C H A P T E R   S I X :   *Document Your Work*

In this chapter, see how

> *To print your display using the Waverunner internal printer*
>
> *To print or plot your display with an external printer or plotter*
>
> *To create TIFF and BMP image files*
>
> *To store and retrieve floppy-disk, PC Memory-card and hard-disk-card files*
>
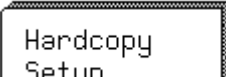> *To give custom names to your files and create directories*
>
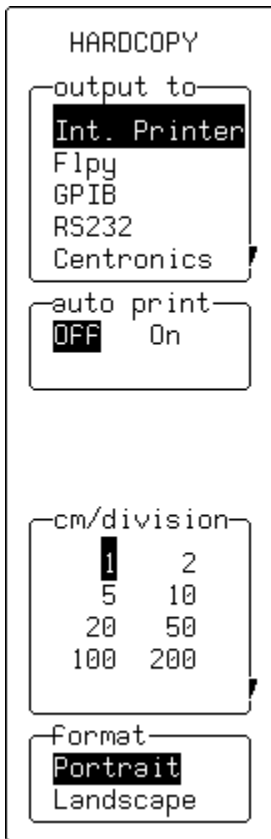> *To add or delete file directories*
>
> *To copy files from one portable storage device to another*

Make a Hard Copy

Make a hard copy of your displayed traces and screen data using the scope's optional internal printer. Or print to an external printer or plotter using the rear GPIB, RS-232-C, or Centronics port. Create TIFF and BMP image files with the scope and save them to floppy disk, or optional PC memory or hard disk card.

UTILITIES

1.   Press   to display the UTILITIES menus.

2.   Then press the button for   Hardcopy Setup   to access these menus.

Use them to make a hard copy of your screen.

```
     HARDCOPY
  ┌output to────┐
  │Int. Printer │
  │Flpy         │
  │GPIB         │
  │RS232        │
  │Centronics   │
  ├auto print───┤
  │OFF    On    │
  └─────────────┘
```

3.   Press to select the optional internal printer, or another device to print or save to (see next page).

> *TIP: Connect an external printer or plotter using one of the ports on the rear of your Waverunner scope. Print or plot to an external device selected from the "output to" menu. A wide range of printers and plotters can be used.*

4.   Press to turn the auto-print function on or off: **On** will print a hard copy after every acquisition.

```
  ┌cm/division──┐
  │  1      2   │
  │  5     10   │
  │ 20     50   │
  │100    200   │
```

5.   Press or turn to expand the waveform and show more detail.

```
  ┌format───────┐
  │Portrait     │
  │Landscape    │
  └─────────────┘
```

6.   Press or turn to select the page format.

PRINT
SCREEN

7.   Press [button] to print a copy of the screen display.

> PRINT
> SCREEN
>
> ***TIP: Press*** [button] ***while printing to cancel.***

PRINT, PLOT, OR COPY

```
┌output to─┐
  Card
  Flpy
  GPIB
  RS232
  Centronics
```
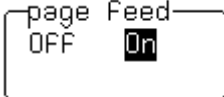
1.   Press the button to select a port, the PC Card slot, or floppy-disk drive:
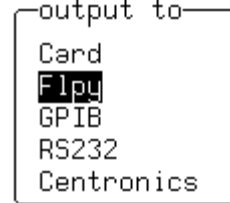
2.   Press the button to select a printer, plotter, or graphic protocol (TIFF, BMP, or

```
┌printer───┐
  EPSON col
  LaserJet
  DeskJet col
  DeskJet b/w
  HP 7470
```

HPGL):

Other menus will appear according to your selection. The "plot size" and "pen number" menus appear when a plotter is selected. The "background" menu becomes available when a color or compressed TIFF or BMP graphic protocol is used. This gives you the choice between a black or white background for a screen image. Waverunner assigns file names automatically when copying to floppy or optional storage device (see page 69).

```
┌page Feed─┐
  OFF    On
```

3.   Press the button for [menu] to start a new page each time you perform Step 4.

PRINT
SCREEN

4.   Press [button] to print, plot, or save a copy of the screen display to a printer, plotter, or graphic protocol.

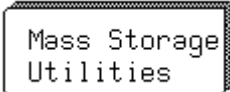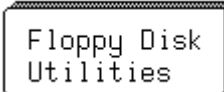| 2 | — | 2 |
3	—	3
5	—	7
8	—	20
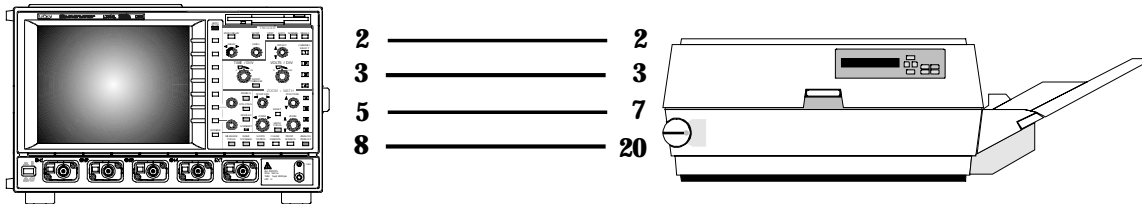
RS-232-C printer cabling: Connect your scope to a variety of external printers using the rear RS-232-C port. You could also connect to PC via GPIB, and use the computer to control a printer connected via RS-232-C. See Chapter 12, "Use Waverunner with PC," for computer cabling.

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Manage Floppy or Card Files

Use Waverunner mass-storage utilities to create waveform files on floppy-disk, or optional PC memory card or hard disk card. Give your files custom names, and create directories for them. Copy files from one portable storage device to another...

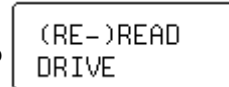1. Press ⬛ to display the UTILITIES menus.
   UTILITIES

2. Press the button for | Mass Storage Utilities | and then the button for | Floppy Disk Utilities |

   Or, if saving to an optional device, such as memory card, in the PC Card slot: | Memory Card Utilities |
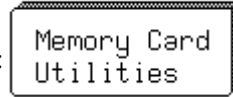
3. Follow the on-screen instructions; when saving to floppy disk, press the button to | (RE-)READ DRIVE |

4. From the menus shown for floppy disk or PC Card slot, press the button for | TEMPLATE AND FORMATTING |

5. Use the menus displayed to format the storage medium in DOS and, in the case of the floppy disk, to select density. Or copy a machine template (an ASCII file containing binary description information) to the storage device.
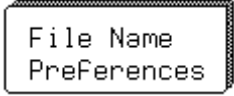
6. Press ⬛ twice to go back to the MASS STORAGE menus.
   RETURN

7. Press the button for | Mass Storage Preferences | to display the PREFERENCES menus.

These menus allow you to select the working directory, to delete directories, and access the File Name Preferences and Add New Directory menus, described on the following pages.
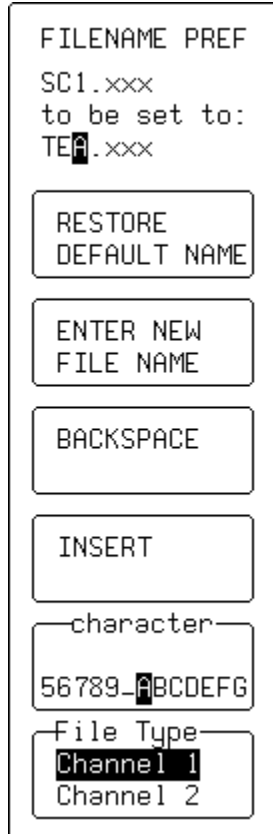
8. Press the button to select a directory for file storage and retrieval from the work with menu. Or, the selected directory can be deleted using the DELETE THIS DIRECTORY menu.

9. Next, press the button for | File Name Preferences | to access these menus.

CUSTOMIZE FILE NAMES

Waverunner gives default names to your files. But you can also customize them using these menus.

```
FILENAME PREF
SC1.xxx
to be set to:
TEA.xxx

RESTORE
DEFAULT NAME

ENTER NEW
FILE NAME

BACKSPACE

INSERT

character
56789_ABCDEFG

File Type
Channel 1
Channel 2
```

10. Give a custom name to your waveform, setup, or hardcopy file.

To select the character to be modified using the character menu (below).

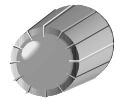To restore the file type selected in the File Type menu (see below) to its default name.

To validate a newly defined name.

To move back a space and erase the previous character in the file name.

To move forward and create a space for the insertion of a character.

To select characters — numbers or letters — for creating the file name, using the knob.

To select the channel of the file type to be customized.

RETURN

11. Press to go back to PREFERENCES menus.

ADD A NEW DIRECTORY

12. Press the button for

┌─────────────┐
│ Add new   │
│ Directory   │
└─────────────┘

```
NEW DIRECTORY
New Directory
  on Card:
DA█
┌─────────────┐
│ MAKE THIS   │
│ DIRECTORY   │
└─────────────┘



┌─────────────┐
│ BACKSPACE   │
│             │
└─────────────┘
┌─────────────┐
│ INSERT      │
│             │
└─────────────┘
┌─character───┐
│ 789_AB█DEFGHI │
└─────────────┘
```

13. Then use these menus to create a new directory for your custom-named files.

To select the character to be modified using the character menu (below).
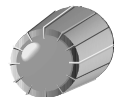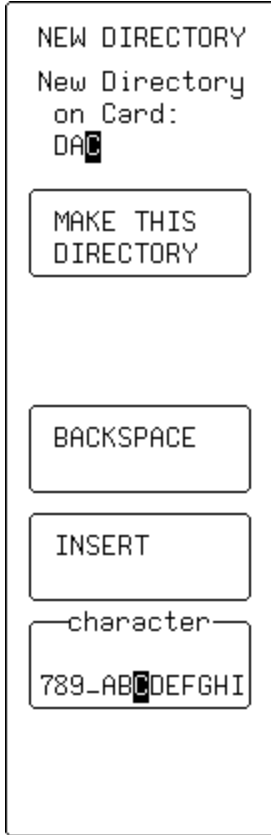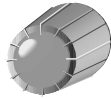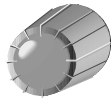
To validate the new directory.

To move back a space and erase the previous character in the file name.

To move forward and create a space for the insertion of a character.

To select characters — numbers or letters — for creating the file name, using the knob.
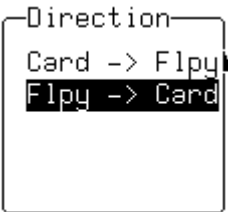
RETURN

14. Press twice to go back to the MASS STORAGE menus.
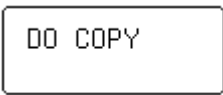
COPY FILES

You can copy files from one portable storage device to another: from a floppy disk in the Waverunner floppy disk drive, to a memory card or hard disk card in the scope's PC Card slot (or vice versa).

15. Press the button for

```
┌──────────────┐
│ File         │
│ Transfers    │
└──────────────┘
```

16. Press the button to select the devices you wish to transfer from and to:

```
┌─Direction──┐
│            │
│ Card -> Flpy▸
│ Flpy -> Card│
│            │
│            │
└────────────┘
```

17. Press the button to transfer certain types of file or all files on the storage device:

```
┌─Which Files─┐
│            │
│ Panels    ▸│
│ Prints     │
│ WaveForms  │
│ All Files  │
└────────────┘
```

18. Press the button to

```
┌──────────┐
│ DO COPY  │
└──────────┘
```

HOW WAVERUNNER MANAGES MASS STORAGE

When you select Mass Storage Utilities from UTILITIES, the MASS STORAGE menu group gives you access to the mass-storage file system controls. The system supports storage and retrieval of data files to and from floppy disk in either the DOS 1.44 MB or 720 kB format.

Waverunner writes and reads all files to and from the floppy disk using the current working directory. If the new file being stored bears the same name as an existing file on the same storage medium, the old file will be deleted. The default name of the working directory is LECROY_1.DIR. This directory is automatically created when the media is formatted. If the media is formatted elsewhere — for instance on a PC — the directory will be created the first time a file is saved to the floppy disk. The maximum number of files allowed in any one directory is 2400.

You can change the name of the working directory to any valid DOS directory name, using the file-name preferences menu. All working directories are created as sub-directories from the root directory. As in MS-DOS, the file name can contain up to eight characters followed by an extension of three characters.

A file is treated as: a panel setup if its extension is PNL; a waveform if its extension is a three-digit number; a waveform template if its extension is TPL; a hard copy if its extension is TIF, BMP, or PRT; and HPGL if its extension is PLT. The table below shows how files are named.

FILE OR DIRECTORY TYPE	DEFAULT NAME	CUSTOMIZED NAME
Manually stored waveforms	Stt.nnn	xxxxxxxx.nnn
Automatically stored waveforms	Att.nnn	xxxxxxxx.nnn
Panel files	Pnnn.PNL	xxxxxnnn.PNL
Hardcopy files	Dnnn.TIF Dnnn.BMP Dnnn.PRT Dnnn.PLT	xxxxxnnn.TIF xxxxxnnn.BMP xxxxxnnn.PRT xxxxxnnn.PLT
Template files	LECROYvv.TPL	Cannot be changed
Directory name	LECROY_1.DIR	xxxxxxxx
Spreadsheet	Sttnnn.TXT	xxxxxnnn.TXT
MATLAB	Sttnnn.DAT	xxxxxnnn.DAT
MathCad	Sttnnn.PRN	xxxxxnnn.PRN

KEY TO MASS-STORAGE TERMS			
x	*Any legal DOS file-name character*	**w**	*The template version number: for example, for a version 2.2, the template will be saved as LECROY22.TPL*
tt	*The trace name of C1, C2, C3, C4, TA, TB, TC, TD*	**TIF BMP**	*Tagged Image Format, bitmap image files*
nnn	*A three-digit decimal sequence number starting at 001 that is automatically assigned*	**PRT**	*Hard copy printer files*
PLT	*HPGL plotter or vector files*		

The default notation for waveform files is Stt.nnn for manually stored files, and Att.nnn for automatically stored files. The characters S and A represent the two storage methods. When automatically generating a file name, Waverunner's system uses the assigned name plus a three-digit sequence number. If the assigned waveform name is already in the default 'Stt' form (such as SC1, STB) the name will be changed to the 'Att' form: AC1, ATB and so on. All other user-assigned names remain as entered.

*If you select **Fill** and use default names, the first waveform stored will be Axx.001, the second Axx.002, and so on. Waverunner continues storing until the storage medium is filled, the file number reaches 999, or there are more than 2400 files in the current working directory.*

*If you select **Wrap**, the oldest auto-stored waveform files will be deleted whenever the medium becomes full. The remaining auto-stored waveform files will be renamed — the oldest group of files will be named "Axx.001", the second oldest "Axx.002", and so on.*

The current sequence number is deduced from Waverunner's inspection of all file names in the working directory, regardless of file type — panel, hard copy, or waveform. The oscilloscope determines the highest occupied numeric file-name extension of the form 'nnn', and uses the next highest number as the current generation number for storage operations. When you delete a file generation, Waverunner deletes all files designated with the three-digit sequence number of the file-name extension, regardless of file type.

The mass-storage file system indicates media size and storage availability in kbytes where 1 kbyte = 1024 bytes. Many media manufacturers specify the available storage in Mbytes where 1 Mbyte = 1 million bytes. This results in an apparent mismatch in specified versus actual media storage availability, when in fact the availability in bytes is identical.

If the floppy's write-protection switch has been pushed to the active position, Waverunner displays the message "Device is Write Protected" on the upper part of the grid whenever the medium is accessed for writing.

See Chapter 12, "Use Waverunner with PC," for how to transfer files to PC.