the product.



- Do not use the digitizer near water. Never spill liquid of any kinds on the product, or it may result in electric shock or other hazards.



- This digitizer should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.



- Do not store the digitizer in which it may be exposed to direct sunlight.

#### Using the Digitizer



- Before using the digitizer, make sure the area of the front cover is clear from any objects that may cause jams inside.



- When using the digitizer, if your hairs have been jammed into the front cover of the digitizer, turn off the power switch immediately. Do not attend to remove your hairs from the front cover when the digitizer is still turned on.

#### Maintenance and Service:



- When the digitizer is going to be cleaned, ensure to turn off the power of each device and unplug the power cable from the AC outlet.



- When you need a repair service, unplug the digitizer from the power outlet and consult qualified service personnel.



- When replacement parts are required, use replacement parts that are specified by the manufacturer or have the same characteristics as the original parts.



- For safety reasons, ensure to inspect the device before using it. In addition, carrying out a regular inspection at least once a year.

#### **WARNING**

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

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# Knowing about Your Film Digitizer

The NDT-2000 is a sheet-fed film digitizer, which is specifically designed for digitizing radiographic films used in NDT (non-destructive testing). With a great mechanism design and innovative filming technology, the NDT-2000 can capture details in bright and dark areas of industrial X-ray films. Equipped with a sheet-fed holder, the NDT-2000 can digitize film with a size up to 14" x 200". Moreover, optional AFF and Multi-Channel Tray provide the professionals a convenient method to digitize the physical originals for the electric data storage, saving maintenance time and storage space enormously.

## Features of the NDT-2000

The NDT-2000 comes with several important features, including the following:

- **Premium Image Quality** — With a high resolution of 1200 dpi (21 $\mu$ m), a dynamic range of 4.5 Dmax, and the 16-bit grayscale, the NDT-2000 allows users to catch wider areas for grayscale tones, presenting grayscale images in better details.
- **Wide Area of Optical Density (OD)** — The NDT-2000 is capable to catch images with values of OD between 0.5D and 4.5D, enriching the lightness and darkness of images in plentiful ways.
- **Meet with the Standard of EN ISO 14096** — The NDT-2000 is a digitizer which fully measures up to the DA/DB/DS classes in EN ISO 14096. By controlling of the hardware and OD, the NDT-2000 divides image qualities into three levels (3.5D, 4.0D, 4.5D); therefore, it can meet with various requirements toward image quality and make a scanning job more flexible.
- **Highly Efficient Green LED** — Adopting green LEDs as the light source, when the digitizer is detected by the system, there are no requirements for any warm-up time before carrying out the scan, which boots your productivity and reduces energy costs amazingly. Comparing with white LEDs, green LEDs generate better performance and thus the image quality will remain consistent even after used for a certain period of time.
- **Support Various Sizes of X-ray Films** — The NDT-2000 covers the scanning of all standard industrial X-ray films sizes, from 2.5" x 2.5" to 14" x 200", which offers more flexibility to digitize X-ray films.
- **Exclusive Film Holders** — These film holders are specifically designed for either positioning the film fixedly or maintaining the scanning size for the scanning target. It is quite useful for scanning of films in same size. Two types of industrial film holders provided, they are 8.5" x 4.5" and 12" x 3 1/3".
- **Exclusive Design of a Light Shield** — The NDT-2000 is equipped with a light shield exclusively designed for films with a size less than 10.24" (26 cm). It can cover up non-essential lights outside film and thus helps users to get better quality for scanned images.

- Easy to operate, clean and maintain — The NDT-2000 requires virtually no routine maintenance and no daily cleaning, which is ideal for radiographic inspection industry.
- Auto Scan — The scanner is equipped with a sensor that can automatically detects if there is film on the input tray; once the film is detected, the scanner starts scanning automatically.
- Optional Auto Film Feeder (AFF) — The AFF can hold up to 15 sheets of X-ray films at one time. When an AFF installed, you can easily perform scanning of multiple films automatically, making your scanning work more efficiently.
- Optional Multi-Channel Tray — This device allows the NDT-2000 to scan up to 3 sheets of 30.5 x 8 cm (12.01" x 3.15") film simultaneously at one time.
- Microtek ScanWizard Industry software — SanWizard Industry is dedicated scanning software developed by Microtek for capturing images of industry X-ray film. It is easy to install and use.
- Optional Microtek MiiNDT software — MiiNDT is software exclusively designed for the image management in the RT industry. It can combine inspecting information and images together and then save them into DICOM format meeting with the ASTM standard. Further, users can search, check, measure, mark, or print out these files for their preferences conveniently.

## System Requirements

In order to use your NDT-2000, your computer must satisfy the following system requirements:

- CD-ROM/DVD-ROM drive (for installing software)
- Color display with 24-bit color output capability
- 4GB RAM or more
- Pentium IV PC or higher with Hi-Speed USB (USB 2.0) port
- Windows 7 / 10 (64-bit)

# Unpacking Your Film Digitizer

## Looking for Damage

While unpacking your digitizer, inspect the shipping carton for any signs of mishandling or damage. The digitizer's packing carton and padding material have been carefully chosen to prevent damage to the unit in shipping and can withstand a reasonable amount of pressure.

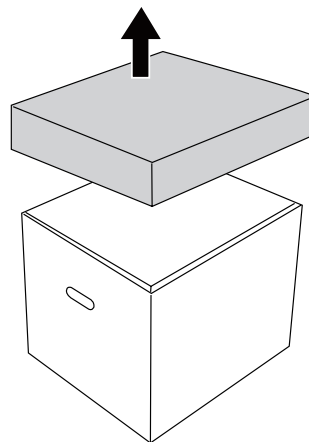
After unpacking your digitizer package, refer to the later section to ensure that you received all of the parts necessary for digitizer setup. If there are any damaged or missing parts, notify the shipper immediately or contact customer service.

**NOTE:** Save the carton and all packing materials. If you need to ship the digitizer later, it is recommended that you should repack it using the original wire ties, plastic bags, foam supports and cartons, which protects your digitizer from unnecessary damage. Refer to the later section "How to Repack Your Film Digitizer for Shipping" for the detail.

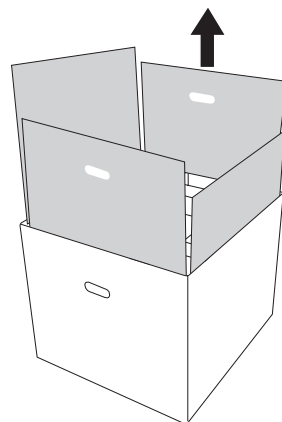
## Unpacking Package Contents

After unpacking the shipping carton, follow the steps shown below to take out your digitizer and other accessory components.

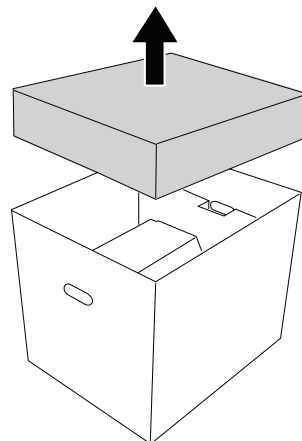
1. Ensure that you put the shipping carton with the correct side up on a flat surface. Then, lift up the top cover.



2. Remove four cardboards around the digitizer from the shipping carton.



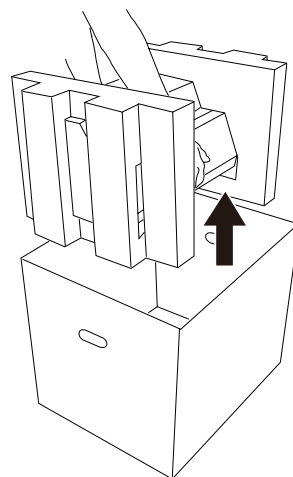
3. Take the accessory box at top out from the shipping carton.



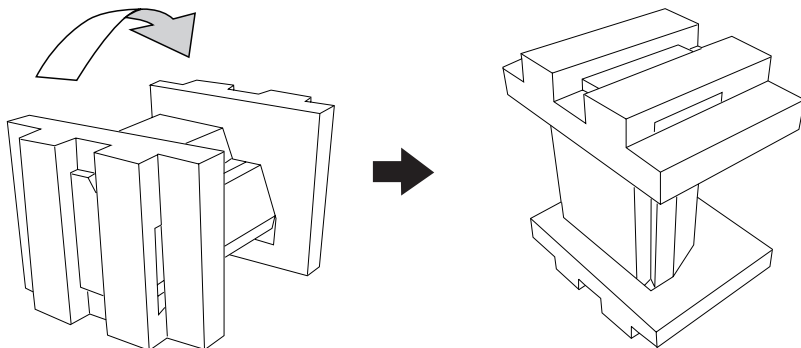
4. With both hands, hold the two sides of the digitizer and lift it up from the carton firmly. Then, place the digitizer on a stable and flat surface.

Do not hold the digitizer with one hand before putting it down on a flat surface.

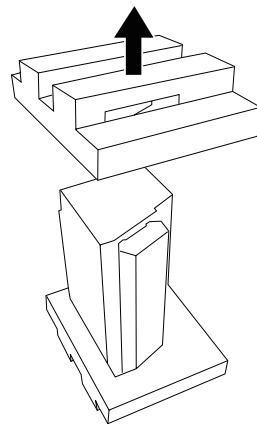
NOTE: The digitizer is quite heavy (almost 44 pounds). Make sure you can handle the digitizer properly before removing it from the carton.



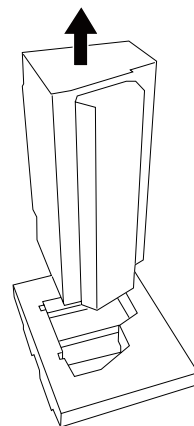
5. Turn over the digitizer and make it stand vertically.



6. Remove the foam support at the top of the digitizer.

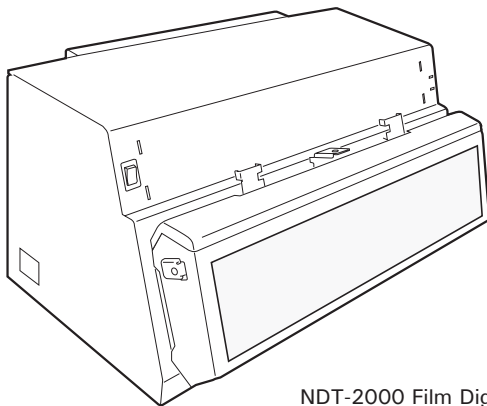


7. Pull out the digitizer from the other foam support. Then, remove the digitizer from its packaging plastic bag.

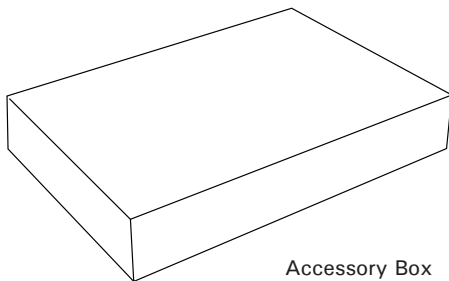


## Package Contents

After you have unpacked your digitizer package, please check for the major components listed below.

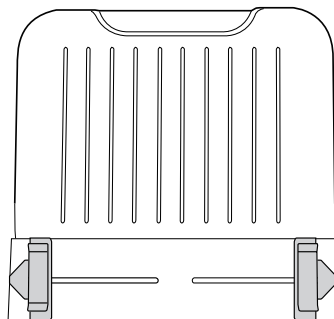


NDT-2000 Film Digitizer

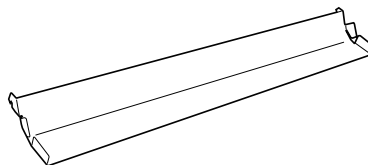


Accessory Box

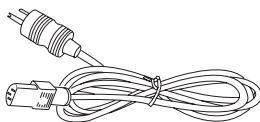
## Accessories in the Box



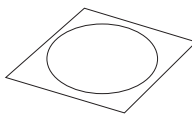
Feed Tray



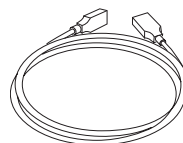
Output Guide



Power Cord



CD



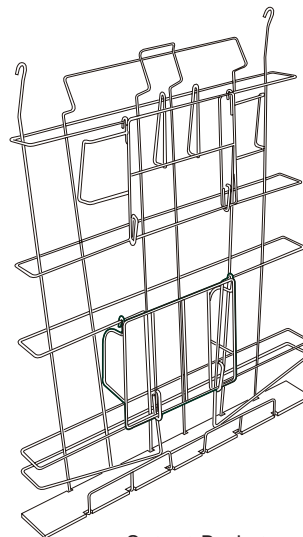
Hi-Speed USB Cable



8.5" x 4.5" Holder



12" x 3 1/3" Holder

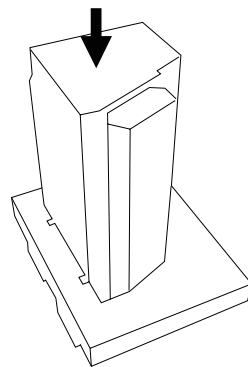


Output Basket

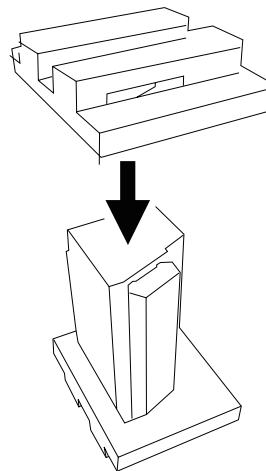
## How to Repack Your Film Digitizer for Shipping

To ship back your NDT-2000 for repairing, maintenance services, or other reasons, in order to not damage your NDT-2000, it is strongly recommended that using the original carton and other packing materials. Follow the steps below to repack your NDT-2000 correctly.

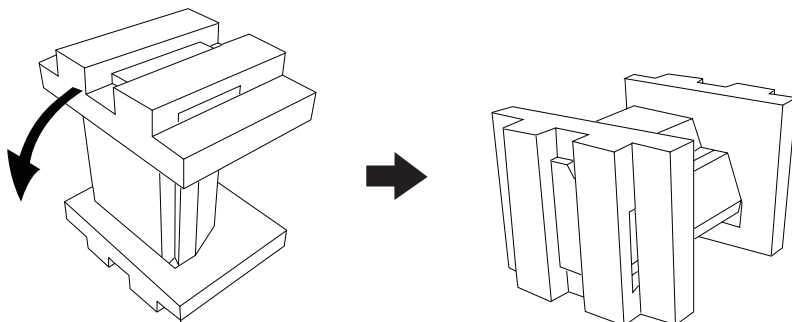
1. Wrap the digitizer with its packaging plastic bag, and then insert it into one foam support.



2. Cover down the other foam support on the top of the digitizer.

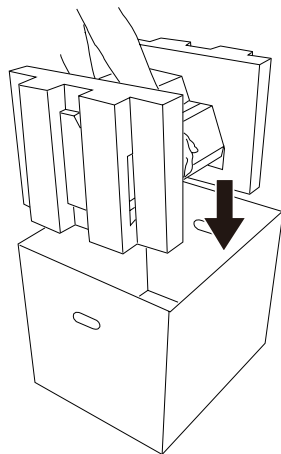


3. Turn over the digitizer and lie it flat as the picture shown.

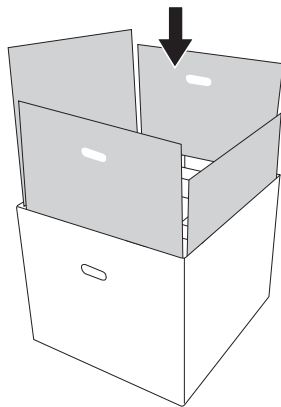




4. With both hands, hold the two sides of the digitizer with the foam supports attached, and then put the digitizer back into the shipping carton.

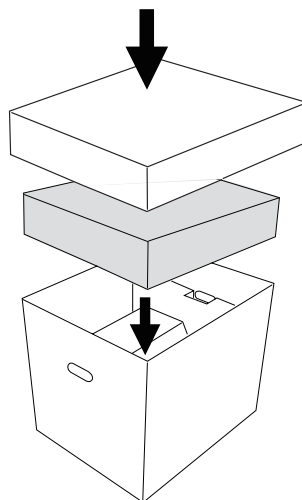


5. Put four cardboards back into the shipping carton.



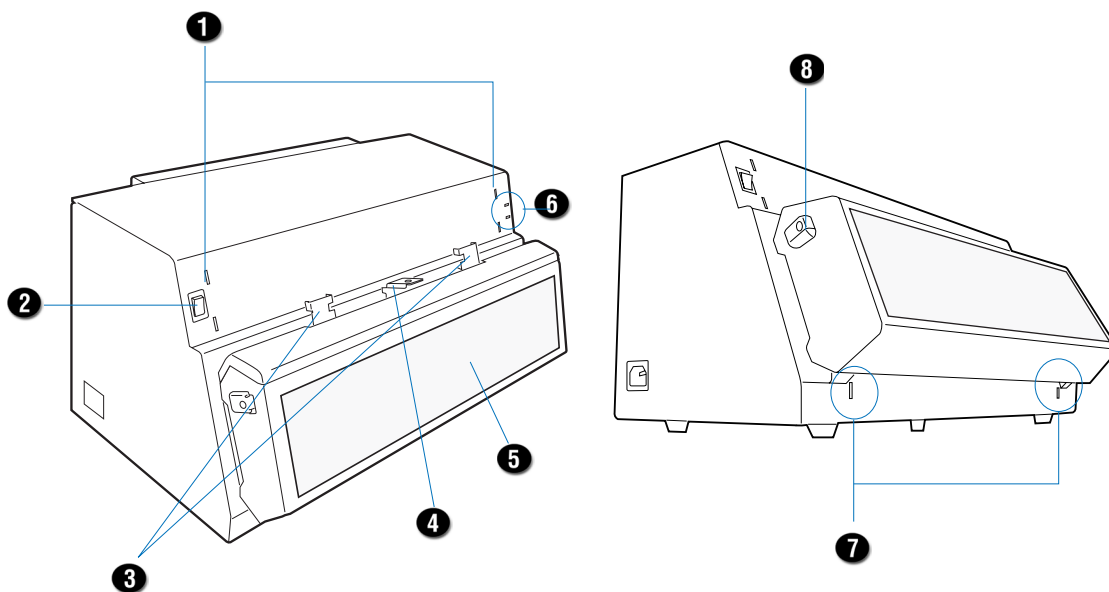
6. Put the accessory box with accessories in the shipping carton and close the top cover.

Then, seal the carton with tape.



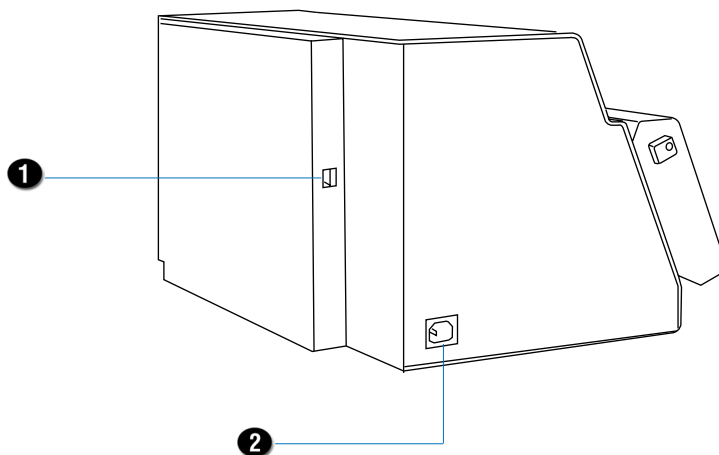
# Taking a Closer Look

## Front / Top / Bottom View



No.	Names of Parts	Functions of Parts
1	Feed Tray Holes	Uses to hook the Feed Tray onto the digitizer.
2	Power Switch	Turns the digitizer on or off.
3	Fastenings of Light Shield	Uses to fasten the Light Shield into Guide Arms on the Feed Tray.
4	Hook of Light Shield	Uses to pull the Light Shield up.
5	Front Cover	Uses to cover inner components of the digitizer.
6	Green/Orange LEDs	Indicates the status of the digitizer. For more details, refer to the "Troubleshooting" section of this manual.
7	Output Tray Holes	Uses to hook either the Output Guide or the Output Basket onto the digitizer.
8	Release Buttons	Releases the front cover to open the lamp holder. There are two Release buttons located on each side of the front cover. Press the buttons down simultaneously to release the front cover.

## Rear / Side View



No.	Names of Parts	Functions of Parts
1	Hi-Speed USB Port	Connects the Hi-Speed USB (USB 2.0) cable to the computer.
2	Power Connector	Connects the digitizer to the power cord.

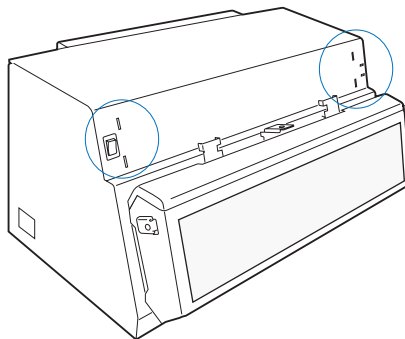
# Assembling Your Film Digitizer

## Installing the Feed Tray

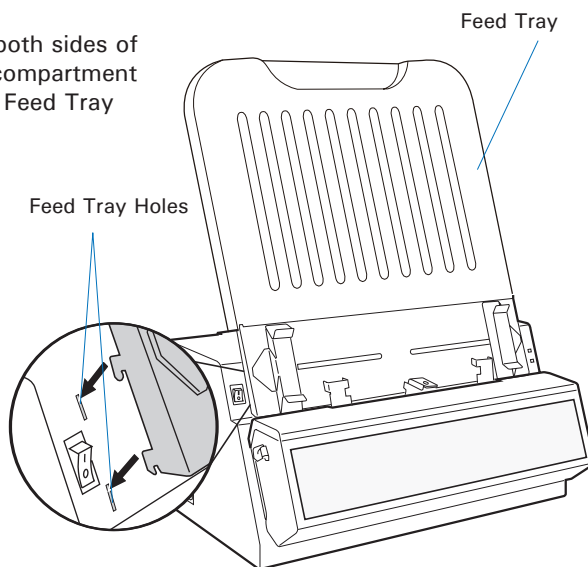
Coming with your digitizer, there is a separated Feed Tray which holds the X-ray films to be fed into the digitizer. Before using the Feed Tray with your digitizer, you need to mount it onto the digitizer.

Follow the instructions and graphs below to correctly install the Feed Tray:

1. Look for two sets of the Feed Tray Holes at both ends of the front-top of the digitizer.



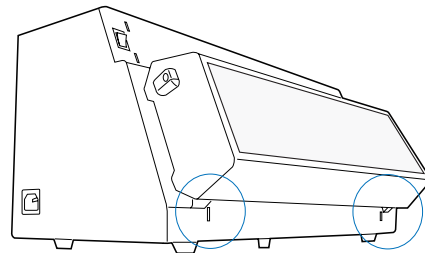
2. Insert and push down both sides of the Feed Tray into its compartment holes, making sure the Feed Tray snaps into place.



## Installing the Output Tray

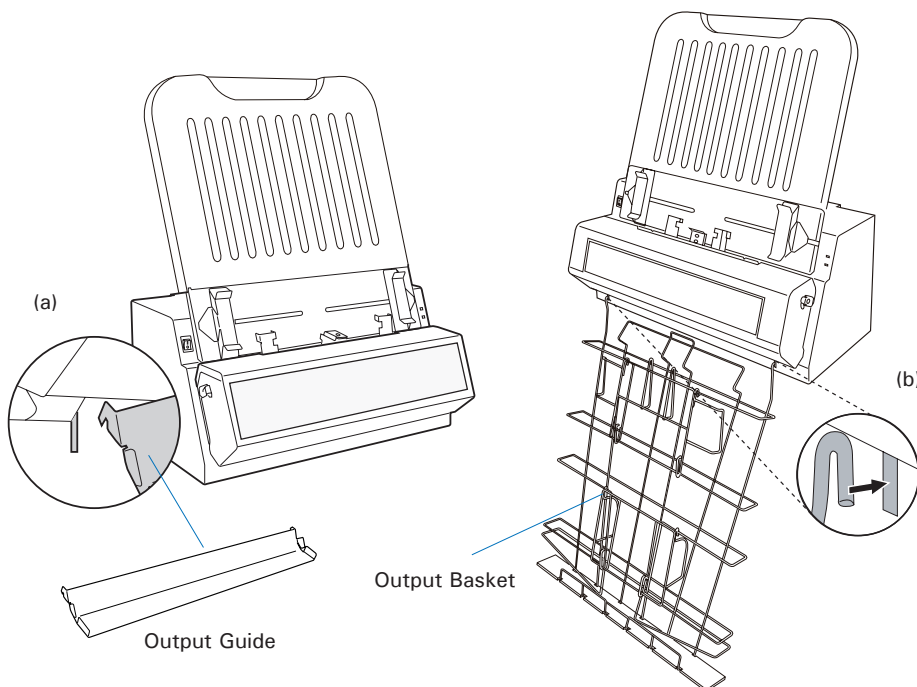
Coming with your digitizer, there are two kinds and separated Output Trays which store the stacked X-ray films which have been digitized. One of them is called Output Guide, used to guide the digitized films staying on the table. The other is called Output Basket, used to store and keep the digitized films in a basket. You may use only one of them as an output tray at a time. Before using them with your digitizer, you need to mount them onto the digitizer.

1. Look for two sets of Output Tray Holes at both ends of the front-bottom of the digitizer.



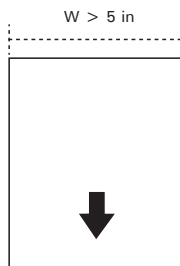
2. Insert and push down both sides of the Output Guide into its compartment holes (a), making sure the Output Guide snaps into place.

Or, Insert and push down both sides of the Output Basket into its compartment holes (b), making sure the Output Basket snaps into place.



## Output Basket

The Output Basket comes with two movable doors which are closed by the factory settings. When a scanned film with a width larger than 5" (shown in pic A), please open the lower door at the Output Basket. On the contrary, if the scanned film with a width less than 5" (shown in pic B), please close both doors.



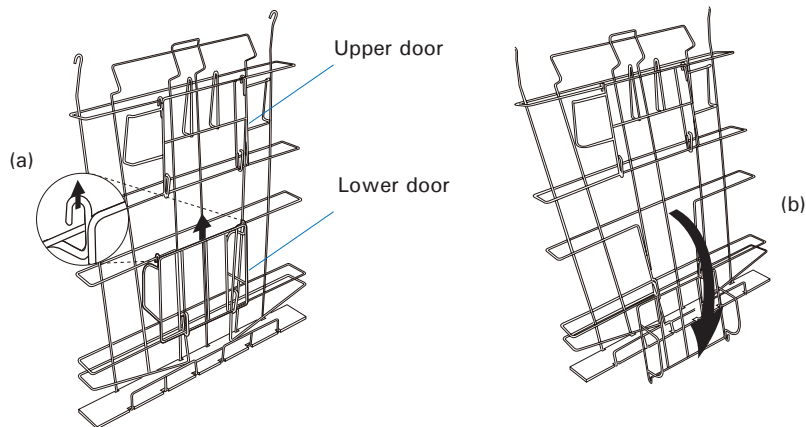
Pic A



Pic B

Follow the instructions and graphs below to open the doors of the basket:

1. Look for two doors at the basket first.
2. To open the door, a) locate the door's hook and then use it to raise the door up. b) Next, pull door outward to open.



### NOTE:

- When using the film holder, please open the lower door at the Output Basket.
- When using the AFF, please close the upper door in order to make the sequences for output film correctly.
- In order to take out output film conveniently from the basket, open the upper door if necessary.
- If the output film slips out from the basket, please close both upper and lower doors at the Output Basket.

# Installing Your Film Digitizer

## Installing the Software

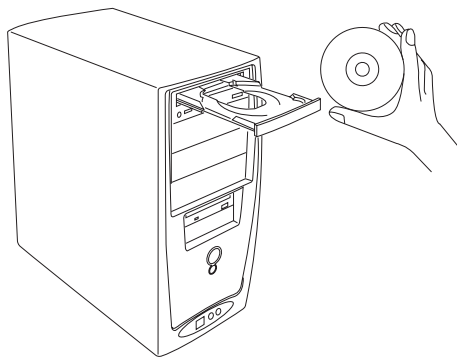
**Important:** You must install software before connecting your digitizer.

Always close any open programs, and turn off Anti-virus utilities before installing software.

1. Turn on your computer.
2. Place the **Microtek CD** into your CD-ROM drive.
3. Follow the on-screen instructions to install the driver and software.

**NOTE:** If the Microtek Software Installer screen does not come up automatically, double-click the following in succession: "My Computer"; the CD-ROM icon; then cdsetup.exe to start the installer program.

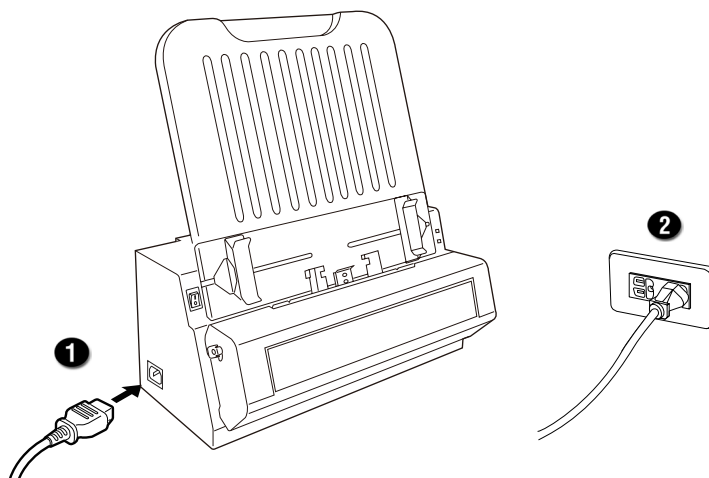
4. Click **EXIT** on the Microtek Software Installer screen when all the software have been installed.
5. Restart your computer.



## Connecting the Film Digitizer

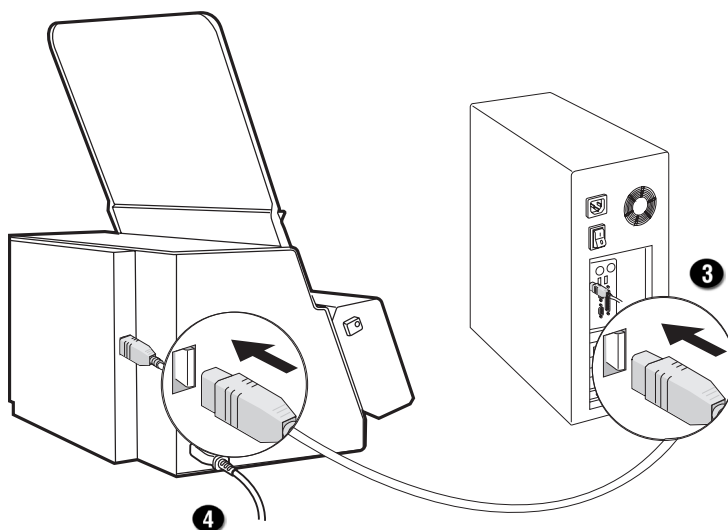
### To the Power Cord

1. Connect the power cord to the left side of the digitizer.
2. Plug one end of the power cord into a wall outlet or other power source.



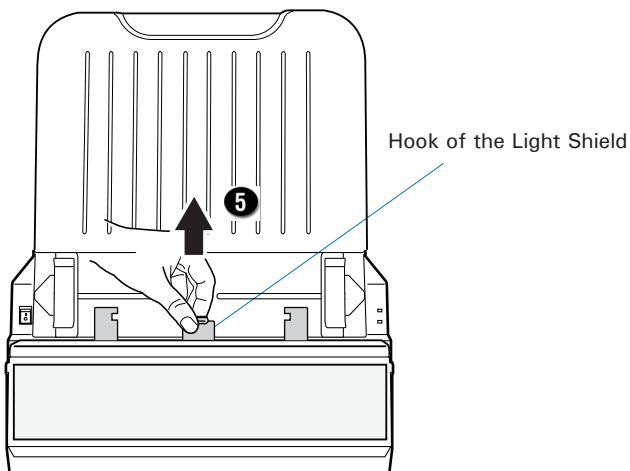
### To the Hi-Speed USB Cable

3. Connect one end of the Hi-Speed USB cable to your computer.
4. Connect the other end of the Hi-Speed cable to the digitizer's USB port, locating at the left side of the digitizer

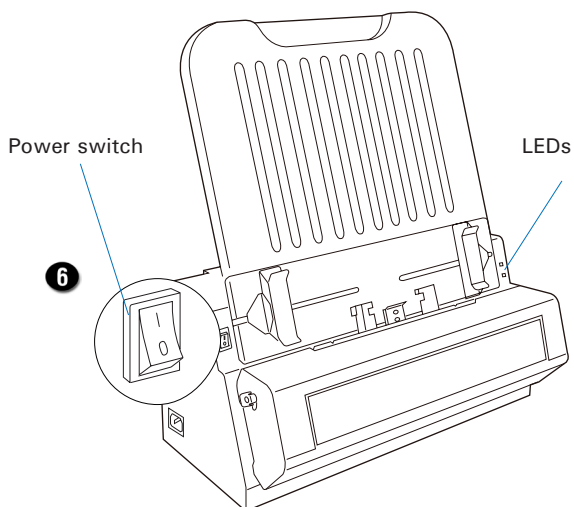




5. Locate the hook of the Light Shield at the top of the Front Cover of the digitizer. Pull it up to raise the Light Shield.



6. Turn the power switch at the front-left panel of the digitizer to "On"; once the digitizer is detected by your system, the LED lights on the front panel will brighten, and the digitizer is ready to scan.



# Using Light Shield to Digitize Industrial X-ray Films

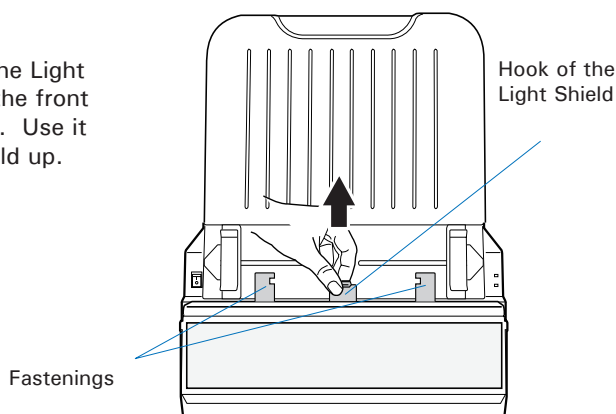
The light shield is a tool equipped in your NDT-2000, used to block out unnecessary light when scanning. It can help to improve the quality of the scanned image. However, the maximum limit for the width of the Light Shield is about 10.24 inches (26 cm). If the width of the scanned target is less than the maximum limit of the Film Shield, push the Light Shield down; otherwise, pull the Light Shield up and do not use it.

NOTE: When pulling up or pushing down the Light Shield, make sure it is set at its proper position; otherwise, the system may detect that you are using a Multi-Channel Tray falsely and then come out a warning message.

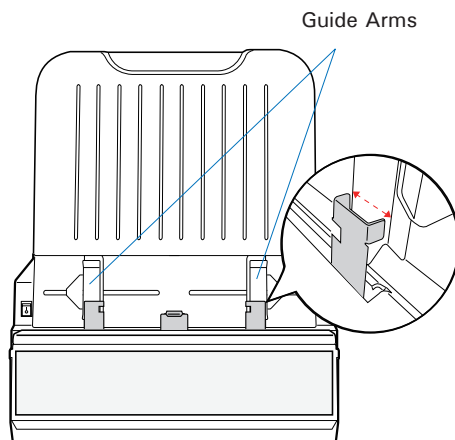
## Attaching Light Shield into Guide Arms

Before using the Light Shield, you have to fasten it into Guide Arms on the Feed Tray. Follow the steps below:

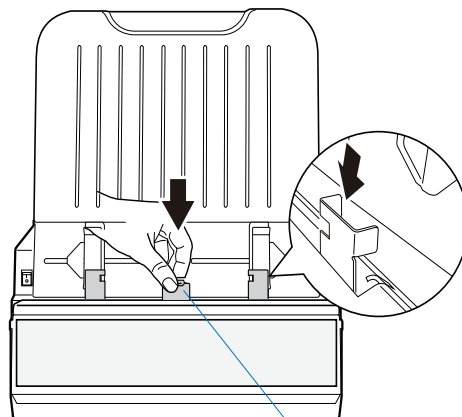
1. Locate the hook of the Light Shield at the top of the front cover of the digitizer. Use it to pull the Light Shield up.



2. Slide the two Guide Arms toward the Light Shield. Align the Guide Arms with the fastenings of Light Shield properly.



3. Push down the Light Shield. Make sure that two fastenings of the Light Shield are attached to protruding parts at the bottoms of Guide Arms tightly. If the Light Shield and Guide Arms are jointed successfully, they can be moved together by sliding Guide Arms.



Push down the  
Light Shield

## Positioning Industrial X-ray Films

NDT-2000's Feed Tray can hold only one piece of X-ray film at a time. This section shows you how to position a single-sheet of X-ray film into the Feed Tray with the aim of the Light Shield.

1. Attach the Light Shield into Guide Arms before using it. Refer to the previous sections "Attaching the Light Shield into Guide Arms" for the detail.

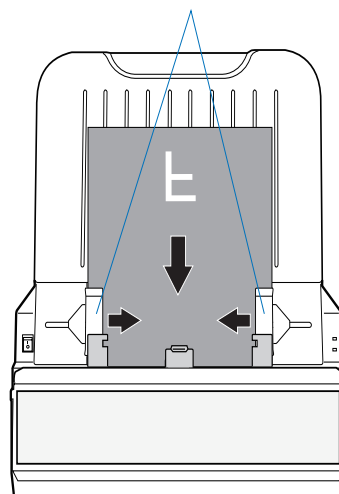
2. Load and insert the film into the Feed Tray, with the side to be scanned facing down and with the top of the film directing downwardly.

Push the film into the tray until the edge of it touches the bottom edge of the Feed Tray.

3. If the width of the film is less than 10.24 inches (26 cm), push the Light Shield **down**; otherwise, pull the Light Shield **up**.

Then, align the film with the center of the Feed Tray by sliding the two Guide Arms with the attached Light Shield toward the film.

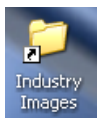
Guide Arms are fixed  
to the Light Shield



## Scanning Industrial X-ray Films

ScanWizard Industry is a scanning software designed by Microtek for Industrial X-ray films scanning used for an industrial purpose. Its user-friendly interface enables you to easily start the scanning process and finish all the scan jobs. Refer to the ScanWizard Industry software manual for more details.

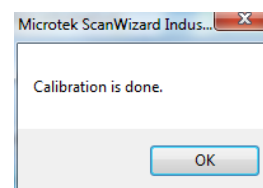
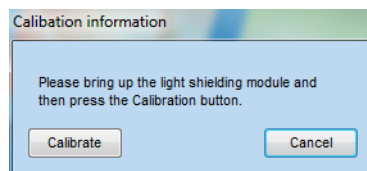
1. Follow the procedures for “Positioning Industrial X-ray Film with the Light Shield” to load the film into the digitizer's Feed Tray.
2. Launch ScanWizard Industry (either as a stand-alone by clicking the program icon, or by using the “File-Import” or “Scan” command from an application program).



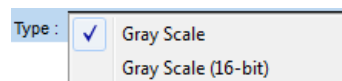
NOTE: If it is your first time to turn on the digitizer and to launch the program, if the Light Shield is not pull up, the program will prompt a window to remind you. Bring up the Light Shield and click the **Calibration** button. Then, the digitizer will start to calibrate.


When the calibration is done, click the **OK** button to bring in main windows of ScanWizard Industry program.

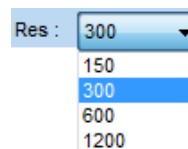
To skip the reminding window, pull up the Light Shield before turning on the digitizer.



3. Click the **Overview** button to perform a preliminary scan of the image, which will appear in the Preview window.
4. Select your image output type in the **Type** drop-down menu.
  - Select **Gray Scale** to scan the image in 8-bit grayscale. This is also the default setting of the software program.
  - Select **Gray Scale (16-bit)** to scan the image in 16-bit grayscale.

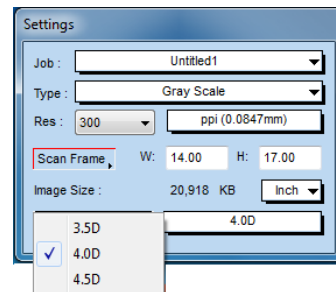


5. Select your desired image output resolution in the **Resolution** drop-down menu. The default setting is 300 dpi.
6. Select the **Scan Frame** tool () from the Toolbar in the Preview window, and choose the area to be scanned by dragging a rectangle around it. You will see a flashing frame (marquee) around the selected area.



7. Select your desired image quality from the **Density** drop-menu for the current scan job, based on the needs/image quality requirements of the inspection.

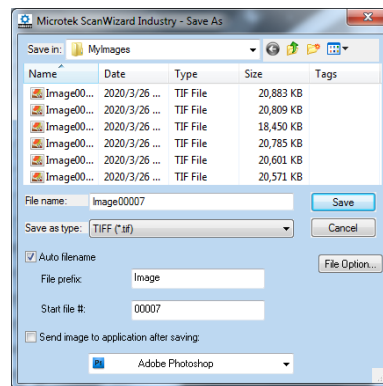
- 3.5D: It allows users to get an image with OD quality between 0.5D and 3.5D. It meets with the DA class of the EN ISO 14096 standard. Image processing is delivered faster.
- 4.0D: It allows users to get an image with OD quality between 0.5D and 4.0D. It meets with the DB class of the EN ISO 14096 standard. Image processing is delivered a little slower but in high quality.
- 4.5D: It allows users to get an image with OD quality between 0.5D and 4.5D. It meets with the DS class of the EN ISO 14096 standard. Image processing is delivered slow but in best quality.



8. Click the **Scan** button in the Preview window to start scanning.

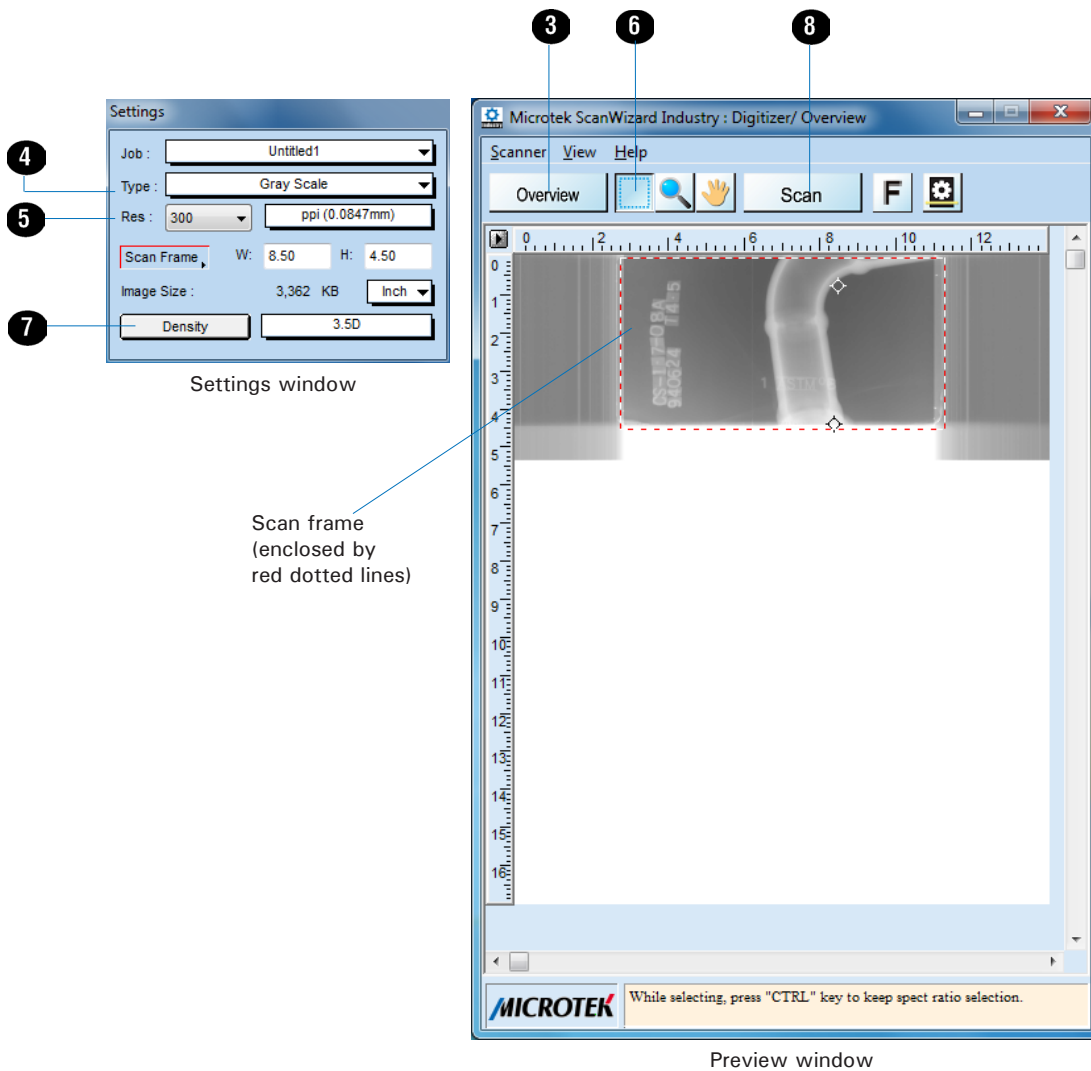
- If ScanWizard Industry is launched as a stand-alone program, a window “Save As” dialog box will appear. Click the **Save** button; then, the scanned image can be saved into your selected folder or sent to your selected application.

To view the scanned image, double click the “Industry Images” icon on your desktop (default folder assigned by the software), or retrieve it from your assigned folder.



- If ScanWizard Industry is launched as a Plug-In from an application program, the scanned image is delivered after the scan to your application, where the image can be saved, viewed, or printed further.

**NOTE:** When scanning with the Light Shield, if the scan frame covers the area of the Light Shield, the selected area of the Light Shield will be cropped out automatically and will not appear in the saved image file. If the scanned image is too big, the auto-crop function will be cancelled.



# Using Film Holders to Digitize Industrial X-ray Films

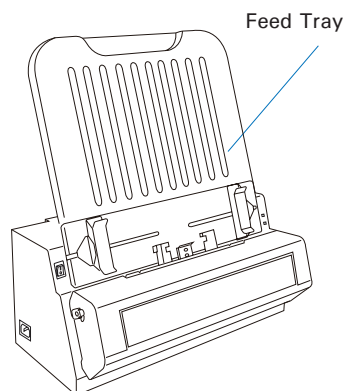
Two film holders included in the digitizer package are designed to scan the standard-size industrial X-ray film. These holders are 8.5" x 4.5" Film Holder and 12" x 3 1/3" Film Holder. To scan film, use the holder that correctly matches the film size to be scanned. The use of the individual film holder is explained in the succeeding pages of the manual.

## Positioning Industrial X-ray Films

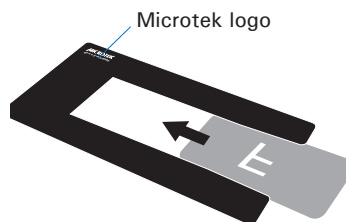
### A. Using the 8.5" x 4.5" Film Holder

To scan 8.5" x 4.5" industrial film, use the 8.5" x 4.5" Film Holder, which can hold up to one piece of the 8.5" x 4.5" industrial X-ray film at a time.

1. Install the Feed Tray onto your digitizer before using it. Refer to the previous section "Installing the Feed Tray" for the detail.

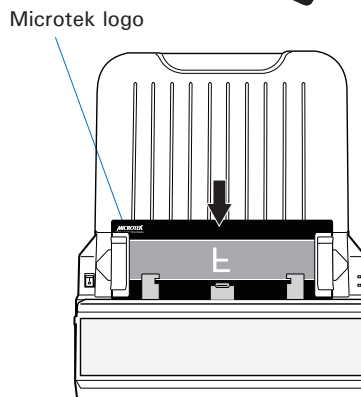


2. Load the film face down inside the holder. Slide the film along the slot of the holder until the film is fully loaded.



3. Load and insert the 8.5" x 4.5" Film Holder with loaded film into the Feed Tray, with the side to be scanned facing down and with the top of the film directing downwardly.

Push the holder into the tray until the edge of it touches the bottom edge of the Feed Tray.

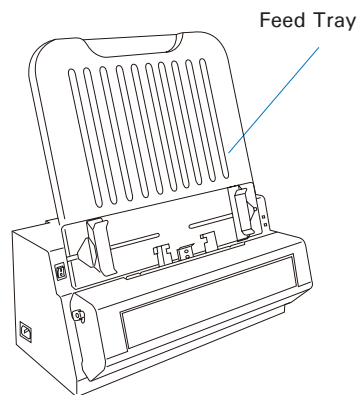


4. Make sure that the Light Shield has been pull up.

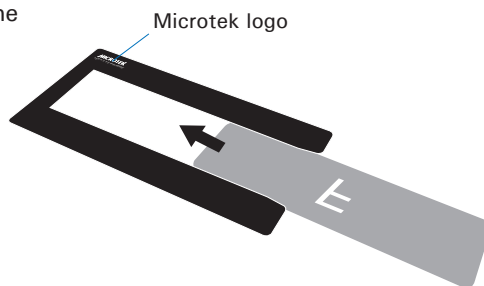
## B. Using the 12" x 3 1/3" Film Holder

To scan 12" x 3 1/3" industrial film, use the 12" x 3 1/3" Film Holder, which can hold up to one piece of the 12" x 3 1/3" industrial X-ray films at a time.

1. Install the Feed Tray onto your digitizer before using it. Refer to the previous section "Installing the Feed Tray" for the detail.



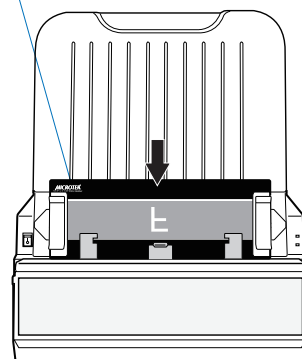
2. Load the film face down inside the holder. Slide the film along the slot of the holder until the film is fully loaded.



3. Load and insert the 12" x 3 1/3" Film Holder with loaded film into the Feed Tray, with the side to be scanned facing down and with the top of the film directing downwardly.

Push the holder into the tray until the edge of it touches the bottom edge of the Feed Tray.

Microtek logo



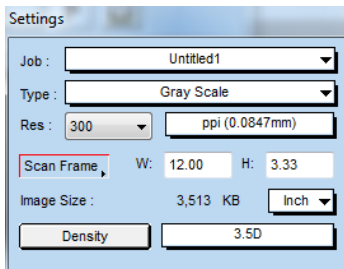
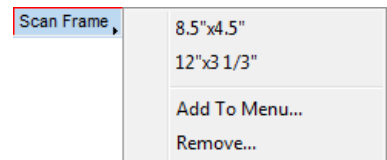
4. Make sure that the Light Shield has been pull up.



## Scanning Industrial X-ray Films

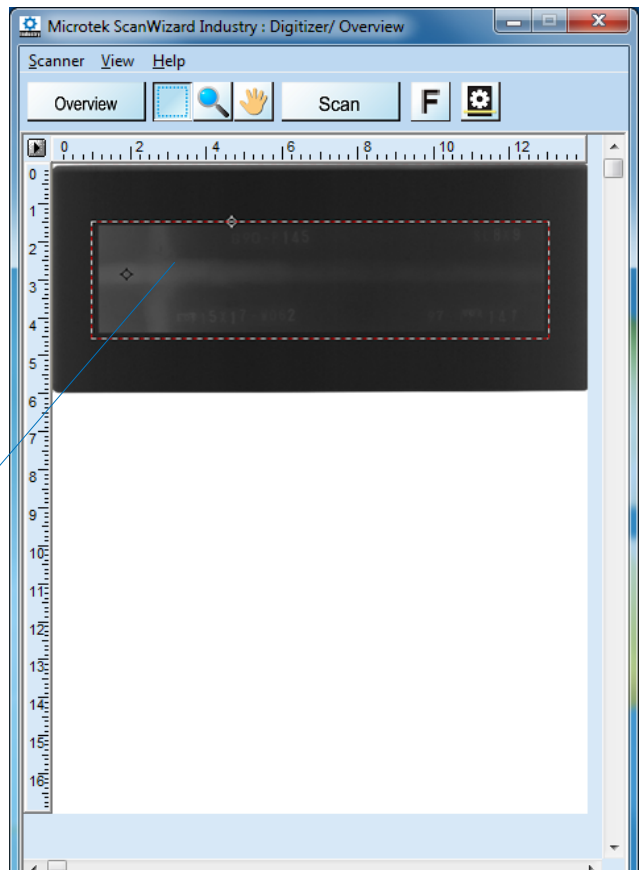
1. Follow the procedures for "Positioning Your Industrial X-ray Film" in this chapter to load the industrial X-ray film into the digitizer's Feed Tray.
2. Follow the procedures (steps 2 through 8) for "Scanning Industrial X-ray Films" in the "Using Light Shield to Digitize Industrial X-ray Film" chapter to launch the ScanWizard Industry software, to specify your scanning requirements and to start scanning.

In step 6, instead, select the correct holder size to frame the scan area from the **Scan Frame** drop-down menu. When done, you will see a flashing frame (marquee) around the selected area.



Settings window

Scan frame  
(enclosed by  
red dotted lines)



Preview window

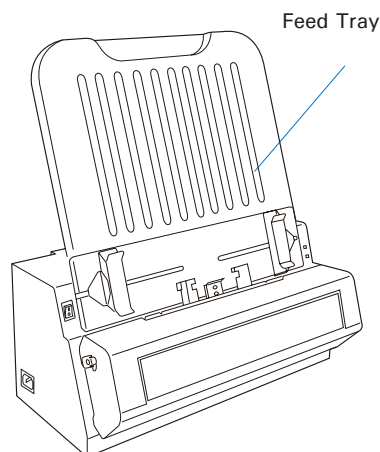
# Digitizing Industrial X-ray Films in Other Sizes

If your scanned target cannot be used together with the Light Shield (wider than 10.24"/26 cm) or the supplied film holders, the NDT-2000 also allows you to scan various sizes of industrial X-ray films up to 14" x 200" (35.56 x 508 cm).

## Positioning Industrial X-ray Films

NDT-2000's Feed Tray can hold only one piece of X-ray film at a time. This section shows you how to position a single-sheet of X-ray film into the Feed Tray.

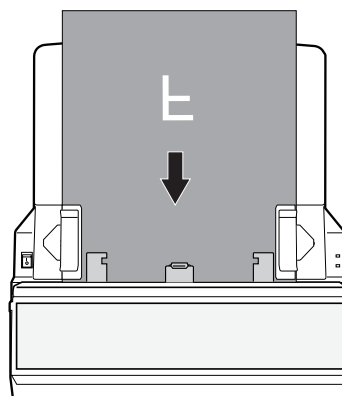
1. Install the Feed Tray onto your digitizer before using it. Refer to the section "Installing the Feed Tray" of this manual for the detail.



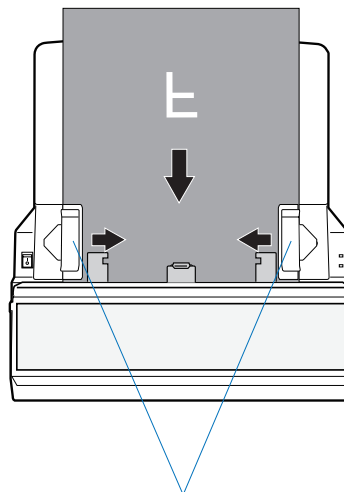
2. Load and insert the film into the Feed Tray, with the side to be scanned facing down and with the top of the film directing downwardly.

Push the film into the tray until the edge of it touches the bottom edge of the Feed Tray.

3. Make sure that the Light Shield has been pull **up**.



4. Align the film with the center of the Feed Tray by sliding the two Guide Arms toward the film if the width of the film is less than 14" (35.56 cm)



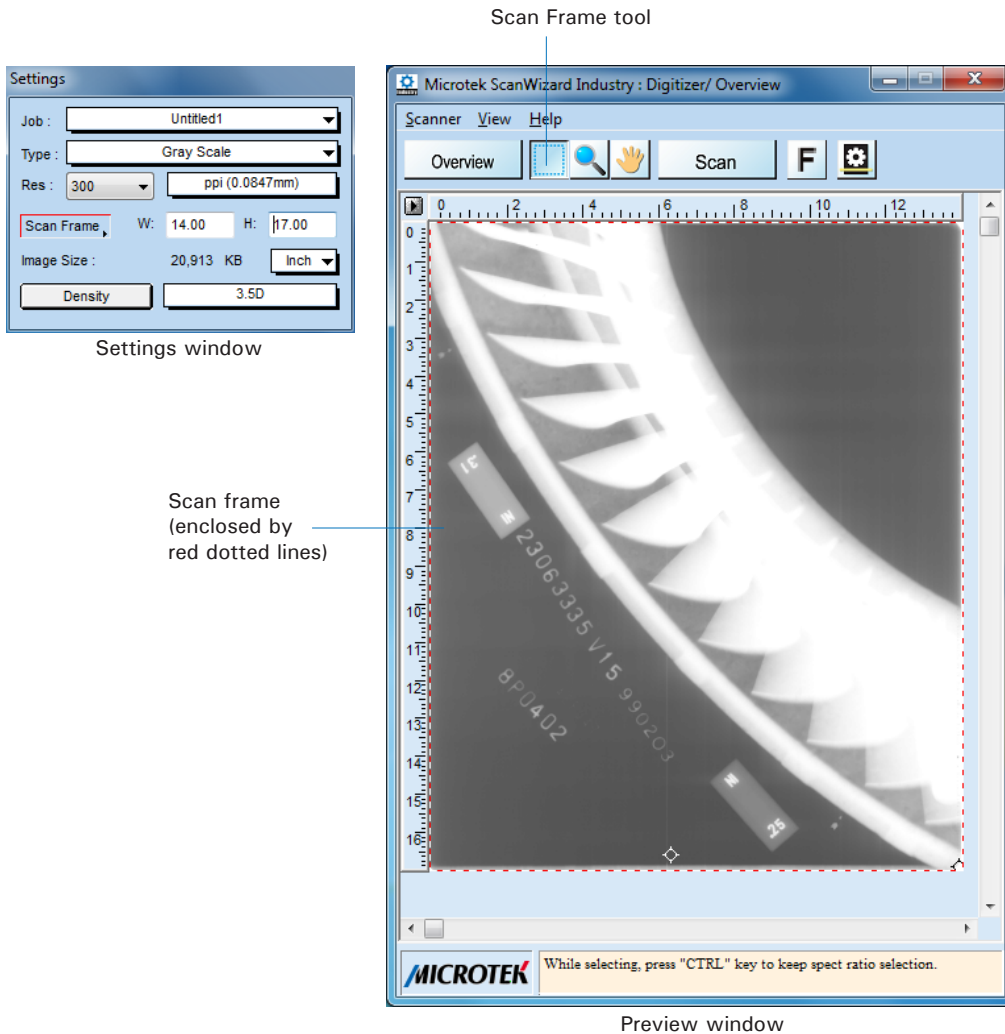
Guide Arms are not fixed  
to the Light Shield

NOTE: There are several precautions and reminders about using the digitizer correctly. Please refer to the section as below for the detail.

- The Feed Tray can handle X-ray films of the following sizes:
  - Width: 2.5" to 14" (6.35 to 35.56 cm)
  - Length: 2.5" to 200" (6.35 to 508 cm)
  - Sheet Feed: Single sheet per time
- If the film are torn, curled, or wrinkled, do not put them into the Feed Tray to scan, because they may cause film jams.
- Remove clips or staples before placing the film into the Feed Tray. **DO NOT** use the digitizer to scan your X-ray film with clips or staples because they may cause film jams or damage the digitizer.

## Scanning Industrial X-ray Films

1. Follow the procedures for "Positioning Industrial X-ray Film" in this chapter to load the industrial X-ray film into the digitizer's Feed Tray.
2. Follow the procedures (steps 2 through 8) for "Scanning Industrial X-ray Films" in the "Using Light Shield to Digitize Industrial X-ray Film" chapter to launch the ScanWizard Industry software, to specify your scanning requirements and to start scanning.

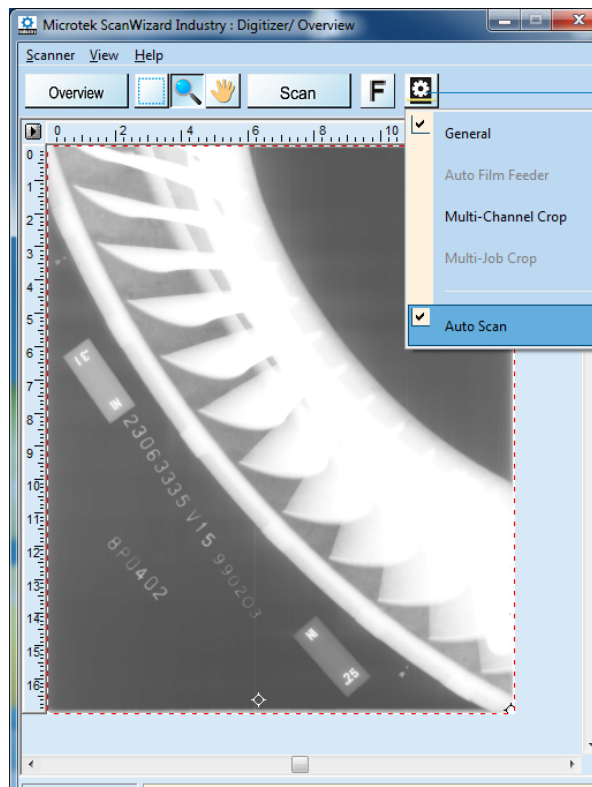


# Digitizing Industrial X-ray Films Automatically

This chapter guides you how to perform the auto-detection function for the film scanning.

1. Base on your specific requirements, refer to the different parts of previous chapters to position your industrial X-ray film, to launch the ScanWizard Industry scanning software, and to specify your scanning requirements.
2. Next, select the **Auto Scan** function instead of the **Scan** button to start scanning.
  - a) Click the **Scan Process Tool** button and then choose "Auto Scan" from the appearing drop-down menu.
  - b) When enabled, once the film on the digitizer's feed tray is detected by the digitizer, the digitizer will start scanning automatically based on your preferred scan settings.

If you want to save your scanned files as your desired parameters, click the **Scan** button to bring up the "Save As" dialog box where you can specify the file name, file format, storage location for saving files



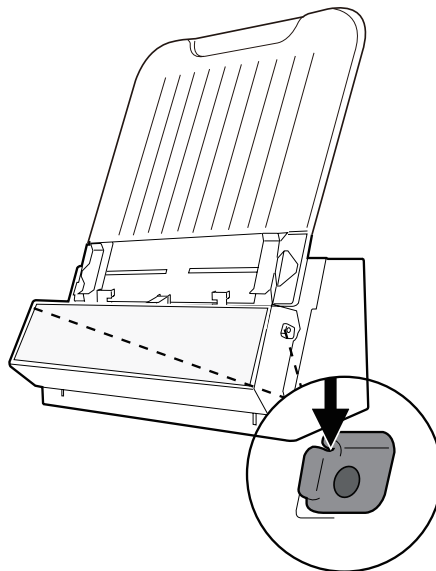
## Care and Cleaning

To ensure optimal performance from the NDT-2000, it is important to clean several critical parts of the digitizer on a regular basis.

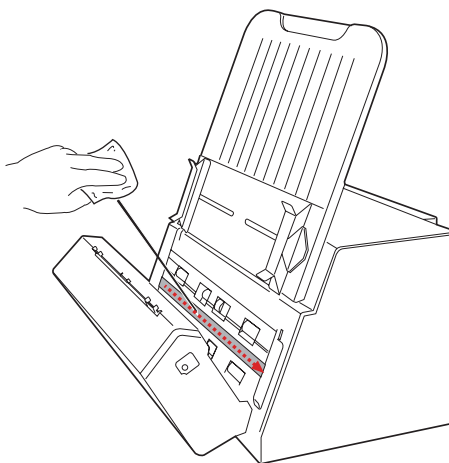
### Cleaning the Glass Surface on the Digitizer

1. Push down two Release buttons at both sides of the front cover of the digitizer and open the front cover.

When opening the front cover, support the both sides of the front cover with your hands, avoiding suddenly falling down of the front cover.



2. Use a soft, nonabrasive, and lint-free cloth to gently wipe the surface of the glass located at the inner side of the digitizer.

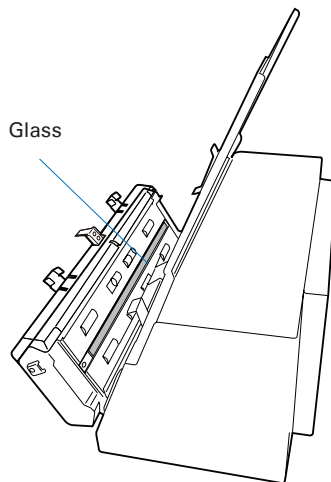


## Cleaning the Glass and Components on the Front Cover

There is one more piece of glass located on the inner side of the front cover of the digitizer. To clean it, please remove it from the front cover first.

1. Push down two Release buttons at both sides of the front cover of the digitizer and open the front cover. Then, locate the glass on the inner side of the front cover.

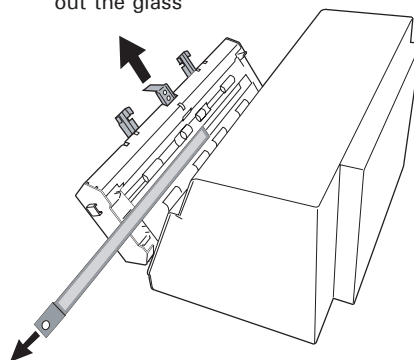
When opening the front cover, support the both sides of the front cover with your hands, avoiding suddenly falling down of the front cover.



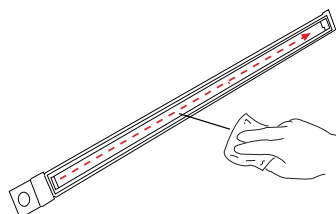
2. Find a perforation at the left of the glass. Use it to pull out the glass, shown as in the graph.

NOTE: Before pulling out the glass, make sure that the Light Shield has been pull up.

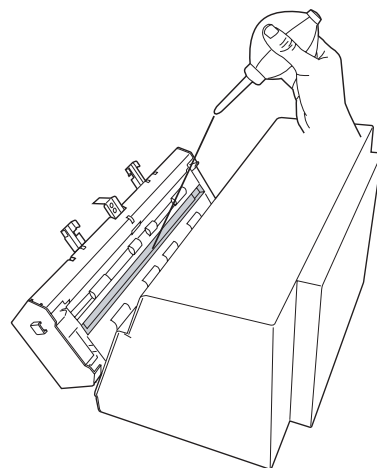
Pull up the Light Shield before pulling out the glass



3. Use a soft, nonabrasive, and lint-free cloth to gently wipe both sides of the glass.

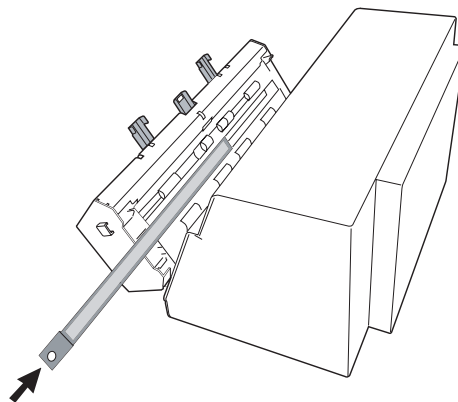


4. Next, use a dust blower or a lint-free cloth to clean components in the hollow part beneath where the glass is stored.



5. After cleaning the glass and the components, along the tracks, push back the glass surface until it snaps into place.

Make sure that the installed glass has been set at its proper position; otherwise, the system may detect that you are using a Multi-Channel Tray falsely and then come out a warning message.



#### NOTE:

- Do not use any detergents, synthetic cleaning solutions, cleaning naphtha, or other solvents to clean the glass surface or diffuser directly. To remove stains, use cotton swabs moistened with optical lens cleaner (e.g. Purosol Lens Cleaner).
- Wipe off dirt and stains from the surface of the glass horizontally while cleaning. Do not wipe them vertically in order to avoid dropping off dirt or stains into the interior of the scanner.
- While cleaning, wipe the glass only toward the same direction. Do not wipe back and forth over the surface of the glass.
- When cleaning the surface of the glass, make sure that the cloth in use is clean. After you wipe off dirt and stains each time, make sure to fold the cloth to a clean side or use another clean cloth to continue cleaning. Do not keep on using the dirty side of the cloth to clean in order to avoid the glass surface getting dirty again.



## Cleaning the Rollers

Prolonged use of the digitizer may result in accumulation of ink and other residue on the feeder's rollers, affecting their efficiency. Clean the rollers periodically to maintain performance.

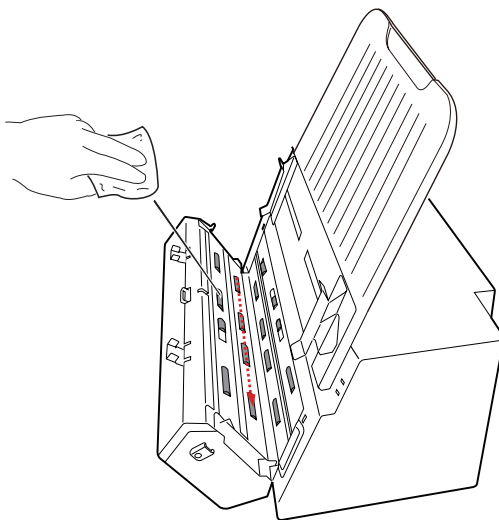
Rollers are found in two areas of the NDT-2000: Directly on the digitizer, and on the inner side of the front cover.

To clean the rollers inside of the digitizer:

1. Push down two Release buttons at both sides of the front cover of the digitizer and open the front cover.

When opening the front cover, support the both sides of the front cover with your hands, avoiding suddenly falling down of the front cover.

2. When the front cover is opened, you can find several groups (4 sets) of rollers located at the inside of the digitizer. Clean the rollers with a lint-free cloth or a swab moistened with alcohol or ECO cleaner, as shown in the graphic below.



### NOTE:

- Remember to clean all rollers inside of the digitizer at one time.
- Wipe off dirt and stains from the surfaces of the rollers horizontally while cleaning. Do not wipe them vertically in order to avoid dropping off dirt or stains into the interior of the scanner.
- While cleaning, wipe rollers only toward the same direction. Do not wipe back and forth over the surface of the rollers.

## Maintenance

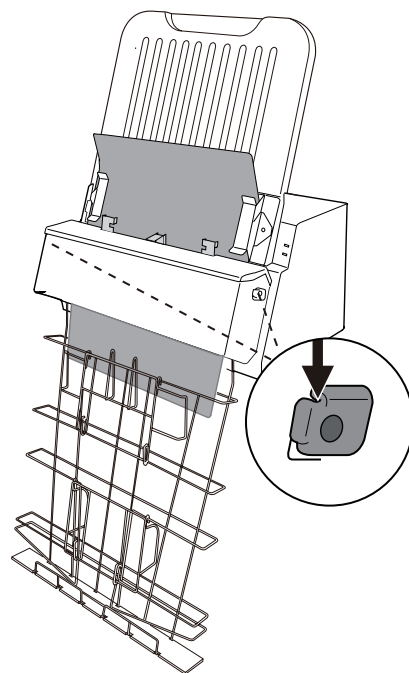
After usage for a period of time, the parts inside your digitizer, such as rollers or light source, may become worn out, and a problem such as insufficient light supply may occur. In this cases, contact your local dealers or wholesales for the maintenance services.

NOTE: Your digitizer need a professional to perform the required service or maintenance. Do not attend to fix or perform the maintenance by yourself, or it may cause dangers to you or the digitizer.

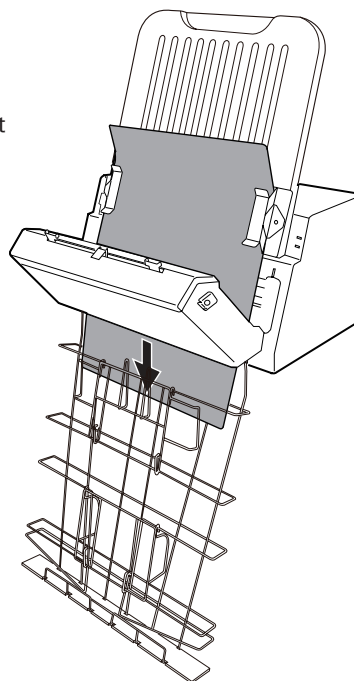
# Appendix

## Fixing Film Jams

1. Open the front cover by pressing the Release buttons on the both sides of the front cover.











2. After opening the front cover, let the jammed film fall into the output basket and then remove it from the output basket.

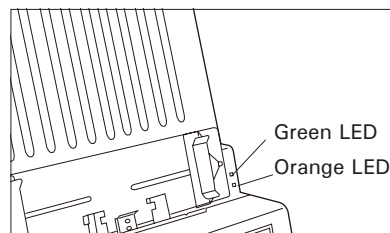


NOTE: To remove the jammed film from the digitizer, you have to open the front cover first. Otherwise, your film may be damaged if they are forcibly removed.

## Troubleshooting

The LEDs on the front-right panel of the digitizer indicate the status of the digitizer.

		<b>All Off</b> - Digitizer is off
		<b>Flashing Orange</b> - Starting up or Calibrating
		<b>All On</b> - Ready to scan
		<b>Orange Off</b> - Scanning



First, make sure that you have followed steps as described in the “Assembling Your Film Digitizer” section of this document. Then if your problem is listed here, try the suggested solution.

**1. No light comes on when the digitizer is turned on.**

Make sure your digitizer is connected to your computer and plugged into a power source.

**2. The Add/Remove Hardware Wizard appears on your screen.**

Click the “Cancel” button and close the ScanWizard Industry scanning software. Disconnect the Hi-Speed USB cable from your computer, and refer to the installation instructions in this document.

**3. When trying to scan, an error message appears on your screen that reads, “Can’t Find Digitizers”.**

Make sure your digitizer is connected to your computer and plugged in to a power source (see “Connecting the Digitizer” in the “Assembling Your Film Digitizer” section).

Uninstall and reinstall the ScanWizard Industry software.

**4. After clicking “Scan,” a blank screen appears.**

Uninstall and reinstall the ScanWizard Industry software.

**5. When trying to scan, an error message appears on your screen that reads, “Code -204, Scanning lamp or image sensor circuit failure. Please don't select fast preview or draft scan!”**

This error message appears when the luminance of lamps is insufficient or surpassed.

Click “OK” first; then contact the professional technician for the further help.

6. **When trying to scan, an error message appears on your screen that reads, "Please make sure that you have selected the correct Scan Type. [Multi-Channel Crop or General] "**

Make sure the glass surface on the front cover has been set into its proper position.

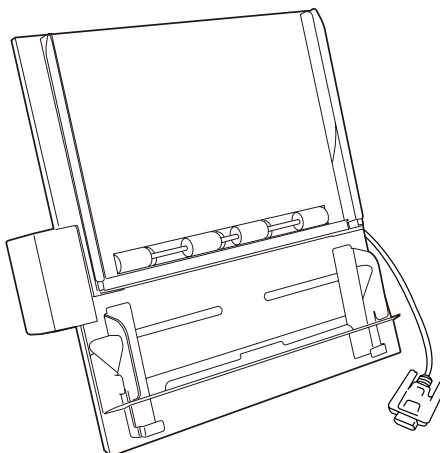
Make sure the Light Shield has been set into its proper position.

Make sure you have selected a correct scan process tool and device connected runs properly.

## Optional Auto Film Feeder (AFF)

The Auto Film Feeder (AFF) is an optional accessory for the NDT-2000 digitizer. The AFF only works with X-ray film, allowing to perform automatic scanning of up to 15 sheets of the X-ray film at a time. It increases convenience and efficiency in multiple-sheet-scanning of X-ray film.

After unpacking the AFF package, check for the item shown below.



Specifications of AFF:

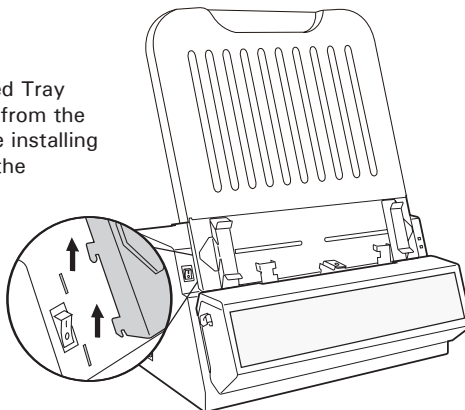
- Film Capacity : Up to 15 sheets of films
- Dimension: 458 (L) x 90 (W) x 438 (H) mm
- Weight: 4.45 kg
- Scanning Area: Min .2.5" x 10"; Max. 14" x 17"

The coming section describes how to install the AFF on the NDT-2000 through the NDT-2000's accessory port and how to scan X-ray films by using the AFF.

## Installing the Auto Film Feeder (AFF)

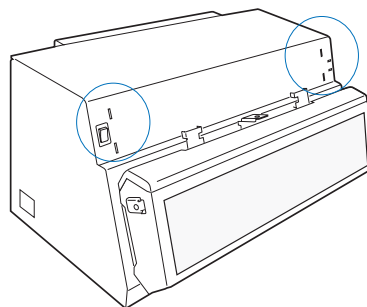
You can use either the Auto Film Feeder or the Feed Tray for one time with your digitizer; therefore, before mounting the AFF onto your digitizer, make sure that the Feed Tray has been removed out from the digitizer and the digitizer's power is off.

Lift up the Feed Tray and remove it from the digitizer before installing the AFF onto the digitizer.

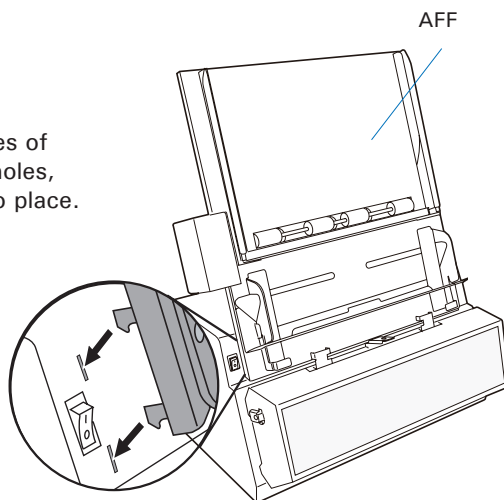


Follow the steps below to install the AFF.

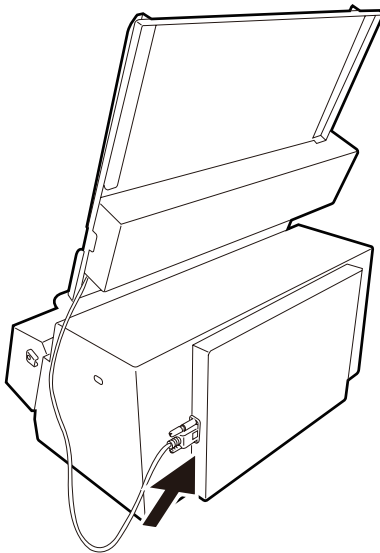
1. Look for two sets of the Feed Tray Holes at both ends of the front-top of the digitizer.



2. Insert and push down both sides of the AFF into its compartment holes, making sure the AFF snaps into place.



4. Plug the connector of the AFF into the digitizer's 9-pin accessory port securely and properly.

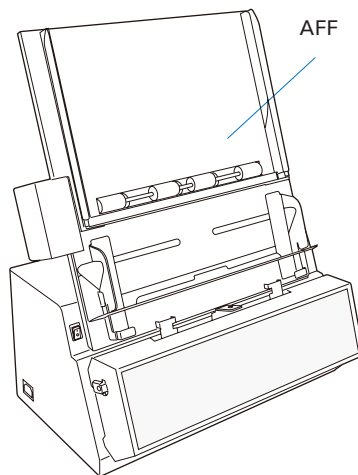




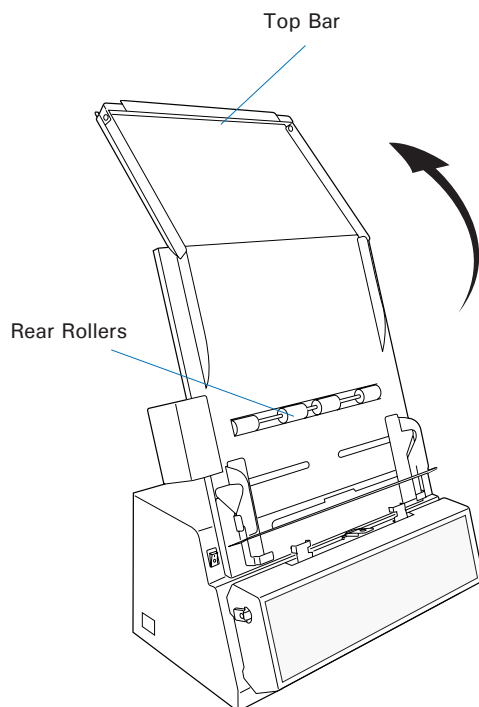
## Positioning the X-ray Films

The AFF can hold up to 15 sheets of X-ray films at a time. This section shows you how to position X-ray films into the AFF Tray correctly.

1. Install the AFF onto your digitizer before using it. Refer to the previous sections "Installing and Connecting the AFF" for the detail.



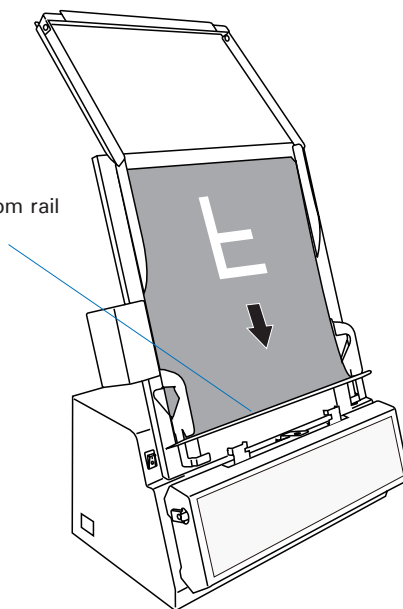
2. Lift up the Top Bar.



3. Load the stack of films into the AFF Tray, with the side to be scanned facing down and with the top of the film directing downwardly.

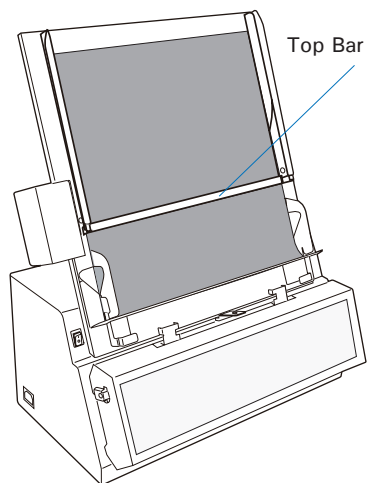
When loading the films into the tray, make sure all films have been loaded on the bottom rail of the AFF Tray. Incorrect positioning of films may cause film jams or damage the digitizer.

Bottom rail

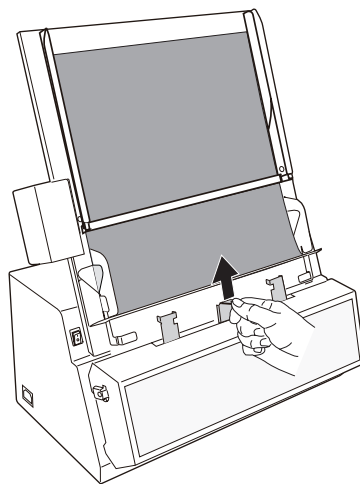


Please take note that the bottom of the films should be placed against the front side of the bottom rail as shown in the graphic and rest the back against the AFF housing.

4. Lower down the Top Bar onto the films so the films are sandwiched between the Top Bar and the AFF tray.



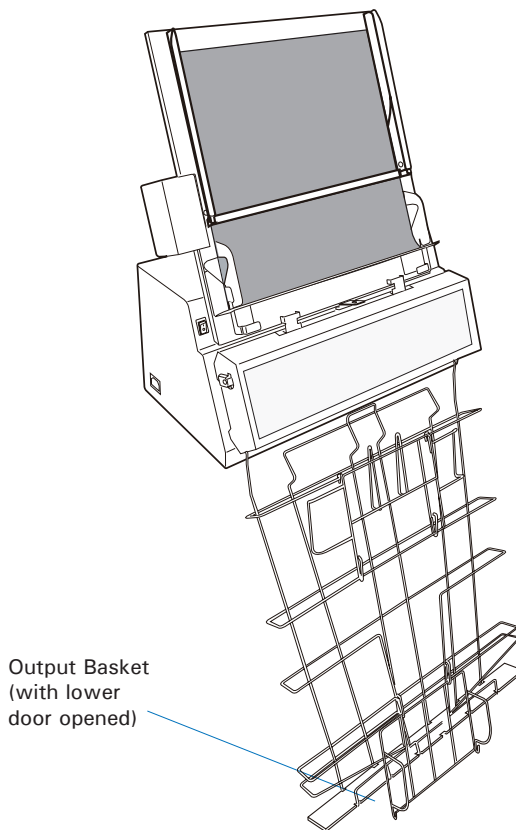
5. If the width of the film is large than 10.24" (26 cm), pull the Light Shied up, otherwise pull it down.




## Using Output Tray

Before start using the AFF to scan, make sure that the Output Tray (e.g., Output Basket) has been installed correctly on your NDT-2000 too; otherwise, improper outputs of piles of films may cause jams of films and bring damage to your digitizer. Refer to the previous section "Installing the Output Tray" for details about how to install the Output Tray onto your NDT-2000.

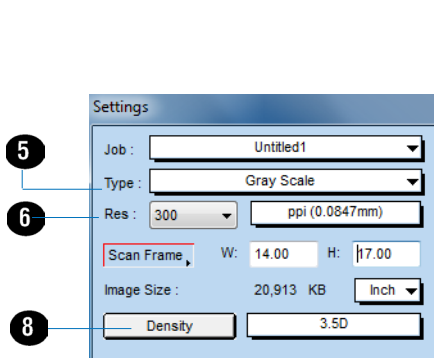
NOTE: To ensure that the after-scan film can stay in the basket neatly, make sure that the lower door of basket is opened.



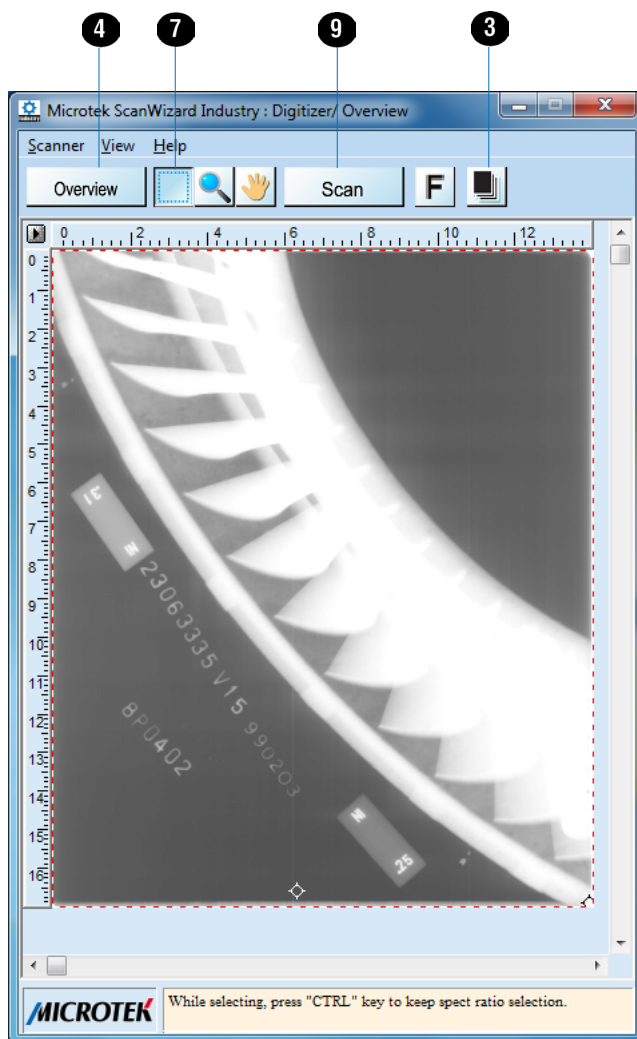
## Scanning X-ray Films by Using the Auto Film Feeder (AFF)

1. Load the films to be scanned into the AFF Tray.  
 Make sure that the Light Shield has been pulled up if the width of the film is large than 10.24" (26 cm); otherwise, pull it down.
2. Launch ScanWizard Industry (either as a stand-alone by clicking the program icon on the desktop, or by using the "File-Import" or "Scan" command from an application program).
3. Click the **Scan Process Tool** button and then choose "Auto Film Feeder" from the appearing drop-down menu.
4. Click the **Overview** button to perform a preliminary scan of the image, which will appear in the Preview window.
5. Select your image output type as **Gray Scale** or **Gray Scale (16-bit)** from the Type drop-down menu.
6. Select your desired image output resolution in the **Resolution** drop-down menu. The recommended resolution is 300 dpi or above.
7. Select the **Scan Frame** tool () from the Toolbar in the Preview window, and choose the area to be scanned by dragging a rectangle around it. You will see a flashing frame (marquee) around the selected area.
8. Select your desired image quality (3.5D, 4.0D, or 4.5D) from the **Density** drop-menu for the current scan job, based on the needs/image quality requirements of the inspection.
9. Click the **Scan** button in the Preview window to scan all the films loaded on the AFF Tray.
  - If ScanWizard Industry is launched as a stand-alone program, a window "Scan To: Save As" dialog box will appear. Click the **Save** button; then, the scanned image can be saved into your selected folder or sent to your selected application.  
 To view the scanned image, double click the "Industry Images" icon on your desktop (default folder assigned by the software), or retrieve it from your assigned folder.
  - If ScanWizard Industry is launched as a Plug-In from an image-editing program, the scanned image is delivered to your application, where the image can be saved, viewed, or modified further.

NOTE: When scanning with the AFF function, the height limit for the scan frame is 17". If the value of the height in the scan frame is larger than 17, it will be set back to 17" automatically by the system.



Settings window

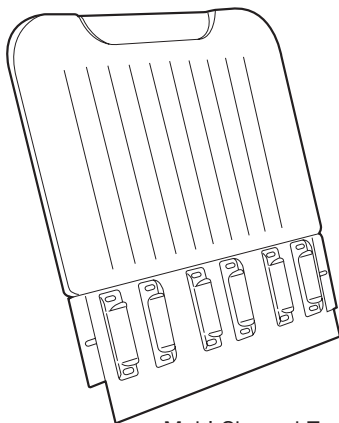


Preview window

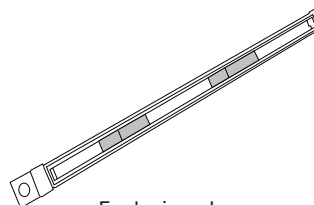
## Optional Multi-Channel Tray

The Multi-Channel Tray is an optional accessory for the NDT-2000 digitizer. The Multi-Channel Tray only works with X-ray film, allowing to scan up to 3 sheets of 12.01" x 3.15" (30.5 x 8 cm) film at one time.

After unpacking the Multi-Channel Tray package, check for the items shown below.



Multi-Channel Tray



Exclusive glass

Specifications of Multi-Channel Tray:

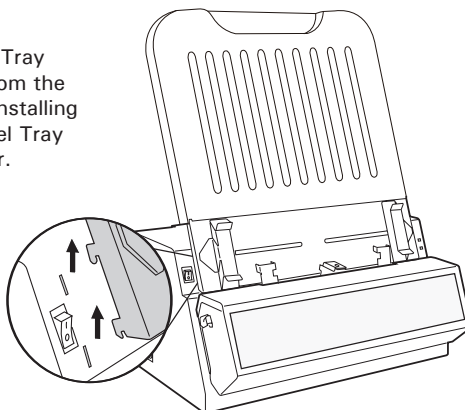
- Film Capacity : Up to 3 sheets of films
- Dimension: 526 (L) x 33 (W) x 419 (H) mm
- Weight: 1.1 kg

The coming section describes how to install the Multi-Channel Tray on the NDT-2000 and how to scan X-ray films by using the Multi-Channel Tray.

## Installing the Multi-Channel Tray

You can use either the Multi-Channel Tray or the Feed Tray for one time with your digitizer; therefore, before mounting the Multi-Channel Tray onto your digitizer, make sure that the Feed Tray has been removed out from the digitizer and the digitizer's power is off.

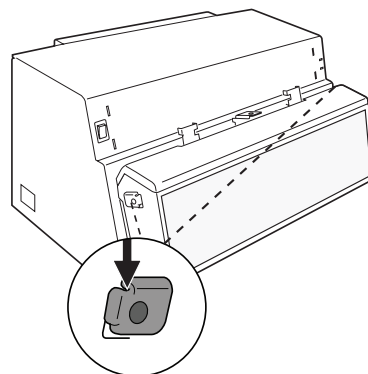
Lift up the Feed Tray and remove it from the digitizer before installing the Multi-Channel Tray onto the digitizer.



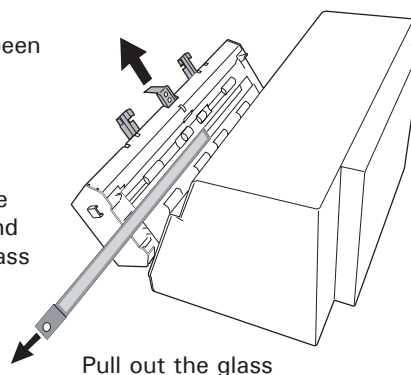
Follow the steps below to install the Multi-Channel Tray.

1. Push down two Release buttons at both sides of the front cover of the digitizer and open the front cover.

When opening the front cover, support the both sides of the front cover with your hands, avoiding suddenly falling down of the front cover.



2. Make sure that the Light Shield has been pulled up.
3. Exchange the exclusive glass for the Multi-Channel tray.
  - a) Locate the glass on the inner side of the front cover first. Then, find a perforation at the left of the glass and use it to pull out the glass.

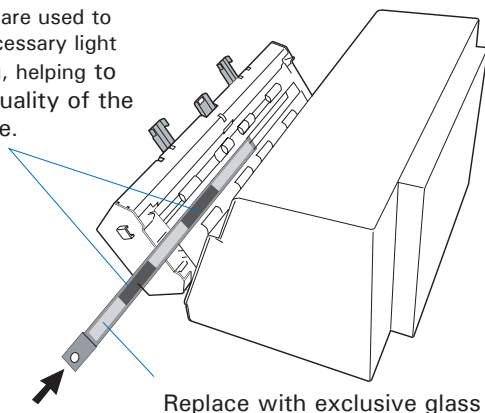




- b) Insert and push the exclusive glass for the Multi-Channel tray into the glass compartment, along the tracks until it snaps into place.

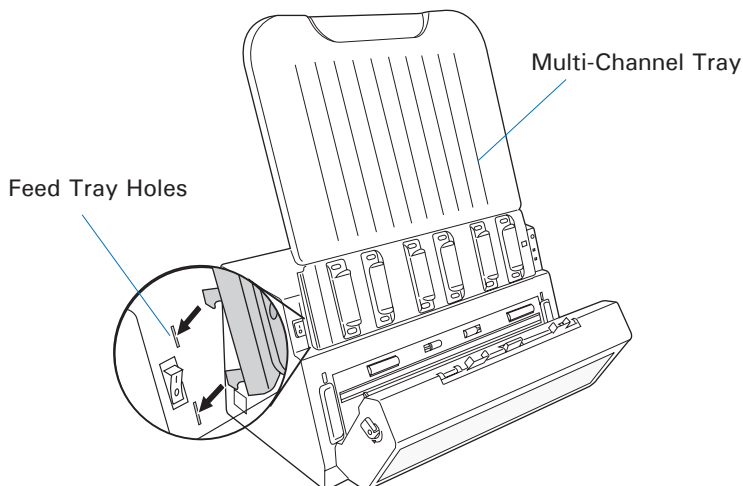
Masked areas:

The masked areas on the exclusive glass are used to block out unnecessary light during scanning, helping to improve the quality of the scanned image.

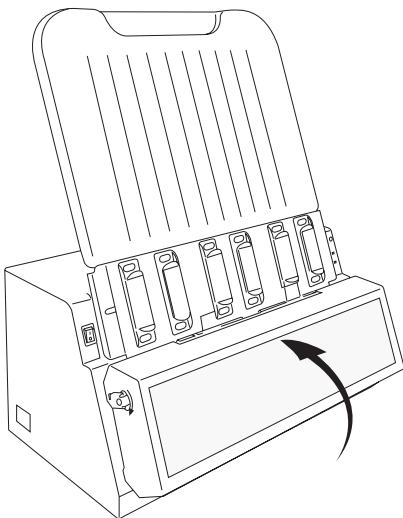


**NOTE:** Make sure that the exclusive glass for the Multi-Channel tray is fully inserted and snapped into place.

4. Install the Multi-Channel Tray onto the digitizer.
  - a) Look for two sets of the Feed Tray Holes at both ends of the front-top of the digitizer.
  - b) Insert and push down both sides of the Multi-Channel Tray into its compartment holes, making sure the Multi-Channel Tray snaps into place.



5. Push back the front cover until it snaps into place.

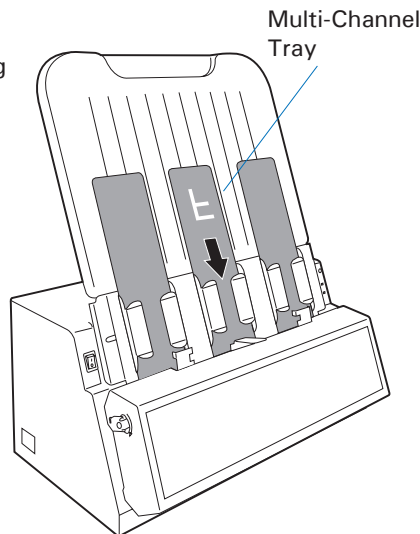


## Positioning the X-ray Films

The Multi-Channel Tray can hold up to 3 sheets of X-ray films at a time. This section shows you how to position X-ray films into the Multi-Channel Tray correctly.

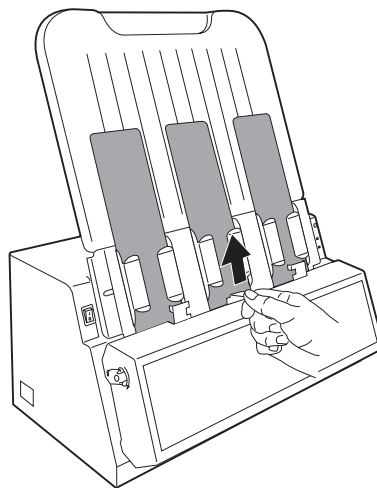
1. Install the Multi-Channel Tray onto your digitizer before using it. Refer to the previous sections "Installing the Multi-Channel Tray" for the detail.
2. Load the films into the Multi-Channel Tray, with the side to be scanned facing down and with the top of the film directing downwardly.

When loading the films into the tray, make sure all films have been pushed into the tray until the edge of them touch the bottom edge of the Multi-Channel Tray.



3. Pull up the Light Shield.

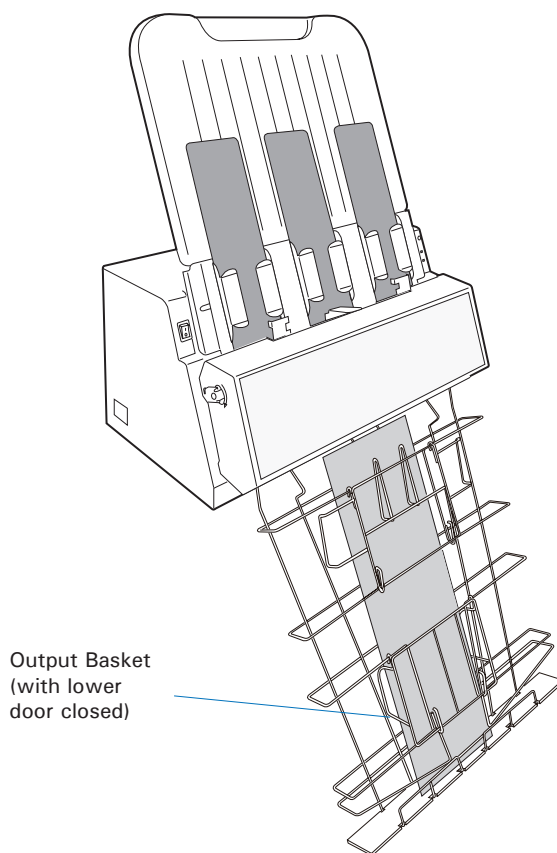
NOTE: If you would like to scan less than 3 sheets of X-ray films at a time, make sure that you have to put one sheet of X-ray films at the middle channel. For example, when scanning two sheets of X-ray films, you should put the first one sheet of X-ray films at the middle channel. Then, you can put the other one at either the left or right channel as preferred.




## Using Output Tray

Before start using the Multi-Channel Tray to scan, make sure that the Output Tray (i.e., Output Basket) has been installed correctly on your NDT-2000 too; otherwise, improper outputs of piles of films may cause jams of films and bring damage to your digitizer. Refer to the previous section "Installing the Output Tray" for the details about how to assemble the Output Tray onto your NDT-2000.

**NOTE:** To ensure that the after-scan film can stay in the basket neatly, make sure that the lower door of basket is closed.



## Scanning X-ray Films by Using the Multi-Channel Tray

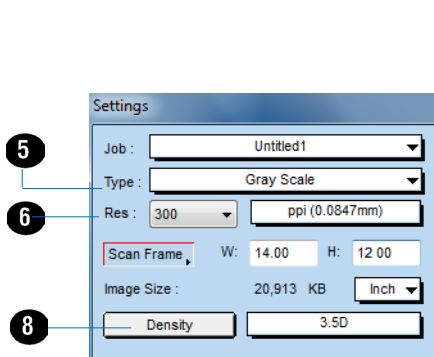
1. Load the films to be scanned into the Multi-Channel Tray.  
Make sure that the Light Shield has been pulled up.
2. Launch ScanWizard Industry (either as a stand-alone by clicking the program icon on the desktop, or by using the "File-Import" or "Scan" command from an application program).
3. Click the **Scan Process Tool** button and then choose "Multi-Channel Crop" from the appearing drop-down menu.
4. Click the **Overview** button to perform a preliminary scan of the image, which will appear in the Preview window.
5. Select your image output type as **Gray Scale** or **Gray Scale (16-bit)** from the Type drop-down menu.
6. Select your desired image output resolution in the **Resolution** drop-down menu. The recommended resolution is 300 dpi or above.
7. Select the **Scan Frame** tool () from the Toolbar in the Preview window, and choose the area to be scanned by dragging a rectangle around it. You will see a flashing frame (marquee) around the selected area.

Please note that when using the Multi-Channel Tray, you are allowed to adjust only the height of the scan frame.

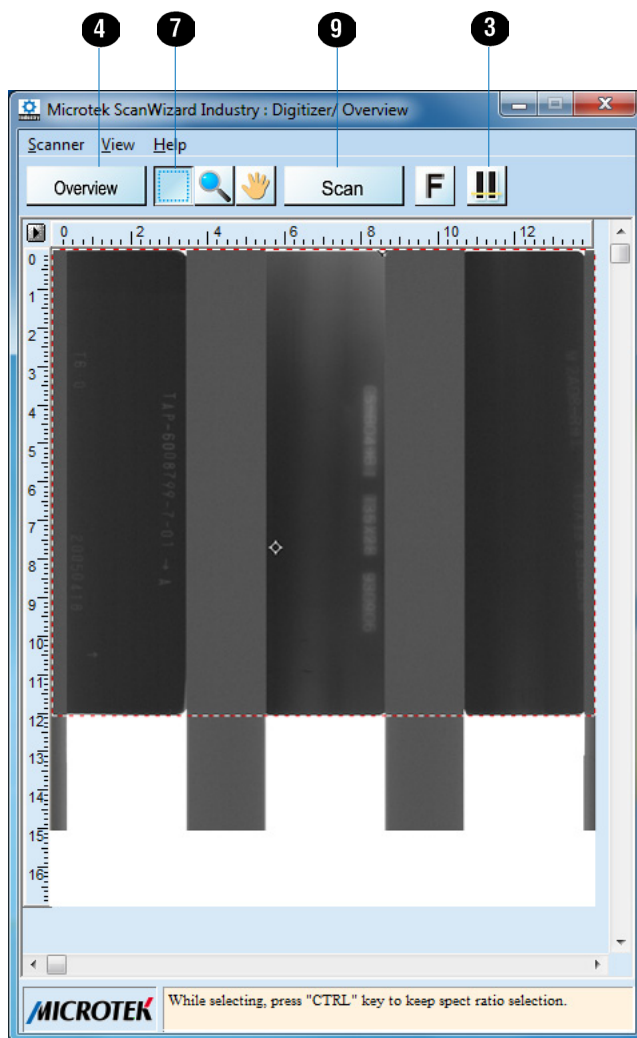
8. Select your desired image quality (3.5D, 4.0D, or 4.5D) from the **Density** drop-menu for the current scan job, based on the needs/image quality requirements of the inspection.
9. Click the **Scan** button in the Preview window to scan all the films loaded on the Multi-Channel Tray.
  - If ScanWizard Industry is launched as a stand-alone program, a window "Scan To: Save As" dialog box will appear. Click the **Save** button; then, the scanned image can be saved into your selected folder or sent to your selected application.

To view the scanned image, double click the "Industry Images" icon on your desktop (default folder assigned by the software), or retrieve it from your assigned folder.

- If ScanWizard Industry is launched as a Plug-In from an image-editing program, the scanned image is delivered to your application, where the image can be saved, viewed, or modified further.



Settings window



Preview window

## Specifications

Type	Sheet feed film digitizer
Model Type	MSS-1200XU2LF
Image Sensor	CCD
Light Source	Green LED
Scanning Modes	Grayscale in a single scanning pass 8-bit grayscale (Approx. 256 shades of gray) 16-bit grayscale (Approx. 65,536 shades of gray)
Resolution	1200 dpi (21 $\mu$ m)
Optical Density	0.5D ~ 4.5 D
Scanning Area	Min. 2.5" x 2.5" (63.5 mm x 63.5 mm) Max. 14" x 200" (355.6 mm x 5080 mm)
Scanning Speed	DA class (3.5D): 58 sec @ 300 dpi, 14" x 17" grayscale DB class (4.0D): 110 sec @ 300 dpi, 14" x 17" grayscale DS class (4.5D): 232 sec @ 300 dpi, 14" x 17" grayscale
Film Size	Min. 2.5" x 2.5" (63.5 mm x 63.5 mm) Max. 14" x 200" (355.6 mm x 5080 mm)
Film Holder	8.5" x 4.5", 12" x 3 1/3"
Lamp Life	100,000 times at 300 dpi scan cycle
Product Life Cycle	100,000 scans or 5 years
Interface	Hi-Speed USB (USB 2.0)
Dimensions (L x W x H)	12.9" x 18.7" x 8.8" (329 x 474 x 224 mm) 329 x 474 x 544 mm (w/ input tray) 586 x 474 x 934 mm (w/ input & output tray)
Weight	44.5 lbs. (20.2 kg)
Voltage	AC 100V to 240V, 50/60 Hz; Max. 4.0A (Input)
Power Consumption	Max. 320 W
Environment	Operating temperature: 50° to 104°F (10° to 40°C) Relative humidity: 20% to 85%  Storage temperature: 14° to 140°F (-10° to 60°C) Relative humidity: 20% to 95%
Optional Accessory	Automatic Film Feeder (AFF), Multi-Channel Tray