

## Discussion of the Cruse Scanner / Digital Camera System

FLAAR edited and updated version of English translation of the Cruse scanner-digital photography system operator manual; updated by Haley Puffer, FLAAR at BGSU.



# Important Things to Know

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Figure 1: A caution symbol. The user should read the manual in its entirety and pay close attention to the important notices designated by this symbol.

- ◆ Nothing should be saved, changed, or deleted on the C:\ drive. Do not save anything to it, make any changes, and do not erase anything from it. This includes the desktop as well.
- ◆ Be sure to remove all objects from the vacuum board before resetting the scanner. Serious damage can occur if the head, lens, or sync light crashes into a foreign object. This may also void warranty, as the software indicates an impending movement of the system, and must be confirmed by the operator unless the user has overridden the confirmation warnings.
- ◆ Never turn the confirmation window off. In the case the user has accidentally turned them off, select User from the main menu, and select Confirmations. Make sure all the boxes are checked and press OK.
- ◆ In emergencies, press the red emergency button on the safety switch to immediately turn the scanner off.
- ◆ Allow the scanning lights to warm up at least fifteen minutes prior to scanning.
- ◆ Never leave the scanner on for a long period of time. More importantly, the vacuum must be turned off after each use. The vacuum may burn out if left on.
- ◆ After a scan, save your image as a new file in PhotoShop (psd, eps, or tif). Then transfer the images to the G:\ shared folder on the connected PC. Delete the scanned TIF file. It has no color calibrations and is only taking up hard drive space.



# General Information

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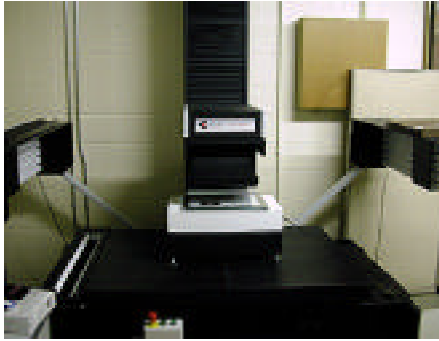


Figure 2: The Cruse reprographic scanner.

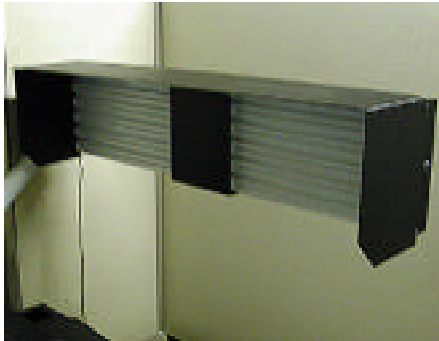


Figure 3: One of two fixed lights on the Cruse scanner.



Figure 4: The light box attachment used for negatives, positives, and transparencies.

**The Cruse Synchron Scanner** is essentially an "inside-out" scanner. (See figure 2.) The main pieces consist of the head and lens, column, fixed lights, sync light, vacuum board, light box, plate glass, and book cradle.

There are three main light sources, giving the user a lot of versatility. The synchron light, or "sync light" for short, travels in sync with the scanner to allow for even illumination over the flat surface of the vacuum board or plate glass. The user is also given the option to install one or two polarizing filters, primarily meant to reduce specular highlights that an oil painting would produce, for example. By installing just one polarizer, the scan will result in directional shadows and highlights on the art scan.

The second source of light would be the set of fixed lights. (See figure 3.) These lights allow the user to scan thicker materials, including 3D objects.

The last source of light is the light box. (See figure 4.) This piece of equipment is removable from the equipment and must be physically placed onto the vacuum board. This accessory allows the user to scan negatives, positives, and transparencies.

The Cruse scanner gathers information in a 48-bit range. Because the scanner works with SilverFast AI software, the 48-bit range allows the user to color correct with more color information before changing to 24-bit in PhotoShop. This captures a high level of detail allowing for a higher quality in color and more total control over the scanned image. This will eventually reduce production and labor costs. Keep in mind that a poor scan will most likely result in poor final output, no matter what changes were made after the initial scan.



# Turning the Scanner On

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Figure 5: The power box is switched on, as indicated by the green light.



Figure 6: The safety switch.

Make sure that the power box is switched on (*see figure 5*), then press the green safety reset button. The green indicator lights for the power box and the safety switch must be on before starting the scanner software.

In emergencies, press the red emergency button on the safety switch. (*See figure 6.*) This will immediately turn the scanner off. To release the emergency button, simply twist until it pops back into place.

Double click the Cruse Scanner Software. The Cruse Color scanner logo will be displayed as the CCD finds its reference position. Be patient while the scanner automatically finds the reference positions for the lens, head, and sync light. Please be sure that there are no objects on the vacuum board during this procedure as damage to the system may occur. The normal system warning indications may not be displayed.

To shut the machine down, first shut down the software. The user may then shut the power switch on the power box off. Make sure the green indicator light is off.



**IMPORTANT:** Never leave the scanner or the vacuum on for a long period of time. The vacuum should only be on during scanning.



# Main Screen

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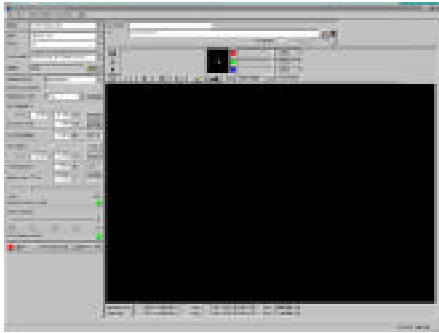


Figure 7: The main software screen.

After starting the CSx software, the main screen will be displayed. (See figure 7.) The main screen allows you to control all the settings, operations, and controls of the scanner system. It functions as the primary window for the user to work out of.

The left menu is organized from top to bottom to set up the scanner settings. This makes scanning easy for any newcomer. The user can simply follow each section from top to bottom to set up any image to be scanned. Be sure to read through this manual before beginning, as there are many things any user needs to be aware of.

Located at the top right of the menu are many more scanning features for use after the pre-scan is made. Color correction tools and zoom tools are just a few.

## Warning Indications

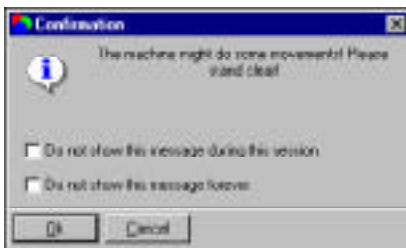


Figure 8: The confirmation window.

This window allows the user to check the confirmations to be displayed. (See figure 8.) The user has the option to turn confirmation boxes on and off. Be aware that by turning these options off, you risk the possibility of the system moving to a position without warning and may cause potential damage.



**IMPORTANT:** For our purposes, students shall NOT change confirmation settings. Refer to the first page of “Important Things to Know.”



Figure 9: The move progress window.

The move progress window will appear when the system is positioning. (See figure 9.)



# Main Menu: General

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Figure 10: This is the standard menu for the Cruse software.

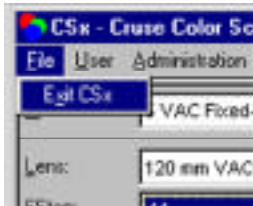


Figure 11: This is the file menu in the Cruse software.

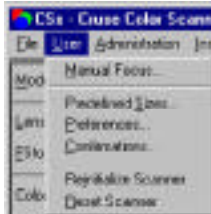


Figure 12: This is the user menu in the Cruse software.

## File

Exit CSx exits the program and closes all background scanner applications. (See figures 10 and 11.)

## User

The user menu contains different settings for the user. (See figure 12.)

*Manual Focus:* This option allows the user to manually move or focus with the zebra chart.

*Predefined Sizes:* Here, the user can edit, add, and delete previous defined sizes. After selecting new or edit, a new window will be displayed. Here you can enter your new size date in inches or centimeters. Check the boxes labeled original or print. Both can be checked if needed.

*Preferences:* This option allows users to manage the system preference file. There should not be any changes made here.

*Confirmations:* This option turns confirmations on or off. Students shall not change these settings. All confirmations shall stay on. Refer to the first page in case these settings are changed.

*Reinitialize Scanner:* Click to reinitialize the scanner system.

*Reset Scanner:* Moves all axis to the reference positions.



**IMPORTANT:** Be sure to remove all objects from the vacuum board before resetting the scanner. Serious damage can occur and may void warranty, Refer to the first page on “Important Things to Know.”



# Main Menu: Left

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Figure 13: The left menu within the Cruse software.

The left side of the menu allows the user to adjust scan settings. (See figure 13.)

**Mode:** Select the desired mode. Possible modes:

- ◆ Fixed Lights
- ◆ Under Glass
- ◆ Light Box
- ◆ Sync Light
- ◆ Sync Light with both Polarization filters
- ◆ Sync Light with one Polarization filter

The corresponding light sources are automatically selected. At this point, you may receive a confirmation window. Click OK to continue.

**Lens:** The system automatically selects the correct lens for the mode and dpi range. The user should not have to change this setting, but must manually change the lens within the scanner to match the default setting.

**F-stop:** The system automatically selects the correct F-stop. The user may change this setting as needed. Make sure that you manually change the F-stop on the lens within the scanner to match your F-stop setting. (To change the f-stop and create a larger depth of field, read the “Scanning in 3D” section on page 12.)

**Color Depth:** Select a color depth of 24 or 48-bit. Use 48-bit whenever possible.

**Media:** For creating or selecting original surface types such as matte or inkjet, the user can generate white balances for different original types.

**Balance Mode:** Select a white balance mode. Possible modes:

- ◆ none
- ◆ mode
- ◆ media specific



## Main Menu: Left (cont'd)

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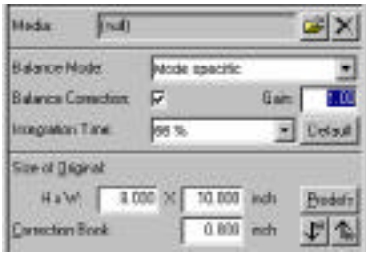


Figure 14: The left menu within the Cruse software allows the user to adjust their scan settings.

### **Scan Resolution vs. Print Resolution:**

Since you may not know the final output of your scanned image, you should base your scan on the scan resolution and create a scan at the highest resolution. You can then later modify your settings when you know the output.

If you know the output, ignore the Scan Resolution settings and skip to the Print Resolution section. Follow the steps and make sure to click the TIF button that corresponds with this section.

*Balance Correction/Gain:* Make exposure corrections if necessary. (See figure 14.) Click the checkbox to activate. “2” doubles the exposure, “0.5” halves the exposure time, etc. (To change the gain to accommodate for a manual change in f-stop, read the “Scanning in 3D” section on page 12.)

*Integration Time:* This controls the saturation in an image. This is automatically set with the mode but may be changed by the user. By gaining the percentage of integration time, the user increases the saturation in the image, and vice versa.

*Size of Original:* Enter the size of the original in inches or cm. (You can change from inches to cm by clicking on the inches or cm text.) By selecting “Predefs,” the user can select from a list of predefined sizes. You can also edit the list.

*Predefs:* Click the down arrow under “Predefs” to automatically calculate the maximum dpi for the original size. Click the up arrow under “Predefs” to automatically calculate the maximum original for the set dpi. Border size is defined in preferences. The default border size is 5%.

*Correction Book:* Here, the user can enter the height correction of the original in inches or cm from the vacuum board. (To calculate for 3D images, read the “Scanning in 3D” section on page 12.)

*Scan Resolution:* Input the scan resolution (dpi). Press Enter and the needed magnification will be automatically re-calculated.

*TIFF:* Check the “Tiff” button to the right of the scan resolution to avoid scanning with the print size settings that follow.

*Size of Print:* Enter the final print or output size in inches or cm. By selecting “Predefs,” the user can select from a list of predefined sizes. You can also edit the list. The “=Orig” button copies the original size data to the print size.





## Main Menu: Left (cont'd)

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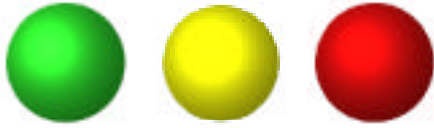


Figure 15: Indicator lights. A green indication light indicates the scan camera is in the dpi position and focused. Yellow indicates the scan camera was manually moved or focused. Red indicates the scan camera is out of focus. The user should have all three indicator lights at green before scanning (with exception to a yellow move indicator light with a manual focus).

*Print Resolution:* Enter the print or output resolution.

*TIFF:* Check the “Tiff” button to the right of print resolution to scan the image using the print settings. (If the TIFF button is not activated, the software will ignore this section.)

*Magnification/Ratio:* Enter the magnification or ratio if necessary. This is automatically selected with your settings. However, the user may have to change these settings manually occasionally. The numbers on the left and right end are the limits. The magnification determines the DPI.

*Indicator Lights:* The indicator lights lets the user know if the selected magnification is in range. (See figure 15.) A green light indicates that the magnification (dpi) is in range. A red light indicates that the magnification (dpi) is out of range.

*Pixel Resolution:* This is the physical resolution of the CCD. The numbers indicate how many pixels will be scanned. A 1/1 will scan all pixel rows. A 1/2 will scan every other pixel row, and so on. 1/16 is the resolution of a pre-scan. The user may occasionally have to change this ratio down to accommodate for the dpi. (It has occurred that the scanner cannot reach the lower dpi that we need. Because of the extra time associated for a higher resolution scan that we will not use, we lowered the pixel resolution to 1/2 to accomodate this problem.)

*White Balance Exists:* A green indicator light shows that a white balance will be applied to the scan. A red indicator light tells the user that no white balance will be applied to the scan.

*Move:* Moves the scan camera into calculated dpi position.

*Home Sync Light:* This button only appears when the user is in sync light mode. This moves the sync light to its home position.

*Lights On/Off:* This button switches the selected light mode on and off.




# Main Menu: Right


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Figure 16: The top menu within the Cruse software.


The top menu allows the user to select their scanning preferences after a pre-scan. (See figure 16.)


 : Click to start a pre-scan. The entire scan area will be pre-scanned. By pressing the Alt. key at the same time, the user will pre-scan the scan frame only.


 : Zoom the scan (selector) frame area. A new window will appear. The user can zoom in closer by selecting a smaller frame within the image.


 : Start the scan. The user will be prompted for a file name. Make sure NOT to save over another image. It is important that all good images be saved to the G:/ drive connected to the PC computer and also archived onto a CD-ROM or DVD-RAM disk.


 : Display or hide the scan (selector) frame.

 : Switch the scan or selector frame to the maximum size.

 : Center the scan selector frame.

 : This is the focus tool. It measures the sharpness on the marked position. Move the mouse cursor to the desired position, press the left mouse button and draw a vertical line. Then manually focus. See the manually focus section.

 : Display or hide the original size frame indicated by the user in the original size section at the left. This frame represents how the original fits into the scan area and re-sizes as dpi (magnification) changes.

 : Clears or erases the preview window of the previously scanned images.



## Main Menu: Right (cont'd)

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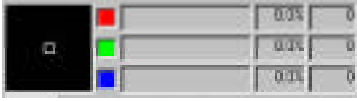



Figure 17: The densitometer.



Figure 18: The user may enter their job name here. It is important to do this as to make sure not to overwrite any previous files.

**NOTE:** Whites should be at about 95%. You can check this after pre-scanning by pointing the cursor at white in the pre-scan. The RGB values should range at about 95% each. This is a good indication of correct exposure.

 : Displays the histogram. The histogram allows the user to set the black-, middle-, and white-point values. This allows you to make corrections by moving the three sliders. For automatic correction, pre-scan the original. Place the selector frame within the image area. Click the histogram button and apply. Be sure to set the gamma to 1.00 first. The black and white point will be automatically set. The reset button allows the user to reset the image.

The densitometer displays the RGB colors and values at the position of the cursor in the pre-scan window. (*See figure 17.*) Colors outside 100% will be lost. For this reason, there is a general rule that whites should measure at about 95%.

# Manual Focus

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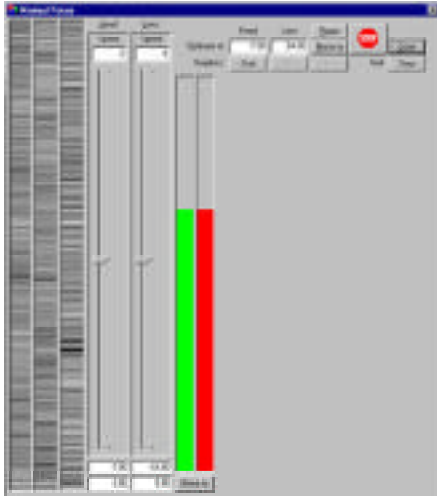


Figure 19: The manual focus window.

The user may adjust the focus manually. (See figure 19.) Normally, this should not be necessary unless a correction book (original height offset) applies and the values cannot be measured exactly.

By moving the sliders, the selected motor will be driven up or down. Speed is determined by how far the slider is moved in either direction.

To manually focus, place the zebra chart in the three display boxes to the left side of the window. Press the reset button to equalize the red and green bars. Now, focus by using the lens slider. The green line displays the current sharpness. The red line displays the maximum sharpness. Move the lens up and down until the red line has reached its highest peak. Then, press the move to button, which will move the lens into the maximum sharpness position.

To obtain the best result, you should reset and adjust again moving the lens slower to obtain a finer focus. When finished, press "Done" to return to the main menu. It is important to always focus with the lens.



# Scanning in 3D

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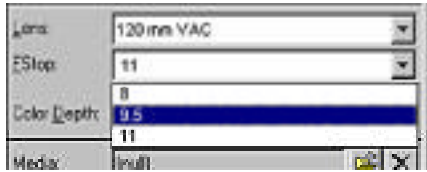


Figure 20: The user can change the f-stop to suit their scanning needs.

	<b>F-stop</b>	<b>Gain</b>
Default:	f-11	1
1 stop more:	f-16	2
2 stops more:	f-22	4
3 stops more:	f-32	8

Figure 21: F-stop table compared to gain. If the default is f-11, the gain is at 1. If the user wishes to have 2 stops more depth of field, they would manually change the f-stop on the camera lens to f-22 and the gain to 4.

First, measure the height of the 3D object. Divide the measurement by three and multiply by two. This gives you two-thirds the original height of the object. This is the ideal focal point. The user should adjust the correction point to this measurement. If the object is three inches high, for example, the correction book should measure two inches high.



**IMPORTANT:** When scanning 3D objects, the user may only use the sync light with objects less than three inches tall. For larger objects, it is necessary to use the fixed lights instead.

Scanning in 3D only proves to be a problem when encountering a small depth of field. The higher the resolution, the closer the scan head is to the vacuum table, and thus the less depth of field.

One option to change the depth of field is to decrease the resolution. However, this will probably not be common. Keep your final output in mind. If your dpi is higher than you need, it is overkill. Not only are you losing depth of field this way, but time as well: the time to scan and the time to open files.

The other option to create more depth of field is by changing the f-stop. (See figure 20.) The software does not have the option of an f-stop higher than f-11, but since the user adjusts this manually anyway, it hardly plays a problem. First, change the f-stop manually on the camera lens. Then change the gain according to the change in f-stop by activating Balance Correction and entering the appropriate gain. (See figure 21.)

For those unfamiliar with the concept of photography, this concept may seem tricky. Keep in mind that the larger the f-stop number, the larger the depth of field. By changing the f-stop from f-11 to f-24, for example, you allow for a larger depth of field. However, you also lose light. The user must accommodate this by changing the gain.

# How to Make a Scan

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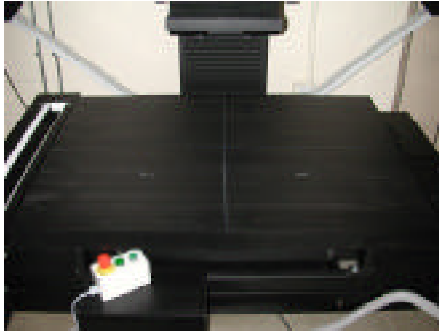


Figure 22: The vacuum board has alignment lines to help center the image as best as possible.

As a general rule, the user should follow the left side of the main menu from top to bottom when making a scan.

- ◆ Select the appropriate lighting mode from the pull down “Mode” menu.
- ◆ Select the correct lens and f-stop. There are two lenses available with this model. The user must manually position the lens turret and F-stop.
- ◆ Set the color depth to 48-bit. This gives the highest possible scan quality for the SilverFast software.
- ◆ Set the correct Balance Mode and Media to ensure a white balance exists during scanning.
- ◆ Measure the size of the original and center it on the scanner. It is important to center the image as best as possible for the highest possible dpi. (*See figure 22.*)
- ◆ Input the Size of Original. Press the Original Size frame selector button to display how the original fits into the capture area. Enter the Scan Resolution (dpi) or adjust the magnification/ratio to obtain the appropriate dpi.
- ◆ Input correction book (original height offset) if necessary.
- ◆ Input the Size of Print and Print Resolution. The scanner has mechanical limitations and therefore dpi limitations. These limitations are based on the position of the scan head and the size of the original. The higher the scan head is positioned on the column, the larger the image it can scan, but with less resolution. The lower the head, only a smaller portion of the scan bed can be seen, but at a greater resolution.
- ◆ Press the Move button to move the system to the selected dpi (resolution) scale.

# How to Make a Scan (cont'd)

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NOTE: Any movement around or near the scanner will disrupt the continuous light produced by the Cruse scanner and possibly ruin scans. To keep the quality Cruse provides, do not allow anyone to walk near the scanner.

- ◆ Do a pre-scan of the original. All three indicator lights should be green before scanning the original.
- ◆ Place the selector frame around the portion of the pre-scan you want for the final high-quality scan. Only the area within the selector frame will be scanned. You may need to adjust the Balance Correction gain first.
- ◆ When you are ready to scan, make sure the lights have been warmed up for at least fifteen minutes after initial startup. Also make sure that the lights in the room are off and remain off for the duration of the scan. Any movement or change of light around the scanner at the time of scanning will ruin the image. No one should be near the scanner when a scan is being made.
- ◆ Press the scan button and give it a file name. Be sure not to save over any other images. The scanning process will begin and automatically start SilverFast, within PhotoShop, when done. Be sure to select the correct IT8 profile, and then press Scan RGB. The color and grayscale correction will be applied as the image is opened into PhotoShop. Note that the final image has also been converted into 24-bit color.
- ◆ The scan creates a TIF file. This file is created and saved as the original TIF file. These files are large and do not contain the color corrections accounted for through the SilverFast software. Thus, there is no reason to keep the original TIF files. \*They will take up too much space on the hard drive. However, once the image is in PhotoShop, immediately save it as a new image. You may overwrite the scanned TIF file by saving it as a tif.



**\*IMPORTANT:** Save the ORIGINAL PhotoShop image before making any changes. Any changes made thereafter shall be saved to a NEW file and the original TIF files may be erased.

## Example # 1 :

### Original size, 300 dpi, at 48-bit color

- ◆ Select the mode. The lens and F-stop will be selected in the program automatically. Make sure to manually select the lens turret and F-stop on the scan head itself. A 48-bit color depth will be selected automatically.
- ◆ Enter the original size, which will then be displayed by pressing the Original Selector frame button at the top of the preview window.
- ◆ Enter 300 dpi for the Scan Resolution and make sure that the TIFF button is selected to the right. This disregards the size of print information located directly underneath.
- ◆ By pressing the Alt. key and the Maximum selector frame button, the scanned area is defined, including a slight enlargement to compensate for placement of the original.
- ◆ To move the head into focus, press the “Move” button at the bottom left of the main menu.
- ◆ You are now ready to pre-scan. Press the Alt. key and pre-scan button to scan the selected area.
- ◆ The user may change the selector frame to outline the final image. (If the image is outside the selector frame, re-measure the original size.)
- ◆ You are now ready to scan.

## Example # 2 :

### 36” width, 150 dpi, at 48-bit color

- ◆ Select the mode. The lens and F-stop will be selected in the program automatically. Make sure to manually select the lens turret and F-stop on the scan head itself. A 48-bit color depth will be selected automatically.
- ◆ Enter the original size, which will then be displayed by pressing the Original Selector frame button at the top of the preview window. Then calculate the Print Size.
- ◆ Next, enter the desired Print Resolution at 150 dpi. The scan resolution above will automatically be calculated. Make sure the TIFF button is selected to the right of the Print Resolution.
- ◆ By pressing the Alt. key and the Maximum selector frame button, the scanned area is defined, including a slight enlargement to compensate for placement of the original.
- ◆ To move the head into focus, press the “Move” button at the bottom left of the main menu.
- ◆ You are now ready to pre-scan. Press the Alt. key and pre-scan button to scan the selected area.
- ◆ The user may change the selector frame to outline the image. (If the image is outside the selector frame, re-measure the original size.)
- ◆ You are now ready to scan.



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The original Cruse manual was created and issued by Cruse. The manual was further reviewed, evaluated, edited, and information was added by Haley Puffer, a FLAAR editor, for FLAAR purposes. This manual is issued by FLAAR for consumers.

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