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Quick Start Guide

HP 54520 and HP 54540 Series
Oscilloscopes

Quick Start Guide

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For Safety information, Warranties, and Regulatory
information, see pages at the end of the book.

HP 54520 and 54540 Series
Oscilloscopes

An Overview of the HP 54520 and 54540 Series Oscilloscopes

Important features of the front panel

The front panel contains seven keypad areas and one set of softkeys. The figure on the facing page shows the location of each of these areas, and the text below describes the functions of the keys found in each area.

Some keys have two functions, one regular function and one shifted function. The shifted function is the one printed in blue just above the key. To use a shifted function, first press the blue key, indicated by (blue) in this book.

1 Entry/Measure area (Keypad)

The keys in this area have two functions. The numeric keys let you enter values in menu areas that you have highlighted with softkey presses. These values might be for voltages, vertical position, or other numerical data. The second function is the shifted function of each key, measurements like Vp-p, Period, V avg, and Frequency written in blue above the key. The (blue) key is also located in this area.

2 Menu area

The keys in this area select menus that appear in the softkey part of the display.

3 Control area

The keys in this area let you control the acquisition of signals and printing.

4 Softkey and menu area

The keys in this area are defined by the labels printed next to them on the display. These labels change depending on the menu previously selected.

5 Setup area

The keys in this area let you save oscilloscope settings to one of nine memory loctions and recall them later.

6 Vertical area

The controls in this area let you make V/div and position adjustments and select channel menus for further vertical and probe control.

7 Horizontal area

The controls in this area let you make s/div and delay adjustments and access the Horizontal menu.

8 Trigger area

The controls in this area let you establish the trigger conditions for data acquisition.
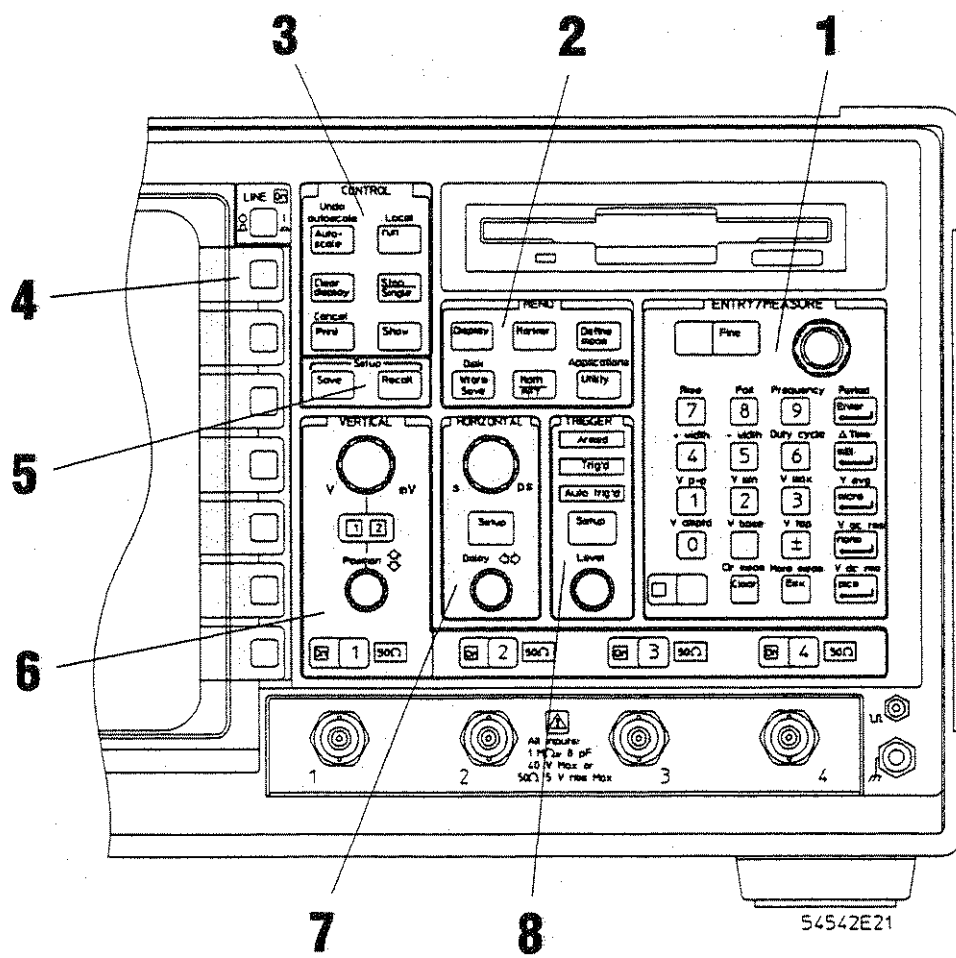
In this book

This Quick Start Guide is designed to get you started quickly using the HP 54520 and 54540 Series Oscilloscopes. The topics covered include:

- Connecting a signal
- Making voltage and timing measurements
- Storing and retreiving data
- Printing hard copy

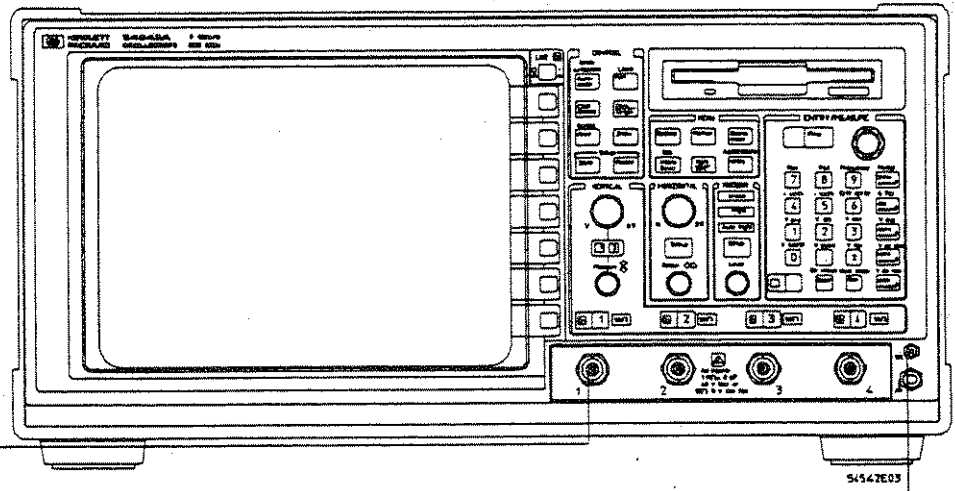# Contents

To connect a signal

- Connect the supplied probe between the probe comp on the front panel and the channel 1 input at the bottom of the front panel.

Channel 1

Probe comp

To set the instrument to a known starting condition

Other users may set up the instrument in a way that will invalidate or
obscure measurements you want to make. Each time you use the
oscilloscope you should set it to a starting condition that will allow you to
avoid those problems.

The easiest way to do this is with the following procedure:

1 Press the Recall key in the Setup area.
2 Press the Clr key in the Entry/Measure area.

If you want more information on instrument setup conditions, please see the
HP 54520 and 54540 Series Oscilloscope User's Reference.

Recall

Clear

54542E03
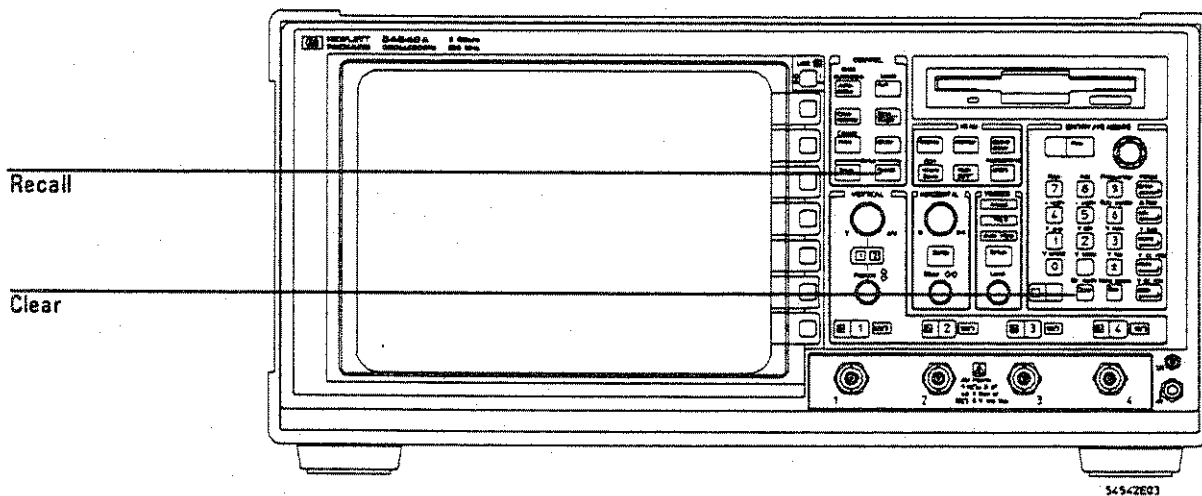
To measure peak-to-peak voltage

1 Press Autoscale.

2 Press the (blue) key on the Entry/Measure keypad.

3 Press the Vp-p key on the Entry/Measure keypad.

Notice the message at the top of the display that tells how use the knob to select function, channel, or memory. The instrument also prompts you for a channel number at the bottom of the display.

4 Press the 1 key on the Entry/Measure keypad to select channel number 1.

Notice that Vp-p is shown at the bottom of the display area.

To measure a waveform period

1 Press the (blue) key on the Entry/Measure keypad.

2 Press the Period key on the Entry/Measure keypad.

3 Press the 1 key on the Entry/Measure keypad to select channel number 1.

Notice that Period is shown at the bottom of the display area.

To set the probe attenuation

If you are using a 10 to 1 probe, you may have noticed that the voltage readings you've gotten are off by a factor of 10. That is because the probe attenuation factor has not yet been set. To set probe attenuation, use the following procedure.

1 Press the channel 1 key at the bottom of the vertical area to bring up the Vertical menu.

2 Press the **more/preset probe** softkey at the bottom of the menu.

Note that the probe attenuation field is highlighted and reads 1.000 : 1.

3 Use the knob or numerical keys in the Entry/Measure area to set probe attenuation to 10.00 : 1.

Notice that as you change the attentuation factor, the voltage measurements at the bottom of the display change scale also.

To change vertical scale

1 Press the Show key in the Control area to see the state of the instrument.

2 Turn the V/div knob, the large knob in the Vertical area of the front panel, and notice that the signal's amplitude varies.

Normally, the V/div settings vary in a 1,2,5 sequence. For vernier control of V/div scale, press the Fine key and then move the V/div knob. Note the LED showing when the Fine function is in effect.

3 Turn the small knob, labeled Position (offset), and watch the effect on the signal.

Note the numbered LEDs between the knobs in the Vertical area. The LED that is lit is active and will be affected by changes made with the knobs. Also notice the LEDs next to each channel key at the bottom of the Vertical area. When a channel is on, its LED will be lit.

To change horizontal scale

1 Turn the large knob in the Horizontal area of the front panel and notice the changes to the signal and to the s/div setting under the graticule.

2 Turn the small knob, labeled Delay, and notice that the signal moves left or right on the display.

To modify the edge trigger level

1 Press the Setup key in the Trigger area of the front panel. Notice the Edge Trigger menu on the display.

2 Turn the Level knob in the Trigger area of the front panel and notice that the trigger level value changes in the menu area and the trigger cursor moves to indicate the new level.

To pan and zoom on a signal

1 Press Recall, Clear, and then Autoscale.

This will return the instrument to a known starting condition and provide an autoscaled signal.

2 Press the Setup key in the Horizontal area to bring up the menu.

3 Press the **record length** softkey near the bottom of the menu.

Notice that the value is now highlighted.

4 Turn the large knob in the Entry/Measure area to set the record length to 4096.

The reason for doing this now is to provide a longer signal record length to view for this exercise. You can select any value between 512 and 32K, but 4096 will provide a record length adequate to show how to pan and zoom.

5 Press the Stop/Single key to stop signal acquisition.

6 Turn the large knob in the Horizontal area to zoom in and out on the signal.

7 Turn the small knob in the Horizontal area to pan along the signal

If you look at the top of the display, you will see a bar called the memory bar. In the real-time mode, the entire length of the memory bar represents the data record the instrument has captured. The bolded part of the bar represents the part of the data record that is displayed on the instrument. The indicator on the memory bar represents the trigger point. Note the actions on the memory bar as you pan and zoom on the signal.

To use softkey menu items

The fields in the softkey menu areas are of three basic types. To see how they work, press the Channel 1 key at the bottom of the Vertical area and press softkeys to see the effect. Then, press the Setup key in the Horizontal area and do the same. The three softkey types are:

• The toggle, in which you toggle between two states each time the softkey is pushed. The two states might be On and Off, for example.

• One in which several selections are available and each time the softkey is pushed a new selection is made. The selections are made in a left to right and top to bottom sequence. The active selection is highlighted.

• One in which a value is either highlighted or dimmed. To highlight a value, press the softkey next to it. Then, the highlighted value may be changed with either the knob or the numeric keys in the Entry/Measure area.

You may change some values even though they are not highlighted by using the knobs in the Vertical and Horizontal areas. When these values are highlighted, you may also change them using the knob and numeric keys in the Entry/Measure area.

To save a setup to memory

1 Press the Save key in the Setup area.

2 Press a key between 1 and 9 on the Entry/Measure keypad to select the memory location for the setup.

You can store nine setups in the oscilloscope's internal non-volatile memory.

To recall a setup from memory

1 Press the Recall key in the Setup area.

2 Press the key on the Entry/Measure keypad corresponding to the memory location of the setup you want to recall.

The previous setup is always stored in memory location 0. If you want to return to the previous setup, press the Recall key and the 0 key.

If you have many setups that you use and want them available to load quickly, you may also store them to disk. See the *HP54520 and 54540 Series Oscilloscopes User's Reference* for storing setups to disk.

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To save a waveform to disk

1 Put a formated MS DOS disk into the instrument's disk drive.

For information of formatting disks, see the *HP54520 and 54540 Series Oscilloscope User's Reference.*

2 Press the (blue) key and then the Disk key in the menu area.

3 Press the **store** softkey in the DISK menu.

4 Select **wav** from the STORE menu.

5 Select **internal.**

6 Select the data source in the **data from** field.

7 Press the **to file** softkey.

 a Use the knob in the keypad area to select letters for the filename.

 b Press the top softkey to enter each letter selected.

 c Press the **done** softkey when the filename is complete.

8 This action will clear any softkey menu from the display, allowing you to see the setup information. Press the **execute** softkey.

To load a waveform from disk

1 Press the (blue) key and then Disk on the Menu keypad.

2 Press the **load** softkey to bring up the LOAD menu.

3 Select the proper parameters from the menu including the name of the file to load and its destination.

4 Press the **execute** softkey to bring the file into memory and **exit menu** to return to the DISK menu.

5 Press the Wform Save key in the Menu area.

6 Select **waveform** and memory location in the **nonvolatile** field from the menu.

7 Turn **display** on.

Waveforms already on the display may obscure the one you've just loaded. Either turn those waveforms off using the Vertical menu or use the V/div knob to separate the waveforms.

If you want to see the setup parameters for the waveforms you are presently viewing, press the Show key in the Control area.

> You can also save four waveforms to non-volatile memory. For information about how to store waveforms to memory, see the *HP54520 and 54540 Series Oscilloscope User's Reference.*

To print hardcopy

1 Press the Utility key.
2 Press the **HPIB/RS232** menu softkey.
3 Select **HPIB Talk**.

   The proper HP-IB setup for the printer and port must be in place to print. Refer to the *HP 54520 and 54540 Series Oscilloscope User's Reference* for setup instructions.

4 Press the Print key

   To cancel a print request, press the (blue) key and then the Cancel key on the Control keypad.

To register for product and software updates

1 Press the Utility key in the Menu area.
2 Press the **system menu** softkey.
3 Press the **registration form (print)** softkey.
4 Fill out the form.
5 Mail the registration form to HP.

> For more information on using your HP54520 and 54540 Series Oscilloscopes, see the *Quick Reference Card* and *User's Reference* in this binder. Use the *Quick Reference Card* to refresh your memory about procedures and menu structures. Use the *User's Reference* when you need more in-depth information about the features of the instrument.

Document Warranty

The information contained in this document is subject to change without notice.

Hewlett-Packard makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability or fitness for a particular purpose.

Hewlett-Packard shall not be liable for errors contained herein or for damages in connection with the furnishing, performance, or use of this material.

Safety

This apparatus has been designed and tested in accordance with IEC Publication 348, Safety Requirements for Measuring Apparatus, and has been supplied in a safe condition. This is a Safety Class I instrument (provided with terminal for protective earthing). Before applying power, verify that the correct safety precautions are taken (see the following warnings). In addition, note the external markings on the instrument that are described under "Safety Symbols."

Warning

• Before turning on the instrument, you must connect the protective earth terminal of the instrument to the protective conductor of the (mains) power cord. The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. You must not negate the protective action by using an extension cord (power cable) without a protective conductor (grounding). Grounding one conductor of a two-conductor outlet is not sufficient protection.

• Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short-circuited fuseholders. To do so could cause a shock of fire hazard.

• Service instructions are for trained service personnel. To avoid dangerous electric shock, do not perform any service unless qualified to do so. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

• If you energize this instrument by an auto transformer (for voltage reduction), make sure the common terminal is connected to the earth terminal of the power source.

• Whenever it is likely that the ground protection is impaired, you must make the instrument inoperative and secure it against any unintended operation.

• Do not operate the instrument in the presence of flammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

• Do not install substitute parts or perform any unauthorized modification to the instrument.

• Capacitors inside the instrument may retain a charge even if the instrument is disconnected from its source of supply.

• Use caution when exposing or handling the CRT. Handling or replacing the CRT shall be done only by qualified maintenance personnel.

Safety Symbols

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Instruction manual symbol: the product is marked with this symbol when it is necessary for you to refer to the instruction manual in order to protect against damage to the product.

Hazardous voltage symbol.

Earth terminal symbol: Used to indicate a circuit common connected to grounded chassis.

WARNING

The Warning sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a Warning sign until the indicated conditions are fully understood and met.

CAUTION

The Caution sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a Caution symbol until the indicated conditions are fully understood or met.

Product Warranty

This Hewlett-Packard product has a warranty against defects in material and workmanship for a period of three years from date of shipment. During the warranty period, Hewlett-Packard Company will, at its option, either repair or replace products that prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by Hewlett-Packard.

For products returned to Hewlett-Packard for warranty service, the Buyer shall prepay shipping charges to Hewlett-Packard and Hewlett-Packard shall pay shipping charges to return the product to the Buyer. However, the Buyer shall pay all shipping charges, duties, and taxes for products returned to Hewlett-Packard from another country.

Hewlett-Packard warrants that its software and firmware designated by Hewlett-Packard for use with an instrument will execute its programming instructions when properly installed on that instrument. Hewlett-Packard does not warrant that the operation of the instrument software, or firmware will be uninterrupted or error free.

Limitation of Warranty

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by the Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

No other warranty is expressed or implied. Hewlett-Packard specifically disclaims the implied warranties of merchantability or fitness for a particular purpose.

Exclusive Remedies

The remedies provided herein are the buyer's sole and exclusive remedies. Hewlett-Packard shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

Assistance

Product maintenance agreements and other customer assistance agreements are available for Hewlett-Packard products.

For any assistance, contact your nearest Hewlett-Packard Sales Office.

Certification

Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members.

About this edition

This is the first edition of the *HP 54520A and 54540A Series Oscilloscope Quick Start Guide.*

New editions are complete revisions of the manual. Update packages, which are issued between editions, contain additional and replacement pages to be merged into the manual by you. The dates on the title page change only when a new edition is published.

A software or firmware code may be printed before the date. This code indicates the version level of the software or firmware of this product at the time the manual or update was issued. Many product updates do not require manual changes; and, conversely, manual corrections may be done without accompanying product changes. Therefore, do not expect a one-to-one correspondence between product updates and manual updates.

The following list of pages gives the date of the current edition and of any changed pages to that edition.

All pages original edition