

Saving data

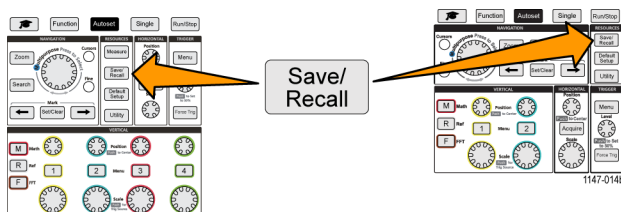
The oscilloscope has internal memory locations where you can save instrument setups and waveforms. You can also save screen images, setups, and waveforms to files on an external USB drives.

Saving screen images to a file

Use this procedure to save a screen image to a file on a USB drive. A screen image is a 'picture' of the oscilloscope screen. Screen images are useful to include in reports or to compare with other screen images over time.

NOTE. A screen image is different than waveform data. A screen image is a picture of the screen, and does not contain any data about the signals shown in the image. Waveform data is a file that contains the numeric values of all the sampled points in a single channel waveform. You cannot use a screen image file for further analysis, whereas you can load the data from a waveform file into other oscilloscopes, or into PC-based analysis programs to perform advanced signal measurements.

1. Install a USB drive.
2. Set up the display to show the waveforms and other readouts that you want to save.
3. Push the **Save/Recall** front-panel button.



4. Push the **Action** side-menu button.
5. Use the **Multipurpose** knob to select and click **Save Image**.
6. Push the **File Format** side-menu button.
7. Select and click a graphical file format (**BMP**, **JPG**, or **PNG**).
8. Push the **Save** side-menu button to save the screen image to an automatically-named file at the top level of the USB drive.

(See page 78, *About automatically generated file names.*)

You can also set the **File Save** button to automatically save an image file to the USB drive. (See page 70, *Saving files to USB with the Save File button.*)

About saved image file formats

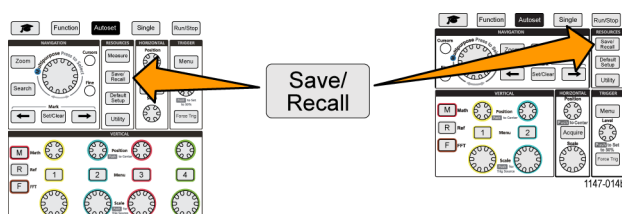
The image save function saves screen information to three common image formats.

- **BMP:** This bitmap format uses a lossless algorithm, and is compatible with most word processing and spreadsheet programs; this is the default. Creates the largest file size.
- **JPG:** This bitmap format uses a lossy compression algorithm, and is compatible with most word processing and spreadsheet programs. Creates the smallest file size.
- **PNG:** This bitmap format uses a lossless compression algorithm, and is compatible with most word processing and spreadsheet programs.

Saving waveform data

Use this procedure to save waveform data to a reference (**Ref**) memory location or an external file.

1. (Optional) Install a USB drive to save the waveform data to a file on the USB drive.
2. Acquire and display the waveform that you want to save.
3. Push the **Save/Recall** front-panel button.



4. Push the **Action** side-menu button.
5. Use the **Multipurpose** knob to select and click **Save Waveform**.
6. To save waveform data to internal reference memory:

NOTE. 20M record length waveforms cannot be saved to reference memory. All other record length waveforms can be saved to reference memory.

- a. Push the **Save To** side-menu button.
- b. Select and click **Ref**.
- c. Push the **Source** side-menu button
- d. Select and click the waveform data source (**CH1-CH4, Math, FFT**).

NOTE. *The selected waveform must be displayed on the screen to save waveform data.*

- e. Push the **To** side-menu button.
 - f. Select and click **Ref1** or **Ref2**.
 - g. Push the **Save** side-menu button.
7. To save waveform data to a file on the USB drive:
- a. Push the **Save To** side-menu button.
 - b. Select and click **USB File (*.ISF)** or **USB File (*.CSV)**. (See page 68, *About waveform data files*.)
 - c. Push the **Source** side-menu button
 - d. Select and click the waveform data source (**CH1-CH4, Math, FFT, Ref1, Ref2**).

NOTE. *The selected waveform must be displayed on the screen to save waveform data.*

- e. Push the **Save** side-menu button to save the waveform data to an automatically named file on the USB drive. (See page 78, *About automatically generated file names*.)

About waveform data files

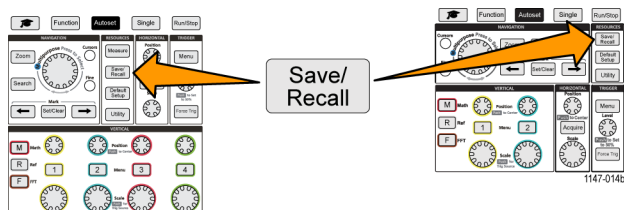
- **.ISF (Internal File Format):** Sets the oscilloscope to save waveform data from analog channels (and math and reference waveforms derived from analog channels), in internal waveform save file (ISF) format. This format is the fastest to write and creates the smallest-sized file. Use this format if you intend to recall a waveform to reference memory for viewing or measuring.
- **.CSV (comma separated values):** Sets the oscilloscope to save waveform data as a comma-separated data file compatible with popular spreadsheet programs. This file cannot be recalled to reference memory. A CSV file is significantly larger than an ISF file, and takes longer to write to the USB drive.
- To find out the channel for which the file was written, open the file in a text editor. The channel name is in the top few lines of the file.

Saving oscilloscope setup information

You can save the oscilloscope internal settings to an internal memory location (setup 1–10) or to an external file on the USB drive. A setup file contains most of the oscilloscope settings, including vertical, horizontal, trigger, cursor, and measurement parameters. It does not include communications information, such as GPIB addresses. You can then use the setup data to quickly set the oscilloscope to take a certain measurement.

Use this procedure to save the current oscilloscope settings to a memory location or external file.

1. (Optional) Install a USB drive to save the setup data to a file on the USB drive.
2. Push the **Save/Recall** front-panel button.



3. Push the **Action** side-menu button.
4. Use the **Multipurpose** knob to select and click **Save Setup**.
5. To save setup data to internal setup memory:
 - a. Push **Save To** side-menu button.
 - b. Select and click **Setup**.
 - c. Push **Setup** side-menu button and use the **Multipurpose** knob to select the setup memory location (1-10).
 - d. Push **Save** side-menu button.
6. To save setup data to a file on the USB drive:
 - a. Push **Save To** side-menu button.
 - b. Use the **Multipurpose** knob to select and click **USB File (*.SET file)**.
 - c. Push **Save TEKxxxxx.SET** side-menu button to save the setup data to an automatically named *.SET file at the top level of the USB drive. (See page 78, *About automatically generated file names.*)

Saving files to USB with the Save File button

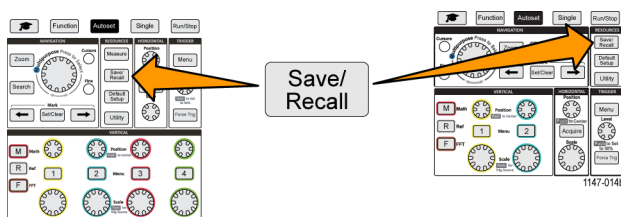
The **Save File** button is a quick, one-push way to save a specified data files to the USB drive. After you have defined the save parameters with the **Save/Recall** button and **Action** side-menu button, you can assign that save action to the **Save File** button. For example, if you assign **Save** to write waveform data to a USB drive, then each push of the **Save** button saves the current waveform data to the USB drive.

NOTE. The **Save** button only saves files to the USB drive. You cannot assign the **Save** button to save information to reference or setup memory, or to recall files from the USB drive.

NOTE. The oscilloscope saves files to the top level of the USB drive by default. You can use the **Change folder** button in the **File Utility** side menu to set the oscilloscope to save files to a specific location on the USB drive. (See page 75, *Changing the default file save location on the USB drive.*)

Files are saved to the USB drive using a specific naming convention. (See page 78, *About automatically generated file names.*)

1. Push the **Save/Recall** front-panel button.



2. Push the **Assign To** side-menu button.
3. Push the side-menu buttons for the action that you want to assign to the **Save** button (**Screen Image**, **Waveform**, or **Setup**). The save button is now assigned to that action.
4. For image or setup files: Use the **Save/Rec** side-menu buttons to select the output format for the action you assigned to the Save button (BMP, JPG, or PNG for screen images; .ISF or .CSV for waveforms).

NOTE. Setup files will always be saved as .SET files.

5. For waveform files: Use the **Save/Rec** side-menu buttons to select the signal source for saving waveforms (**CH1-CH4**, **Math**, **Ref1-2**).
6. Push the **Save** button to confirm that the assigned file type and format was saved to the USB drive.

NOTE. The **Assign To** button does not store the current save settings (such as file format or waveform source). The **Save** button uses the settings of the **Save/Rec** side menu to save files.

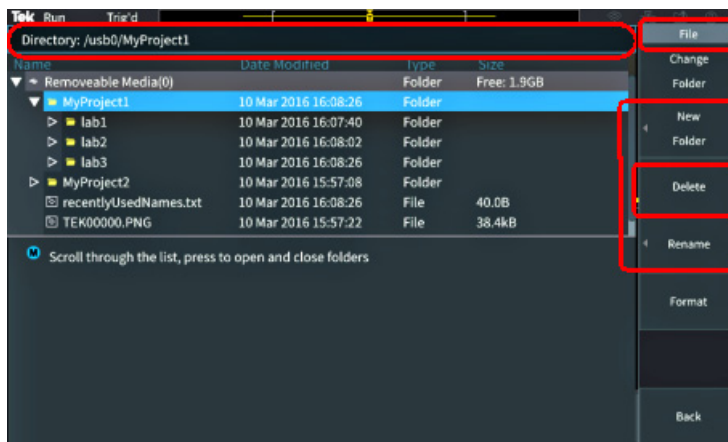
Using the USB File Utility functions

Use the **File Utility** functions to do file-related tasks on a connected USB drive. File tasks include:

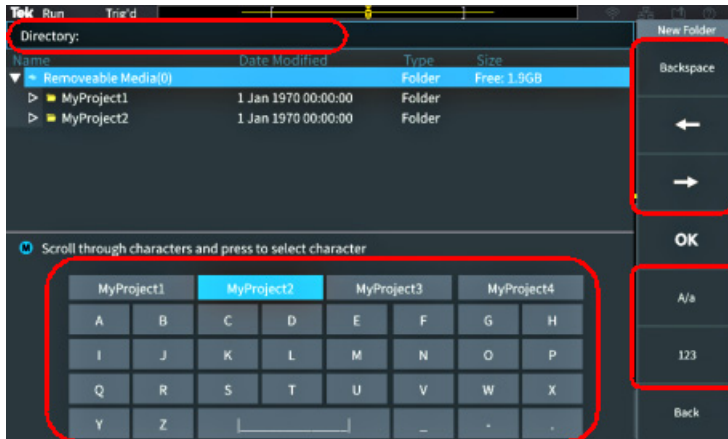
- Change the default folder where files are saved. (See page 75, *Changing the default file save location on the USB drive.*)
- Create new folders (See page 76, *Creating a new folder on the USB drive.*)
- Delete files and folders (See page 76, *Deleting files or folders from the USB drive.*)
- Rename files and folders (See page 77, *Renaming files or folders on the USB drive .*)
- Format the USB drive (See page 78, *Formatting the USB drive.*)

Overview of the File Utility pane

To open the **File Utility** pane, push the **Save/Recall** front-panel button and push the **File Utility** side-menu button.



- The **Directory** field lists the path for the highlighted folder or file. This is also the field you use to enter text to create or rename files or folders.
- The area below the Directory field shows the files and folders. Use the **Multipurpose** knob to highlight a name. Push the **Multipurpose** to open or close a folder. Folders are marked with a ► when closed, and with a ▼ when that folder is open.
- The **File** side-menu buttons perform the indicated file utility functions. **Change Folder**, **Delete**, and **Format** directly perform the indicated tasks.
- **New Folder** and **Rename** open the character entry field, keyboard, and side-menu buttons, shown in the following image.



- Use the **Multipurpose** knob to select and click a recently created name (listed at top of the characters list), or highlight the individual letters of the name that you want to enter. Then push the **Multipurpose** knob to add that letter to the **Directory** field. Repeat this process to enter the entire name.

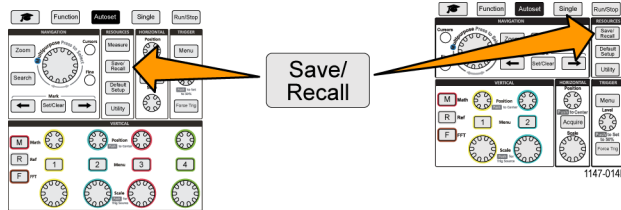
NOTE. If you are renaming an image, waveform, or setting file, you do not need to add the extension name when renaming the file.

- Use the upper side-menu buttons to delete the character to the left of the cursor (**Backspace**), or move the cursor left or right in the **Directory** field.
- Use the lower side-menu buttons to show upper-or lower-case letters on the keyboard or show a numeric keypad.
- Push the **OK** side-menu button to create or rename the file or folder with the name in the **Directory** field.

Changing the default file save location on the USB drive

By default, the oscilloscope saves image, waveform, and setup files to the top directory of the USB drive. Use this procedure to select a different default save folder on the USB drive in which to save files.

1. Push the **Save/Recall** front-panel button.



2. Push the **File Utility** side-menu button.
3. Use the **Multipurpose** knob to navigate to and highlight a folder in which to save files.
4. Push the **Change Folder** side-menu button. Saved files will now be saved to this location.

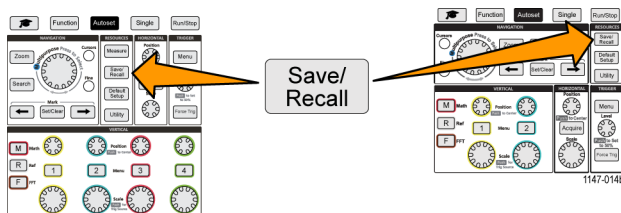
Default save folder location rules

- The new save folder location remains in effect until:
 - A new location is set with the **Change Folder** button.
 - The oscilloscope is powered down. The save location changes back to the top level of the USB drive.
- The following actions do not change the file save location. The oscilloscope shows an error message when it tries to save the file to a location that it cannot find. Use the **Change Folder** function to change the working folder location to an existing folder and try the save operation again.
 - Deleting the save location folder.
 - Removing or inserting a USB drive.
 - Pushing the **Default Setup** front-panel button.

Creating a new folder on the USB drive

Use this procedure to create a new folder on the USB drive.

1. Push the **Save/Recall** front-panel button.



2. Push the **File Utility** side-menu button.
3. Use the **Multipurpose** knob to navigate to the location at which to create the new folder.
4. Push the **New Folder** side-menu button.
5. Use the **Multipurpose** knob to select and click a recently created name (listed at top of the characters list), or enter the folder name using the **Multipurpose** knob and side-menu buttons to scroll through and highlight letters, numbers, and valid characters in the list.

Click the **Multipurpose** knob to enter the highlighted character. The characters that you enter are shown at the top of the file pane.
6. Repeat step 5 until you have entered the folder name.
7. Push the **OK** side-menu button to add the new folder name to the USB drive.

NOTE. There are four names at the top of the character list (default values are MyProject1-4). These names will change to show the most recent file or folder names that you have created. These names change back to the default values when you power off the oscilloscope or push the **Default Setup** front-panel button.

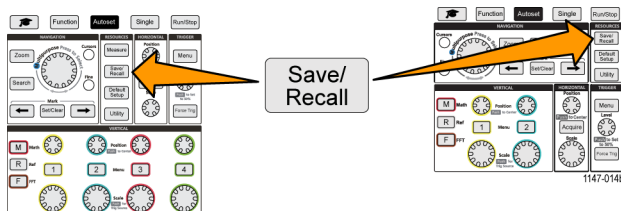
Folder creation tip

If you need to create many folders on a USB drive, it is faster to insert the USB drive into a PC and use the standard Microsoft Windows or other OS folder creation utilities.

Deleting files or folders from the USB drive

Use this procedure to delete files or folders from the USB drive.

1. Push the **Save/Recall** front-panel button.



2. Push the **File Utility** side-menu button.

3. Use the **Multipurpose** knob to navigate to and highlight a file or folder name to delete.
4. Push the **Delete** side-menu button. the oscilloscope asks you confirm the delete action.
5. Highlight **Yes** (to delete) or **No** (to cancel the delete).
6. Push the **Multipurpose** knob to delete the file or folder.

NOTE. Deleting a folder also deletes all files and subfolders contained in that folder.

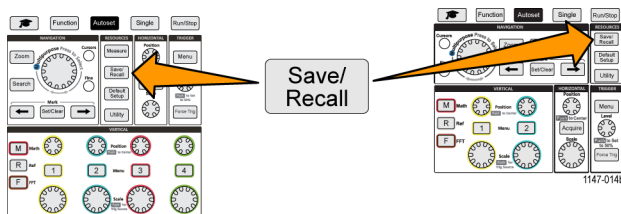


CAUTION. Deleting a file or folder on the USB drive does not remove the data on the drive. It deletes the FAT table entries for the names of the files and folders and marks the memory as available. If you have critical or secure data that must be removed from the USB drive, connect the USB drive to a PC and use a file 'shredding' program to replace the file data with zeros.

Renaming files or folders on the USB drive

Use this procedure to rename files and folders from the USB drive.

1. Push the **Save/Recall** front-panel button.



2. Push the **File Utility** side-menu button.
3. Use the **Multipurpose** knob to navigate to the location at which to create the new folder.
4. Push the **Rename** side-menu button.
5. Select and click a recently created name (listed at top of the characters list), or enter the folder or file name using the **Multipurpose** knob and side-menu buttons to scroll through and highlight letters, numbers, and valid characters in the list.

Push the **Multipurpose** knob to enter the highlighted character. The characters that you enter are shown at the top of the file pane.

6. Repeat step 5 until you have entered all characters of the folder name.
7. Push the **OK** side-menu button to add the new folder name to the USB drive.

NOTE. You do not need to add the file extension name (.ISF, .SET, and so on) when renaming an image, waveform, or setting file.

File, folder renaming tip

If you need to rename many files or folders, it is faster to insert the USB drive into a PC and use the standard Microsoft Windows or other OS file renaming utilities.

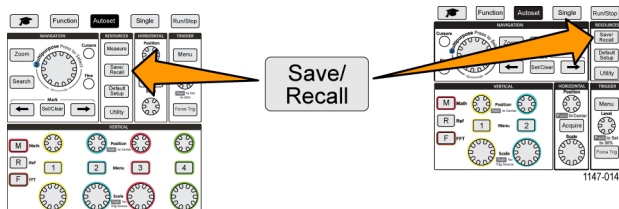
Formatting the USB drive

Formatting a USB drive removes the file and directory names from the drive, making the entire USB drive memory available for new files and folders.



CAUTION. Formatting a USB drive does not remove the data on the drive. It deletes the FAT table entries for the names of the files and folders and marks the memory as available. If you have critical or secure data that must be removed from the USB drive, connect the USB drive to a PC and use a file 'shredding' program to replace the file data with zeros.

1. Push the **Save/Recall** front-panel button.



2. Push the **File Utility** side-menu button.
3. Push the **Format** side-menu button.
4. Use the **Multipurpose** knob to select and click **Yes**. The oscilloscope formats the drive and reopens the file utility pane.

About automatically generated file names

The oscilloscope automatically creates a numbered file name for the files that it saves to the USB drive.

The naming convention is TEKXXXXX.<ext>, where:

- XXXXX is an integer from 00000 to 99999
- <ext> is the file type (.PNG, .BMP, or .JPG for screen image files; .SET for setup files; .ISF or .CSV for waveform files)

To create a new file name, the oscilloscope scans the USB drive to determine the highest-numbered file name present for the file type being saved. The oscilloscope then increments that number and uses it for the new file name. For example, the first time you save a file, the oscilloscope creates the file name TEK00000. The next time you save the same type of file, the new file is named TEK00001.

Image, setting, and waveform file tips

- If there are nonsequential jumps in the file numbering, such as TEK00001, TEK00002, TEK00005, the oscilloscope uses the highest-numbered file as the starting point for new file names (TEK00006 in this example).
- If you select a different USB drive or folder location, the oscilloscope creates the file number based on the files present in that USB drive or folder. For example, if you select the save folder as /usb0/MyProject1, which contains file TEK00006.png, the next saved .png file in that folder is named TEK00007.png.
- To determine the channel or waveform type (**Math**, **FFT**, **Ref**) of a saved waveform file, open the waveform file (.CSV or .ISF) in a text editor. The channel name or waveform type is at or near the top of the file structure.