

7 Working With Studies

The Terason software provides many tools for you to work with studies. These tools allow:

- [Storing Images and Loops](#); see page 113
- [Reviewing Patient Studies](#); see page 115
- [Exporting Studies](#); see page 115
- [Exporting Images and Loops](#); see page 119
- [Deleting Studies and Images](#); see page 122
- [Printing Images](#); see page 123
- [Using Studies with a DICOM Server](#) on page 138

Storing Images and Loops

You can save acquired images either as individual image files, or as Cine loop files. To store images and loops, you must understand:

- [Monitoring Disk Space](#); see page 113
- [Saving Images and Loops](#); see page 114
- [Viewing saved Images and Loops](#) on page 115

Images and loops are saved in the DICOM format and have a file extension of **.dcm**.

You can also copy the image in the 2D Image window by pressing the F4 key. This saves the image in the Windows clipboard, and you can paste the image into another application on your computer.

Monitoring Disk Space

Be aware of the amount of free space on your C: drive (the default drive where the application is installed). If the hard drive is full, the system cannot save files.

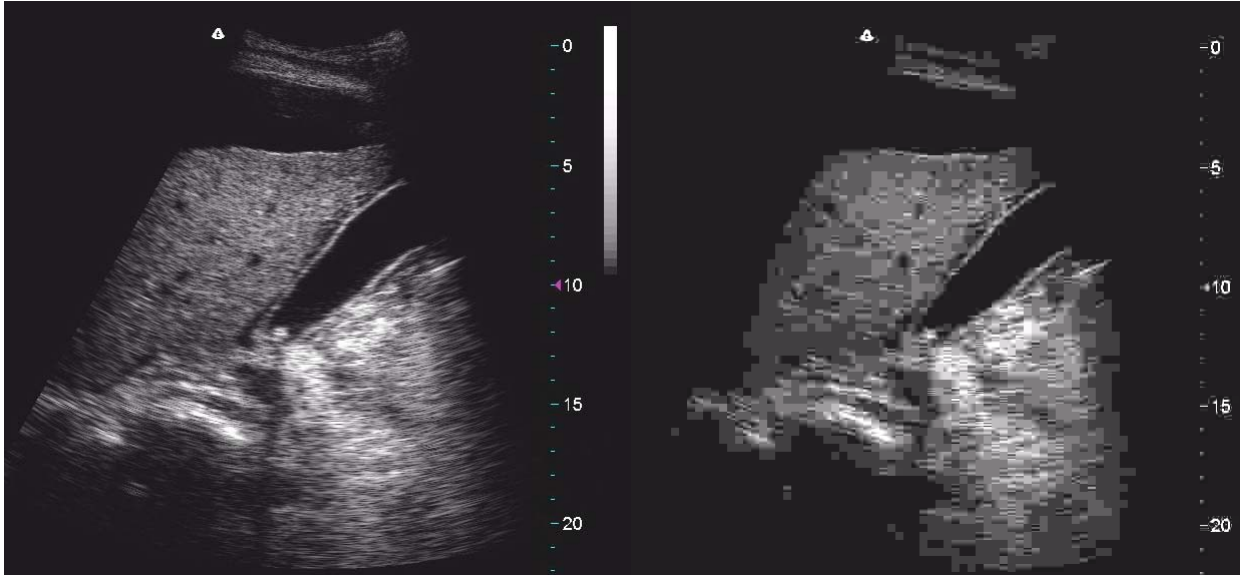
Many factors, such as the scan mode and measurements or annotations, can contribute to the size of an image file. A single frame (a saved image) can range from 300 KB to 700 KB. An image loop can be from 2 MB to 18 MB.

The Imaging window includes an indicator showing free disk space, next to the DICOM Status indicator at the top of the screen.



Disk Free Space Indicator

When free disk space is less than 2 GB, the background of the indicator changes from gray to yellow. You can select a different level for this change on the Store/Acquire tab of the Setup window. If the free disk space becomes smaller than 1 GB, you should move files to a backup CD (see [Exporting Studies](#) on page 115) and delete them from the C: drive, or just delete unimportant files (see [Deleting Studies and Images](#) on page 122).



Scan Uncompressed (Left) and JPEG Compressed (Right)

The compressed scan shows squares throughout. If you see squares like these, or an occasional block, interpret them as JPEG artifacts.

Saving Images and Loops

Images and loops are saved to the Study directory, in the appropriate patient folder. If no patient is associated with a scan, no images or loops can be saved. All images and loops for a given patient saved on the same day are saved in the same study, unless the **New Study** button in the Patient window is clicked before a later image is saved. A single study cannot include images and loops saved on different days.

For Split Screen mode, you can save the Split Screen image (as a single frame showing both screens).

You can save the Split Screen image as a loop file. When you do, the Terason software saves the active screen as an image loop, and the other screen as a single frame.

To save an image or loop, complete these steps:

1. Press the **Freeze** key if viewing a live image.
2. To save an image, press the **Store** key.
You can also save an image by pressing F8 on the computer keyboard.
3. To save an image loop, press the **Store** key when live imaging (not frozen).
4. To add the saved image or loop to the report for the current study, place the cursor on the image or loop, press the **Right Enter** key, and select Add to Report.

5. To delete an image or loop, place the cursor on the image or loop, press the **Right Enter key**, and select Delete.

If you did not load patient information for an exam, you cannot save images or loops.

You can view the saved studies as described in [Finding Studies in the Patient Window](#) on page 115.

If you open an image file and then save it again, the Terason software creates a new file; it does not overwrite the original file.

Viewing saved Images and Loops

When you save an image or loop, a thumbnail of it appears in the area at the right of the Imaging window. When more than 12 images or loops are included in the study, some will be hidden. To view them, click the scroll arrow at the bottom of the thumbnail area. To scroll back up, click the scroll arrow at the top of the thumbnail area.

To review a saved image or loop in the current study, double-click the thumbnail of the image or loop. It displays in the Imaging window.

Reviewing Patient Studies

You can find saved patient studies by using the Study List... button on the Patient window.

Finding Studies in the Patient Window

To find previously-saved studies in the Patient window:

1. Press the **Patient key**.
2. In the Patient window, click the **Study List... button**.
The Study List window opens, displaying a list of saved studies.
3. The default is to show all the studies. To find studies done on a specific day or range of days, click the **Study Date** menu, and select Today, Last 7 days, Last 30 days, or In date range.

If you click In date range, a box opens where you can select a range of dates to show studies from.

4. Find the desired **study** in the list, and click it to select it.
5. Press the **Review key**.

The selected study loads in the Imaging window.

Exporting Studies

You can export studies, images to a CD, a DVD, a DICOM server, a USB drive, or another location on a network. When exporting a study, image, or loop, the system creates a uniquely-named subdirectory for each study, image, or loop.

Study Exporting Procedure

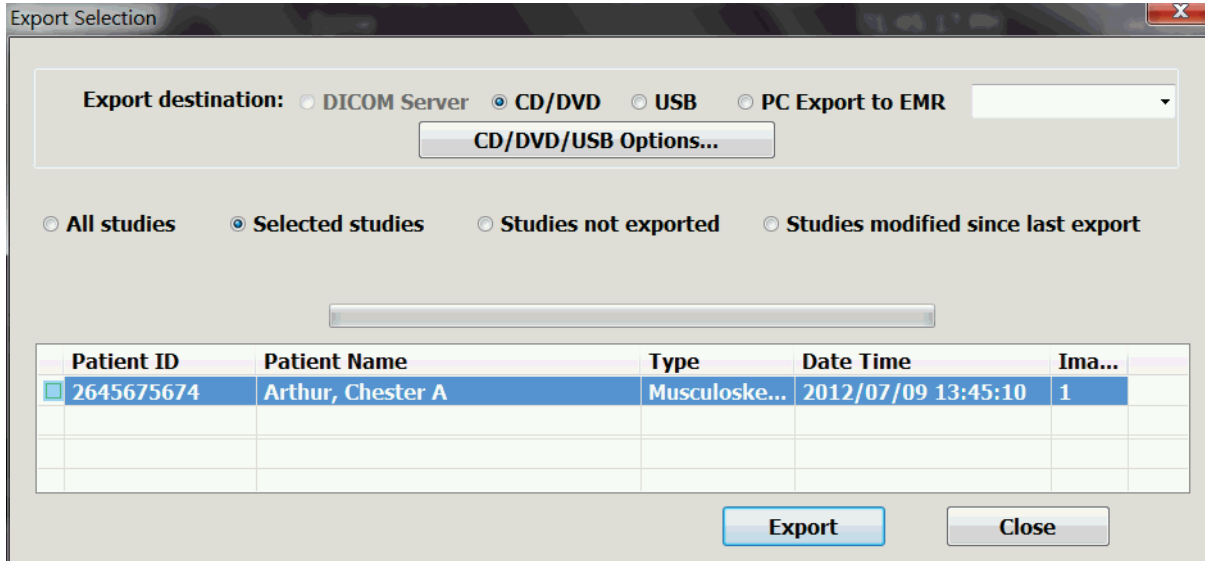
To **export a study**, complete the following procedure:

1. **Save** the study. See [Saving Images and Loops](#) on page 114.
2. Press the **Patient key**.
3. On the Patient window, click the **Study List...** button.
4. On the Study List window, select the **study** you want to export

To select multiple studies, hold down the Shift key while you click the first and last study you want to export. If that selects studies you do not want to export, hold down the Control key and click on the unwanted studies.

5. Click the **Export** button.

The Export Selection window opens. A row of radio buttons lets you choose different parameters for selecting studies to export.



Export Selection Window

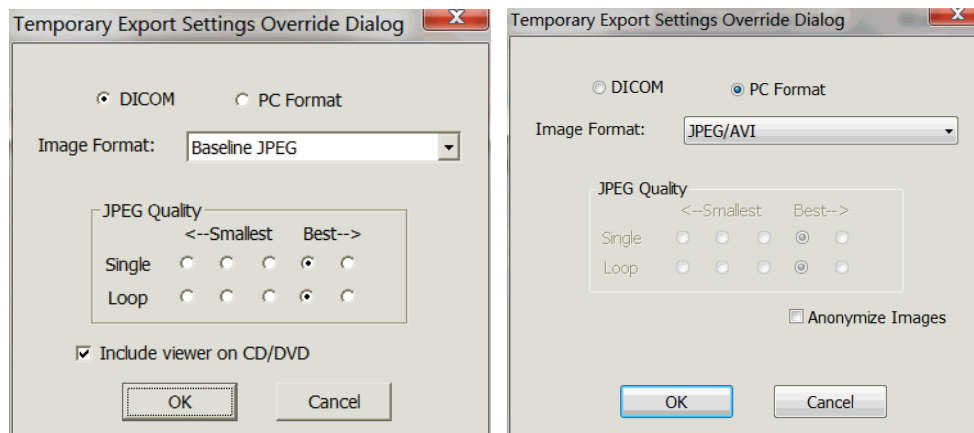
6. To **export to a CD or DVD**, configure the image format and other parameters.

- a. Click **CD/DVD**.

The DICOM Server button changes to a CD/DVD/USB Options button.

- b. Click the **CD/DVD/USB Options button**.

The Temporary Export Settings Override Dialog box opens.



Temporary Export Settings Override Dialog Box

- c. To change the image format, choose a format from the **Image Format:** drop-down menu.



Note: If the PC Format radio button is selected, only the image is exported. None of the patient information is exported.
If the DICOM radio button is selected, the patient information is exported.

- d. To change the JPEG quality, select a **radio button** in the JPEG Quality area.
 - e. To copy a DICOM image viewer onto the CD, select **Include viewer on CD/DVD** so the box is checked.
See [Using the DICOM Image Viewer on a CD or DVD](#) on page 140.
 - f. To **remove patient information** from a PC Format study, click Anonymize Images.
 - g. When the selections are correct, click **OK**.
7. To **export to a USB drive:**
- a. Click **USB** on the Export Selection window.
 - b. Click the **CD/DVD/USB Options** button.
- The Temporary Export Settings Dialog box opens. It has the same controls as the CD/DVD box (see step 6, above), except that it has no option for including a viewer on the target drive.
- c. When the selections are correct, click **OK**.
8. To export to **an electronic medical records (EMR) location on a network:**
- a. Click the **PC Export to EMR** radio button.
 - b. If no EMR destination is set as a default, or if you want to send to a different destination, select a destination from the drop-down menu.
For information on setting defaults for PC Export, see [PC Export Options](#) on page 155.
9. On the Export Selection window, click the **Export.** button.

The Select Path window opens.

10. On the Select Path window, navigate to the **target drive** and select it.

11. Click **OK**.

The Terason software exports the image or loop to the target drive.

Exporting Studies Automatically

An option on the Setup/Export window (see [Setup Export Window](#) on page 154) enables exporting studies automatically to the designated default location when the Close Study or End Study button is pressed, or when a new patient is selected. To export automatically, the following conditions must be met:

- The destination must be either:
 - PACS, if one or more DICOM servers is configured for image or structured report exporting
 - or
 - EMR, if no PACS DICOM server is configured and a default EMR PC Export location is set as the default
- The study must never have been exported or must be modified since a previous export. Studies exported to PACS are considered exported when the status is Pending, but not when the status is Failed.

Auto exports start automatically with the Export dialog displayed. The buttons on the dialog are disabled until the export is finished queuing for PACS or finished exporting to EMR. The Export dialog window closes automatically when the export is finished.

Export Status Indicator

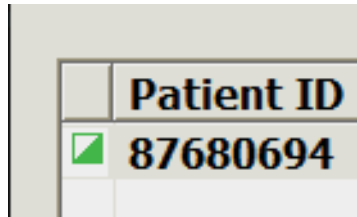
In the left column of the study list in the Export Selection window is a small box that indicates by its color whether the study has been exported. The upper left area of the box refers to exports to USB drives, CDs, and DVDs. The lower right area of the box refers to exports to a PACS system.

The meanings of the colors are given in the following table.

Export Status Indicator color meanings

USB / CD / DVD	PACS
Blank: study not sent	Blank: study not sent
Green: study sent ^a	Green: study sent
	Yellow: send pending
	Red: sending failed
	Black: study has been modified since being sent (the file on PACS is not up to date)

- a. During export to a USB drive or disc, the status indicator turns green. If writing to the target fails, the indicator goes back to blank.



Export Status Indicator

In the illustration above, the indicator shows that the study has been sent to a PACS system, and that it has not been exported to a USB drive, CD, or DVD.

Exporting Images and Loops

You can export an image onto the computer hard drive or an external drive, as a JPEG, BMP, or AVI format. You can also attach an image in one of those formats to an email message.

See:

- [Selecting File Types for Export](#) on page 119
- [Exporting an Image in a PC Format](#) on page 120
- [Attaching an Image to an Email Message](#) on page 121

Selecting File Types for Export

The Terason software allows you to export an image or loop to external media in any of these formats:

- AVI
- Bitmap
- DICOM
- JPEG

You can email image and loop files or include them as graphics in other applications.

If you save images using the JPEG format, be aware of the effects of data compression. By default, the Terason software uses a lossy JPEG compression algorithm. After compression, some of the image data is gone. When viewed, the compressed image may show artifacts caused by the JPEG compression. The artifacts may also show if you view the image on a medical viewing station that allows you to window and level the image.

The amount of compression on an image cannot be selected or predicted. One scan may compress at a ratio of 10:1, and another may compress at a ratio of 5:1. It is possible that medically-significant structures could be lost as a result of compression, regardless of the amount of compression. In addition, compression may result in artifacts appearing on the image.

To demonstrate what JPEG artifacts look like, the following example shows an uncompressed ultrasound image, and a JPEG compressed image of the same scan. The JPEG version was compressed at a ratio of 2500:1.

Exporting an Image in a PC Format

To export an image in a PC format:

1. Place the cursor on the image or loop in the thumbnail area at the right side of the Imaging window, and press the **Right Enter key**.

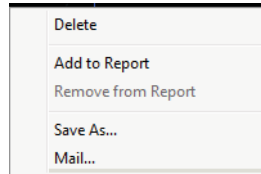
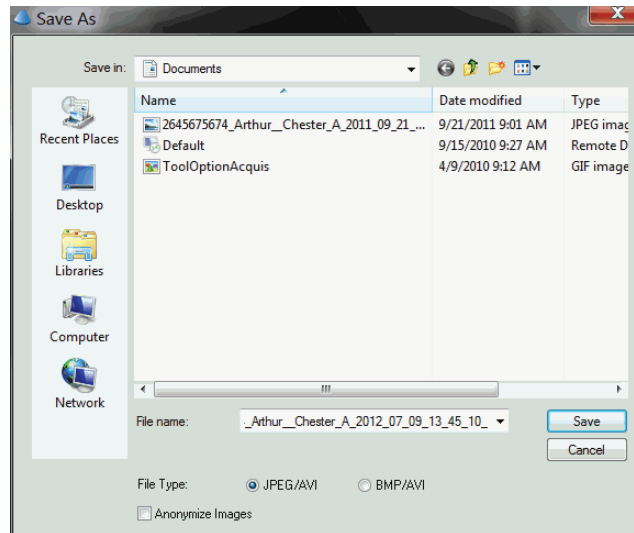


Image Context Menu

2. Select **Save As** from the Image Context menu.

The Save As window opens.



Save As Window

3. To remove the patient identification from the file name, click **Anonymize Images** so that the box is checked.
4. Click the radio button for the **format** you want to export as, either JPEG/AVI or BMP/AVI.
5. If you clicked Anonymize Images, enter a **file name** for the image file in the File Name: field.
6. Click the arrowhead at the right-hand end of the **Save in:** field, and navigate to the directory you want to save the image file in.
7. Click **Save**.

The system saves the image to the specified drive in the format you selected, in a new directory.

Attaching an Image to an Email Message

When you choose the Mail... option on the image context menu, you can attach the selected image to an email message.



Note: You must have an email program installed on the Terason Ultrasound System computer to use this feature.

To attach an image to an email message:

1. Place the cursor on the image or loop in the thumbnail area at the right side of the Imaging window, and press the **Right Enter key**.

The Image Context menu appears.

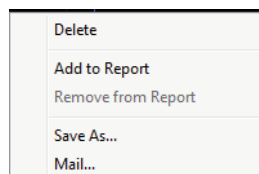


Image Context Menu

2. Click **Mail...**

The E-mail Options window opens.

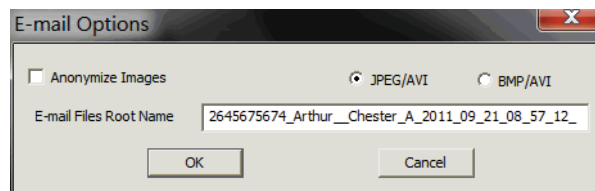


Image E-mail Options Window

3. Configure the **email options**.
 - a. To remove the patient identification from the file name, click **Anonymize Images** so that the box is checked.
 - b. Click the radio button for the **format** you want to export as, either JPEG/AVI or BMP/AVI.
 - c. If you clicked Anonymize Images, enter a **file name** for the image file in the E-mail Files Root Name field.
 - d. Click **OK**.

The system launches the email program and opens a new email message with the image attached.

4. Enter the **recipient and title** of the email.
5. Add any desired **text** in the message area of the email.
6. Click **Send**.

Deleting Studies and Images

Terason recommends that you delete unnecessary studies and images to free up disk space.

Files are immediately and permanently removed from the system, and cannot be retrieved.

Deleting Studies Manually

Deleting a study also deletes its component images and loops. Deletion is permanent, and the images and loops cannot be retrieved.

To delete studies, complete these steps:

1. Press the **Patient key**.
2. Click the **Study List...** button.
3. If the study was not done today, click the **Study Date** menu, and select All Dates.
4. Click to **select the study** you want to delete.
 - To select **multiple consecutive studies**, hold down the Shift key, then click the first and last studies.
 - To select **multiple non-consecutive studies**, hold down the Control key, and click on each study you want to select.
5. Click the **Delete** button.

A dialog asks you to confirm that you want to delete the files.
6. Click **Yes**.

The study is permanently deleted, and cannot be retrieved.

Deleting Studies sAutomatically

You can configure the system to automatically delete studies that have been exported. See [Auto Delete Exported Studies](#) on page 152 to set up auto deletion.

Deleting Images

To delete images, complete these steps:

1. Place the cursor on the image or loop in the thumbnail area at the right side of the Imaging window, and press the **Right Enter key**.

A menu appears.

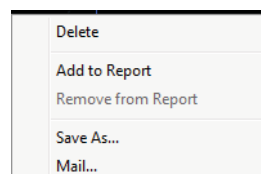


Image Context Menu

2. Click **Delete**.
3. In the confirmation dialog box, click **Yes**.

The image is permanently deleted, and cannot be retrieved.

Printing Images

You can print any image file from the Terason system. If you print an image loop, the Terason software only prints the currently displayed frame.



Warning: Non-medical grade report printers cannot be used within a patient environment.

Warning: During use of a non-medical grade report printer or when a non-medical grade report printer is connected to the ultrasound system, the printer must be outside of the patient environment and the ultrasound system cannot in any way be in contact with a patient.

You can use any of the following methods to print images (described in more detail in the subsequent sections):

- [Setting Up Printing](#); see page 123
- [Printing the Displayed Image](#); see page 125
- [Printing in Split Screen Mode](#); see page 125
- [Printing Multiple Images](#); see page 126

Before printing, use **Print Setup...** on the **Print** tab of the **Setup** window to select a default printer and default print settings, such as page size and orientation.

Setting Up Printing

Before printing, you must connect the ultrasound system to a printer and select default print settings.

Connecting a Printer

To physically connect a printer, use a USB cable connected to the printer and to a USB port on the side of the ultrasound system. Windows automatically recognizes the printer.

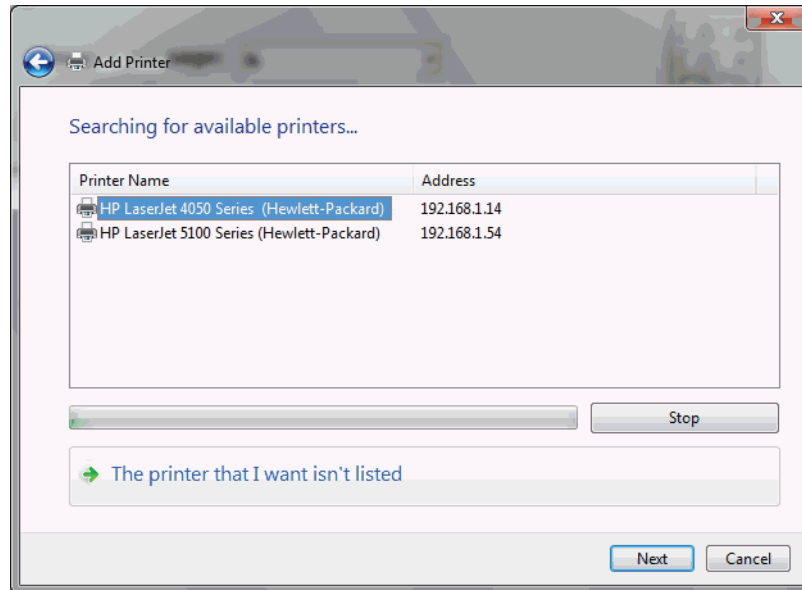
To connect a remote printer on a wired or wireless network, complete these steps:

1. Press the **Setup** key.
2. On the Setup window, click the **Print** tab.
3. Click **Add Printer....**

The Add Printer window opens asking whether you want to connect to a local (non-USB) printer or a network printer.

4. Click **Add a network, wireless or Bluetooth printer**.

The software begins searching for printers on all networks that the system is connected to.

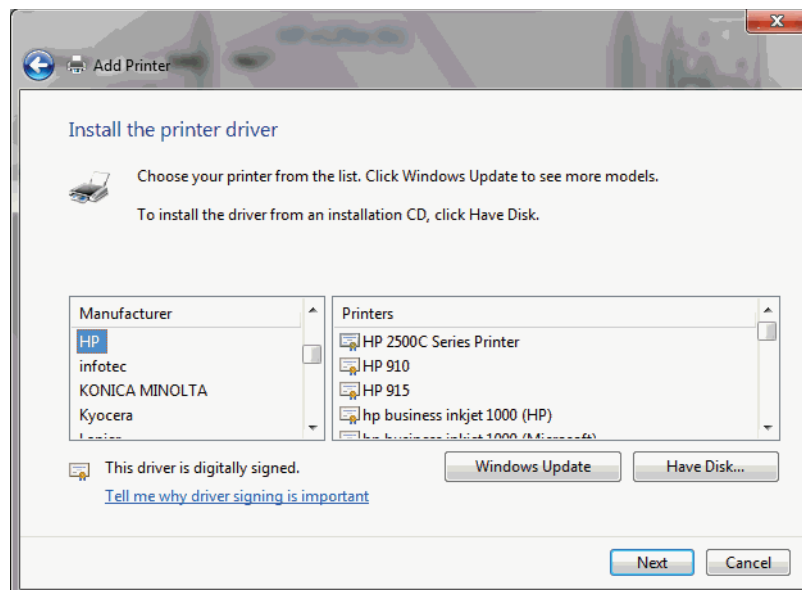


Add Printer Window

When it is done searching, the progress bar below the list turns completely green.

5. Click the name of the printer you want to connect to, then click **Next**.

The Add Printer window changes, showing a list of printer manufacturers and a list of models.



Getting the Printer Driver

6. Click the **printer manufacturer name** in the left pane of the window.
7. Click the **model of printer** you want to connect to in the right pane of the window.
8. Click **Next**.

You may see a dialog box saying a driver is already installed, and asking if you want to use that driver or replace it.

9. Click **Next.**

A confirmation message box opens.

10. Click **Next.**

You may see a dialog box asking about sharing the printer.

11. Click **Next.**

12. Click **Print a test page to verify that the connection to the printer is working.**

13. Click **Finish.**

Configuring Printing

You must configure the printer defaults before printing. When you press a **Print** softkey, the image or images are sent to the printer using the defaults.

To configure the printer defaults, complete these steps:

- 1. Press the **Setup key**.**
- 2. On the Setup window, click the **Print tab**.**
- 3. Under **Layout**, select the number of images to print on a page.**

Multiple images print only from the Thumbnail window. In all other cases, only one image prints, on one page.

- 4. Click **Print Setup...** to configure setting such as Orientation (landscape or portrait), paper size, etc.**

The window that opens when you click **Print Setup...** is generated by the printer software, and is different for every printer.

Printing the Displayed Image

When viewing an image in the Imaging window, you can print the image. You must freeze live images before you can print them.

To print the displayed image:

- 1. If the image is not already frozen, press the **Freeze key**.**
- 2. Press the **Print** softkey.**

Printing in Split Screen Mode

When in Split Screen mode, the Terason software prints both screens.

To print a split-screen image:

- 1. Make sure that both screens are **frozen** and that you have added any necessary measurements or annotations.**
- 2. Press the **Print softkey**.**

The Terason software prints the Imaging window, including both screens.

Printing Multiple Images

You can print more than one image on a page. The images must be saved.

In Setup > Page > Layout, you can set a default number for printing when multiple images are selected. The available options are 1, 2, 4, 6, or 9 images to a page.

To print more than one image on a page, complete these steps:

1. Press the **Review key**
2. Press the **Thumbnail** softkey.
3. Select the **images** you want to print, by clicking them.
 - To select a **continuous sequence** of images, hold down the Shift key, then click the first and last image in the sequence.
 - To select a group of images that are **not a continuous sequence**, hold down the Control key and click each of the images you want to print.
4. Press the **Print** softkey.

The selected images are sent to the default printer, and printed at the number per page previously selected in the Setup window.