

Agilent E5052A Signal Source Analyzer

User's Guide

Second Edition

FIRMWARE REVISIONS

This manual applies directly to instruments that have the firmware revision 1.10.
For additional information about firmware revisions, see Appendix A.



Agilent Part No. E5052-90010

October 2004

Printed in Japan

Notices

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

This document contains proprietary information that is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Agilent Technologies.

Microsoft®, MS-DOS®, Windows®, Visual C++®, Visual Basic®, VBA® and Excel® are registered

UNIX is a registered trademark in U.S. and other countries, licensed exclusively through X/Open Company Limited.

Portions ©Copyright 1996, Microsoft Corporation. All rights reserved.

© Copyright 2004 Agilent Technologies

Manual Printing History

The manual's printing date and part number indicate its current edition. The printing date changes when a new edition is printed (minor corrections and updates that are incorporated at reprint do not cause the date to change). The manual part number changes when extensive technical changes are incorporated.

August 2004	First Edition (part number: E5052-90000)
October 2004	Second Edition (part number: E5052-90010, changes for firmware version 1.10)

Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS elsewhere in this manual may impair the protection provided by the equipment. Such noncompliance would also violate safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies assumes no liability for the customer's failure to comply with these precautions.

NOTE

The E5052A complies with INSTALLATION CATEGORY II as well as POLLUTION DEGREE 2 in IEC61010-1. The E5052A is an INDOOR USE product.

NOTE

The LEDs in the E5052A are Class 1 in accordance with IEC60825-1, CLASS 1 LED PRODUCT

NOTE

This equipment is MEASUREMENT CATEGORY I (CAT I). Do not use for CAT II, III, or IV.

NOTE

This equipment is tested with stand-alone condition or with the combination with the accessories supplied by Agilent Technologies against the requirement of the standards described in the Declaration of Conformity. If it is used as a system component, compliance of related regulations and safety requirements are to be confirmed by the builder of the system.

- Ground the Instrument

To avoid electric shock, the instrument chassis and cabinet must be grounded with the supplied power cable's grounding prong.

- DO NOT Operate in an Explosive Atmosphere

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

- Keep Away from Live Circuits

Operators must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltage levels may remain even after the power cable has been disconnected. To avoid injuries, always disconnect the power and discharge circuits before touching them.

- DO NOT Service or Adjust the Instrument Alone

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

- DO NOT Substitute Parts or Modify the Instrument

To avoid the danger of introducing additional hazards, do not install substitute parts or perform unauthorized modifications to the instrument. Return the instrument to an Agilent Technologies Sales and Service Office for service and repair to ensure that

safety features are maintained in operational condition.

- Dangerous Procedure Warnings

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

WARNING

Dangerous voltage levels, capable of causing death, are present in this instrument. Use extreme caution when handling, testing, and adjusting this instrument.

- Do not connect the measuring terminals to mains.

Safety Symbols

General definitions of safety symbols used on the instrument or in manuals are listed below.



Instruction Manual symbol: the product is marked with this symbol when it is necessary for the user to refer to the instrument manual.



Alternating current.



Direct current.



On (Supply).



Off (Supply).



In-position of push-button switch.



Out-position of push-button switch.



A chassis terminal; a connection to the instrument's chassis, which includes all exposed metal structure.



Stand-by.

WARNING

This warning sign denotes a hazard. It calls attention to a procedure, practice, or condition that, if not correctly performed or adhered to, could result in injury or death to personnel.

CAUTION

This Caution sign denotes a hazard. It calls attention to a procedure, practice, or condition that, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the instrument.

NOTE

This Note sign denotes important information. It calls attention to a procedure, practice, or condition that is essential for the user to understand.

Certification

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

Documentation Warranty

The material contained in this document is provided "as is," and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Agilent disclaims all warranties, either express or implied with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Agilent shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or any information contained herein. Should Agilent and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement will control.

Exclusive Remedies

The remedies provided herein are Buyer's sole and exclusive remedies. Agilent Technologies 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 Agilent Technologies products.

For any assistance, contact your nearest Agilent Technologies Sales and Service Office. Addresses are provided at the back of this manual.

Typeface Conventions

Sample (bold)

Boldface type is used when a term is defined or emphasis.

Sample (Italic)

Italic type is used for emphasis.

Sample key

Indicates a hardkey (key on the front panel or external keyboard) labeled “Sample.” “key” may be omitted.

Sample menu/button/box

Indicates a menu/button/box on the screen labeled “Sample” which can be selected/executed by clicking. “menu,” “button,” or “box” may be omitted.

Sample block/toolbar

Indicates a block (group of hardkeys) or a toolbar (setup toolbar) labeled “Sample.”

Sample 1 - Sample 2 - Sample 3

Indicates a sequential operation of **Sample 1**, **Sample 2**, and **Sample 3** (menu, button, or box). “-” may be omitted.

Documentation Map

The following manuals are available for the Agilent E5052A.

- ***User's Guide (Part Number E5052-900x0, attached to Option ABA)***

This manual describes most of the basic information needed to use the E5052A. It provides a function overview, detailed operation procedure for each function (from preparation for measurement to analysis of measurement results), measurement examples, specifications, and supplemental information. For programming guidance on performing automatic measurement with the E5052A, please see the *Programming Manual*.

- ***Programmer's Guide (Part Number E5052-900x1, attached to Option ABA)***

This manual provides programming information for performing automatic measurement with the E5052A. It includes an outline of remote control, procedures for detecting measurement start (trigger) and end (sweep end), application programming examples, a command reference, and related information.

- ***VBA Programmer's Guide (Part Number E5052-900x2, attached to Option ABA)***

This manual describes programming information for performing automatic measurement with internal controller. It includes an outline of VBA programming, some sample programming examples, a COM object reference, and related information.

NOTE

The number position shown by “x” in the part numbers above indicates the edition number.

VBA Macro

The Agilent folder (D:\Agilent) on the hard disk of the E5052A contains the VBA macros (VBA Projects) used in this manual.

The customer shall have the personal, non-transferable rights to use, copy, or modify the VBA macros for the customer's internal operations.

The customer shall use the VBA macros solely and exclusively for their own purposes and shall not license, lease, market, or distribute the VBA macros or modification of any part thereof.

Agilent Technologies shall not be liable for any infringement of any patent, trademark, copyright, or other proprietary right by the VBA macros or their use. Agilent Technologies does not warrant that the VBA macros are free from infringements of such rights of third parties. However, Agilent Technologies will not knowingly infringe or deliver software that infringes the patent, trademark, copyright, or other proprietary right of a third party.

1. Precautions	
Software Installed	16
2. Overview of Functions	
Front Panel: Names and Functions of Parts	18
1. Standby Switch	19
2. LCD Screen	19
3. WINDOW/TRACE Block	20
4. MEASUREMENT Block	21
5. CONTROL Block	22
6. Floppy Disk Drive	23
7. NAVIGATION Block	24
8. ENTRY Block	26
9. INSTR STATE Block	27
10. MKR/ANALYSIS Block	28
△ 11. DUT Interface	28
12. OPTIONAL RF Ports	29
LCD Screen: Names and Functions of Parts	30
1. Data Entry Bar	31
2. Softkey Menu Bar	32
3. Instrument Status Bar	34
4. Measurement Window	37
Rear Panel: Names and Functions of Parts	42
1. 24-bit I/O Port	43
2. LAN Port	43
3. External Monitor Output Terminal (Video)	43
4. GPIB Connector	43
5. External Trigger Input Connector (Ext Trig)	43
6. Fan	43
7. Line Switch (Always ON)	43
8. Power Cable Receptacle (to LINE)	44
9. High Stability Frequency Reference Output Connector (Ref Oven)	44
10. External Reference Signal Input Connector (Ref In)	44
11. Internal Reference Signal Output Connector (Ref Out)	44
12. Serial Number Plate	44
13. Certificate of Authenticity Label	45
14. Rear USB port	45
15. Reserved Port (Reserved)	45
16. Printer Parallel Port	45
17. Mini-DIN Keyboard Port	45
18. Mini-DIN Mouse Port	45
3. Installation	
Checking the Shipment	49
Environmental Requirements	52
Operating environment	52
Ventilation requirements	53
Protection against electrostatic discharge (ESD)	54

Ensuring adequate free space around analyzer for immediate disconnection of power cable in case of emergency	54
Installing Front Handles/Rack Mounting Flanges	55
How to install the handle kit (Option 1CN)	56
How to install the rack-mount kit (Option 1CM)	57
How to install the rack-mount and handle kit (Option 1CP)	57
Connecting the Accessories	58
Connecting the mouse and keyboard	58
Connecting a LAN cable	59
Connecting a printer	60
Power Supply and Blown Fuses	61
Verification of the power supply	61
Verification and connection of power cable	61
Blown fuses	63
Starting the E5052A	64
Turning the Power ON and OFF	64
Disconnection from supply source	65
Initial Registration of E5052A	66
Setting the Internal Clock	69
Setting the Date/Time	69
Turning the Date/Time display ON and OFF	70
Daily Maintenance	71
Cleaning method	71
Maintaining connectors/ports on test port (DUT interface)	71
Self-test When Turning on the Power	71
Considerations When Shipping to a Service Center Due to Breakdown or Other Problems	72
4. Basic Measurement Using E5052A	
Frequency/Power Measurement in Frequency/Power Measurement Mode	74
Overview of frequency/power measurement	74
About analyzer mode and tester mode	74
Common settings in RF power, frequency and power supply DC current measurement	76
Setting DC power/DC control and protection	79
About DC control voltage delay, DC power delay and point delay	81
Confirming the result of frequency measurement	83
Confirming the result of RF power measurement	86
Confirming the result of power supply DC current measurement	88
Phase Noise Measurement in Phase Noise Measurement Mode	90
Overview of phase noise measurement	90
Setting phase noise measurement	90
Confirming the result of phase noise measurement	93
Spectrum Monitor Measurement in Spectrum Monitor Measurement Mode	96
Overview of spectrum monitor measurement	96
Setting spectrum monitor measurement	96
Confirming the result of spectrum monitor measurement	99
Transient Measurement in Transient Measurement Mode	102
Overview of transient measurement	102
Common settings for transient measurement	102
Setting video trigger	106

Setting External Trigger	107
Confirming the result of frequency transient (Wide Band) measurement	108
Confirming the result of frequency transient (Narrow Band) measurement.	110
Confirming the result of power transient measurement	112
Confirming the phase transient measurement	114
5. Data Analysis and Result Output	
Analyzing Data on the Trace Using the Marker	118
About marker functions.	118
Reading values on the trace.	119
Changing the display position of marker value.	120
Specifying the sweep range by using the marker	121
Reading a relative value from the reference point on the trace.	122
Reading only the actual measurement point/Reading the value interpolated between measurement points	
123	
Setting up markers for each trace/Setting up markers for coupled operations between traces	124
Listing all marker values in all displayed traces	125
Searching for Positions that Match Specified Criteria	126
Setting search range (Bandmarkers)	126
Searching in the specified range	127
Setting up bandmarker for each trace/Setting up markers for coupled operations between traces.	128
Automatically executing a search each time a sweep is done (search tracking).	130
Searching for the maximum and minimum measured values	131
Searching for the target value (target search)	132
Searching for the Peak.	134
Searching for multiple peaks.	137
Determining the Mean, Standard Deviation, and Peak-to-Peak of the Trace	139
Specifying the Range for Statistical Data	140
Displaying Statistical Data	140
Comparing Traces/Performing Data Math	141
Operational Procedure.	141
File Saving and Loading the Instrument Status Settings	143
Saving Procedure.	145
Recalling Procedure	148
Managing Files/Folders	149
Running Windows Explorer	149
Copying Files/Folders	149
Moving Files/Folders	149
Removing Files/Folders	150
Changing the Name of File/Folder	150
Formatting the Floppy Disk	150
Saving a Trace on a File	151
Saving Trace Data on a File	151
Saving Trace Memory	152
Saving Display Screen	153
Operational Procedure.	153
Printing Screen Image.	154
Supported printers	154
Images you can print/save.	155

Contents

Printing procedure	155
Installing the printer driver	157
6. Setting and Using the Control and Management Functions	
Setting the GPIB	160
Setting talker/listener GPIB address of E5052A	160
Setting system controller (USB/GPIB interface)	160
Setting the Mouse	163
Setup steps	163
Configuring the Network	166
Enabling/disabling network	166
Setting IP address	167
Specifying computer name	169
Accessing Hard Disk of E5052A from External PC	171
Enabling access from an external PC	171
Accessing hard disk of E5052A from external PC	173
Locking the Front Keys, Keyboard, and Mouse (Touch Screen)	174
Locking the front keys, keyboard, and mouse	174
Setting the Beeper (Built-in Speaker)	175
Setting the Operation Complete Beeper	175
Setting the Warning Beeper	175
Turning off the LCD Screen Backlight	176
Turning off the LCD Screen Backlight	176
Checking the Product Information	177
Checking the serial number	177
Checking the firmware revision	177
Checking the option number	177
7. Information on Maintenance	
Backing Up the Data	180
Making backup files	180
System Recovery	181
Notes on executing system recovery	181
Procedure To Execute System Recovery	182
Calibration of the Touch Screen	185
Cleaning the Instrument	186
Cleaning the LCD	186
Maintenance of test ports (DUT INTERFACE) and other connectors/ports	186
Cleaning parts other than the LCD	186
Replacement of Parts with Limited Service Life	187
Cautions Applicable to Requesting Repair, Replacement, Regular Calibration, etc.	188
Backing up data in the hard disk	188
Devices to be sent back for repair or regular calibration	188
Recommended Calibration Period	188
8. Specifications and Supplemental Information	
Definitions	190
Phase Noise Measurement	191

Measurement capabilities	195
.	195
Frequency, RF Power, DC current Measurements	196
Measurement capabilities	197
Softkeys and SCPI commands that are not available when using “Tester” mode or option 011 is installed 197	
Transient Measurement.	199
Measurement capabilities	201
Spectrum Monitor	202
Measurement capabilities	202
Port Output (DC Power/Control)	203
Test Port Input.	204
General Information	205
Measurement capabilities	210
DC Power/Control Voltage Setting.	210
Trace functions	211
Storage	211
System capabilities	211
Automation	212
A. Manual Changes	
Manual Changes	214
Change 1	215
B. Troubleshooting	
Troubleshooting	218
Troubleshooting during Startup.	218
Troubleshooting during Operation	219
Troubleshooting for External Devices	221
Error Messages	222
D	222
E	222
F	222
I	223
L	224
M	224
O	224
P	225
R	226
S	226
T	226
U	226
Warning Message	228
C. List of Default Values	
List of Default Values, Save/Recall Settings, and Backup Settings	232
FP Menu	233
PN Menu	237

SP Menu	241
TR Menu	245
USER Menu	249
D. Softkey Functions	
Phanase Noise Menu (Top Menu)	254
PN Menu	255
Spectrum Monitor Menu (Top Menu)	264
SP Menu	265
Frequency Power Menu (Top Menu)	274
FP Menu	275
Transient Menu (Top Menu)	285
TR Menu	286
User Defined Menu (Top Menu)	296
USER Menu	297

1 Precautions

This chapter describes cautions that must be observed in operating the E5052A.

Software Installed

The Windows operating system installed in this machine is customized for more effective operation, and has different functions that are not part of the Windows operating system for ordinary PCs (personal computers).

Therefore, do not attempt to use the system in ways other than those described in this manual or to install Windows-based software (including anti-virus software) for ordinary PCs as doing so may cause malfunctions.

Also note the followings.

- Do not update the Windows operating system installed in this machine to the Windows operating system for ordinary PCs. Doing so will cause malfunctions.
- Do not attempt to update VBA (Visual Basic for Applications) software installed in this machine to its equivalent developed for ordinary PCs. Doing so will cause malfunctions.
- Do not allow any computer virus to infect the system. This machine has no virus check function nor anti-virus software installed.

Agilent Technologies will not be held liable for any failure or damage arising from negligence regarding these prohibitions and warnings.

NOTE

If the pre-installed software is damaged somehow, resulting in errant behavior by the machine, perform a system recovery. For further details of system recovery, refer to “System Recovery” on page 181.

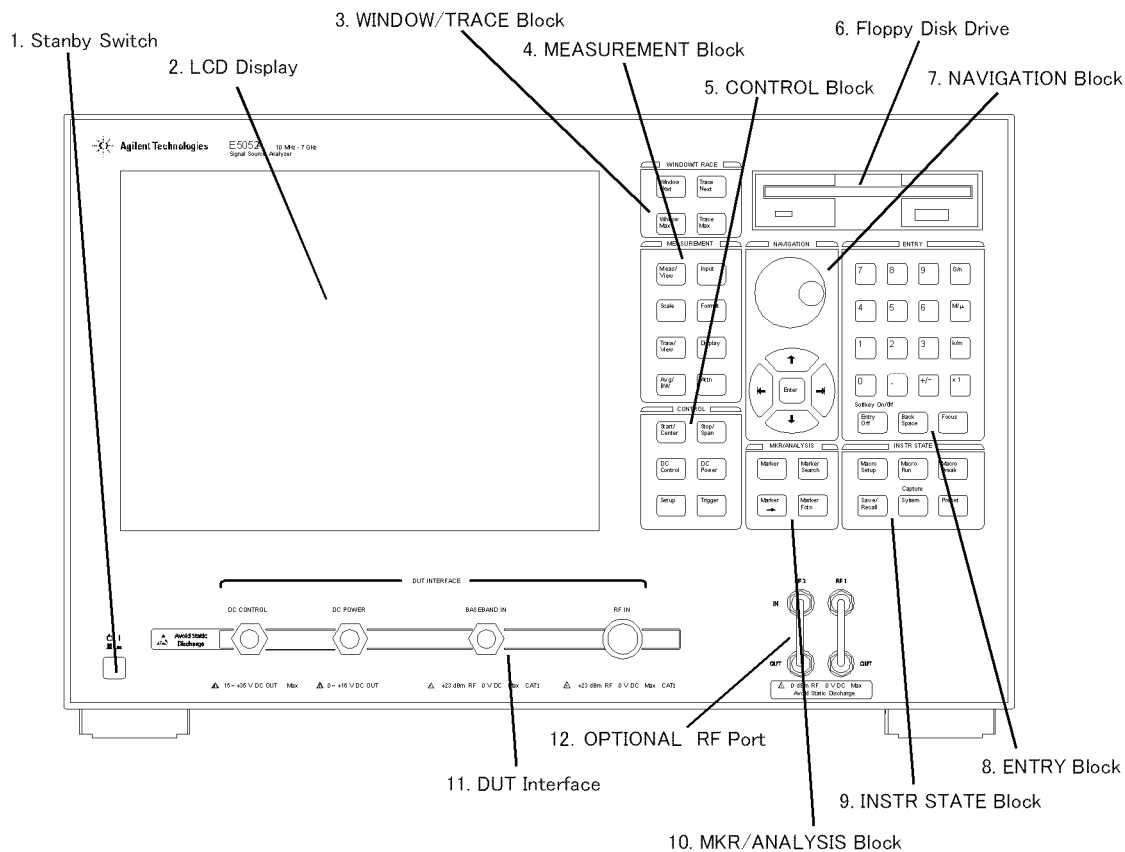
2 Overview of Functions

This chapter describes the functions of the E5052A that can be accessed from the front panel, LCD screen, and rear panel.

Front Panel: Names and Functions of Parts

This section describes the names and functions of the parts on the front panel of the E5052A. For more about the functions displayed on the LCD screen, see “LCD Screen: Names and Functions of Parts” on page 30. For more about the functions of softkeys, see Appendix D, “Softkey Functions,” on page 253.

Figure 2-1 Front Panel



e5052aue032

1. Standby Switch

Used for choosing between power-on (|) and standby (○) states of the E5052A.

NOTE

To turn off the power of the E5052A, be sure to follow the steps described below.

1. First, press the standby switch or send a shutdown command from the external controller to activate the shutdown process (the processing of software and hardware necessary to turn off the power supply). This will put the E5052A into the standby state.
2. Next, if necessary, turn off the power supply to the “8. Power Cable Receptacle (to LINE)” on page 44 on the rear panel.

Under normal use, never directly interrupt the power supply to the power cable receptacle on the rear panel when the power supply is on. Always keep the “7. Line Switch (Always ON)” on page 43 at (|). Never turn it off (○).

If you directly interrupt the power supply to the power cable receptacle when the power supply is on, or turn off the “7. Line Switch (Always ON)” on page 43, the shutdown process will not work. This could damage the E5052A’s software and hardware and lead to device failure.

Turning on the power supply after a faulty shutdown may cause the system to start up in a condition called “safe mode.” If this occurs, first shut down the system to put it into the standby state and then turn on the power supply again to start up the system in normal mode.

See also Chapter 3, “Installation,” for further information on power on/off.

2. LCD Screen

A 10.4-inch touch screen TFT color LCD used for displaying traces, scales, settings, softkeys, etc. The touch screen LCD allows you to manipulate softkeys by touching the LCD screen directly with a finger. For more about the LCD screen, see “LCD Screen: Names and Functions of Parts” on page 30.

NOTE

Do not press the surface of the LCD screen (both standard and touch screen types) with a sharp object (e.g., a nail, pen, or screwdriver). Pressing the surface with a sharp-pointed object can damage the LCD screen surface or cause the screen to fail.

NOTE

Occasionally, a few pixels may appear on the screen as a fixed point of blue, green or red. Please note that this is not a failure and does not affect the performance of your product.

3. WINDOW/TRACE Block

A group of keys for selecting active measurement windows and active traces. For more about the concepts of measurement windows and traces, see “4. Measurement Window” on page 37.

Table 2-1

Window Next Key	Pressing this key causes the active measurement window to switch over to the next higher window number of four measurement windows. It is possible to define sweep range and other parameters of an active measurement window. To change the settings of a window, use this key to first activate the window.
Window Max Key	Switches over between normal and maximum display of the active measurement window. In normal display, all four measurement windows (both active and non-active) are displayed in split views on the screen. In maximum display, only the active measurement window is displayed over the entire area, without showing non-active measurement windows. You can also switch over between the normal and maximum windows by double-clicking the measurement window frame. Measurements are also carried out on the non-active measurement windows that are not displayed.
Trace Next Key	Switches over the active trace to the next one. (Each time the key is pressed the active trace steps up from the trace with the designated number to the one with a higher number.) An active trace is one for which the measurement parameters are defined. To change the settings for a trace, use this key to first make the trace active.
Trace Max Key	Switches over between normal and maximum display of the active trace within the measurement window. In normal display, all traces are displayed in split views on the measurement window. In maximum display, only the active trace is displayed over the entire area, without showing non-active traces. To maximize the active trace, you can also double-click the area inside the measurement window (excluding the frame). Measurements are also carried out on the non-active traces that are not displayed.

4. MEASUREMENT Block

A group of keys used mainly for setting up measurements on the E5052A.

Table 2-2

Meas/View Key	Displays the “Measurement View Menu” in the right part of the screen. Manipulating the “Measurement View Menu” enables you to select any active measurement window. Active measurement windows are also selectable in maximum display. In this case, the measurement window in maximum display will switch over to the one you have selected.
Input Key	Displays the “Input Menu” in the right part of the screen. Manipulating the “Input Menu” enables you to select any port for the measurement signal input.
Scale Key	Displays the “Scale Menu” in the right part of the screen. Manipulating the “Scale Menu” enables you to specify the scale for displaying a trace (magnitude per division, value of the reference line, etc.) for each trace.
Format Key	Displays the “Format Menu” in the right part of the screen. Manipulating the “Format Menu” enables you to specify the data format (data transformation and graph formats) for each trace.
Trace/View Key	Displays the “Trace View Menu” in the right part of the screen. Manipulating the “Trace View Menu” enables you to specify the data smoothing, data saving on memory, title of trace, etc. for each trace.
Display Key	Displays the “Display Menu” in the right part of the screen. Manipulating the “Display Menu” enables you to specify the screen title display, digit of the y-axis value, marker position, etc. for each active measurement window.
Avg/BW Key	Displays the “Average Menu” in the right part of the screen. Manipulating the “Average Menu” enables you to specify enabling/disabling and number of times for averaging, etc. For spectrum measurements only, you can specify the bandwidth of resolution.
Attn Key	Displays the “Attenuator Menu” in the right part of the screen. Manipulating the “Attenuator Menu” enables you to change the setting of the input signal attenuator.

5. CONTROL Block

A group of keys for defining the values of the DC output port and sweeps as well as trigger settings.

Table 2-3

Start/Center Key	<p>Displays the data input bar in the upper part of the screen by which you can specify the start value of the sweep range for the active measurement trace or the time offset value for the transient measurement. Also displays the menu in the right part of the screen that allows you to specify the sweep range. You can use the following menus:</p> <ul style="list-style-type: none"> • Phase noise measurement “Start Menu” • Spectrum measurement “Start/Center Menu” • Frequency power measurement “Start/Center Menu” • Transient measurement “Time Offset Menu”
Stop/Span Key	<p>Displays the data input bar in the upper part of the screen by which you can specify the stop value of the sweep range for the active measurement trace or the span value for the transient measurement. Also displays the menu in the right part of the screen that allows you to specify the sweep range. You can use the following menus:</p> <ul style="list-style-type: none"> • Phase noise measurement “Stop Menu” • Spectrum measurement “Stop/Span Menu” • Frequency power measurement “Stop/Span Menu” • Transient measurement “Span Menu” <p>In these menus, the titles are different from those at the start, but the function of the softkey is the same.</p>
DC Control Key	<p>Displays the “DC Control Voltage Menu” by which you can specify the values of control voltage output for the DC CONTROL port.</p>
DC Power Key	<p>Displays the “DC Power Voltage Menu” by which you can specify the values of power voltage output for the DC power port.</p>
Setup Key	<p>Displays the “Setup Menu” in the right part of the screen. Manipulating the “Setup Menu” enables you to specify the frequency range, IF Gain, input level, etc. required for individual measurements.</p>
Trigger Key	<p>Displays the “Trigger Menu” in the right part of the screen. Manipulating the “Trigger Menu” enables you to specify the trigger mode and trigger source and obtain triggers. Specify the trigger mode for each measurement window.</p>

6. Floppy Disk Drive

A device to use for storing to and reading from a floppy disk the setup state of the E5052A, measurement data, calibration data, data on images displayed on the LCD screen, VBA (Visual Basic for Applications) programs, etc. The floppy disk drive is compatible with a 3.5-inch, 1.44-MB DOS (Disk Operating System) formatted floppy disk.

A floppy disk access lamp is provided at the lower left of the floppy disk drive opening. When the floppy disk drive is accessing a disk (for reading or writing), this lamp is lit green.


A disk eject button is provided at the lower right of the floppy disk drive opening. Pressing this button ejects the inserted floppy disk.

NOTE

Insert a floppy disk into the floppy disk drive opening **rightside up** in the direction of the arrow marked on the disk.

Do not press the disk eject button while the floppy disk access lamp is on. Trying to forcefully pull the floppy disk out while the lamp is on may damage the floppy disk or disk drive.

7. NAVIGATION Block








The keys and knob in the NAVIGATION block are used to navigate between softkey menus or selected (highlighted) areas in a dialog box and to change numeric values in the data entry area by stepping up or down. When selecting one of two or more objects (softkey menus, data entry areas, etc.) to manipulate with the NAVIGATION block keys displayed on the screen, first press the  key in the “8. ENTRY Block” on page 26 to select the object to be manipulated (focus on the object) and then manipulate the NAVIGATION block keys (knob) to move your selection (highlighted object) or change numeric values.

In the following, you will see how the NAVIGATION block keys work in both the softkey menu and the data entry area. For more on manipulating tables and dialog boxes, refer to the manipulation procedure for each of those functions.

Operation in softkey menu (softkey menu is selected)

When the focus is on the softkey menu (the menu title area in the uppermost part is displayed in blue), the NAVIGATION block keys work as described below.

Table 2-4

 Knob (turned clockwise or counterclockwise)	Moves the softkey selection (highlighted display) up or down.
  Key	Moves the softkey selection (highlighted display) up or down.
 Key	Displays the softkey menu one layer above.
 Key	Displays the softkey menu one layer below.
 Knob (pressed) or  key	Executes the function of the selected softkey.

After pressing the data entry softkey, the focus automatically moves to the data entry area.

Operation in data entry area (data entry area is selected)

When the focus is on the data entry area (the data entry bar is displayed in blue), the NAVIGATION block keys work as described below.

Table 2-5




 Knob (turned clockwise or counterclockwise)	Increases or decreases the numeric value in the data entry area in small steps.
  Keys	Increases or decreases the numeric value in the data entry area in large steps.

Table 2-5



Keys

Moves the cursor (|) in the data entry area laterally back and forth. Use it together with the “8. ENTRY Block” keys to change data one character at a time.



Knob (pressed) or



key

Finishes the entry in the data entry area and moves the focus to the softkey menu.

8. ENTRY Block

A group of keys used for entering numeric data.

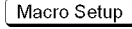


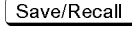


Table 2-6

<p> 0 1 2 . . . 9 . Keys (numeric keys) </p>	<p>Type numeric characters and a decimal point at the position of the cursor in the data entry area.</p>
<p> +/- Key </p>	<p>Alternately changes the sign (+, -) of the numeric value in the data entry area.</p>
<p> G/n M/μ k/m x1 Keys </p>	<p>Adds a prefix to the numeric data typed by using the numeric key and +/- and then enters that data. One of the two prefixes written on the surface of the key is automatically selected depending on the parameter to be entered. x1 is entered without a prefix being given.</p>
<p> <small>Softkey On/Off</small> Entry Off Key </p>	<p>Turns off the data entry bar if it is displayed. If the dialog box is displayed, cancels the entry and close the dialog box. If the data entry bar and dialog box are not displayed, turns the softkey menu display on/off.</p>
<p> Back Space Key </p>	<p>Deletes the character to the left of the cursor () in the data entry area. When two or more characters in the data entry area are selected (highlighted), deletes all the characters selected.</p>
<p> Focus Key </p>	<p>Changes the selection (focus) between the objects to be manipulated by the keys for “7. NAVIGATION Block” on page 24 and “8. ENTRY Block” on page 26.</p> <p>“7. NAVIGATION Block”: The objects to be manipulated by the “8. ENTRY Block” keys include softkey menus, data entry areas, tables (e.g., segment tables, limit tables, and marker tables), and dialog boxes. When two or more of these are displayed on the screen and need selecting, use this key to change the selection (focus) between the objects to be manipulated. When a softkey menu is selected, the menu name area at the top of the menu is displayed in blue. When a data entry area is selected, the data entry bar is displayed in blue. When a table is selected, the frame of the table window is displayed in light gray.</p> <p>While a dialog box is displayed, the focus is fixed on the dialog box and cannot be changed.</p>

9. INSTR STATE Block

A group of keys related to the macro function, store and call function, control/management function, and the presetting of the E5052A (returning it to the preset state).

Table 2-7





 Key	Displays the “Macro Setup Menu” in the right part of the screen. Manipulating the “Macro Setup Menu” enables you to start up the VBA editor, or create, call, or store a VBA project.
 Key	Executes a VBA procedure called “main” that has a VBA module named Module1.
 Key	Stops the VBA procedure being executed.
 Key	Displays the “Save/Recall Menu” in the right part of the screen. Manipulating the “Save/Recall Menu” enables you to store to or read from the internal hard disk or floppy disk the setup conditions and trace data of the analyzer.
 Key	First, temporarily saves the data for the image displayed on the LCD screen at the moment the key is pressed ^{*1} to the internal memory (clipboard). Immediately afterwards, it displays the “System Menu” on the right side of the screen. Manipulating the “System Menu” enables you to define the setup for the control and management of the analyzer. Using the Dump Screen Image key enables you to store the image data in the clipboard to a file on the internal hard disk or a floppy disk. Also, using the Print key in the System menu enables you to print the image data in the clipboard to a printer.
 Key	Displays the “Preset Menu” on the right side of the screen. Pressing OK enables you to return the analyzer to the initial setup state, called the preset setup. For the initial setup for each of the functions, see Appendix C, “List of Default Values,” on page 231.

*1. Strictly speaking, the temporary save occurs the moment the “System Menu” is manipulated.

10. MKR/ANALYSIS Block

A group of keys used for analyzing the measurement results by using the markers. For functions of the keys in the MKR/ANALYSIS block, see Chapter 2 “Overview of Functions” in the User’s Guide.

Table 2-8

 Key	<p>Displays the “Marker Menu” on the right side of the screen. Manipulating the “Marker Menu” enables you to turn the markers on/off and to move them by entering stimulus values. You can place up to 10 markers on each trace.</p>
 Key	<p>Displays the “Marker Search Menu” on the right side of the screen. Manipulating the “Marker Search Menu” enables you to move a marker to a specific point (maximum, minimum, peak, and a point with a target value) on a trace. You can also find and display the bandwidth parameters (up to six).</p>
 Key	<p>Displays the “Marker To Menu” in the right part of the screen. Manipulating the “Marker To Menu” enables you to specify the marker sweep range and coupling of markers within a measurement and to display statistics data on traces.</p>
 Key	<p>Displays the “Analysis Menu” on the right side of the screen. Manipulating the “Analysis Menu” enables you to use the analytical functions.</p>

11. DUT Interface

A port used to connect the DUT. It has a DC CONTROL port, DC POWER port, BASEBAND IN port, and RF port. The connector type of each port is given below.

RF port: 50 Ω, N-type, female connector

DC CONTROL port, DC POWER port, base band port: BNC, female connector

CAUTION



Do not apply a DC voltage or current to the individual ports of the DUT interface. Applying a DC voltage or current may lead to device failure. In particular, there is the risk of the capacitor remaining charged. Connect the measurement sample (DUT) to the port (or the test fixture, cables, etc. connected to the port) after the analyzer has been completely discharged.

The individual ports comply with Installation Category I of IEC 61010-1 and Measurement Category I of IEC 61010-1.

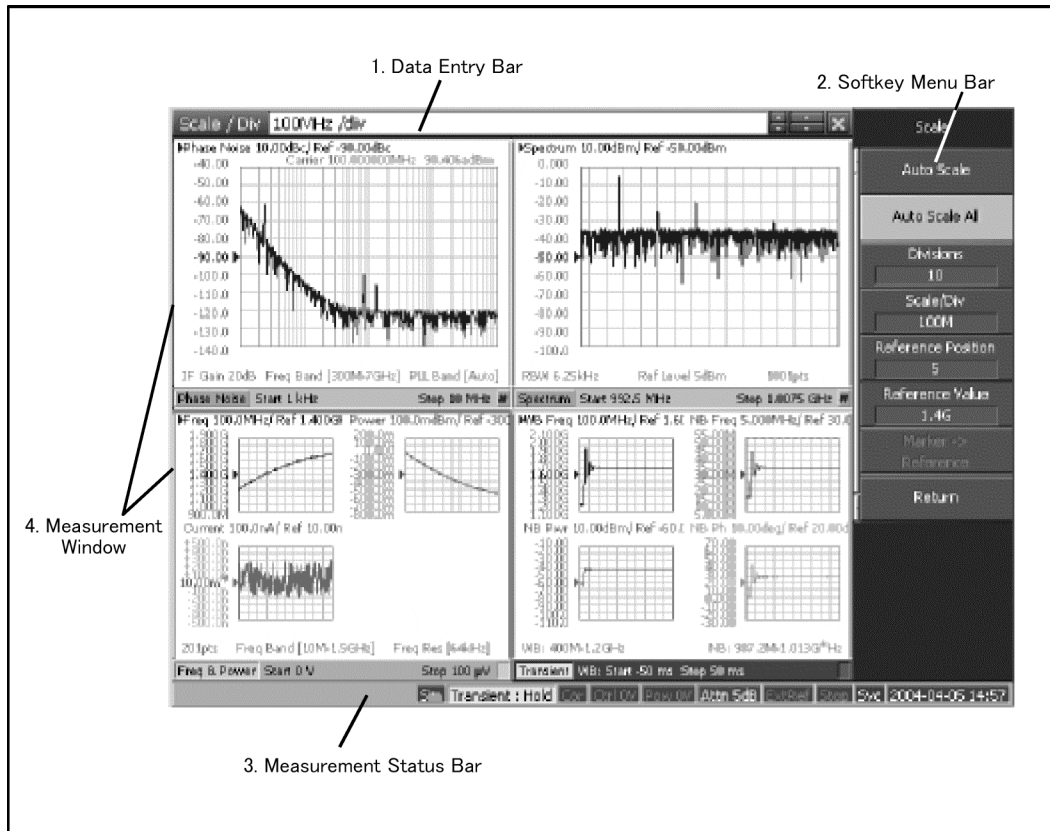
12. OPTIONAL RF Ports

For the firmware version 1.00, these ports are already connected and ready to operate; the user does not have to connect them.

LCD Screen: Names and Functions of Parts

This section describes the names and functions of the parts on the E5052A's LCD screen.

Figure 2-2 Screen Display



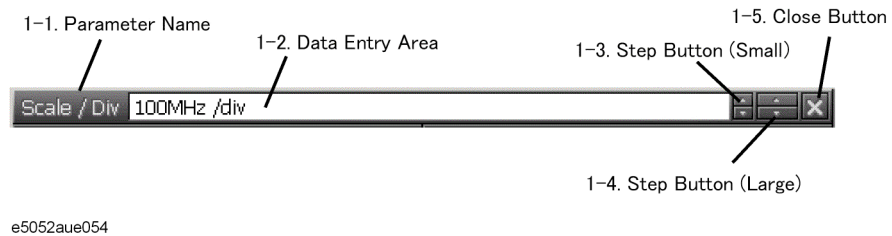
e5052aue053

1. Data Entry Bar

Used to enter numeric data into the E5052A. Press a hardkey or softkey to enter data, and the data entry bar will appear at the top of the screen. To assign a title to a measurement window, the entry bar also allows you to enter letters and symbols by using the front panel keys or mouse.

Figure 2-3

Data Entry Bar



NOTE

To manipulate the data entry bar with the front panel keys, it has to be selected as the object to manipulate (focus placed on it). When the focus is placed on the data entry bar, the entire bar is displayed in blue. Pressing or clicking on **Focus** of “8. ENTRY Block” on page 26 enables you to move the focus to the desired object.

1-1. Parameter Name

Displays the name of the parameter for which data will be entered.

1-2. Data Entry Area

When the data entry bar is displayed for the first time, the current settings are displayed on it. You can change numeric values by typing from the keyboard or in the ENTRY block on the front panel.

1-3. Step Button (Small)

Increases or decreases the numeric value in the data entry area in small steps. Use the mouse to manipulate these buttons.

1-4. Step Button (Large)

Increases or decreases the numeric value in the data entry area in large steps. Use the mouse to manipulate these buttons.

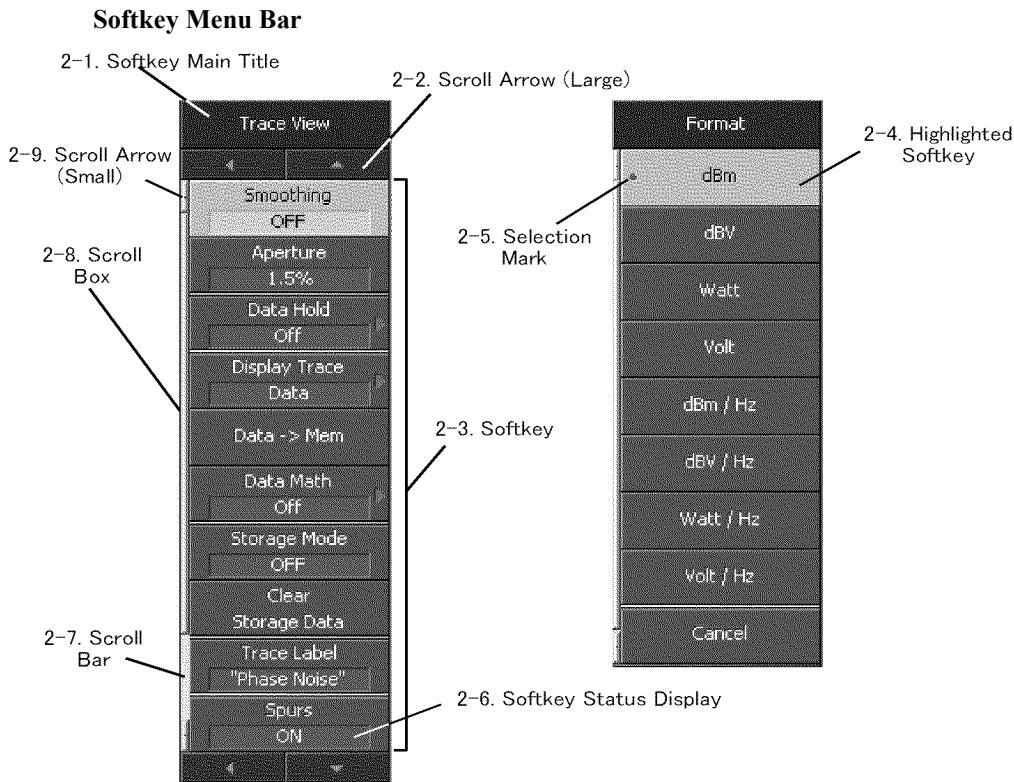
1-5. Close Button

Closes the data entry area (turns off the display). Use the mouse to manipulate this button.

2. Softkey Menu Bar

A group of keys on the screen called up by the hardkeys or menu bars. You can manipulate these keys by using the NAVIGATION block keys on the front panel, the mouse, or the keyboard. You can perform manipulations by directly touching the screen with your finger instead of using a mouse.

Figure 2-4



e5052aue075

NOTE

To manipulate a menu bar, it has to be selected as the object to manipulate (focus placed on it). When the focus is placed on a menu bar, any of the softkeys may be highlighted. An example of the focus not being placed on the menu bar is when it's on the data entry bar.

2-1. Softkey Menu Title

The title of the softkey menu is displayed here. Double-clicking on this part of the menu bar displays the top layer of softkeys.









2-2. Scroll Arrow (Large)





When the softkeys in a menu overflow the screen, using this key enables you to scroll the menu page by page. There are four scroll arrows: two for up and down and two for returning to the top menu (at top and bottom). Use the mouse to manipulate these buttons.

2-3. Softkeys

These are the actual keys you can use to perform setup. A ► displayed to the right of a softkey indicates that pressing that softkey will display the lower layer of softkeys.

2-4. Highlighted Softkey

Pressing  and  on the front panel or pressing  on the keyboard causes the highlighted (selected) softkey to be executed. You can change which softkey in the menu is highlighted by turning  or pressing   on the front panel or by pressing   on the keyboard.

Pressing the  key on the front panel or the  key on the keyboard brings up the upper level softkey menu, and pressing the  key on the front panel or the  key on the keyboard brings up the lower level softkey menu.

2-5. Selection Mark

Shows which softkey function is currently selected.

2-6. Softkey Status Display

Displays the setup status of that softkey.

2-7. Scroll Bar

When the softkeys in a menu overflow the screen, clicking on the blank part of this scroll bar enables you to scroll the softkey menu up or down.

2-8. Scroll Box

You can scroll the softkey menu up or down by using the mouse to select and drag the scroll box (pressing the button on the object to be moved and then releasing the button at the desired location). The length and position of the scroll box indicate the length and position of the currently displayed part of the softkey menu relative to the entire menu.

2-9. Scroll Arrow (Small)

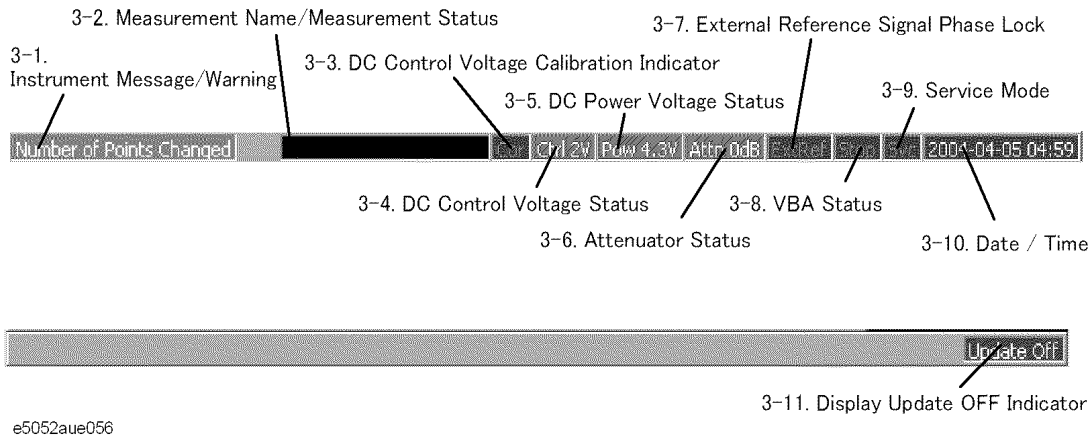
Using this button, you can scroll the menu one softkey at a time. Both upward and downward scroll arrows are available. Use the mouse to manipulate these buttons.

3. Instrument Status Bar

This graphical bar displays the status of the entire instrument.

Figure 2-5

Instrument Status Bar



3-1. Instrument Message/Warning

Displays instrument messages and warnings. Instrument messages are displayed in gray and warnings in red. For the meanings of the instrument messages and warnings, see Appendix B, “Troubleshooting,” on page 217.

3-2. Measurement Name/Measurement Status

Displays the measurement name and measurement status of the E5052A. Each measurement status is described below.

Table 2-9

Hold	A holding state is maintained for measurement (idling).
Man	The trigger source is set to “Manual” and waiting for trigger.
Ext	The trigger source is set to “External” and waiting for trigger.
Bus	The trigger source is set to “Bus” and waiting for trigger.
NVideo ^{*1}	The trigger source is set to “Narrow Video” and waiting for trigger.
WVideo ^{*1}	The trigger source is set to “Wide Video” and waiting for trigger.
Meas	A measurement is in progress.

^{*1}. You can select "Narrow Video" or "Wide Video" for the transient measurement only.

3-3. DC Control Voltage Calibration Indicator

When the DC control voltage calibration is enabled, it is displayed in blue. When disabled, it is displayed in grey.

3-4. DC Control Voltage Status

When the DC control voltage signal output is turned on, the specified voltage is displayed.

3-5. DC Power Voltage Status

When the DC power voltage signal output is turned on, the specified voltage is displayed.

3-6. Attenuator Status

The specified attenuator value is displayed.

3-7. External Reference Signal Phase Lock

When the frequency reference signal is input to the “10. External Reference Signal Input Connector (Ref In)” on page 44 on the rear panel and the measurement signal of the E5052A is phase-locked to the reference signal, **ExtRef** is displayed in blue.

Table 2-10

ExtRef (displayed in blue)	Measurement signal is phase-locked to external reference signal.
ExtRef (displayed in gray)	Measurement signal is not phase-locked to external reference signal.

NOTE

When the phase lock function is not operated improperly, “**Unlock**“ is displayed in red. Even when “9. High Stability Frequency Reference Output Connector (Ref Oven)” on page 44 and “10. External Reference Signal Input Connector (Ref In)” on page 44 are interconnected, the measurement signal may not be phase-locked immediately after powered on under a cool-temperature environment (i.e. the display of “ExtRef” does not change from grey to blue). In this case, wait a few minutes until the instrument warms-up and “ExtRef” is displayed in blue.

3-8. VBA Status

Indicates the current status of the VBA program running on the E5052A.

Table 2-11

Run	VBA program is currently running.
Stop	VBA program has stopped.

3-9. Service Mode

Indicates the service mode status.

Table 2-12

SVC (displayed in red)	An abnormal condition has been detected inside the E5052A. The unit may be damaged. Notify the Customer Contact listed at the end of this brochure or the distributor from whom the unit was purchased.
SVC (displayed in gray)	The E5052A is in normal mode.

3-10. Date / Time

Displays the date and time generated by the internal clock. The display format is as follows:

Table 2-13

YYYY-MM-DD HH:MM	YYYY: Year (AD) MM: Month DD: Day HH:MM: Time (0:00 to 23:59)
-------------------------	--

You can turn the date and time display on/off by manipulating the keys: **System** - **Misc Setup** - **Clock Setup** - **Show Clock**.

3-11. Display Update OFF Indicator

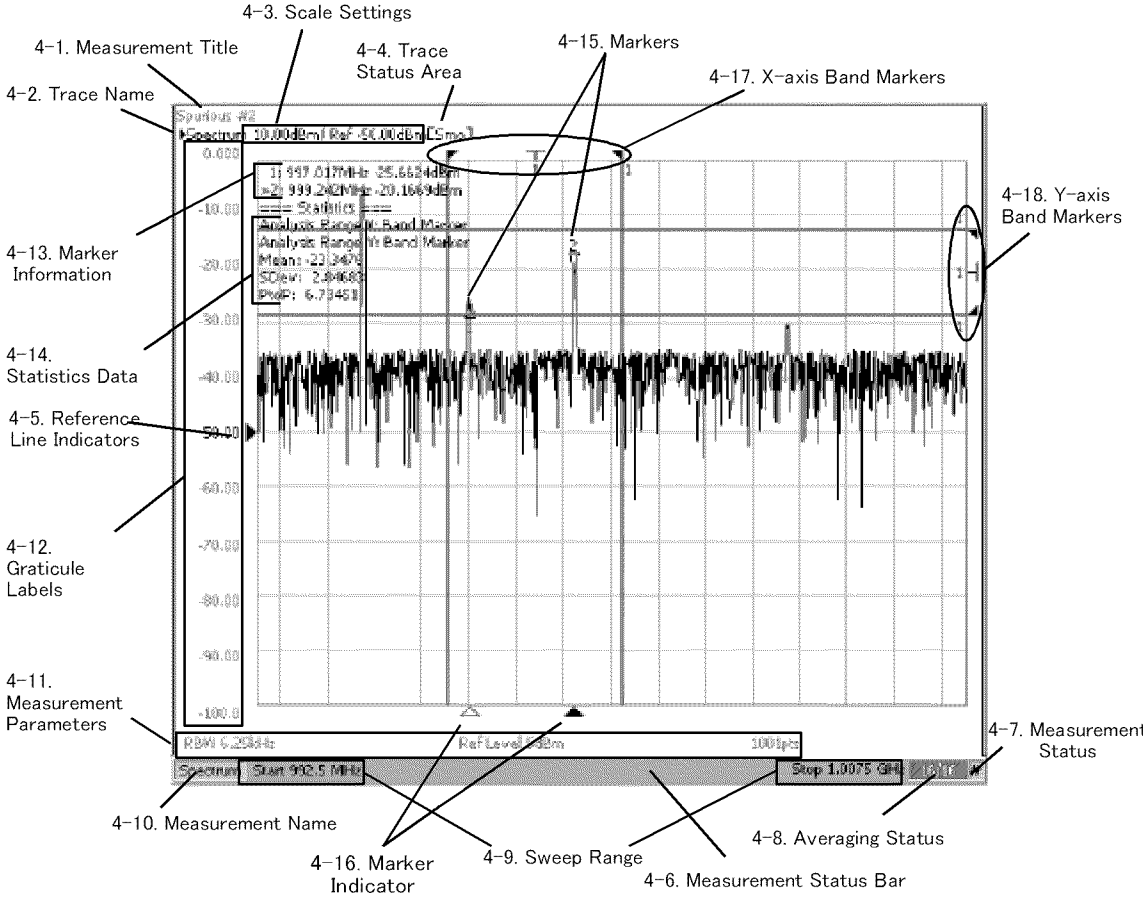
When you have turned off updating of information displayed on the LCD screen, this indicator is displayed.

4. Measurement Window

This provides windows for displaying traces. Because a measurement corresponds to a window, it is called a measurement window. When the outer frame of a measurement window is displayed in light gray, the measurement is active (the measurement for which setup is being performed). Figure 2-2 on page 30 shows that the transient measurement is active (lower-right window). To make a measurement active, use **Window Next**. Clicking inside a measurement window will also make it active. Figure 2-6 shows a spectrum measurement displayed in maximum screen by using **Window Max**.

Figure 2-6

Measurement Window



e5052aue055

4-1. Measurement Title

You can assign a title to each channel and have the title displayed in the bar. To set up the measurement title, enter a title in **[Display]** - **Edit Title Label** and then toggle on/off the title display by using **[Display]** - **Title Label** .

4-2. Trace Name

The names of the traces on the measurement are displayed here. **▶** to the left of the trace name indicates the active trace (the trace for which setup is being performed). To switch over the active trace, use **[Trace Next]** .. Clicking the graph of the trace will also activate the trace.

4-3. Scale Settings

The scale setting for each trace is displayed here. This example shows that “0.00dB/” corresponds to 10 dB per division. “Ref -50.00.000dB” shows that the value of the reference line is -50 dB. To specify the scale settings, use each softkey that can be displayed by pressing the **[Scale]** hardkey.



4-4. Trace Status Area

The setup for each trace is displayed here.

Table 2-14 Trace Status Display

Classification	Contents inside the []	Meaning
Turning on/off traces	Nothing M D&M off	Data trace: ON, Memory trace: OFF Data trace: OFF, Memory trace: ON Data trace: ON, Memory trace: ON Data trace: OFF, Memory trace: OFF
Performing data math: Refer to the indication in parentheses when the memory trace is turned on.	D+M (D+M&M) D-M (D-M&M) D*M (D*M&M) D/M (D/M&M)	Execution of Data+Mem math Execution of Data-Mem math Execution of Data*Mem math Execution of Data/Mem math
Smoothing	Smo	Smoothing: ON

4-5. Reference Line Indicators

These indicate the position of the reference line for the Y-axis scale in the rectangular display format. There is an indicator to the right of the scale (**▶**). To enter a numeric value for the position of the reference line, open the data entry bar using the keys: **[Scale]** - **Reference Position**. You can also move the position of the reference line by placing the mouse pointer on the reference line indicator (the pointer changes from  to ), moving the indicator vertically with the left mouse button kept pressed, and then releasing the button at the desired location (i.e., a drag-and-drop operation).

4-6. Measurement Status Bar

The status of each measurement is displayed here (see parts 4-7 through 4-10).

4-7. Measurement Status

Displays the update status of traces on the measurement.

Table 2-15

#	Invalid traces. The measurement conditions have changed, but the traces on the measurement window currently displayed have not been updated to match the new conditions.
(not displayed)	Valid traces.

4-8. Averaging Status

Displays the averaging factor and averaging count when averaging is turned on.

Table 2-16

n/m (displayed in blue)	Averaging: ON (m: averaging factor; n: averaging count)
(not displayed)	Averaging: OFF

4-9. Sweep Range

Indicates the sweep range by using the start/stop or center/span. This varies depending on the given parameters or measurements.

4-10. Measurement Name

Indicates the measurement name.

4-11. Measurement Parameters

Indicates the parameters specified to perform a measurement sweep at the bottom of each measurement screen. The content may vary depending on the measurement.

4-12. Graticule Labels

Y-axis divisions in the rectangular display format. The value of the reference line (the division line indicated by ►) can be entered numerically by opening the data entry bar using the keys: **Scale** - **Reference Value**. You can change values of the reference line in one division intervals by placing the mouse pointer in the area of the graticule label (the pointer changes from ↖ to ⇕), moving the pointer vertically with the left mouse button pressed, and then releasing the button at the desired location. By using **Display** - **Y # of Digits**, you can select the display format of the graticule label from three options: 4 digits, 12digits, and “not displayed.”

4-13. Marker Information

The marker information is displayed in a list. It shows the marker number, marker x-axis value, and marker measurement value from left to right. For the active marker (the one for which setup and analysis are being performed), > is displayed to the left of the marker number. For the reference marker, Δ is displayed instead of the marker number.



4-14. Statistics Data

Turning on the statistics data function displays statistics data here. For more about the statistics data function, see “Determining the Mean, Standard Deviation, and Peak-to-Peak of the Trace” on page 139.

4-15. Markers

The markers used for reading values on a trace. Up to six markers can be displayed for each trace.

Table 2-17

\overline{n} 	Active marker (ready for setup and analysis)
 \overline{n}	Non-active marker



Here, “n” denotes a marker number. For the reference marker, however, nothing is displayed at the location of n. Clicking the marker or one of the “4-16. Marker Indicators” makes the marker active.

4-16. Marker Indicators

These indicate the positions of markers on the x-axis.

Table 2-18

▲	Active marker indicator
△	Non-active marker indicator



You can also move a marker to the desired position by placing the mouse pointer on the marker indicator or the position of the marker itself (the pointer changes from  to ), moving the indicator vertically with the left mouse button pressed, and then releasing the button at the desired location.

4-17. X-axis Bandmarkers

By turning on the x-axis band marker function, the x-axis band marker is displayed in a specified position.

Table 2-19

▼	Indicator of start value of x-axis band marker
▼	Indicator of stop value of x-axis band marker
T	Indicator of center value of x-axis band marker



You can also move a marker to the desired position by placing the mouse pointer on the marker indicator or the position of the marker itself (the pointer changes from  to ) , moving the indicator vertically with the left mouse button pressed, and then releasing the button at the desired location.

4-18. Y-axis Bandmarkers

By turning on the y-axis band marker function, the y-axis band marker is displayed in a specified position

Table 2-20

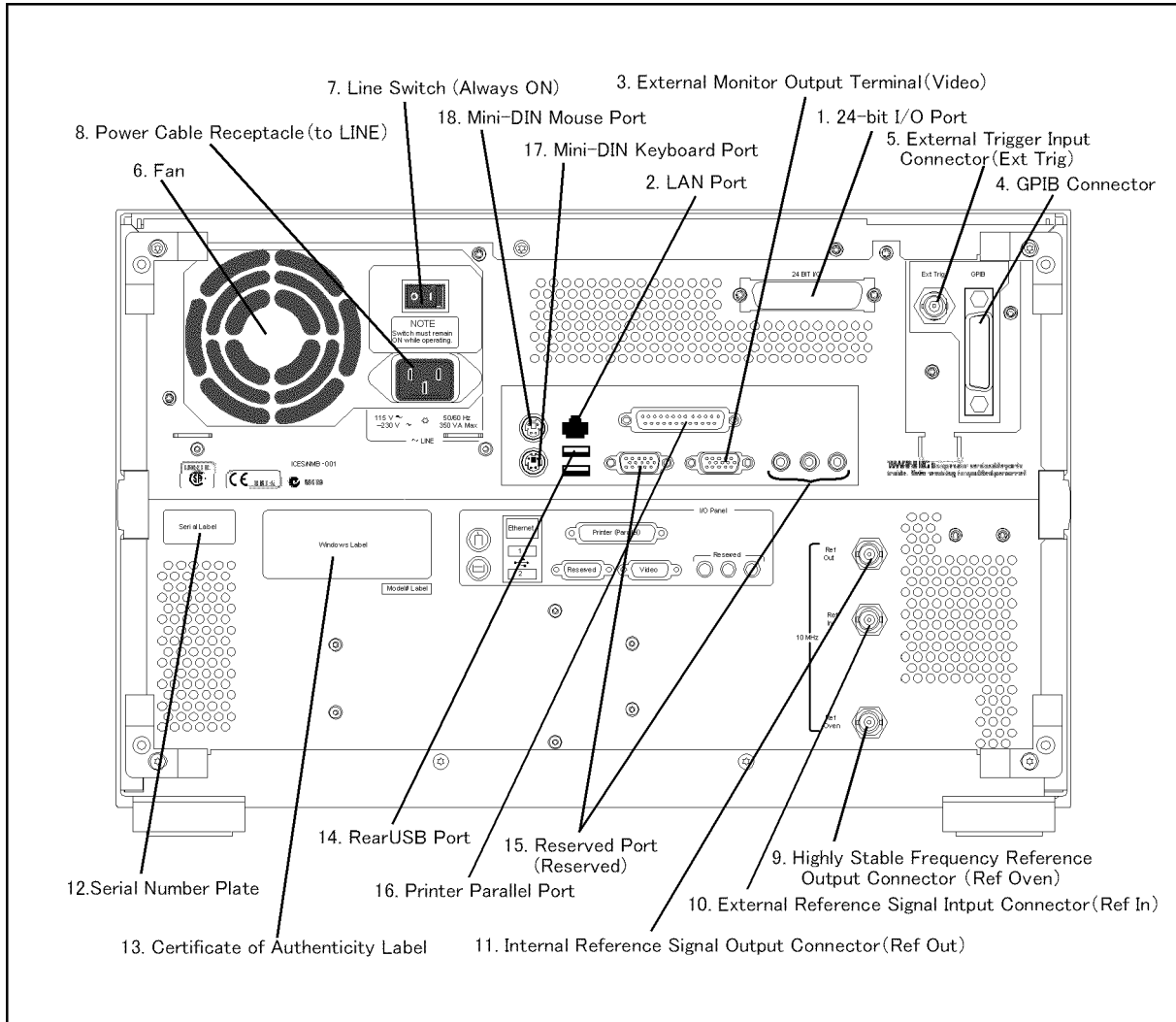
▼	Indicator of start value of y-axis band marker
▲	Indicator of stop value of y-axis band marker
—	Indicator of center value of y-axis band marker

You can also move a marker to the desired position by placing the mouse pointer on the marker indicator or the position of the marker itself (the pointer changes from  to ) , moving the indicator up or down with the left mouse button pressed, and then releasing the button at the desired location.

Rear Panel: Names and Functions of Parts

This section describes the names and functions of the parts on the rear panel of the E5052A.

Figure 2-7 Rear Panel



e5052aue033

1. 24-bit I/O Port

The terminal to which an automatic machine (handler) used on a production line is connected. For more about using the 24-bit I/O port, see the Programmer's Guide.

Connector type: 36-pin Ribbon (centronics) connector

2. LAN Port

A terminal for connecting the E5052A to a LAN (Local Area Network). Connecting this instrument to a LAN enables you to access the hard disk drive of the instrument from an external PC or to control this instrument by using SICL-LAN or telnet.

Connector type: 8-pin RJ-45 connector

Base standard: 10Base-T/100Base-TX Ethernet (automatic data rate selection)

3. External Monitor Output Terminal (Video)

The terminal to which an external color monitor (display device) is connected. By connecting the color monitor to this terminal, the same information shown on the LCD screen of the main body can be displayed on an external color monitor.

Connector type: 15-pin VGA connector, female

4. GPIB Connector

General Purpose Interface Bus (GPIB). The connection of an external controller and other devices through this connector allows you to configure an automatic measurement system. For more on automatic measurement systems via GPIB, see the *Programmer's Guide*.

5. External Trigger Input Connector (Ext Trig)

External trigger signals are input through this connector, which detects the downward transition from the HIGH state in TTL signals as the trigger signal. To use this connector to generate a trigger, you must set the trigger source to the "external" side (key operation:

Trigger - Source - External).

Connector type: BNC connector, female

6. Fan

The cooling fan for controlling the temperature inside the E5052A. This fan exhausts heated air from inside the analyzer to the outside.

7. Line Switch (Always ON)

Always keep this switch on (I).

CAUTION

Do not use this switch to turn off (O) the mains. Doing so may cause the analyzer to fail. For more information, see the description of the "1. Standby Switch" on page 19.

8. Power Cable Receptacle (to LINE)

The receptacle (outlet) to which the power cable is connected.

NOTE

To feed power, use the included three-prong power cable with a ground conductor.

The plug attached to the power cable (on the power outlet side or device side of the cable) serves as the disconnecting device (device that cuts off power supply) of the E5052A.

When the power supply must be cut off to avoid danger such as electric shock, pull out the power cable plug (on the power outlet side or device side of the cable). The procedure for turning off the mains in normal use is given in “1. Standby Switch” on page 19.

For more about the power supply, see Chapter 3, “Installation,”.

9. High Stability Frequency Reference Output Connector (Ref Oven)

A connector from which the reference signals are output.

Connector type: BNC connector, female

Output signal (Nominal): 10 MHz, +0 dBm \pm 3 dB

10. External Reference Signal Input Connector (Ref In)

The reference signal input connector for phase-locking the measurement signal from the E5052A to the external frequency reference signal. Inputting the reference signal via this connector improves the accuracy and stability of the frequency of the measurement signal from the E5052A.

Connector type: BNC connector, female

Input signal (Nominal): 10 MHz \pm 10 ppm, +0 dBm \pm 3 dB

NOTE

When the frequency reference signal is input to this connector, the measurement signal from the E5052A is automatically phase-locked to the reference signal. When an input signal is not present, the frequency reference signal inside the E5052A is automatically used. The **ExtRef** on the instrument status bar is displayed in blue when the system is phase-locked to the external reference signal and in gray when it is not phase-locked.

11. Internal Reference Signal Output Connector (Ref Out)

A connector for outputting the internal frequency reference signal from the E5052A. By connecting this output connector to the external reference signal input connector of another device, the device can be phase-locked to the internal reference signal of the E5052A and used under this condition.

Connector type: BNC connector, female

Output signal (Nominal): 10 MHz \pm 10 ppm, +0 dBm \pm 3 dB

Output impedance (Nominal): 50 Ω

12. Serial Number Plate

The seal showing the serial number of the product.

13. Certificate of Authenticity Label

The label showing the information of the “Certificate of Authenticity.”

14. Rear USB port

A USB (Universal Serial Bus) port (number of ports: 2) specifically for a USB/GPIB interface or a printer.

15. Reserved Port (Reserved)

Using these two ports is not allowed. No connections.

16. Printer Parallel Port

The 25-pin parallel port for printer connection. Connecting a designated printer to this port allows screen information on the E5052A to be printed. For more on printing, see “Printing Screen Image” on page 154.

17. Mini-DIN Keyboard Port

The port to which a mini-DIN type keyboard is connected. The keyboard can be used to edit VBA programs inside the E5052A or to enter file names. Since the arrow keys and numeric keys on the keyboard work in the same way as the arrow keys and numeric keys on the front panel of the E5052A, you can use it instead of front panel operation.

NOTE

Be sure to only use a keyboard designated for use with this instrument. Using a keyboard other than those designated may cause erroneous input.

18. Mini-DIN Mouse Port

The port to which a mini-DIN type mouse is connected. Using a mouse enables you to more efficiently perform the operations of menu bars, softkeys, and dialog boxes as well as selecting an active channel or an active trace. The mouse also enables you to move a marker or the scale reference line by using drag-and-drop operations.

NOTE

Be sure to only use a mouse designated for use with this instrument. Using a mouse other than those designated may cause erroneous input.

Overview of Functions

Rear Panel: Names and Functions of Parts

3 Installation

This chapter provides information on how to set up the Agilent E5052A signal source analyzer and on daily maintenance.

Contents of this Chapter

- ❑ **Checking the Shipment on page 49**

After you receive the analyzer, check all of the items in the packing container.
- ❑ **Environmental Requirements on page 52**

Describes the system requirements needed to install the E5052A and how to secure space for heat radiation.
- ❑ **Installing Front Handles/Rack Mounting Flanges on page 55**

Shows how to mount the front handles used to transport the E5052A and how to install the flanges needed to install it in a rack.
- ❑ **Connecting the Accessories on page 58**

Provides information for connecting the mouse, keyboard, and LAN cable to the E5052A.
- ❑ **Power Supply and Blown Fuses on page 61**

Shows how to check the power supply as well as how to check and connect the power cable. This section also explains how to handle a blown fuse.
- ❑ **Starting the E5052A on page 64**

Describes turning on/off of the Power switch and cutting off the power supply.
- ❑ **Initial Registration of E5052A on page 66**

Describes initial registration of the Windows 2000 operating system.
- ❑ **Setting the Internal Clock on page 69**

Explains how to set the internal clock.
- ❑ **Daily Maintenance on page 71**

Describes the required daily maintenance for the E5052A.

Checking the Shipment

After you receive the analyzer, inspect the contents during unpacking according to the following procedure.

WARNING

When unpacking the analyzer, if an external surface of the analyzer (such as the cover, front/rear panel, LCD screen, power switch, and port connectors) appears to have been damaged during transport, do not turn on the power switch. In an extreme case, this may result in your getting an electric shock.

-
- Step 1.** Check that the packing box or shock-absorbing material used to package the analyzer has not been damaged.

NOTE

If the packing box or shock-absorbing material has been damaged, leave the packing box and shock-absorbing material as is until other inspections are made as follows:

- Step 2.** Check the packaged items supplied with the analyzer for any damage or defect.
- Step 3.** By referring to Table 3-1 and Figure 3-1, check that all packaged items supplied with the analyzer have been provided as per the specified options.
- Step 4.** After checking, if one of the following applies, contact your nearest Agilent Technologies sales and service office.
1. The packing box or shock-absorbing material used to package the analyzer has been damaged or the shock-absorbing material shows evidence where extreme force has been applied.
 2. A packaged item supplied with the analyzer has mechanical damage or defects.
 3. An item that should be packaged with the analyzer is missing.
 4. A fault has been detected in the subsequent operation check of the analyzer.

If an abnormality is detected in Step 1, contact the company that transported the analyzer as well as your nearest Agilent Technologies sales and service office. For inspection by the transport company, save the packing box, shock-absorbing material, and packaged items as you received them.

Installation
Checking the Shipment

Table 3-1 **Items Packaged with the E5052A**

Name	Agilent Product/ Part Number	Qty
Standard Accessories		
<input type="checkbox"/> E5052A	E5052A	1
<input type="checkbox"/> Power cable *1	-	1
<input type="checkbox"/> CD-ROM (of the manual)*2	E5052-9050x	1
<input type="checkbox"/> System recovery disk	E5052-16000	1
<input type="checkbox"/> BNC adaptor	1250-1859	1
Options		
<input type="checkbox"/> Keyboard (Option 810)	-	1
<input type="checkbox"/> Mouse (Option 820)	-	1
<input type="checkbox"/> Manual (Option ABA)*3		
• User's Guide	E5052-900x0	1
• Programmer's Guide	E5052-900x1	1
• VBA Programmer's Guide	E5052-900x2	1
<input type="checkbox"/> Handle Kit (Option 1CN)*4	5063-9229	1
<input type="checkbox"/> Rack Mount Kit Without Handles (Option 1CM)*4	5063-9216	1
<input type="checkbox"/> Rack Mount Kit With Handles (Option 1CP)*4	5063-9223	1

*1. This accessory varies from country to country. For an illustration of the power cable options, see Figure 3-8.

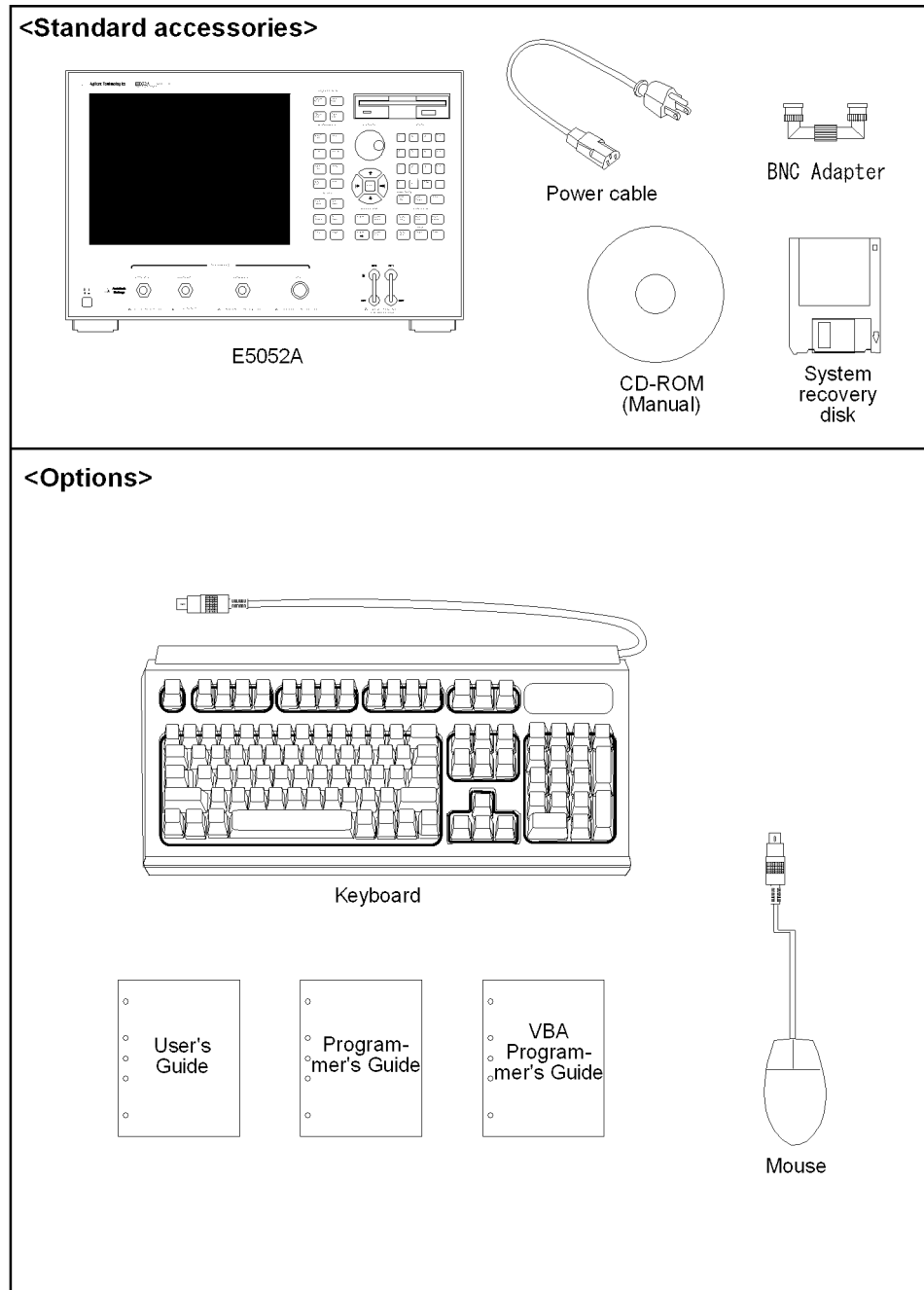
*2. The CD-ROM contains the same information as in the *User's Guide*, *Programmer's Guide*, *VBA Programmer's Guide*. The "xx" in the part number is a number that is incremented each time a revision is made, with "00" regarded as the first edition. The network analyzer will always be supplied with the latest versions of these items.

*3. The "x" in the part number of the Manual is a number that is incremented each time a revision is made, with "0" regarded as the first edition. The network analyzer will always be supplied with the latest versions of these items.

*4. This accessory is not shown in Figure 3-1. For details, see Table 3-4 on page 55.

Figure 3-1

E5052A accessories



e5052aue022

Environmental Requirements

Set up the E5052A in a location where the following environmental requirements are met.

Operating environment

Ensure that the operating environment meets the following requirements.

Temperature	10°C to 40°C
Temperature range at measurement	23°C ±5°C (<1°C deviation from temperature while performing error-correction)
Humidity	20% to 80% at wet bulb temperature <+29 °C (non-condensation)
Altitude	0 to 2,000 m (0 to 6,561 feet)
Vibration	0.5 G maximum, 5 Hz to 500 Hz

NOTE

The above environmental requirements are **not** intended for the specifications and measurement accuracy of the analyzer but for the operating environment of the analyzer.

Ventilation requirements

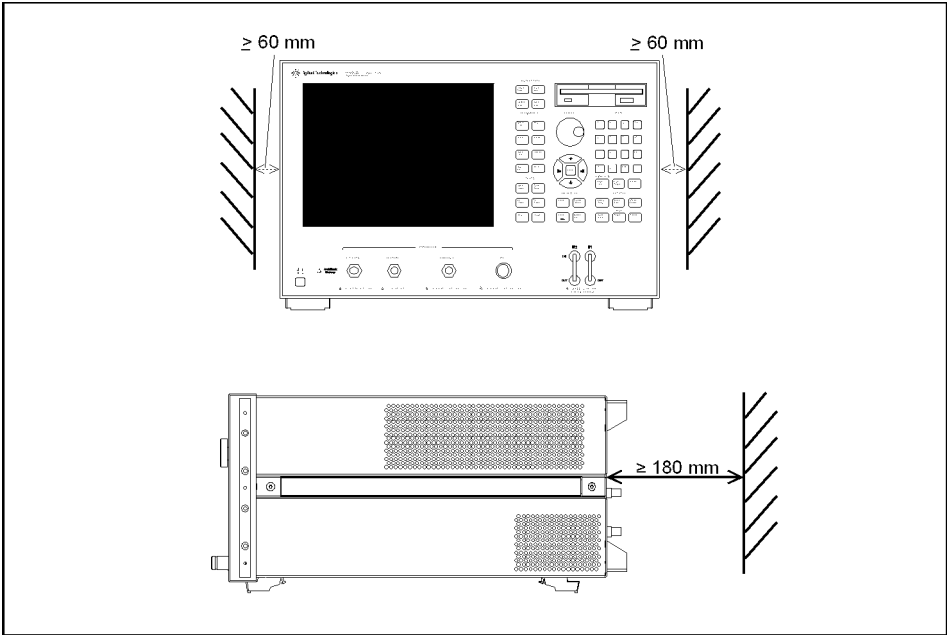
To ensure compliance with safety requirements, as well as the specifications and measurement accuracy of the analyzer, you must maintain an environmental temperature that is within the specified range by providing appropriate cooling clearance around the analyzer (or, for the rackmount type, by forced air-cooling inside the rack housing). For more information on the environmental temperature needed to satisfy the specifications and measurement accuracy of the analyzer, see the Chapter 8, “Specifications and Supplemental Information.”

When the environmental temperature around the analyzer is kept within the temperature range of the operating environment specification (see the section on “Operating environment” on page 52), the analyzer conforms to the requirements of the safety standard. Furthermore, under that temperature requirement, the analyzer still conforms to the requirements of the safety standard even when the analyzer is placed with the following cooling clearance:

	Requirement
Back	≥180 mm
Sides	≥60 mm (both right and left)

Figure 3-2

Ventilation space needed for installation



e5052auj007

Protection against electrostatic discharge (ESD)

Set up a static-free workstation to protect the electronic components against damage by electrostatic discharge (ESD) as shown in Figure 3-3. Table 3-2 shows the accessories available to provide protection against ESD.

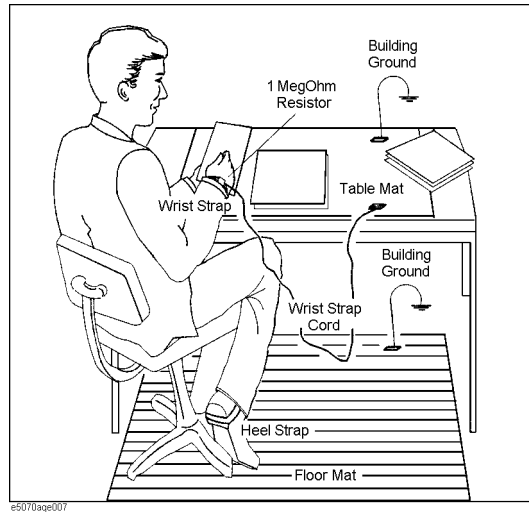
Table 3-2

Accessories available to provide anti-ESD protection

Name	Agilent Part Number
Static-control table mat and earth ground wire	9300-0797
Wrist-strap cord	9300-0980
Wrist-strap	9300-1383
Heel-straps	9300-1169

Figure 3-3

Example of static-free workstation



Ensuring adequate free space around analyzer for immediate disconnection of power cable in case of emergency

As described in “Disconnection from supply source” on page 65, the power supply is disconnected by removing the power cable’s connector plug from either the AC outlet or the E5052A unit. When installing the E5052A, ensure that there is sufficient free space around the unit to permit quick disconnection of the plug (from AC outlet or E5052A unit) in case of emergency.

Installing Front Handles/Rack Mounting Flanges

The E5052A can be installed on a workbench or in a rack. This section describes how to install the front handles (Option 1CN) used for transporting the instrument and how to install the analyzer in an equipment rack as part of a measurement system (Option 1CM: without handles, Option 1CP: with handles).

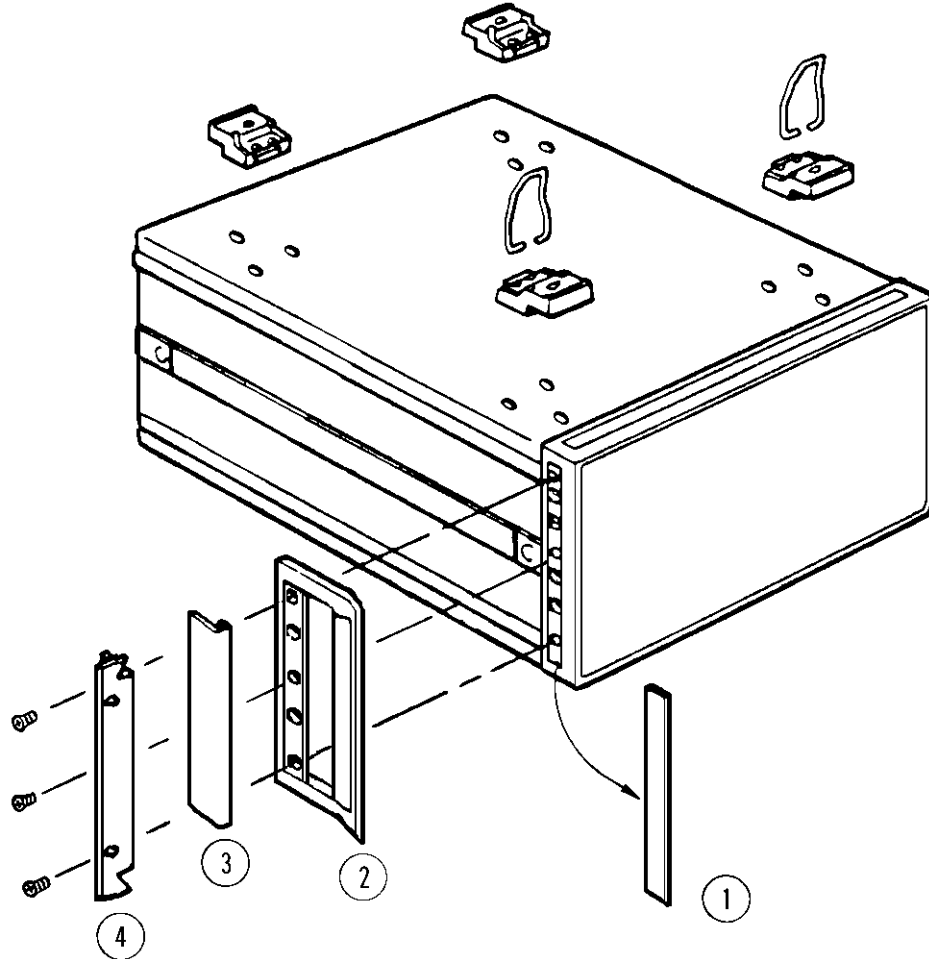
Table 3-3 **Agilent E5052A handles/rack mounting options**

Option	Name	Agilent Part Number
1CN	Handle Kit	5063-9229
1CM	Rack-mount Kit	5063-9216
1CP	Rack-mount and Handle Kit	5063-9223

Table 3-4 **Contents of each option**

Option	Contents	Quantity
1CN	Front Handles	2
	Screws	6
	Trim Strips	2
1CM	Rack-mounting flanges (locking side plate)	2
	Screws	6
1CP	Rack-mounting flanges (locking side plate)	2
	Front Handles	2
	Screws	8

Figure 3-4 Installing front handle/rack-mount kits



e5070aqj009

How to install the handle kit (Option 1CN)

The handle kit is used for transport and relocation of the E5052A. While referring to Figure 3-4, install the handle kit by following these steps.

- Step 1.** Remove the adhesive-backed trim strip (1) from each side of the outer frame of the E5052A front panel.
- Step 2.** Use the provided screws to mount the front handles (2) on each side of the E5052A front panel frame.
- Step 3.** Attach the provided modified trim strip (3) to each front handle in order to cover the front panel locking screws.

WARNING

If the installed front handle becomes damaged, replace it with a new one immediately. A damaged handle can break while moving or lifting the instrument and cause personal injury or damage to the instrument.

How to install the rack-mount kit (Option 1CM)

The rack-mount kit includes two flanges (locking side plates) for mounting the E5052A on a rack (482.6 mm/19 inches), conforming to the EIA Standard. While referring to Figure 3-4, install the rack-mount kit by following these steps.

- Step 1.** Remove the adhesive-backed trim strip (1) from each side of the outer frame of the E5052A front panel.
- Step 2.** Use the provided screws to mount a rack-mounting flange (4) on each side of the E5052A front panel frame.
- Step 3.** Remove the four bottom feet of the E5052A (lift the bar marked TAB on the inner side of the foot and slide the foot toward the bar).
- Step 4.** Mount the E5052A on the rack.

How to install the rack-mount and handle kit (Option 1CP)

The rack-mount and handle kit includes both the rack-mounting flanges (locking side plates) and front handles. While referring to Figure 3-4, install the rack-mount kit by following these steps.

- Step 1.** Remove the adhesive-backed trim strip (1) from each side of the outer frame of the E5052A front panel.
- Step 2.** Use the provided screws to mount a front handle (2) and rack-mounting flange (4) on each side of the E5052A front panel frame.

CAUTION

Be sure to use both the front handles and the rack-mounting flanges at the same time. Do not attempt to install flanges or handles separately with the hardware provided, since this risks serious electrical damage to the instrument.

- Step 3.** Remove the four bottom feet of the E5052A (lift the bar marked TAB on the inner side of the foot and slide the foot toward the bar).
- Step 4.** Mount the E5052A on the rack.

Connecting the Accessories

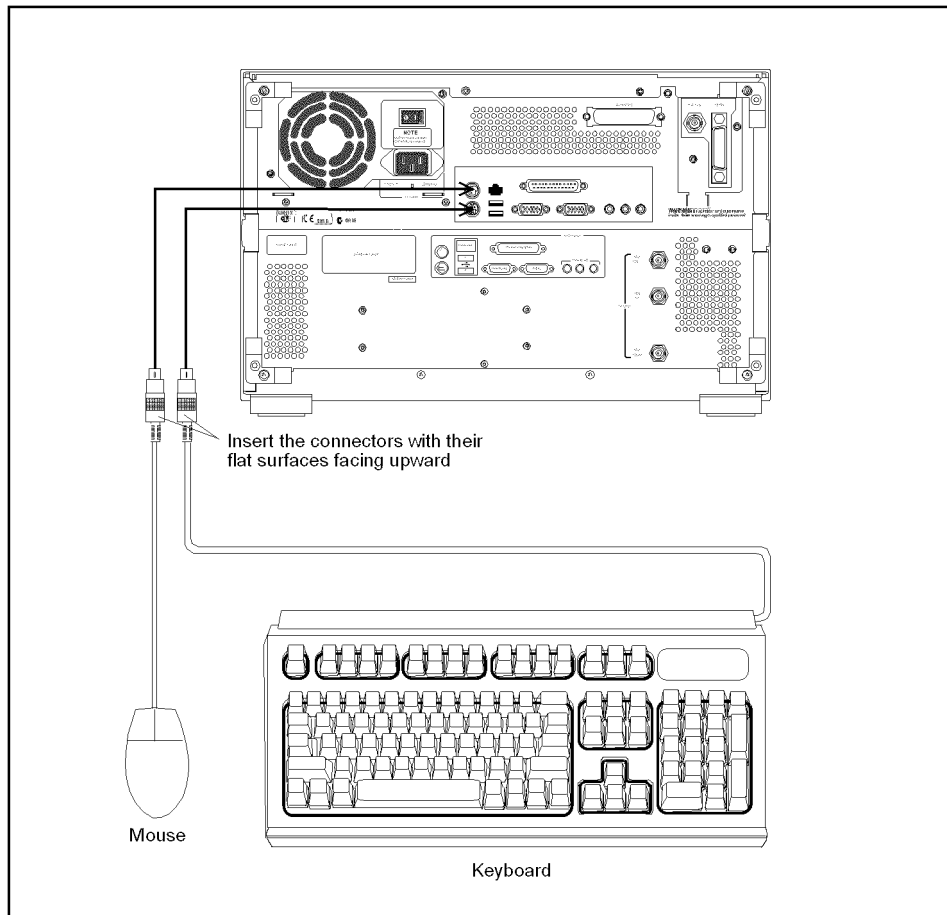
The E5052A allows you to connect a variety of accessories using the USB ports on the front panel or each of the ports on the rear panel.

Connecting the mouse and keyboard

As shown in Figure 3-5, connect the mouse and keyboard to the mini-DIN mouse port and mini-DIN keyboard port, respectively, before turning ON the power.

Figure 3-5

Connecting mouse and keyboard



e5052aue009

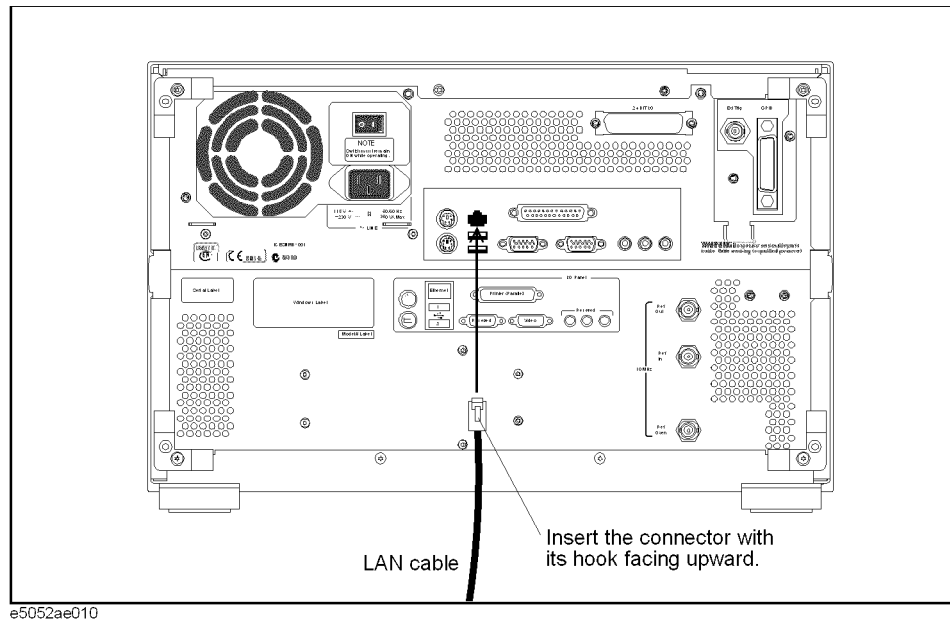
Connecting a LAN cable

When using a LAN (local area network), follow the procedure below to connect the E5052A to the LAN.

- Step 1.** By referring to the Chapter 6, “Setting and Using the Control and Management Functions,” on page 159, set up the E5052A LAN.
- Step 2.** As shown in Figure 3-6, connect a LAN cable to the LAN port on the rear panel of the E5052A.

Figure 3-6

Connecting LAN cable



NOTE

When connecting the E5052A to a LAN for use, consult the network administrator about the proper LAN settings.

Do not connect a LAN cable until the proper LAN settings have been made. Connecting the E5052A to a LAN with improper settings may cause a problem in the network.

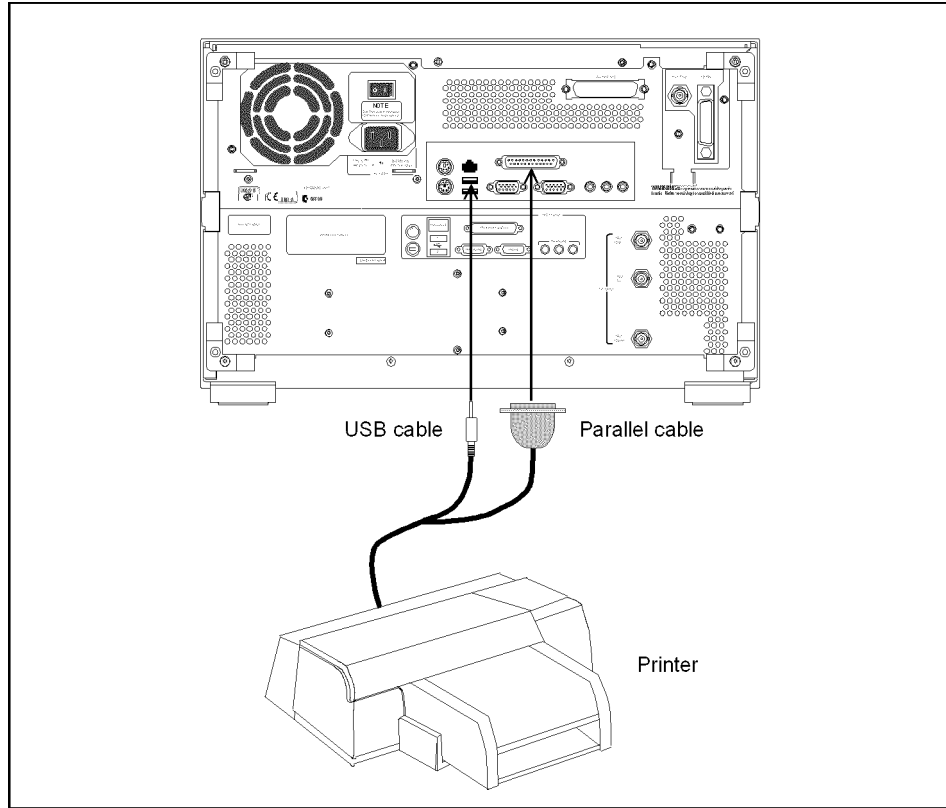
Connecting a printer

When using a compatible printer, connect it to the printer parallel port or USB (Universal Serial Bus) port on the rear panel of the E5052A as shown in Figure 3-7.

For a list of printers that work with the E5052A in its factory-shipped condition, see the Chapter 5, “Data Analysis and Result Output.”

Figure 3-7

Connecting a printer



e5052aue011

Power Supply and Blown Fuses

Before turning on the E5052A power, check the following important items.

Verification of the power supply

Confirm that the power supplied to the E5052A meets the following requirements:

	Requirement
Voltage	90 to 132 VAC or 198 to 264 VAC *1
Frequency	47 to 63 Hz
Maximum power consumption	500 VA

*1. Switched automatically by the E5052A in conformity to the voltage used.

Verification and connection of power cable

The three-wire power cable attached to the E5052A has one wire serving as a ground. Using this power cable allows the E5052A to be grounded, thereby protecting you against electrical shock from the power outlet.

Step 1. Confirm that the power cable is not damaged.

WARNING NEVER use a power cable showing any sign of damage. Faulty cables can cause electrical shock.

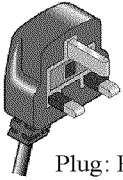
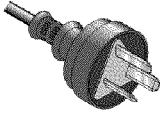
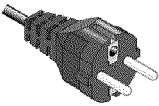
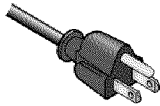

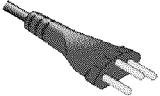
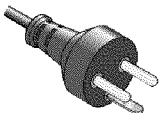
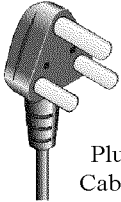
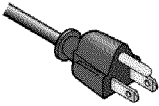
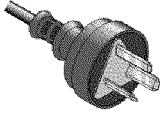
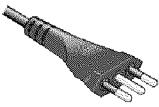
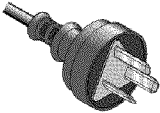
Step 2. Use the supplied cable to connect between the power cable receptacle (Figure 3-9 on page 65) on the rear panel of the E5052A and a three-wire power outlet, with the grounding prong firmly connected in the ground slot.

WARNING Use the supplied power cable with grounding wire to securely ground the E5052A.

Figure 3-8 shows the power cable options.

Installation
Power Supply and Blown Fuses

Figure 3-8 Power cable options

<p>OPTION 900</p>  <p>United Kingdom</p> <p>Plug: BS 1363/A, 250V, 10A Cable: 8120-1351, 8120-8705</p>	<p>OPTION 901</p>  <p>Australia/New Zealand</p> <p>Plug: AS 3112, 250V, 10A Cable: 8120-1369</p>
<p>OPTION 902</p>  <p>Continental Europe</p> <p>Plug: CEE 7 Standard Sheet VII, 250V, 10A Cable: 8120-1689</p>	<p>OPTION 903</p>  <p>U.S./Canada</p> <p>Plug: NEMA 5-15P, 125V, 10A Cable: 8120-1378</p>
<p>OPTION 904</p>  <p>U.S./Canada</p> <p>Plug: NEMA 6-15P, 250V, 6A Cable: 8120-0698</p>	<p>OPTION 906</p>  <p>Switzerland</p> <p>Plug: SEV Type 12, 250V, 10A Cable: 8120-2104</p>
<p>OPTION 912</p>  <p>Denmark</p> <p>Plug: SR 107-2-D, 250V, 10A Cable: 8120-2956</p>	<p>OPTION 917</p>  <p>India/Republic of S. Africa</p> <p>Plug: IEC 83-B1, 250V, 10A Cable: 8120-4211</p>
<p>OPTION 918</p>  <p>Japan</p> <p>Plug: JIS C 8303, 125V, 12A Cable: 8120-4753</p>	<p>OPTION 920</p>  <p>Argentina</p> <p>Plug: Argentine Resolution 63, Annex IV, 250V, 10A Cable: 8120-6870</p>
<p>OPTION 921</p>  <p>Chile</p> <p>Plug: CEI 23-16, 250V, 10A Cable: 8120-6978</p>	<p>OPTION 922</p>  <p>China</p> <p>Plug: GB 1002, 250V, 10A Cable: 8120-8376</p>
<p>NOTE: Each option number includes a 'family' of cords and connectors of various materials and plug body configurations (straight, 90° etc.).</p>	

power_e

Blown fuses

If the fuse appears to have blown during operation, this instrument may be subject to failure and must be repaired. Ship the E5052A to the nearest Agilent Technologies Service Center according to the section on “Considerations When Shipping to a Service Center Due to Breakdown or Other Problems” on page 72

WARNING

Do NOT replace the fuse yourself; doing this may expose you to dangerous electrical shock.




Starting the E5052A


This section explains how to turn on/off the E5052A power, how to cut off the power supply in an emergency, and how to set the internal clock.

Turning the Power ON and OFF

Perform the following steps to turn the power ON or OFF.

Turning the Power ON

Step 1. If the standby switch () in the lower-left part of the front panel is in the depressed () position, press it to put it in the popped-up position ().

Step 2. Press the standby switch to put it in the depressed position ().




This operation turns ON the power, and the E5052A starts the self-test.

Step 3. Confirm that the self-test indicates normal operation.

Normal operation is confirmed by the self-test if no error message appears.


Turning the Power OFF

Step 1. Use either of the following methods to turn the power OFF.

- Press the standby switch () in the lower-left part of the front panel (now in the depressed () position) to put it in the popped-up () position.
- Send the shutdown command from an external controller.

These operations will start the E5052A shutdown process (required software and hardware processes for turning the power off), and the power will turn OFF after a few seconds.

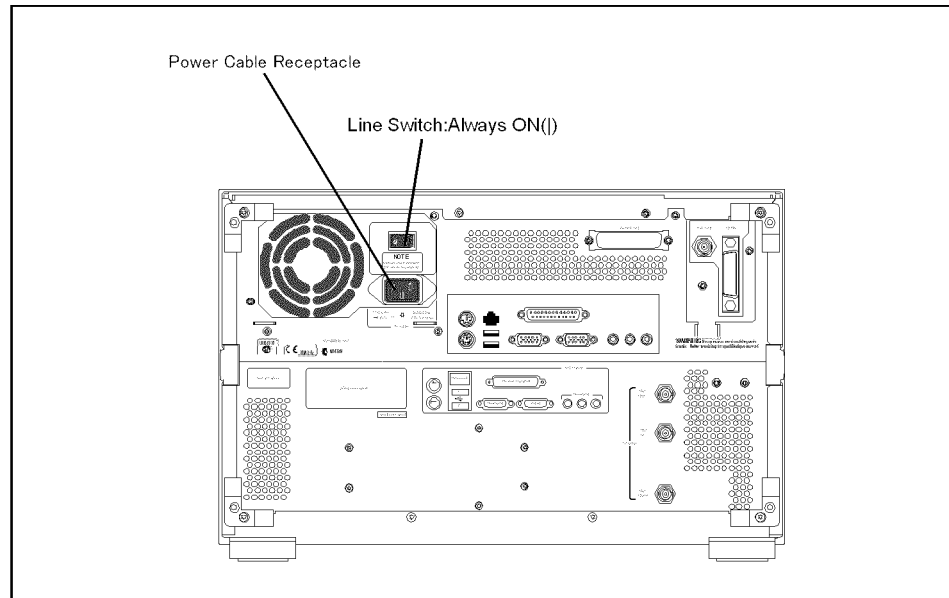
NOTE

Under normal circumstances, always press the standby switch (), or send the shutdown command from an external controller, to execute the E5052A shutdown process. **Never cut off the power supply directly by disconnecting the power cable plug from the rear panel of the unit.**

If the power supply is cut off directly by disconnecting the power cable plug from the instrument or the AC outlet, the shutdown process is not carried out and there is a risk of damage to the E5052A's software or hardware.

Figure 3-9

Line switch (Always ON) and power cable receptacle



Disconnection from supply source

The power supply of the E5052A is cut off by disconnecting the plug of the power cable (on either AC outlet side or E5052A side). When it is necessary to disconnect the power supply in order to avoid shock hazards, etc., pull out the power cable plug from either the AC outlet side or the E5052A side.

NOTE

To allow this to be done smoothly, be sure to follow the guidelines in “Ensuring adequate free space around analyzer for immediate disconnection of power cable in case of emergency” on page 54.

When turning the power OFF under normal circumstances, always follow the methods described in “Turning the Power OFF” on page 64.

Initial Registration of E5052A

When you start up the E5052A for the first time or after executing system recovery, you need to perform the initial registration of the Windows 2000 operating system used in the E5052A.

NOTE You cannot use the front panel keys during the initial registration of the E5052A, so be sure to connect the mouse and keyboard before turning on the power.

NOTE If you perform the following procedure incorrectly, a message appears asking whether to return to the previous registration screen and perform the registration again. In this case, follow the instruction to return to the previous registration screen.

Step 1. Turns on the E5052A.

Step 2. The Windows 2000 Professional Setup Wizard appears. Click the **Next >** button (Figure 3-10).

Figure 3-10 Windows 2000 Professional Setup Wizard



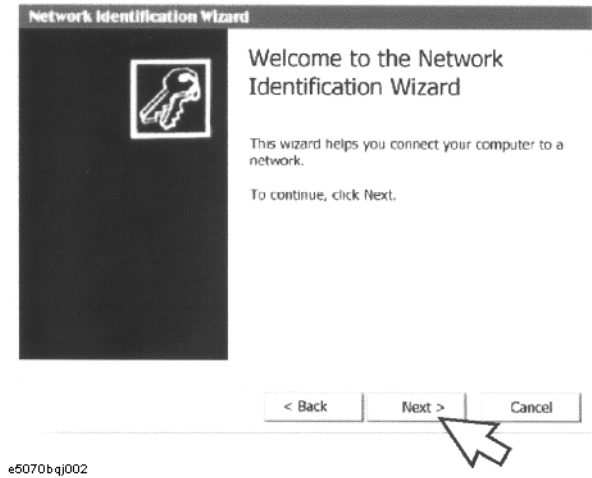
Step 3. In the Windows 2000 Professional Setup dialog box, select the **I accept this agreement** box and click the **Next >** button (Figure 3-11). Then, the Windows 2000 operating system restarts automatically.

Figure 3-11 Windows 2000 Professional Setup dialog box



Step 4. The Network Identification Wizard appears. Click the **Next >** button (Figure 3-12).

Figure 3-12 Network Identification Wizard

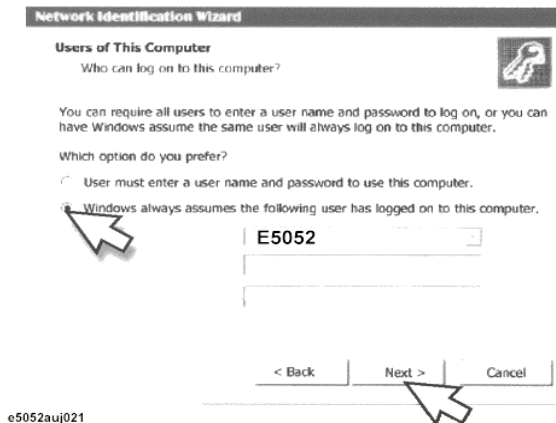


3. Installation

Installation
Initial Registration of E5052A

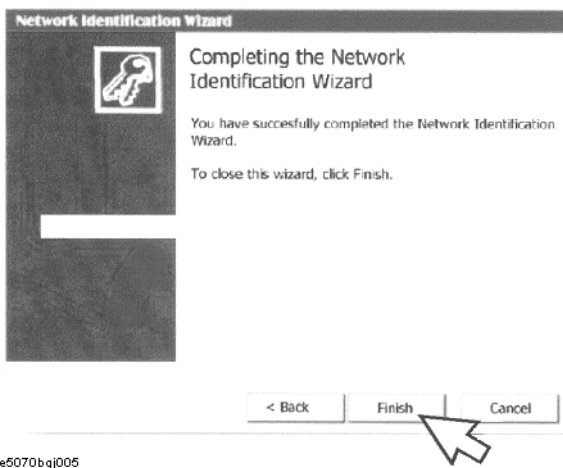
Step 5. In the Network Identification Wizard dialog box (1/2), select the **Windows always assumes the following user has logged on to this computer** box and check that **E5052** is in the **User Name** box. If not, type in **E5052**. Then type in **E5052** both in **Password box and Confirm password box**. Click the **Next>** button (Figure 3-13).

Figure 3-13 Network Identification Wizard dialog box (1/2)



Step 6. In the Network Identification Wizard dialog box (2/2), click the **Finish** button to finish the initial registration of the E5052A (Figure 3-14). Then, the measurement display of the E5052A appears.

Figure 3-14 Network Identification Wizard dialog box (2/2)



Setting the Internal Clock

You can set the date/time displayed at the lower right of the screen. When you save data in the storage unit, for example, the settings of the internal clock will be used for the saved file's information. The following describes the setting procedure by using the keys on the front panel.

NOTE

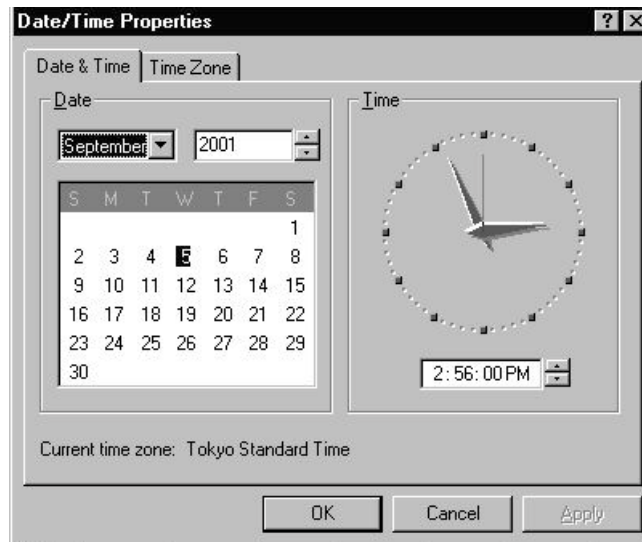
After turning on the instrument's power for the first time after delivery, be sure to set the internal clock.

Setting the Date/Time

- Step 1.** Press the [System] key in the INSTR STATE block. Press the [↓] or [↑] key to move the focus to the Misc Setup button and then press the [Enter] or [→] key. Press the [↓] or [↑] key to move the focus to the Clock Setup button and then press the [Enter] or [→] key. Place the focus on the Set Date and Time button and press the [Enter] key. The Date/Time Properties dialog box will appear (Figure 3-15).

Figure 3-15

Date/Time Properties dialog box ("Date & Time" tab)



- Step 2.** Turn the rotary knob (⊙) on the front panel to place the focus on the **Date & Time** tab and then press the [→] key to move the focus to the **Time Zone** tab (Figure 3-16).

Figure 3-16

Date/Time Properties dialog box (“Time Zone” tab)



e5070aqi005

- Step 3.** Turn the rotary knob (⊙) on the front panel to place the focus on the **Time Zone** box and press the [←]/[→] or [↓]/[↑] key to select the time zone.

NOTE

When you select a time zone having daylight savings time (‘summer time’), the **Automatically adjust clock for daylight saving changes** box becomes selectable. To set automatic adjustment to daylight savings time to ON, turn the rotary knob (⊙) to place the focus on the **Automatically adjust clock for daylight saving changes** box and press the rotary knob (⊙) to display the ✓ mark (Figure 3-16).

- Step 4.** Turn the rotary knob (⊙) on the front panel to place the focus on the **Time Zone** tab and press the [←] key to move the focus to the **Date & Time** tab.
- Step 5.** By referring to Figure 3-15, turn the rotary knob (⊙) on the front panel to place the focus on the desired item. Press the [←]/[→] or [↓]/[↑] keys to set each item.
- Step 6.** Turn the rotary knob (⊙) on the front panel to place the focus on the **OK** button and then press the [Enter] key.

Turning the Date/Time display ON and OFF

The Date/Time is displayed within the instrument status bar at the lower right of the display screen.

- Step 1.** Press the [System] key in the INSTR STATE block. Press the [↓] or [↑] key to move the focus to the **Misc Setup** button and then press the [Enter] or [→] key. Press the [↓] or [↑] key, move the focus to the **Clock Setup** button, and press the [Enter] or [→] key. Place the focus on the **Show Clock** button and press the [Enter] key to set the date/time display to on/off.

Daily Maintenance

This section provides the maintenance information for the E5052A and describes the self-test function, which checks the instrument for failure. This section also provides information required for shipping the E5052A due to breakdown or other problems.

Cleaning method

To clean the surface of the E5052A, wipe the surface gently with a dry cloth or soft cloth dampened with water and wrung dry. Never attempt to clean the inside of the instrument.

WARNING To avoid electric shock, always disconnect the power cord of the E5052A from the power outlet when cleaning.

NOTE To clean a touch-screen LCD, do not wet the cloth with water.

Occasionally, a few pixels may appear on the screen as a fixed point of blue, green or red. Please note that this is not a failure and does not affect the performance of your product.

Maintaining connectors/ports on test port (DUT interface)

Each port on the front panel of the E5052A has an N-type connector (female) and a BNC connector (female). In the RF band, soil or damage on the connector or cable will affect the measurements. The following describes how to handle and maintain these N-type connectors and BNC connectors.

- The connectors should always be kept clean and away from dirt.
- To prevent electrostatic discharge (ESD), do not touch the contact face of the connector.
- Never attempt to use a damaged or nicked connector.
- When cleaning, blow air onto the connector. Never attempt to use abrasives such as emery paper.

NOTE The RF port on the front panel of the E5052A is a 50 Ω -based N-type connector (female). Note that connecting a connector with different impedance can damage the connectors.

Self-test When Turning on the Power

When the power is turned on, the E5052A automatically performs a self-test. If any error is detected by the self-test at power-on, the error message “Power on test fail” appears in the instrument status bar. This causes the E5052A to enter the service mode. If your E5052A is in the service mode, ship it to the nearest Agilent Technologies Service Center by referring to the section on “Considerations When Shipping to a Service Center Due to Breakdown or Other Problems” on page 72.

Considerations When Shipping to a Service Center Due to Breakdown or Other Problems

When shipping the E5052A to an Agilent Technologies Service Center because of breakdown or other problems, for re-shipment use the packing box and shock-absorbing material used to package the analyzer, or static-protective package in place of them. To find your nearest Agilent Technologies Service Center, contact the Agilent Technologies Customer Center displayed at the end of the Manual.

NOTE

Occasionally, a few pixels may appear on the screen as a fixed point of blue, green or red. Please note that this is not a failure and does not affect the performance of your product.

4

Basic Measurement Using E5052A

This chapter describes the basic measurement procedures of the DUT using the E5052A. The description is mainly based on the manual measurement method.

The E5052A has a measurement screen for each measurement target; and the target you can measure may vary depending on the screen. Select measurement screens according to your intended use.

Frequency/Power Measurement in Frequency/Power Measurement Mode

Overview of frequency/power measurement

For frequency/power measurements, the E5052A measures the corresponding frequency, power and power supply DC current by sweeping the specified range of the DC control/power given to the DUT.

The E5052A's frequency/power measurement window has three measurement trace screens: RF power measurement trace, frequency measurement trace, and power supply DC current measurement trace. By using the individual trace screen, you can measure RF power, frequency and power supply DC current corresponding to the DC control/power of the DUT.

The following sections explain how to use the E5052A to make these basic measurements.

About analyzer mode and tester mode

The frequency/power measurement has two modes: analyzer mode, which analyzes input signals for a specific period of time, and tester mode, which performs measurement on the spot without DC bias sweeping.

In analyzer mode, an individual change in frequency, RF power or power supply DC current of the input signals for a defined period of time will be shown in a graph and analyzed by using the marker or analysis function.

In tester mode, the frequency, RF power or power supply DC current of the input signals will be measured on the spot. You can confirm each numeric value by viewing the screen.

Selecting Analyzer Mode or Tester Mode

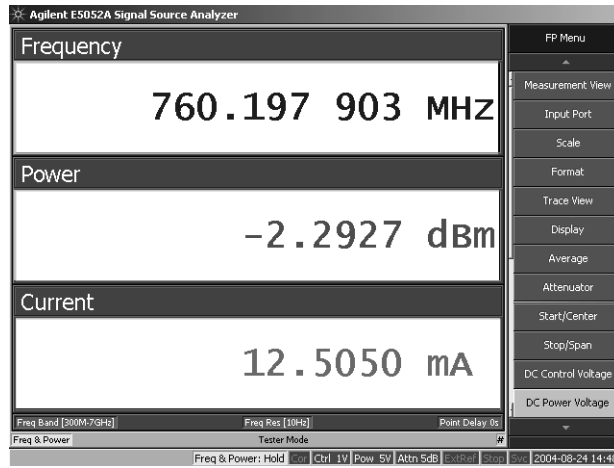
- Step 1.** You can select either analyzer mode or tester mode by pressing the **Trigger]-Mode** key. Analyzer mode is selected by default.

The basic settings and their examples described in the following sections assume signal analysis using the analyzer mode.

NOTE

Analyzer mode is not available when option 011 is installed.

Figure 4-1 Example of tester mode screen



Common settings in RF power, frequency and power supply DC current measurement

The following section describes the common setting steps to measure RF power, frequency and power supply DC current corresponding to the DUT's DC control/power by using the E5052A's frequency/power measurement window.

Selecting Measurement Window

Step 1. Press **Meas/View** - **Freq & Power** to select the frequency/power measurement window.

NOTE

You can maximize the frequency/power measurement window by pressing **Window Max** key while the window is selected. You can bring up the original size when you press the **Window Max** key once again.

You can select the next trace by pressing the **Trace Next** key and maximize the target trace by pressing the **Trace Max** key. The frequency/power window will come back when you press the **Trace Max** key once again.

Specifying Sweep Range

Step 1. Press **Setup** - Sweep Parameter.

Step 2. Selecting from the softkey menu list, you can define a sweep operation to be performed for either DC control or DC power. Select **Control Voltage** for DC control and **Power Voltage** for DC power.

Step 3. Press **Start/Center** (**Stop/Span**) - **DC Control(Power)Start**.

Step 4. Enter the sweep start value in the data entry field that appears in the upper part of the screen.

Step 5. Press **Start/Center** (**Stop/Span**) - **DC Control(Power)Stop**.

Step 6. Enter the sweep stop value in the data entry field that appears in the upper part of the screen.

NOTE

Otherwise, press **Start/Center** (**Stop/Span**) - **DC Control(Power)Center** to enter the sweep center value in the data entry field that appears in the upper part of the screen and then press **DC Control(Power) Span** to enter the sweep span value in the same way.

The same softkey will be displayed by pressing either **Start/Center** or **Stop/Span**. You can make the same settings by using either of the two keys.

Setting Frequency Band, Frequency Resolution, Number of Measurement Points and Delay

Step 1. Press **Setup** - Freq Band to switch over to the appropriate frequency band. The available

frequency bands are as follows:

Table 4-1

Frequency Band

Frequency Band
10 MHz - 1.5 GHz
300 MHz - 7 GHz

Step 2. Press **Setup** - **Freq Resolution**.

Step 3. Select the appropriate frequency resolution from the softkey menu list. The available frequency resolutions are as follows:

Table 4-2

Frequency Resolution List

Frequency Resolution
10 Hz
1 kHz
64 kHz

Step 4. Press **Setup** - **Points**.

Step 5. Enter the number of measurement points in the data entry field that appears in the upper part of the screen.

Step 6. Press **Setup** - **Points Delay**.

Step 7. Enter the measurement delay in the data entry field that appears in the upper part of the screen.

About DC voltage setting and protection

You can specify the DC power/control that will be applied to the DUT. Refer to “Setting DC power/DC control and protection” on page 79 for the setting procedure.

Setting Average Function

Follow the steps below to use the averaging function.

Step 1. Press **Avg/BW** - **Avg Factor**.

Step 2. Enter the number of times for averaging in the data entry field that appears in the upper part of the screen.

Step 3. Press **Avg/BW** - **Averaging** to turn on the averaging function.

Setting Trigger

Step 1. Press **Trigger** - Source.

Step 2. Select the trigger source from the softkey menu list. The available options are as follows.

Basic Measurement Using E5052A
Frequency/Power Measurement in Frequency/Power Measurement Mode

Internal is selected by default.

Table 4-3

Trigger Source List

Softkey	Overview
Internal	Sets trigger source to internal continuous trigger signal
External*1	Sets trigger source to external trigger input connector
Manual	Sets trigger source to manual operation
Bus	Sets trigger source to the bus; the trigger signal is issued by the trigger command via GPIB interface or LAN.

*1. If External is selected for the trigger source, the trigger signal must be provided by an external instrument. Refer to “Setting External Trigger” on page 107 for the setting procedure.

Step 3. Press **Trigger** - **Trigger to Freq & Power** to send a trigger to the frequency/power measurement. By default, **Continuous** is selected for sweep.

NOTE

The E5052A has four measurement functions: phase noise measurement, spectrum monitor measurement, frequency/power measurement, and transient measurement. Because individual measurements differ in their characteristics from one another, each of the E5052A's trigger is used exclusively for a single measurement.

In other words, only one measurement function can be triggered at a time, and only it can perform measurement at that time.

Setting DC power/DC control and protection

You can set the DC power or the DC control that is applied by the E5052A to the DUT not only to protect the DUT but also to perform stable measurements.

The E5052A allows you to set the maximum and minimum allowance levels of DC power/control that are applied to the DUT. This prevents excessive voltage from being applied to the DUT.

Follow the steps below to set the DC voltage for the DC control measurement.

Setting DC Power

- Step 1.** Press **DC Power** - **Max Pwr Voltage Limit**.
- Step 2.** Enter the maximum allowance voltage of DC power in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **DC Power** - **Min Pwr Voltage Limit**.
- Step 4.** Enter the minimum allowance voltage of DC power in the data entry field that appears in the upper part of the screen.
- Step 5.** Press **DC Power** - **DC Power Delay**.
- Step 6.** Enter the delay for the DC power, in cases where it is changed, in the data entry field that appears in the upper part of the screen.
- Step 7.** Press **DC Power** - **DC Power Voltage**.
- Step 8.** Enter DC power in the data entry field that appears in the upper part of the screen.

Setting DC Control

- Step 1.** Press **DC Control** - **Max Ctrl Voltage Limit**.
- Step 2.** Enter the maximum allowance voltage of DC control in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **DC Control** - **Min Ctrl Voltage Limit**.
- Step 4.** Enter the minimum allowance voltage of DC control in the data entry field that appears in the upper part of the screen.
- Step 5.** Press **DC Control** - **DC Control Delay**.
- Step 6.** Enter the delay for the DC control, in cases where it is changed, in the data entry field that appears in the upper part of the screen.
- Step 7.** Press **DC Control** - **DC Control Voltage**.
- Step 8.** Enter DC control in the data entry field that appears in the upper part of the screen.

To use the DC control calibration function, press **DC Control** - **Control Voltage Cal** to turn this function on. By pressing **DC Control** - **Execute Control Voltage Cal**, you can perform DC control calibration once.

NOTE

You must perform this calibration every time you power on the instrument, since the DC control calibration is cleared when the power is turned off.

Applying DC Power/DC Control to DUT

Step 1. Press - **DC Power Output** to turn on the DC power output.

Step 2. Press - **DC Control Output** to turn on the DC control output.

About DC control voltage delay, DC power delay and point delay

This section describes the point delay for DC control delay, DC power delay, and common settings, which were mentioned in the previous sections. This is not a part of the setting procedures, so for more on settings you can skip this section and proceed to “Confirming the result of RF power measurement” on page 86.

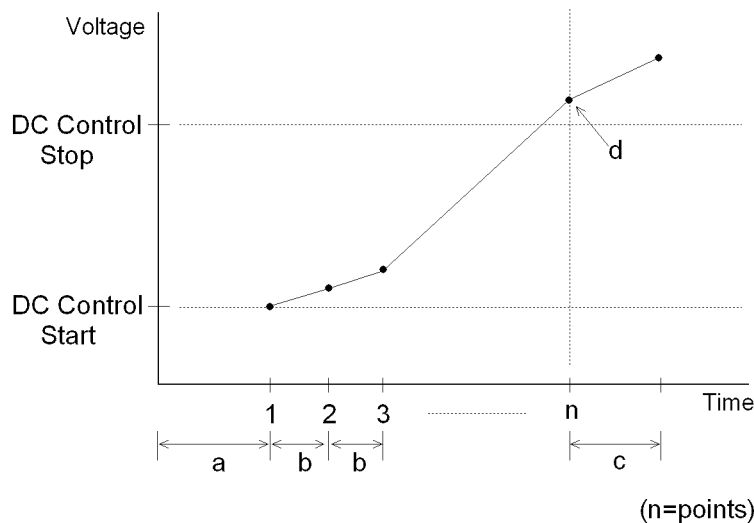
About delay while DC control is selected for sweep parameter

The following section describes how to set up DC control delay and point delay. For better understanding of each delay, “a,” “b” and “c” and the measurement point “d” used in the description below, refer to Figure 4-2, “Delay while DC control is selected for sweep parameter,”.

- “a” signifies the delay until measurement of the first point starts. This delay is equal to the addition of the setting times of DC control delay and point delay.
- “b” signifies the individual delay between respective measurement points. The setting times of point delay is set as this delay.
- “c” signifies the time that elapses when the last measurement point (“d”) of the sweep is different from the setting value of DC control. The setting time of the DC control delay is set as this delay, after DC control is output.

Figure 4-2

Delay while DC control is selected for sweep parameter



e5052aue015

NOTE

If the output voltage falls 0 V or exceeds 20 V, the setting time of DC control delay will be set as the delay, after the voltage is output.

About delay while DC power is selected for sweep parameter

The following section describes how to set up DC power delay and point delay. For better understanding of each delay, “a,” “b” and “c” and the measurement point “d” used in the description, refer to Figure 4-3, “Delay while DC power is selected for sweep parameter,”.

- “a” signifies the delay until the measurement of the first point starts. This delay is equal

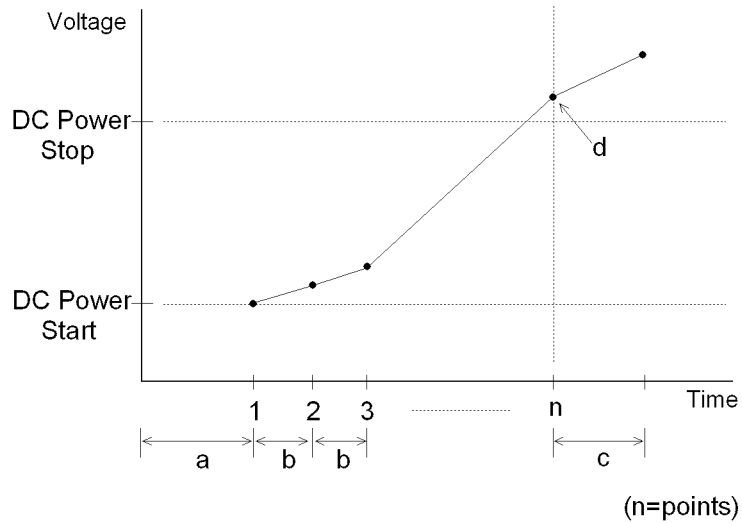
Basic Measurement Using E5052A
Frequency/Power Measurement in Frequency/Power Measurement Mode

to the addition of the setting times of DC power delay and point delay.

- “b” signifies the individual delay between respective measurement points. The setting times of point delay is set as this delay.
- “c” signifies the time that elapses when the last measurement point (“d”) of the sweep is different from the setting value of DC power voltage. The setting time of DC power delay will be set as this delay, after DC power voltage is output.

Figure 4-3

Delay while DC power is selected for sweep parameter



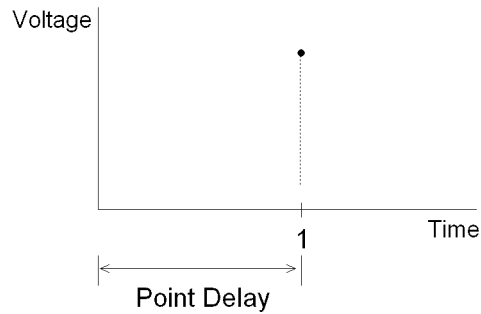
e5052aue016

About delay in tester mode

In the tester mode, measurement is made for only one measurement point. The delay for the measurement point can be set by using a point delay setting. Refer to Figure 4-4, “Delay in tester mode,”.

Figure 4-4

Delay in tester mode



e5052aue017

Confirming the result of frequency measurement

The following section describes the procedure used to confirm the measurement results of frequencies corresponding to the DUT's DC control/power by using the E5052A's frequency/power measurement window.

Selecting Trace

- Step 1.** Press the **Trace Next** key to select the frequency measurement trace.

NOTE

If you want to maximize the screen, press the **Trace Max** key.

Setting Frequency Format and Sensitivity Aperture

You can select the unit (frequency format) used in the frequency trace screen and set the sensitivity aperture.

- Step 1.** Press **Format** - **Frequency Format**.
- Step 2.** Select an appropriate frequency format from the softkey menu list. The available option is either Hz or Hz/V.
- Step 3.** Press **Format** - **Sensitivity Aperture**.
- Step 4.** Enter the sensitivity aperture value in the data entry field that appears in the upper part of the screen. The unit is %.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

- Step 1.** Press **Scale** - **Divisions**.
- Step 2.** Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **Scale** - **Reference Position**.
- Step 4.** Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.

The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (max scale).

- Step 5.** Press **Scale** - **Reference Value**.
- Step 6.** Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit varies depending on the frequency format setting.
- Step 7.** Press **Scale** - **Scale/Div**.
- Step 8.** Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit varies depending on the frequency format setting.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of measurement trace automatically.

Basic Measurement Using E5052A Frequency/Power Measurement in Frequency/Power Measurement Mode

Step 1. Press **Scale** - **Auto Scale**.

NOTE

If you want the scale setting to be performed automatically for all three measurement traces (RF power, frequency and power supply DC current), press **Scale** - **Auto Scale All**.

Setting Attenuator

When an input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

Step 1. Press **Attn** - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port may approximate this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

Step 1. Press **Trace/View** - **Aperture**.

Step 2. Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.

Step 3. Press **Trace/View** - **Smoothing** to turn on the smoothing function.

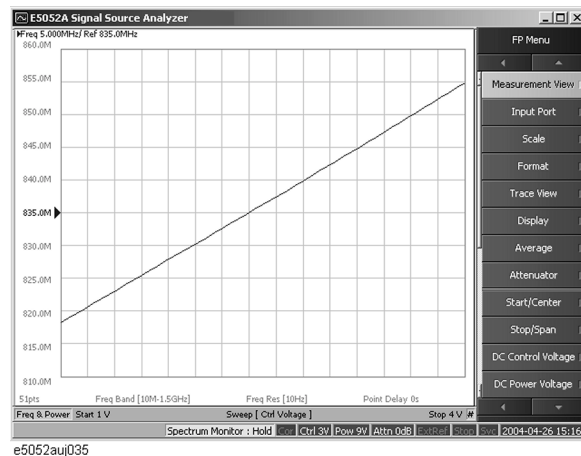
Confirming Measurement Points by Markers

Step 1. Press **Marker** to display marker 1 on the screen.

Step 2. Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press **Marker** - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-5

Example of measurement screen (frequency characteristics)



NOTE

By taking into account the transient of DC control/power prior to the sweep, the instrument will start the sweep after the time specified in **DC Control** (**DC Power**) **Voltage - DC Control(Power) Delay** has elapsed. This delay time is not included in the sweep time, and it only applies to the first measurement point.

Confirming the result of RF power measurement

The following section describes the procedure to confirm the measurement results of RF power corresponding to the DUT's DC control/power by using the E5052A's frequency/power measurement window.

Selecting Trace

Step 1. Press **Trace Next** key to select the RF power measurement trace.

NOTE If you want to maximize the screen, press the **Trace Max** key.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

Step 1. Press **Scale** - **Divisions**.

Step 2. Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.

Step 3. Press **Scale** - **Reference Position**.

Step 4. Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.

The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (max scale).

Step 5. Press **Scale** - **Reference Value**.

Step 6. Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit is dBm.

Step 7. Press **Scale** - **Scale/Div**.

Step 8. Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit is dB/Div.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

Step 1. Press **Scale** - **Auto Scale**.

NOTE If you want the scale setting to be performed automatically for all three measurement traces (RF power, frequency and power supply DC current), press **Scale** - **Auto Scale All**.

Setting Attenuator

When an input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

Step 1. Press **Attn** - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

Frequency/Power Measurement in Frequency/Power Measurement Mode

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

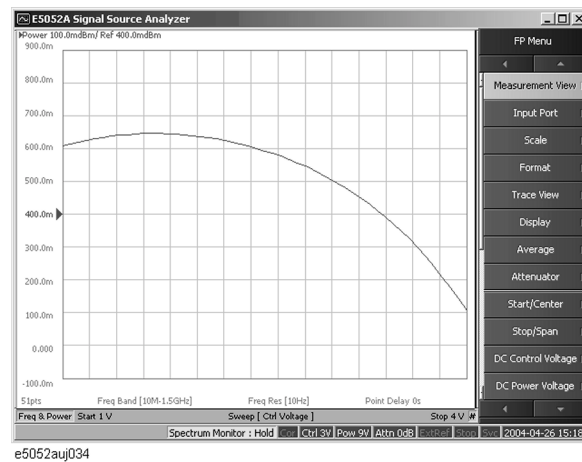
- Step 1.** Press **Trace/View** - **Aperture**.
- Step 2.** Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **Trace/View** - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

- Step 1.** Press **Marker** to display marker 1 on the screen.
- Step 2.** Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press **Marker** - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-6

Example of measurement screen (RF power characteristics)



NOTE

By taking into account the transient of DC control/power prior to the sweep, the instrument will start the sweep after the time specified in **DC Control**(**DC Power**) - **DC Control(Power) Delay** has elapsed. This delay time is not included in the sweep time, and it only applies to the first measurement point.

Confirming the result of power supply DC current measurement

The following section describes the procedure used to confirm the measurement results of the power supply DC current corresponding to the DUT's DC control/power by using the E5052A's frequency/power measurement window.

Selecting Trace

Step 1. Press the **Trace Next** key to select the power supply DC current measurement trace.

NOTE If you want to maximize the screen, press the **Trace Max** key.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

Step 1. Press **Scale** - **Divisions**.

Step 2. Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.

Step 3. Press **Scale** - **Reference Position**.

Step 4. Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.

The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).

Step 5. Press **Scale** - **Reference Value**.

Step 6. Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit is A.

Step 7. Press **Scale** - **Scale/Div**.

Step 8. Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit is A/Div.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

Step 1. Press **Scale** - **Auto Scale**.

NOTE If you want the scale setting to be performed automatically for all three measurement traces (RF power, frequency and power supply DC current), press **Scale** - **Auto Scale All**.

Setting Attenuator

When the input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

Step 1. Press **Attn** - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

Frequency/Power Measurement in Frequency/Power Measurement Mode

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

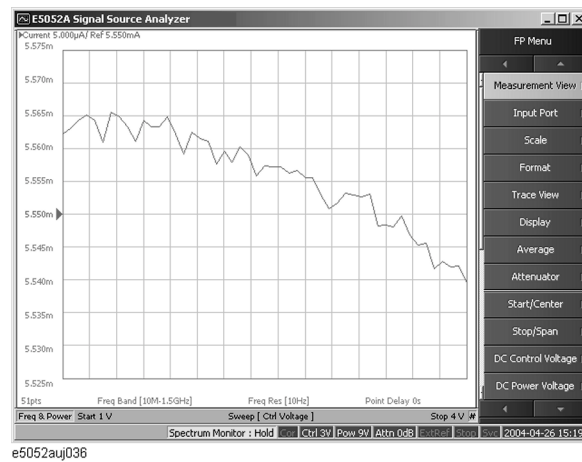
- Step 1.** Press **Trace/View** - **Aperture**.
- Step 2.** Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **Trace/View** - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

- Step 1.** Press **Marker** to display marker 1 on the screen.
- Step 2.** Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press **Marker** - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-7

Example of measurement screen (power supply DC current characteristics)



NOTE

By taking into account the transient of DC control/power prior to the sweep, the instrument will start the sweep after the time specified in **DC Control**(**DC Power**) **Voltage - DC Control(Power) Delay** has elapsed. This delay time is not included in the sweep time, and it only applies to the first measurement point.

Phase Noise Measurement in Phase Noise Measurement Mode

Overview of phase noise measurement

This function locks on the DUT's output signal and measures the phase of the signal in the specified sweep range.

The following section describes the basic measurement method of the DUT's phase noise corresponding to the offset frequency from the carrier by using the E5052A's phase noise measurement window.

Setting phase noise measurement

Follow the steps below to measure the phase noise by using the E5052A's phase noise measurement window.

Selecting Measurement Window

Step 1. Press **Meas/View** - **Phase Noise** to select the phase noise measurement window.

NOTE

You can maximize the frequency/power measurement window by pressing the **Window Max** key while the window is selected. You can return to the original size when you press the **Window Max** key once again.

Specifying the Sweep Range for Offset Frequency

Step 1. Press **Start/Center** (**Stop/Span**) - **Start**.

Step 2. Select the sweep start value from the softkey menu list.

You can select the value from the options: 1 Hz, 10 Hz, 100 Hz or 1 kHz.

Step 3. Press **Start/Center** (**Stop/Span**) - **Stop**.

Step 4. Select the sweep stop value from the softkey menu list.

You can select the value from the options: 100 kHz, 1 MHz, 5 MHz, 10 MHz or 40 MHz.

NOTE

The number of measurement points varies depending on the setting value for the sweep range.

Table 4-4

Correlation Table for Measurement Points and Sweep Range

Start/Stop	100 kHz	1 MHz	5 MHz	10 MHz	40 MHz
1 Hz	646	775	865	904	982
10 Hz	517	646	736	775	853
100 Hz	388	517	607	646	724

Table 4-4 Correlation Table for Measurement Points and Sweep Range

Start/Stop	100 kHz	1 MHz	5 MHz	10 MHz	40 MHz
1 kHz	259	388	478	517	595

NOTE For phase noise measurement, you cannot use the center value or span value for log sweep.

Selecting Carrier Frequency Band

- Step 1.** Press **Setup** - **Frequency Band**.
- Step 2.** Select the appropriate frequency band that contains the target carrier signal from the softkey menu list. The range of each frequency band is listed in the following table.

Table 4-5 List of Carrier Frequency Bands

Carrier Frequency band
10 M - 41 MHz
39 M - 101 MHz
99 MHz - 1.5 GHz
300 MHz - 7 GHz

Optimizing LO phase noise characteristics

The measurement uncertainty increases when the DUT's phase noise is close to the LO's phase noise. In that case, LO phase noise characteristics can be selected either $L(f) < 150$ kHz or $L(f) > 150$ kHz for optimizing the phase noise measurement accuracy.

- Step 1.** Press **Setup** - **LO PhNoise Optimize**.
- Step 2.** Select LO phase noise optimization.

Table 4-6 List of LO phase noise characteristics

Softkey	Overview
L(f) for > 150 kHz	Lowering LO SSB phase noise at > 150 kHz offset frequency
L(f) for < 150 kHz	Lowering LO SSB phase noise at < 150 kHz offset frequency

NOTE Refer to the “Phase Noise Measurement” on page 191 in the Chapter 8, “Specifications and Supplemental Information.”

Basic Measurement Using E5052A
Phase Noise Measurement in Phase Noise Measurement Mode

Setting Average Function and Correlation Number

Follow the steps below to use the averaging function.

- Step 1.** Press **[Avg/BW]** - **Avg Factor**.
- Step 2.** Enter the number of times for averaging in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **[Avg/BW]** - **Averaging** to turn on the averaging function.
- Step 4.** Press **[Avg/BW]** - **Correlation**.
- Step 5.** Enter the value of the correlation number in the data entry field that appears in the upper part of the screen.

About DC Voltage Setting and Protection

You can specify DC power/control that is applied to DUT. Refer to “Setting DC power/DC control and protection” on page 79 for the setting procedure.

Setting Trigger

- Step 1.** Press **[Trigger]** - **Source**.
- Step 2.** Select the trigger source from the softkey menu list. The available options are as follows. Internal is selected by default.

Table 4-7

Trigger Source List

Softkey	Overview
Internal	Sets trigger source to internal continuous trigger
External*1	Sets trigger source to external trigger input connector
Manual	Sets trigger source to manual operation
Bus	Sets trigger source to the bus; the trigger signal is issued by the trigger command via GPIB interface or LAN.

*1. If External is selected for the trigger source, the trigger signal must be provided by an external instrument. Refer to “Setting External Trigger” on page 107 for the setting procedure.

- Step 3.** Press **[Trigger]** - **Trigger to Phase Noise** to send a trigger to the phase noise measurement. By default, **Continuous** is selected for sweep.

NOTE

The E5052A has four measurement function: phase noise measurement, spectrum monitor measurement, frequency/power measurement, and transient measurement. Because individual measurements differ in their characteristics from one another, the E5052A’s each trigger is used exclusively for a single measurement function.

In other words, only one measurement function can be triggered at a time, and only this function can perform measurement at this time.

Confirming the result of phase noise measurement

Follow the steps below to confirm the results of the DUT's phase noise measurement by using the E5052A's phase noise measurement window.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

- Step 1.** Press - **Divisions**.
- Step 2.** Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.
- Step 3.** Press - **Reference Position**.
- Step 4.** Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.

The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).
- Step 5.** Press - **Reference Value**.
- Step 6.** Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit is dBc/Hz.
- Step 7.** Press - **Scale/Div**.
- Step 8.** Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit is dB/Div.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of measurement trace automatically.

- Step 1.** Press - **Auto Scale**.

Basic Measurement Using E5052A
Phase Noise Measurement in Phase Noise Measurement Mode

Setting IF Gain

“IF over flow” error may be displayed when phase noise is distorted. In this case, follow the steps below to adjust the IF Gain value.

- Step 1.** Press **[Setup]** - **IF Gain**.
- Step 2.** Enter the IF Gain value in the data entry field that appears in the upper part of the screen.
 You can select the value from the options: 0 dB, 10 dB, 20 dB, 30 dB, 40 dB or 50 dB.

NOTE When either "Phase lock loop unlocked" or "IF A/D overflow" error message is displayed, choose an appropriate IF Gain value indicated as the table below (Table 4-8).

Table 4-8 IF Gain selection table

DUT type	IF Gain
Frequency drifting sources (Free-run VCO, etc)	0, 10 dB
Frequency locked sources (PLL Synthesizer, etc)	20, 30, 40, 50 dB

Setting Attenuator

In case when an input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

- Step 1.** Press **[Attn]** - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.
 You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

- Step 1.** Press **[Trace/View]** - **Aperture**.
- Step 2.** Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **[Trace/View]** - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

- Step 1.** Press **[Marker]** to display marker 1 on the screen.
- Step 2.** Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press **[Marker]** - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Spectrum Monitor Measurement in Spectrum Monitor Measurement Mode

Overview of spectrum monitor measurement

You can measure the spectrum of a specified range by sweeping the DUT's output signals and approximate frequency range.

The following section describes the basic measurement method of spectrum monitor measurement by using the E5052A's spectrum monitor measurement window.

Setting spectrum monitor measurement

Follow the steps below to set up the measurement by using the E5052A's phase spectrum monitor measurement window.

Selecting Measurement Window

Step 1. Press **Meas/View** - **Spectrum Monitor**.

NOTE

You can maximize the frequency/power measurement window by pressing the **Window Max** key while the window is selected. You can return to the original size when you press the **Window Max** key once again.

Specifying Frequency Sweep Range

Step 1. Press **Start/Center** (**Stop/Span**) - **Start**.

Step 2. Enter the sweep start value in the data entry field that appears in the upper part of the screen.

Step 3. Press **Start/Center** (**Stop/Span**) - **Stop**.

Step 4. Enter the sweep stop value in the data entry field that appears in the upper part of the screen.

NOTE

Otherwise, press **Start/Center** (**Stop/Span**) - **Center** to enter the sweep center value in the data entry field that appears in the upper part of the screen and then press **Span** to enter the sweep span value in the same way.

The same softkey will be displayed by pressing either **Start/Center** or **Stop/Span**. You can make the same settings by using either of the two keys.

Specifying the Maximum Input Level of Input Signal

Follow the steps below to enter the maximum level value of the measurement signals that are input from the RF port. For more information, refer to the Chapter 8, "Specifications and Supplemental Information," on page 189.

Step 1. Press **Setup** - **Reference Level**.

Spectrum Monitor Measurement in Spectrum Monitor Measurement Mode

- Step 2.** Enter the maximum input level in the data entry field that appears in the upper part of the screen.

Setting Average Function

Follow the steps below to use the averaging function.

- Step 1.** Press **[Avg/BW]** - **Avg Factor**.
- Step 2.** Enter the number of times for averaging in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **[Avg/BW]** - **Averaging Type** to select the averaging type. You can choose either Log-Pwr Avg or Pwr Avg(RMS).
- Step 4.** Press **[Avg/BW]** - **Averaging** to turn on the averaging function.

Specifying Measurement Resolution Bandwidth

- Step 1.** Press **[Avg/BW]** - RBW.
- Step 2.** Enter the RBW value in the data entry field that appears in the upper part of the screen.
- You can select the value from the options: 100 kHz, 25 kHz, 6.25 kHz, 1.56 kHz, 391 Hz, 97.7 Hz, 24.4 Hz, 6.1 Hz, or 1.53 Hz.

About DC voltage setting and protection

You can specify DC power/control that is applied to the DUT. Refer to “Setting DC power/DC control and protection” on page 79 for the setting procedure.

Setting Trigger

- Step 1.** Press **[Trigger]** - Source.
- Step 2.** Select the trigger source from the softkey menu list. The available options are as follows. Internal is selected by default.

Trigger Source List

Softkey	Overview
Internal	Sets trigger source to internal continuous trigger
External ^{*1}	Sets trigger source to external trigger input connector
Manual	Sets trigger source to manual operation
Bus	Sets trigger source to the bus; the trigger signal is issued by the trigger command via GPIB interface or LAN.

*1. If External is selected for the trigger source, the trigger signal must be provided by an external instrument. Refer to “Setting External Trigger” on page 107 for the setting procedure.

- Step 3.** Press **[Trigger]** - **Trigger to Spectrum Monitor** to deliver a trigger to the spectrum monitor measurement. By default, **Continuous** is selected for sweep.

Table 4-9

NOTE

The E5052A has four measurement functions: phase noise measurement, spectrum monitor measurement, frequency/power measurement and transient measurement. Because individual measurements differ in characteristics from one another, each of the E5052A's triggers is used exclusively for a single measurement function.

In other words, only one measurement function can be triggered at a time, and only this function can perform measurement at this time.

Spectrum Monitor Measurement in Spectrum Monitor Measurement Mode

Confirming the result of spectrum monitor measurement

Follow the steps below to confirm the results of the DUT's spectrum monitor measurement by using the E5052A's spectrum monitor measurement window.

Moving Carrier Frequency to the Center

- Step 1.** Press **Marker** to display marker 1 on the screen.
- Step 2.** Press **Marker Search** - **Peak** - **Search Peak** to move marker 1 to the position of carrier frequency.
- Step 3.** Press **Marker →** - **Marker->Center** to move the frequency in which the carrier resides to the center of the sweep range.

Setting Format and Detector Mode

You can select the unit (format) used in the spectrum monitor measurement trace screen and switch to the detector mode.

NOTE

The E5052A displays the measurement value at the specified point; actually, it sweeps (measures) with the resolution determined by the RBW. The detector captures all of the signals not only at the display point but also between individual display points. If there are more measurement points than display points, you must select the detector mode so that each display point is converted from the individual value of multiple measurement points.

“Positive” displays the maximum value (peak) of the measurement values between the display points. “Sample” displays the measurement value (latest measurement value) at the display point.

- Step 1.** Press **Format** - **Format**.
- Step 2.** Select the appropriate format from the softkey menu list. The available options are as follows.

Table 4-10**Format List**

Format	
dBm	dBm / Hz
dBV	dBV / Hz
Watt	Watt / Hz
Volt	Volt / Hz

- Step 3.** Press **Format** - **Detector Mode**.
- Step 4.** Select the appropriate detector mode from the softkey menu list. You can choose either Positive or Sample. Positive is selected by default.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

Basic Measurement Using E5052A

Spectrum Monitor Measurement in Spectrum Monitor Measurement Mode

- Step 1.** Press **Scale** - **Divisions**.
- Step 2.** Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **Scale** - **Reference Position**.
- Step 4.** Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.
- The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).
- Step 5.** Press **Scale** - **Reference Value**.
- Step 6.** Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit varies depending on the format setting.
- Step 7.** Press **Scale** - **Scale/Div**.
- Step 8.** Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit varies depending on the format setting.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

- Step 1.** Press **Scale** - **Auto Scale**.

Setting Attenuator

When the input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

- Step 1.** Press **Attn** - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

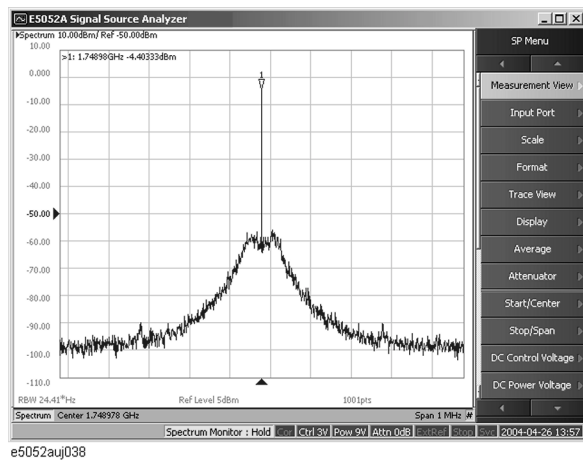
You can use the smoothing function to reduce the trace noise. Follow the steps below.

- Step 1.** Press **Trace/View** - **Aperture**.
- Step 2.** Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **Trace/View** - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

- Step 1. Press **Marker** to display marker 1 on the screen.
- Step 2. Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press **Marker** - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-9 Example of measurement screen (spectrum)



NOTE In this measurement, you cannot specify the sweep time. It will be determined automatically based on the frequency sweep range and measurement resolution bandwidth.

Transient Measurement in Transient Measurement Mode

Overview of transient measurement

You can measure the frequency, power and phase of the DUT along the time axis. The frequency can be measured by using two instruments of different frequency resolutions. Each frequency resolution has its own x-axis.

The E5052A's transient measurement window has four measurement trace screens to perform transient measurement of frequency (Wide Band/Narrow Band), power and phase. You can use each trace screen to measure the variation in frequency, power or phase after you have changed the output settings of the DUT.

The following section describes the basic measurement method of the variations in the DUT's frequency, power and phase by using the E5052A's transient measurement window.

Common settings for transient measurement

Follow the steps below for the common settings to perform transient measurements of frequency, power or phase by using the E5052A's transient measurement window.

Selecting Measurement Screen

Step 1. Press **Meas/View** - **Transient** to select the transient measurement window.

NOTE

You can maximize the transient measurement window by pressing the **Window Max** key while the window is selected. You can return to the original size when you press the **Window Max** key once again.

You can select the next trace by pressing the **Trace Next** key and maximize the target trace by pressing the **Trace Max** key. The transient window will come back when you press the **Trace Max** key once again.

Specifying Target Frequency

Step 1. Press **Setup** - Target Freq.

Step 2. Enter the target frequency in the data entry field that appears in the upper part of the screen.

Specifying Frequency Range

Step 1. Press **Setup** - **Freq Range** to select the frequency range.

You can select either 1.6 MHz or 25.6 MHz. However, when the target frequency is set to less than 100 MHz, only 1.6 MHz is available.

Specifying Frequency Band of Input Signal

- Step 1.** Press **[Setup]** - **Wide Freq Range**.
- Step 2.** Select the frequency band (Wide Band) from the softkey menu list. The available options are as follows.

Table 4-11 Frequency Band List (Wide Band)

Frequency Band	
50 M -150 MHz	1 G - 3 GHz
100 M -300 MHz	1.2 G -3.6 GHz
200 M -600 MHz	1.4 G -4.2 GHz
300 M -900 MHz	1.6 G -4.8 GHz
400 MHz -1.2 GHz	1.8 G -5.4 GHz
500 MHz - 1.5 GHz	2 G -6 GHz
600 MHz -1.8 GHz	2.2 G -6.6 GHz
800 MHz -2.4 GHz	2.4 G -7.2 GHz

NOTE The Target Frequency setting and the Frequency Range setting are specified for Narrow Band, and the Frequency Band of Input Signal setting is specified for Wide Band.

Specifying the Maximum Input Level of Input Signal

Follow the steps below to enter the maximum level value of the measurement signals that are input from the RF port. For more information, refer to the Chapter 8, “Specifications and Supplemental Information,” on page 189.

- Step 1.** Press **[Setup]** - **Max Input Level**.
- Step 2.** Enter the maximum input level in the data entry field that appears in the upper part of the screen.

Specifying Sweep Start Time, Sweep Time and Reference Position for Frequency Transient (Wide Band) Measurement Trace

- Step 1.** Press the **[Trace Next]** key to select the measurement trace for the frequency transient (Wide Band). You can confirm which trace is selected by viewing the cursor, which is displayed to the left of the trace title.

NOTE You can also click on the trace of the frequency transient (Wide Band) for confirmation.

- Step 2.** Press **[Start/Center]** - **Wide Ref Position**.
- Step 3.** Select the sweep reference position from the softkey menu list.
 You can select any of the three options: Left, Center or Right.

4. Basic Measurement Using E5052A

Basic Measurement Using E5052A
Transient Measurement in Transient Measurement Mode

Step 4. Press **Start/Center** - **Wide Span**.

Step 5. Enter the sweep time value in the data entry field that appears in the upper part of the screen. The allowable input value may vary depending on the scale value, target frequency or frequency range of the measurement trace.

Step 6. Press **Start/Center** - **Wide Time Offset**.

Step 7. Enter the sweep offset value in the data entry field that appears in the upper part of the screen.

NOTE

The function of **Time Offset** on the softkey is same as that of the **Start/Center** key.

Specifying Sweep Start Time, Sweep Time and Reference Position for Frequency Transient (Narrow Band) Measurement Trace, Power Transient Measurement Trace and Phase Transient Measurement Trace

Step 1. Press the **Trace Next** key to select the measurement trace for the frequency transient (Narrow Band). You can confirm which trace is selected by viewing the cursor which is displayed to the left of the trace title.

NOTE

You can also click on the trace of the frequency transient (Narrow Band) for confirmation.

The procedure for specifying the sweep start time, sweep time and reference position for frequency transient (Narrow Band) measurement trace is also applicable to the measurement trace of power transient and phase transient.

You can also specify the sweep start time, sweep time, and reference position for the frequency transient (Narrow Band) measurement trace by selecting the measurement trace of the power transient or phase transient.

Step 2. Press **Start/Center** - **Narrow Ref Position**.

Step 3. Select the sweep reference position from the softkey menu list.

You can select any of the three options: Left, Center or Right.

Step 4. Press **Start/Center** - **Narrow Span**.

Step 5. Enter the sweep time value in the data entry field that appears in the upper part of the screen. The allowable input value may vary depending on the scale value, target frequency, or frequency range of the measurement trace.

Step 6. Press **Start/Center** - **Narrow Time Offset**.

Step 7. Enter the sweep offset value in the data entry field that appears in the upper part of the screen.

NOTE

The function of **Time Offset** on the softkey is the same as that of the **Start/Center** key.

You can apply the setting values of sweep start time, sweep time, and reference position for the frequency transient (Wide Band) measurement trace to the frequency transient (Narrow Band) by pressing **Start/Center** - **Wide Settings -> Narrow**.

Setting Average Function

Follow the steps below to use the averaging function.

- Step 1.** Press **[Avg/BW]** - **Avg Factor**.
- Step 2.** Enter the number of times for averaging in the data entry field that appears in the upper part of the screen.
- Step 3.** **[Avg/BW]** - Press **Averaging** to turn on the averaging function.

About DC Voltage Setting and Protection

You can specify DC power/control that will be applied to the DUT. Refer to “Setting DC power/DC control and protection” on page 79 for the setting procedure.

Setting Trigger

- Step 1.** Press **[Trigger]** - Source.
- Step 2.** Select the trigger source from the softkey menu list. The available options are as follows. Internal is selected by default.

Table 4-12

Trigger Source List

Softkey	Overview
Internal	Sets trigger source to internal continuous trigger
External* ¹	Sets trigger source to external trigger input connector
Manual	Sets trigger source to manual operation
Bus	Sets trigger source to the bus; the trigger signal is issued by the trigger command via GPIB interface or LAN.
Wide Video* ²	Sets trigger source to Wide Video
Narrow Video* ²	Sets trigger source to Narrow Video

*1. If External is selected for the trigger source, the trigger signal must be provided by an external instrument. Refer to “Setting External Trigger” on page 107 for the setting procedure.

*2. When you select either Wide Video or Narrow Video for the trigger source, you must set up the video trigger. Refer to “Setting video trigger” on page 106 for the setting procedure.

- Step 3.** Press **[Trigger]** - **Trigger to Transient** to send a trigger to the transient measurement. By default, **Continuous** is selected for sweep.

NOTE

The E5052A has four measurement functions: phase noise measurement, spectrum monitor measurement, frequency/power measurement, and transient measurement. Because individual measurements differ in characteristics from one another, each of the E5052A’s trigger is used exclusively for a single measurement function.

In other words, only one measurement function can be triggered at a time, and only this

function can perform measurement at this time.

Setting video trigger

You must set up the video trigger when you select either Wide Video or Narrow Video for the trigger source. You do not have to set up the video trigger when you select other trigger sources.

Follow the steps below to set up the video trigger for the transient measurement.

Setting Video Trigger (Wide Band)

- Step 1.** Press - **Video Trigger - Wide Freq.**
- Step 2.** Enter the center frequency of the video trigger in the data entry field that appears in the upper part of the screen.

NOTE The setting is enabled when you select **Wide Video** from the trigger source options.

Setting Video Trigger (Narrow Band)

- Step 1.** Press - **Video Trigger - Narrow Freq.**
- Step 2.** Enter the center frequency of the video trigger in the data entry field that appears in the upper part of the screen.
- Step 3.** Press - **Video Trigger - Minimum Power Level.**
- Step 4.** Enter the minimum power level of the video trigger in the data entry field that appears in the upper part of the screen.

NOTE The setting is enabled when you select **Narrow Video** from the trigger source options.

Setting External Trigger

When the trigger source is set to External, the input signal is regarded as the start trigger of measurement, which is transmitted to the external trigger input connector (Ext Trig) from the external instruments. When the connector detects more than 20 us of pulse transition upward or downward, a measurement starts. A TTL compatible signal is used as the trigger signal.

Follow the steps below to set up the external trigger.

Connecting to the External Trigger Input Connector

Connect the trigger output connector of the external instrument to the E5052A's EXT TRIG connector on the rear panel.

Selecting Trigger Source

- Step 1.** Press **Trigger** - **Source**.
- Step 2.** Select **External** from the softkey menu list.
- Step 3.** Press **Trigger** - **Ext Trig Polarity** to select the polarity of the external trigger. You can select either **Positive** (upward) or **Negative** (downward).

Confirming the result of frequency transient (Wide Band) measurement

Follow the steps below to confirm the results of the DUT's frequency transient (Wide Band) measurement, using the E5052A's transient measurement window.

Selecting Frequency Transient (Wide Band) Measurement Trace

- Step 1.** Press the **Trace Next** key to select the measurement trace for the frequency transient (Wide Band). You can confirm which trace is selected by viewing the cursor displayed to the left of the trace title.

NOTE

You can also click on the measurement trace of the frequency transient (Wide Band) for confirmation.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

- Step 1.** Press **Scale** - **Divisions**.
- Step 2.** Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **Scale** - **Reference Position**.
- Step 4.** Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.
- The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).
- Step 5.** Press **Scale** - **Reference Value**.
- Step 6.** Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit is Hz.
- Step 7.** Press **Scale** - **Scale/Div**.
- Step 8.** Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit is Hz/Div.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

- Step 1.** Press **Scale** - **Auto Scale**.

NOTE

If you want the scale setting to be performed automatically for all four measurement traces (frequency transient (Wide Band and Narrow Band), power transient and phase transient), press **Scale** - **Auto Scale All**.

Setting Attenuator

When the input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

- Step 1.** Press **Attn** - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurements or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

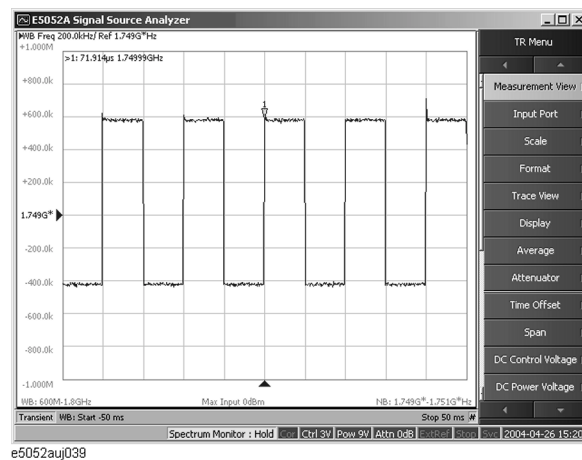
- Step 1.** Press **Trace/View** - **Aperture**.
- Step 2.** Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **Trace/View** - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

- Step 1.** Press **Marker** to display marker 1 on the screen.
- Step 2.** Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press **Marker** - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-10

Example of measurement screen (frequency transient wide band)



Confirming the result of frequency transient (Narrow Band) measurement

Follow the steps below to confirm the results of the DUT's frequency transient (Narrow Band) measurement by using the E5052A's transient measurement window.

Selecting Frequency Transient (Narrow Band) Measurement Trace

- Step 1.** Press the **Trace Next** key to select the measurement trace for the frequency transient (Narrow Band). You can confirm which trace is selected by viewing the cursor which is displayed in the left to the trace title.

NOTE

You can also click on the measurement trace of the frequency transient (Narrow Band) for confirmation.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

- Step 1.** Press **Scale** - **Divisions**.
- Step 2.** Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **Scale** - **Reference Position**.
- Step 4.** Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen. The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).
- Step 5.** Press **Scale** - **Reference Value**.
- Step 6.** Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit is Hz.
- Step 7.** Press **Scale** - **Scale/Div**.
- Step 8.** Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit is Hz/Div.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

- Step 1.** Press **Scale** - **Auto Scale**.

NOTE

If you want the scale setting to be performed automatically for all four measurement traces (frequency transient (Wide Band and Narrow Band), power transient and phase transient), press **Scale** - **Auto Scale All**.

Setting Attenuator

When the input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

- Step 1.** Press **[Attn]** - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurements or the characteristics of DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

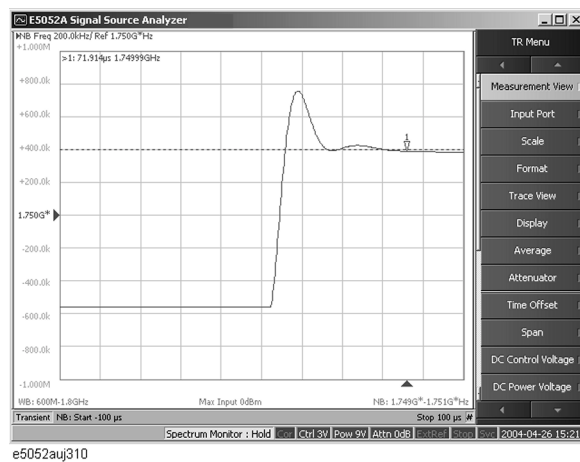
- Step 1.** Press **[Trace/View]** - **Aperture**.
- Step 2.** Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **[Trace/View]** - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

- Step 1.** Press **[Marker]** to display marker 1 on the screen.
- Step 2.** Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press **[Marker]** - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-11

Example of measurement screen (frequency transient narrow band)



Confirming the result of power transient measurement

Follow the steps below to confirm the results of the DUT's power transient measurement by using the E5052A's transient measurement window.

Selecting Power Transient Measurement Trace

- Step 1.** Press the **Trace Next** key to select the power transient measurement trace. You can confirm which trace is selected by viewing the cursor that is displayed to the left of the trace title.

NOTE

You can also click on the measurement trace of the power transient for confirmation.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

- Step 1.** Press **Scale** - **Divisions**.
- Step 2.** Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **Scale** - **Reference Position**.
- Step 4.** Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.
- The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).
- Step 5.** Press **Scale** - **Reference Value**.
- Step 6.** Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit is dBm.
- Step 7.** Press **Scale** - **Scale/Div**.
- Step 8.** Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit is dB/Div.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

- Step 1.** Press **Scale** - **Auto Scale**.

NOTE

If you want the scale setting to be performed automatically for all four measurement traces (frequency transient (Wide Band and Narrow Band), power transient and phase transient), press **Scale** - **Auto Scale All**.

Setting Attenuator

When the input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

- Step 1.** Press **Attn** - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

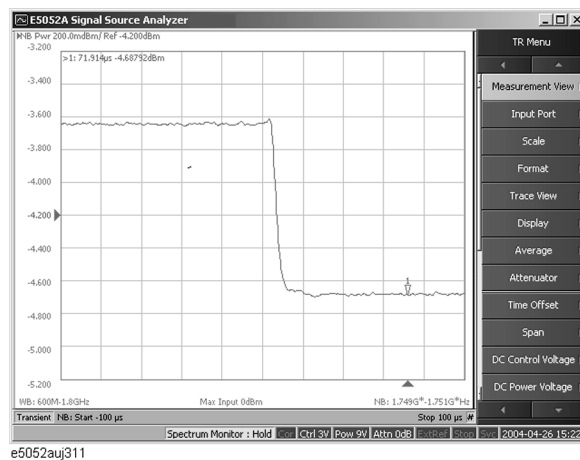
You can use the smoothing function to reduce the trace noise. Follow the steps below.

- Step 1.** Press **Trace/View** - **Aperture**.
- Step 2.** Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **Trace/View** - **Smoothing** to turn on the smoothing function.

Confirming Measurement Points by Markers

- Step 1.** Press **Marker** to display marker 1 on the screen.
- Step 2.** Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press **Marker** - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Figure 4-12 Example of measurement screen (power transient)



Confirming the phase transient measurement

Follow the steps below to confirm the results of the DUT's phase transient measurement by using the E5052A's transient measurement window.

Selecting Phase Transient Trace

- Step 1.** Press the **Trace Next** key to select the phase transient measurement trace. You can confirm which measurement trace is selected by viewing the cursor that is displayed to the left of the trace title.

NOTE

You can also click on the phase transient measurement trace for confirmation.

Setting Phase Unit and Wrap Phase

You can select the unit (phase unit) used in the phase transient measurement trace screen and specify the wrap phase.

- Step 1.** Press **Format** - **Phase Unit**.
- Step 2.** Select the appropriate format from the softkey menu list. You can select any of the three options: Deg, Rad or Grad.
- Step 3.** Press **Format** - **Wrap Phase** to turn on/off the wrap phase function.

Setting Scale of Measurement Trace (manual setting)

Follow the steps below to set the scale of the measurement trace manually.

- Step 1.** Press **Scale** - **Divisions**.
- Step 2.** Enter the number of divisions by scale for the y-axis in the data entry field that appears in the upper part of the screen.
- Step 3.** Press **Scale** - **Reference Position**.
- Step 4.** Enter the position of the scale reference line in the data entry field that appears in the upper part of the screen.
- The position of the scale reference line must be specified by any of the numbers assigned to the y-axis scale, from 0 (minimum scale) to the number of divisions (maximum scale).
- Step 5.** Press **Scale** - **Reference Value**.
- Step 6.** Enter the value of the scale reference line in the data entry field that appears in the upper part of the screen. The unit varies depending on the format setting.
- Step 7.** Press **Scale** - **Scale/Div**.
- Step 8.** Enter the value per scale in the data entry field that appears in the upper part of the screen. The unit varies depending on the format setting.

Setting Scale of Measurement Trace (automatic setting)

Follow the steps below to set the scale of the measurement trace automatically.

Step 1. Press **Scale** - **Auto Scale**.

NOTE

If you want the scale setting to be performed automatically for all four measurement traces (frequency transient (Wide Band and Narrow Band), power transient and phase transient), press **Scale** - **Auto Scale All**.

Setting Attenuator

When the input level is very high, a message may appear to prompt you to adjust the attenuator. In this case, follow the steps below to adjust the attenuator.

Step 1. Press **Attn** - **Input Attenuator** to enter the attenuator value in the data entry field that appears in the upper part of the screen.

You can select the value from the options: 0 dB, 5 dB, 10 dB, 15 dB, 20 dB, 25 dB, 30 dB or 35 dB. The appropriate input level is between 0 and 5 dBm, depending on the type of measurement or the characteristics of the DUT. Adjust the attenuator so that the input level of the RF port approximates this range.

Setting Smoothing

You can use the smoothing function to reduce the trace noise. Follow the steps below.

Step 1. Press **Trace/View** - **Aperture**.

Step 2. Enter the value of the smoothing aperture (%) in the data entry field that appears in the upper part of the screen.

Step 3. Press **Trace/View** - **Smoothing** to turn on the smoothing function.

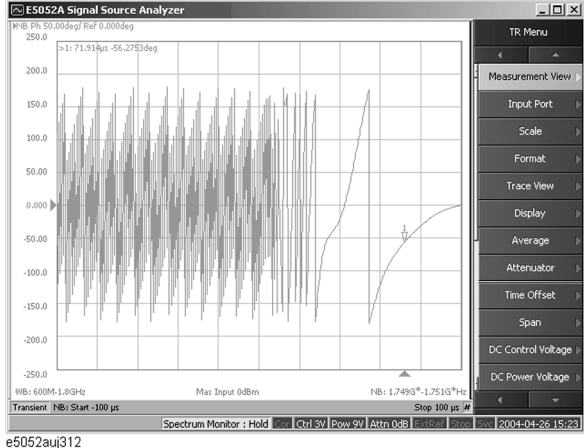
Confirming Measurement Points by Markers

Step 1. Press **Marker** to display marker 1 on the screen.

Step 2. Move marker 1 to the point you want to confirm and read the measurement value displayed in the upper part of the graph. To confirm multiple values, press **Marker** - **Marker x (x=1 to 6)**, which allows you to display up to marker 6.

Basic Measurement Using E5052A
Transient Measurement in Transient Measurement Mode

Figure 4-13 Example of measurement screen (phase transient)



e5052auj312

5 **Data Analysis and Result Output**

This chapter describes the analysis function of the E5052A, how to use the saving/recalling function, and the concept and method of screen information printing.

Analyzing Data on the Trace Using the Marker

About marker functions

The marker can be used in the following ways:

- Reading a measured value as numerical data (as an absolute value or a relative value from the reference point)
- Moving the marker to a specific point on the trace (marker search)
- Using the value of the marker to change the stimulus (sweep range) and scale (value of the reference line)

For more information, refer to “Searching for Positions that Match Specified Criteria” on page 126.

For the procedure used to change the sweep range and scale by using the marker, refer to “Specifying the sweep range by using the marker” on page 121.

The E5052A is capable of displaying up to 6 markers on each trace. Each marker has a stimulus value (the value on the X-axis) and a response value (the value on the Y-axis).

Reading values on the trace

You can read the value of a marker displayed on the trace.

You can set the marker for the selected measurement window.

The marker response value is always in the same data format as that of the Y-axis.

Operational Procedure

Step 1. Press **Trace Next** or **Trace Max** to activate the trace on which you want to use the marker.

Step 2. Press **Marker**.

NOTE

At this point, marker 1 is turned on and becomes active (you can operate the marker). When using marker 1, you can omit Step 3.

Step 3. Select a marker and turn it on. The softkey used to turn on a marker is used to activate that marker.

Table 5-1

Softkey	Function
Marker 1	Turns on marker 1, which has been turned off; activates marker 1
Marker 2	Turns on marker 2, which has been turned off; activates marker 2
Marker 3	Turns on marker 3, which has been turned off; activates marker 3
Marker 4	Turns on marker 4, which has been turned off; activates marker 4
Marker 5	Turns on marker 5, which has been turned off; activates marker 5
Marker 6	Turns on marker 6, which has been turned off; activates marker 6

Step 4. Change the marker value in the entry area. This operation enables you to move the marker to a point on the desired trace.

The marker value in the entry area can be changed by one of the following methods.

NOTE

To change the value in the entry area, the figure in the box should be highlighted. If the figure is not highlighted, press the softkey for the marker you are using (**marker 1** to **marker 6**) or **Focus** to highlight the figure.

- Enter a numeric value using the ENTRY block key on the front panel.
- Turn the rotary knob (⊙) on the front panel.
- Press the up or down arrow key (⬆️⬇️) on the front panel.
- Using the mouse, click one of the buttons (▲ ▼) on the right side of the entry area.

You can move the marker by dragging and dropping either one of the marker position pointers above or below the graph (▲) (pressing the button on the object to be moved and releasing the button on the destination). You can also move a marker itself by dragging and dropping it.

Data Analysis and Result Output

Analyzing Data on the Trace Using the Marker

- Step 5.** When using other markers, repeat Step 3 and Step 4.
- Step 6.** Read the marker stimulus value and marker response value displayed in the upper part of the trace screen.
- Step 7.** To turn off marker(s), press the **Clear Marker Menu** and then press one of the softkeys as follows:

Table 5-2

Softkey	Function
All OFF	Turns off all markers on active trace
Marker 1 to Marker 6	Turns off one of markers 1 through 6 on active trace

Changing the display position of marker value

You can change the display position of the marker value on the graph.

Operational Procedure

- Step 1.** Press **Trace Next** or **Trace Max** to activate the trace on which you want to use the marker.
- Step 2.** Press **Display**.
- Step 3.** Press **Marker Information** to change the display position.

Table 5-3

Softkey	Function
Left	Displays marker value in upper-left part of graph
Right	Displays marker value in upper-right part of graph

You can also view the marker values in a list. For more information, refer to “Listing all marker values in all displayed traces” on page 125.

Specifying the sweep range by using the marker

You can copy the active marker value to the position of start, stop or center.

NOTE If multiple markers are present on the active trace, only the active marker can be moved.

NOTE This function is not available for the transient measurement.

Operational Procedure

- Step 1.** Press **Trace Next** or **Trace Max** to activate the trace on which you want to use the marker.
- Step 2.** Press **Marker →**.
- Step 3.** Press the corresponding softkey to specify the sweep range.

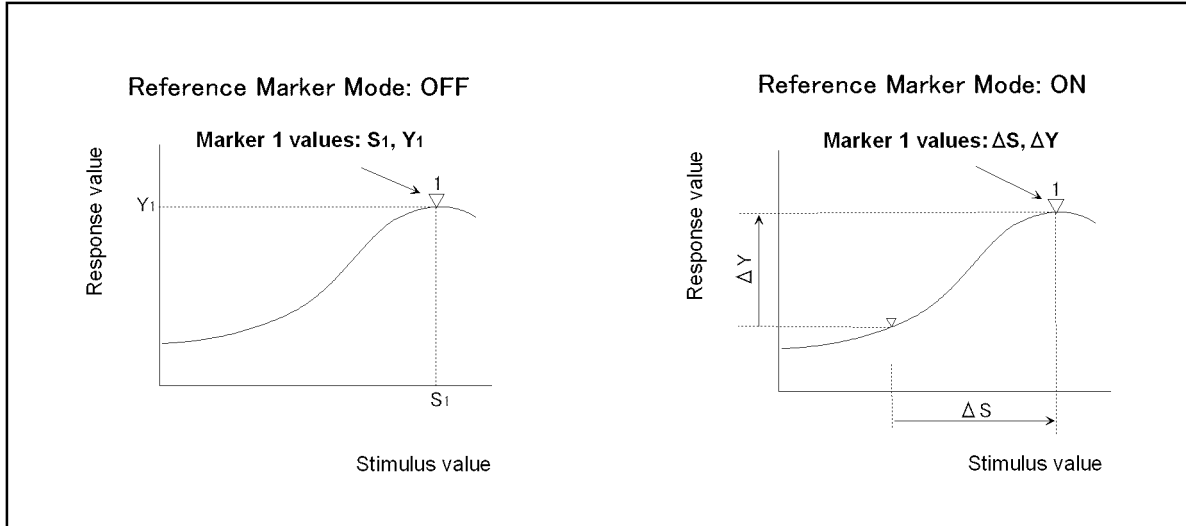
Table 5-4

Softkey	Function
Marker to Start	Changes start value to be equal to stimulus value of active marker on current active trace
Marker to Stop	Changes stop value to be equal to stimulus value of active marker on current active trace
Marker to Center	Changes center value to be equal to stimulus value of active marker on current active trace

Reading a relative value from the reference point on the trace

You can convert the marker reading to a relative value from the reference point.

Figure 5-1 Reference marker mode



e5070aue121

Operational Procedure

Step 1. Press **Trace Next** or **Trace Max** to activate the trace on which you want to use the marker.

Step 2. Press **Marker**.

Step 3. Press **More functions**.

Step 4. Press **Ref Marker** to specify the reference marker (Marker 1 through 6).

By default, marker 1 is set as the reference marker.

Step 5. Press **Ref Marker Mode** to turn on the reference mode.

Activate the reference marker if it is not active.

With the reference mode turned on, the stimulus values and response values are indicated in relative values referred to by the position of the reference marker.

NOTE

While the reference marker mode is turned on, you cannot view the relative value from the reference point unless the delta marker mode is set to 'ON'.

Step 6. Following Step 4 in "Reading values on the trace" on page 119, place the reference marker on the point to be used as the reference.

Step 7. Following Step 3 to Step 4 in "Reading values on the trace" on page 119, place markers 1 through 6 on the desired points to read the values.

To use the list view of the marker values, refer to "Listing all marker values in all displayed traces" on page 125.

Reading only the actual measurement point/Reading the value interpolated between measurement points

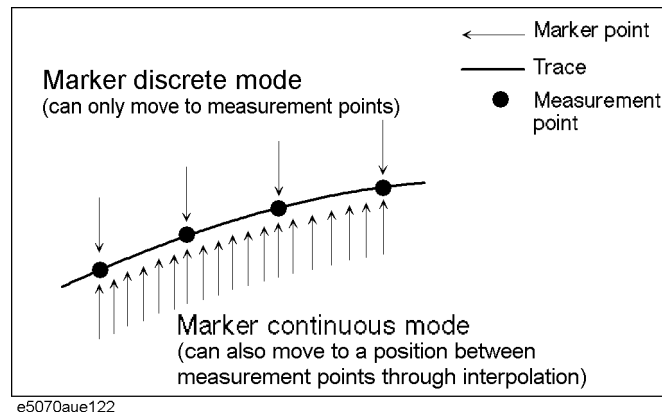
The point on the trace on which a marker can be placed differs depending on how the discrete marker mode is set up.

Table 5-5

Turning on discrete mode (Discrete ON)	A marker moves only between actual measurement points. When a specific marker stimulus value is specified as a numerical value, the marker is placed at the measurement point closest to the specified value. A marker that is placed between interpolated points with the discrete mode off automatically moves to the nearest measurement point when the discrete mode turns on.
Turning off discrete mode (Discrete OFF)	The marker can move from one actual measurement point to another. Because it is interpolated, it can also move in the space between measurement points.

Figure 5-2

Marker discrete mode



Operational Procedure

- Step 1.** Press **Trace Next** or **Trace Max** to activate the trace on which you want to use the marker.
- Step 2.** Press **Marker**.
- Step 3.** Press **More functions**.
- Step 4.** Press **Discrete** to turn the discrete mode on or off.

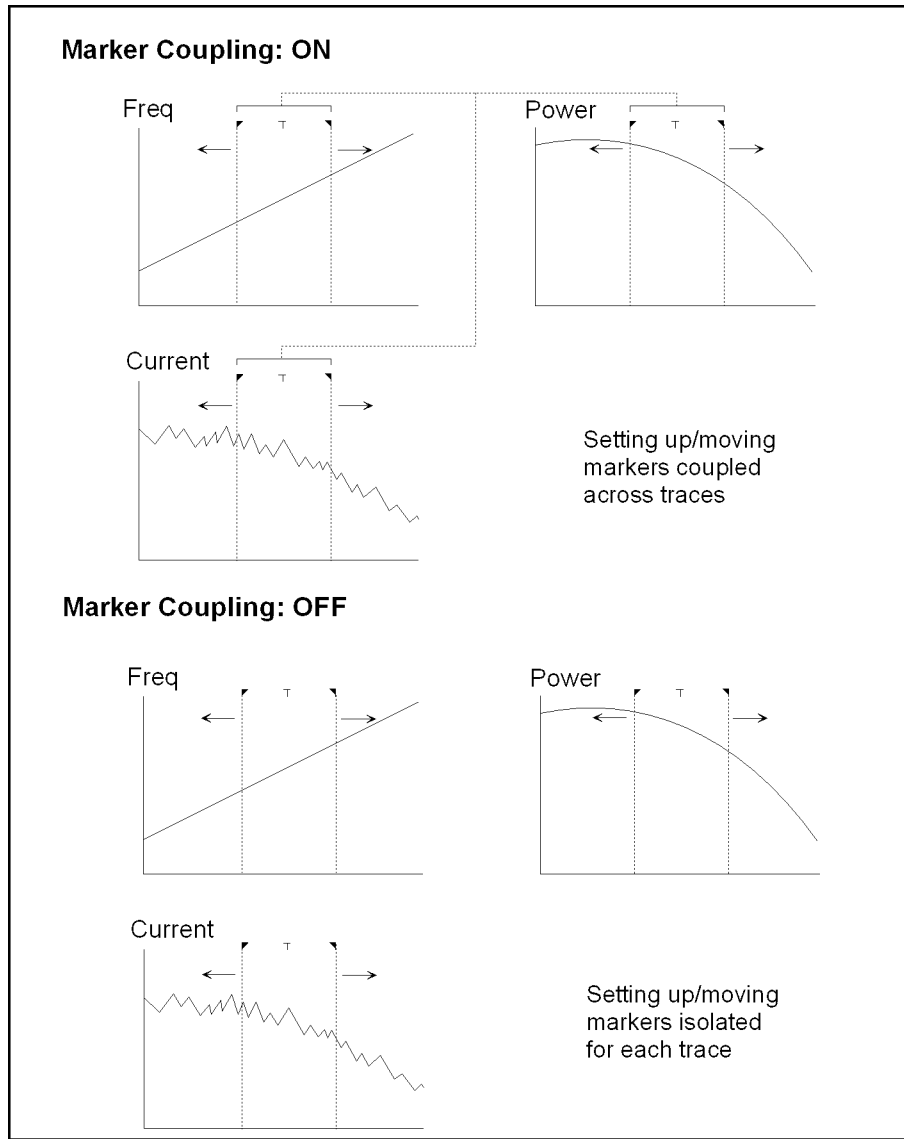
Setting up markers for each trace/Setting up markers for coupled operations between traces

Markers can be set up and moved either in a coupled operation for all traces in a channel or independently for each trace.

You can set up marker coupling for frequency/power measurement, transient measurement and the user window.

Figure 5-3

Marker Coupling



e5052aue049

Table 5-6

Marker Couple is on (Couple ON)	Markers are set up and moved in coupled operation on all traces in a channel.
Marker Couple is off (Couple OFF)	Markers are set up and moved independently for each trace.

Operational Procedure

- Step 1.** Press **Trace Next** or **Trace Max** to activate the trace on which you want to use the marker.
- Step 2.** Press **Marker**.
- Step 3.** Press **Couple** to turn the marker coupling on or off.

NOTE

For the transient measurement, both the marker coupling (Couple) and the marker discrete mode are turned on, where the active marker on the active trace operates in the discrete mode; however, the other subsequent markers are not always on the measurement point, since they are coupled with the value.

Listing all marker values in all displayed traces

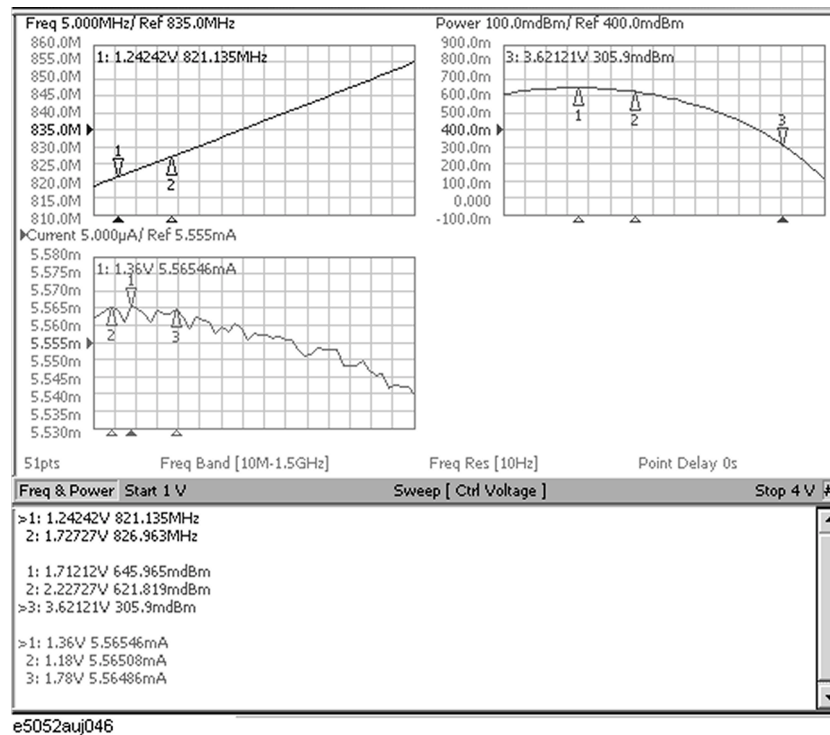
You can list all of the marker values for all traces on the marker list display.

Operational Procedure

- Step 1.** Press **Marker**.
- Step 2.** Press **Marker List** to turn on the marker list display.

The marker list is displayed in the lower part of the screen (Figure 5-4).

Figure 5-4 Turning on the marker list



Searching for Positions that Match Specified Criteria

You can search for a position that matches your specified criteria by using the Marker Search feature.

Marker Search allows you to search for a position that matches the following criteria.

- Maximum value
- Minimum value
- Target (a point that has a target measurement value)
 - Target nearest to marker position
 - Target nearest to left-hand side of marker position
 - Target nearest to right-hand side of marker position
- Peak
 - Maximum peak (for a positive peak), minimum peak (for a negative peak)
 - Peak nearest to left-hand side of marker position
 - Peak nearest to right-hand side of marker position






Setting search range (Bandmarkers)




The Marker Search feature allows you to set part of the sweep range as the search target (Bandmarker feature) as well as the entire search range.

Procedure to Set Search Range

- Step 1.** Press **Trace Next** or **Trace Max** to activate the trace on which you want to use the marker.
- Step 2.** Press **Marker Fctn** (or press **Marker Search**).
- Step 3.** To set the search range for the X-axis, turn on **Bandmarker X**.
- Step 4.** Set the search range using **X start**, **X stop**, **X center** and **X span**.

Each value for the search range can be changed by one of the following methods.

- Enter a numeric value using the ENTRY block key on the front panel.
- Turn the rotary knob () on the front panel.
- Press the up or down arrow key ( ) on the front panel.
- Using the mouse, click one of the buttons ( ) on the right side of the entry area.

You can move the search range by dragging and dropping either one of the bandmarker position pointers (  ) above the graph (pressing the button on the object to be moved and releasing the button on the destination). You can also drag and drop the start/stop line of the search range.

- Step 5.** To set the search range for the Y-axis, turn on **Bandmarker Y**.

Step 6. Set the search range using **Y start**, **Y stop**, **Y center** and **Y span**.

Each value for the search range can be changed by one of the following methods.

- Enter a numeric value using the ENTRY block key on the front panel.
- Turn the rotary knob (⊙) on the front panel.
- Press the up or down arrow key (⬆️⬇️) on the front panel.
- Using the mouse, click one of the buttons (▲▼) on the right side of the entry area.

You can move the search range by dragging and dropping either one of the bandmarker position pointers (↖️ → ↘️) above the graph (pressing the button on the object to be moved and releasing the button on the destination). You can also drag and drop the start/stop line of the search range.

Searching in the specified range

Procedure to Set Search Range

- Step 1.** Press **Trace Next** or **Trace Max** to activate the trace on which you want to use the marker.
- Step 2.** Press **Marker Search**.
- Step 3.** To perform the partial search for the stimulus value (x-axis), press **Search Range(X)** to select Bandmarker.
- Step 4.** To perform the partial search for the response value (y-axis), press **Search Range(Y)** to select Bandmarker.

Table 5-7

Fullspan Search (Full Range)	All data on the trace are specified as the search target.
Left search (Bandmarker)	Partial data on the trace are specified as the search target.

Setting up bandmarker for each trace/Setting up markers for coupled operations between traces

The bandmarkers can be set up and moved either in coupled operation for all traces in a channel or independently for each trace.

You can set up bandmarker coupling for frequency/power measurement, transient measurement and the user window.

Figure 5-5 Bandmarker Coupling

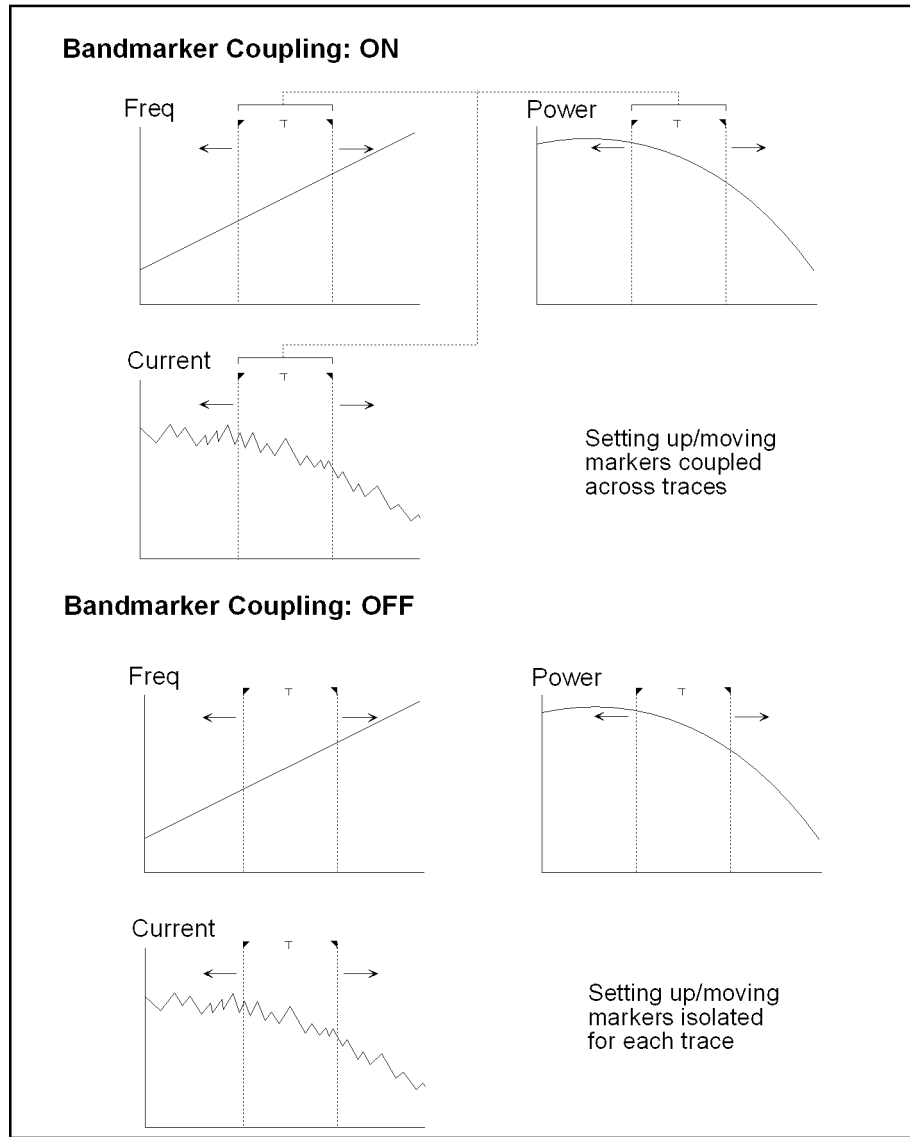


Table 5-8

<p>Bandmarker Couple is on (Couple ON)</p>	<p>Bandmarkers are set up and moved in coupled operation on all traces in a channel.</p>
---	--

Table 5-8

Bandmarker Couple is Bandmarkers are set up and moved independently for each trace.
off
(**Couple OFF**)

Operational Procedure

- Step 1.** Press **Trace Next** or **Trace Max** to activate the trace on which you want to use the marker.
- Step 2.** Press **Marker Fctn** (or press **Marker Search**).
- Step 3.** Now you can set up the bandmarker. For more information, refer to “Setting search range (Bandmarkers)” on page 126.
- Step 4.** Press **Couple** to turn the marker coupling on or off.

NOTE You cannot turn on the bandmarker coupling for the x-axis.

Automatically executing a search each time a sweep is done (search tracking)

Search tracking is a function that sets a search to be repeated every time a sweep is done. This function facilitates the observation of measurement results, such as the maximum value of traces.

Operational Procedure

- Step 1.** Press **Trace Next** or **Trace Max** to activate the trace on which search tracking is set up.
- Step 2.** Press **Marker Search**.
- Step 3.** Press **Tracking** and specify the parameters of the search tracking function.

Table 5-9

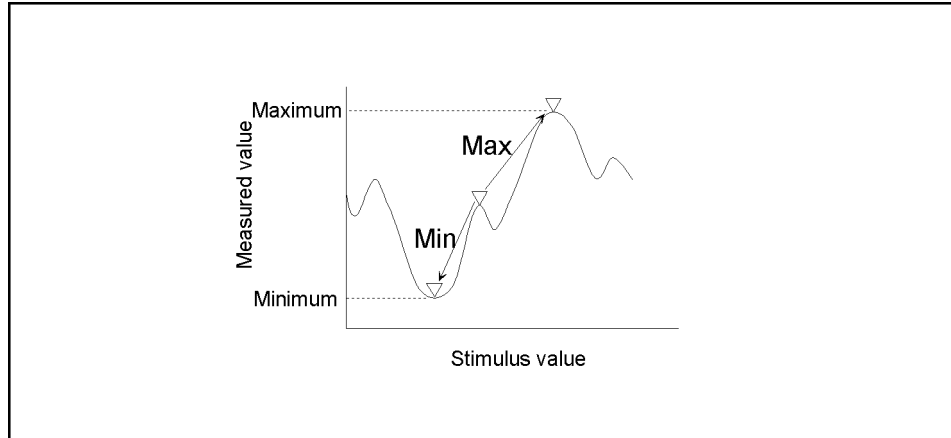
Off	Turns off search tracking function
Maximum value	Specifies the maximum value for search tracking function
Minimum value	Specifies the minimum value for search tracking function
Peak	Specifies the peak for search tracking function
Target	Specifies the target for search tracking function

Searching for the maximum and minimum measured values

You can search for the maximum or minimum measured value on the trace and move a marker to that point (Figure 5-6).

Figure 5-6

Searching for the maximum and minimum measured values



e5070aue047

Table 5-10

Search for maximum (Max)	Moves active marker to point on trace where measured value is greatest
Search for minimum (Min)	Moves active marker to point on the trace where measured value is lowest

Operational Procedure

- Step 1.** Following Step 1 to Step 3 in “Reading values on the trace” on page 119, activate the marker you will use to search for the maximum and minimum values.
- Step 2.** Press .
- Step 3.** Press the corresponding softkey to move the marker to the maximum or minimum measured value.

Table 5-11

Softkey	Function
Search Max	Performs a search for the maximum value
Search Min	Performs a search for the minimum value

Searching for the target value (target search)

The target search function enables you to move the marker to the point that has the target measured value.

Target and transition types

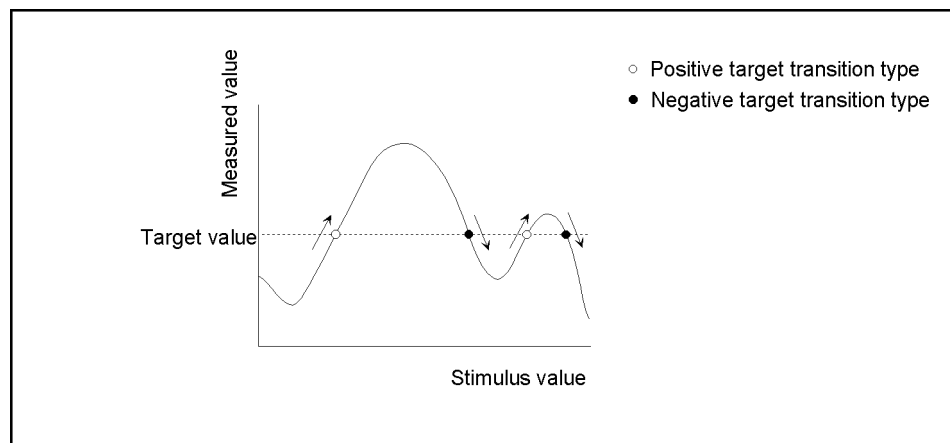
A target is a point that has a specific measurement value on the trace. Targets can be divided into the two groups shown below depending on their transition type.

Table 5-12

Transition type: positive (Positive)	When the value of the target is larger than the measurement value that immediately precedes it (on the left side)
Transition type: negative (Negative)	When the value of the target is smaller than the measurement value that immediately precedes it (on the left side)

Figure 5-7

Target and transition types



e5070aue050

About the target search function

The target search is a function that searches for a target that matches the pre-defined target value and transition type(s) (positive, negative, or both positive and negative) and then moves the marker to the target being searched.

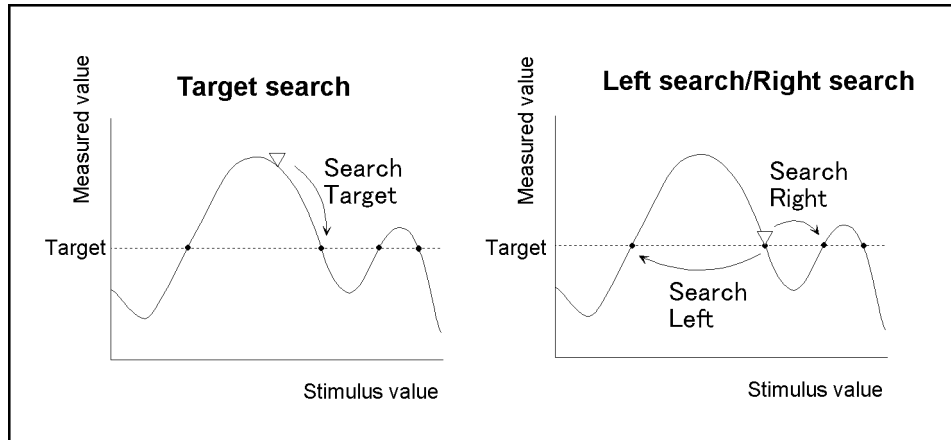
The following three methods are available for executing the target search:

Table 5-13

Search target (Search Target)	The marker moves to the peak with maximum response value if the peak polarity is Positive or Both or to the peak with minimum response value if the peak polarity is Negative.
Left search (Search Left)	Executes search from current marker position to the smaller stimulus values and moves marker to first target encountered
Right search (Search Right)	Executes search from current marker position to the larger stimulus values and moves marker to first target encountered

Figure 5-8

Target search (when transition type is set to “both positive and negative”)



e5070aue048

Operational Procedure

- Step 1.** Following Step 1 through Step 3 in “Reading values on the trace” on page 119, activate a marker you are using for the target search.
- Step 2.** Press Marker Search.
- Step 3.** Press **Target**.
- Step 4.** Press **Target Value** and enter a target value in the entry box that appears.
 The marker target search will be executed based on the newly set target value and the transition type defined.
- Step 5.** Press **Target Transition**.
- Step 6.** Select a transition type.

Table 5-14

Softkey	Function
Positive	Selects positive as transition type
Negative	Selects negative as transition type
Both	Selects both positive and negative as transition type

The marker target search will be executed based on the definitions of the currently set target value and the newly set transition type. Each marker is allowed to have the peak excursion value and the peak polarity individually.

- Step 7.** Press the corresponding softkey to move the marker to the target.

Table 5-15

Softkey	Function
Search Target	Executes target search
Search Left	Executes left search
Search Right	Executes right search

Searching for the Peak

The peak search function enables you to move the marker to the peak on the trace.

Definitions of peaks

A peak is a measurement point whose value is greater or smaller than the adjoining measurement points on its right and left sides. Peaks are classified into the following types depending on the difference in magnitude from the measurement points on either side of it.

Table 5-16

Positive peak (Positive)	A peak whose measurement value is greater than those of the measurement points on either side of it (peak polarity: positive)
Negative peak (Negative)	A peak whose measurement value is smaller value than those of measurement points on either side of it (peak polarity: negative)

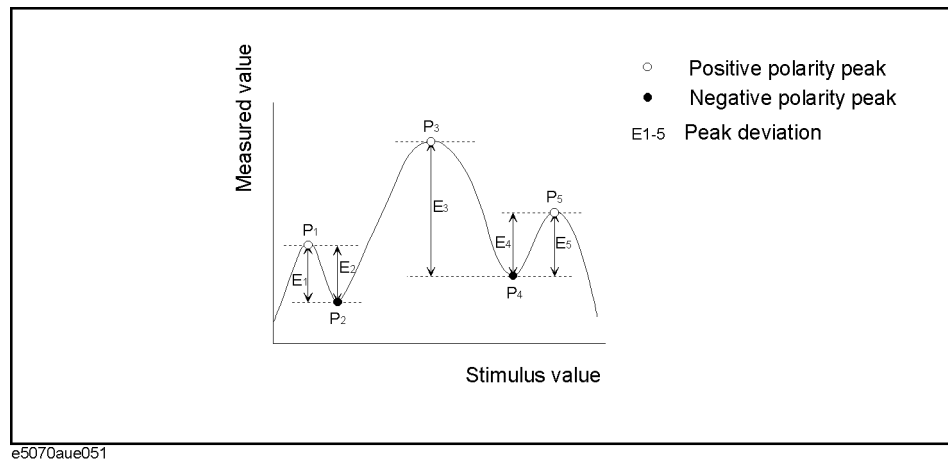
About the peak search function

The peak search is a function that searches for a peak that matches a pre-defined lower limit for the peak excursion value and peak polarity (positive or negative) and then moves the marker to this peak.

The peak excursion is the smaller of the differences in measurement values from the adjoining peaks of the opposite polarity.

Figure 5-9

Positive peak, negative peak and peak excursion



The following four methods are available for executing the peak search:

Table 5-17

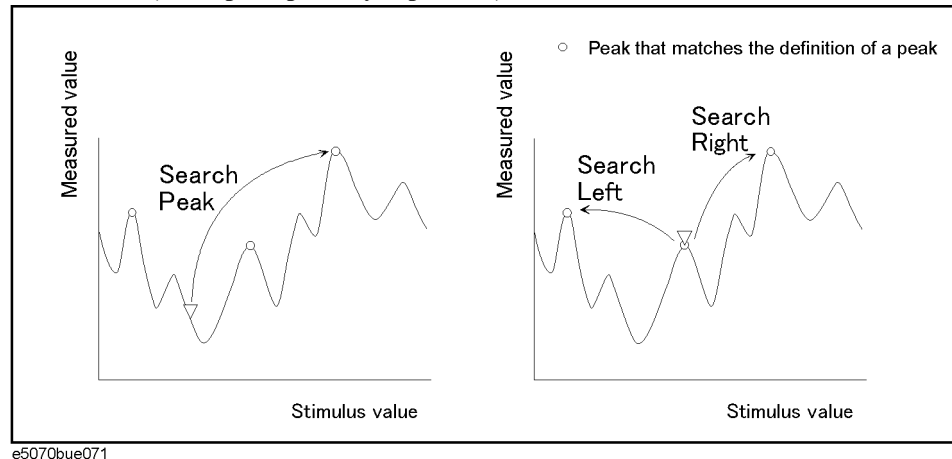
Search peak (Search Peak)	Moves marker to the maximum peak when peak polarity is Positive or Both ; moves marker to the minimum peak when peak polarity is Negative
Search all peaks (Search Peak All)	Moves marker to the maximum peak when peak polarity is Positive or Both ; moves marker to the minimum peak when peak polarity is Negative

Table 5-17

Search left (Search Left)	Executes search from current marker position to the smaller stimulus values and moves marker to the first peak encountered
Search right (Search Right)	Executes search from current marker position to the larger stimulus values and moves marker to the first peak encountered

Figure 5-10

Peak search (when peak polarity is positive)



Operational Procedure

- Step 1.** Following Step 1 through Step 3 in “Reading values on the trace” on page 119, activate a marker you are using for the peak search.
- Step 2.** Press .
- Step 3.** Press **Peak**.
- Step 4.** Press **Peak Excursion** and enter the lower limit for the peak excursion value.
 The marker peak search will be executed based on the definitions of the newly set lower limit for the peak excursion value and the currently set peak polarity.
- Step 5.** Press **Peak Polarity**.
- Step 6.** Select a peak polarity.

Table 5-18

Softkey	Function
Positive	Selects Positive as the peak polarity
Negative	Selects Negative as the peak polarity
Both	Selects Both Positive and Negative as the peak polarity

The marker peak search will be executed based on the definitions of the currently set lower limit for the peak excursion value and the newly set peak polarity. Each marker is allowed to have the peak excursion value and the peak polarity individually.

Data Analysis and Result Output
Searching for Positions that Match Specified Criteria

Step 7. Press the corresponding softkey to move the marker to the peak.

Table 5-19

Softkey	Function
Search Peak	Executes peak search
Search Left	Executes left search
Search Right	Executes right search

Searching for multiple peaks

The multi-peak search function enables you to display markers on multiple peaks on traces.

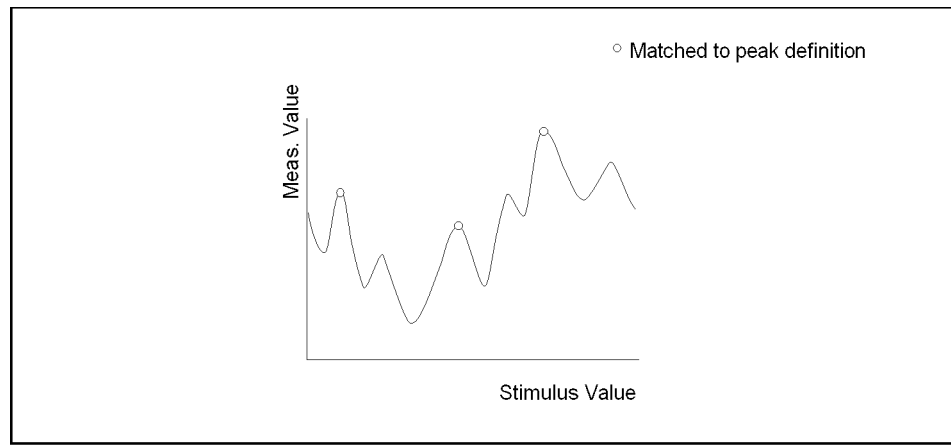
About peak search all functions (Peak Search All)

The peak-search-all is a function that searches for peaks that match a pre-defined lower limit for the peak excursion value and peak polarity (positive or negative) and then displays the markers on these peaks. Up to 6 markers can be displayed.

The peak excursion is the smaller of the differences in measurement values from the adjoining peaks of the opposite polarity.

Figure 5-11

Peak search all (when peak polarity is positive)



Operational Procedure

Step 1. Following Step 1 through Step 3 in “Reading values on the trace” on page 119, display the multiple markers you are using for the peak search.

NOTE

The peak search is executed as many times as the number of markers displayed (up to 6).

Step 2. Press **Marker Search**.

Step 3. Press **Peak**.

Step 4. Press **Peak Excursion** and enter the lower limit for the peak excursion value.

This sets the multiple peak searches to be executed based on the definitions of the newly set lower limit for the peak excursion value and the currently set peak polarity.

Step 5. Press **Peak Polarity**.

Step 6. Select a peak polarity.

Table 5-20

Softkey	Function
Positive	Selects Positive as the peak polarity.
Negative	Selects Negative as the peak polarity

Data Analysis and Result Output
Searching for Positions that Match Specified Criteria

Table 5-20

Softkey	Function
Both	Selects Both Positive and Negative as the peak polarity

This sets the multiple peak searches to be executed based on the definitions of the currently set lower limit for the peak excursion value and the newly set peak polarity.

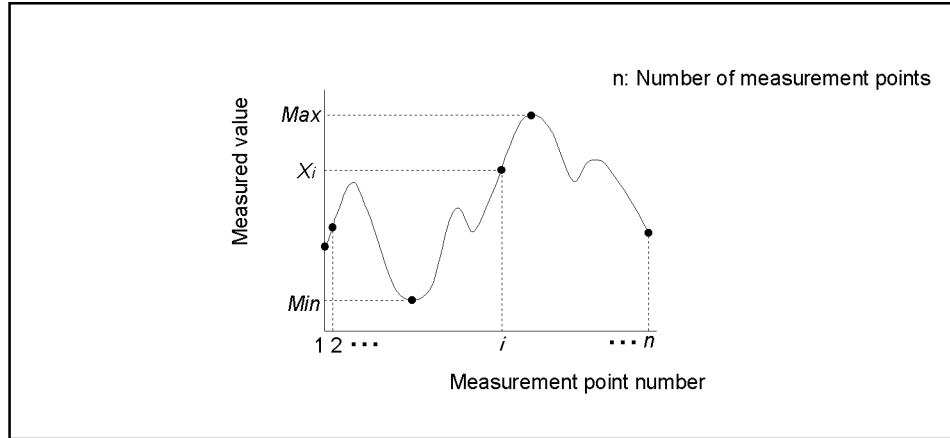
Step 7. Press **Search Peak All** to move the marker to the peak.

Determining the Mean, Standard Deviation, and Peak-to-Peak of the Trace

You can easily determine the statistics data for the trace between marker 1 and marker 2 (mean, standard deviation, and peak-to-peak). Figure 5-12 and Table 5-21 show the definitions for the statistics data elements.

Figure 5-12

Parameters used for calculating statistics data



e5070aue053

Table 5-21

Definitions of Statistics Data

Statistics data element	Definition
Average (Mean)	$\frac{\sum_{i=1}^n x_i}{n}$ (n: number of points; xi: i measured value at the i-th measurement point)
Standard deviation (SDev)	$\sqrt{\frac{\sum_{i=1}^n (x_i - \text{mean})^2}{n - 1}}$ (n: number of points; xi: measured value at the i-th measurement point; mean: mean)
Peak-to-Peak (PtoP)	$\text{Max} - \text{Min}$ (Max: greatest measured value; Min: smallest measured value)

Specifying the Range for Statistical Data

- Step 1.** Press **Trace Next** or **Trace Max** to activate the trace for which you want to obtain statistical data.
- Step 2.** Press **Marker Fctn**.
- Step 3.** Specify the range (x/y-axis) from which you want to obtain statistical data.

Table 5-22

Full Range (Fullscale)	Statistical data are obtained from all traces
Bandmarker (Bandmarker)	Statistical data are obtained from within bandmarker

To set up the bandmarker, refer to “Setting search range (Bandmarkers)” on page 126.

Displaying Statistical Data

- Step 1.** Press **Trace Next** or **Trace Max** to activate the trace for which you want to obtain statistical data.
- Step 2.** Press **Marker Fctn**.
- Step 3.** Specify the range (x/y-axis) from which you want to obtain statistical data. For more information, refer to “Specifying the Range for Statistical Data” on page 140.
- Step 4.** Set the **Analysis Type** to **Statistics**.

NOTE

Turning on the marker list displays statistics data in a list. To display the marker list, refer to “Listing all marker values in all displayed traces” on page 125.

Comparing Traces/Performing Data Math

Each of the traces for which measured data are displayed is provided with an additional trace, called a memory trace, that temporarily stores the measured data. You can use the memory trace to compare traces on the screen or to perform data math between the memory trace and measured data.

The following data math operations are available:

Table 5-23

Data / Memory	Divides measured data by the data in the memory trace; this function can be used to evaluate the ratio of two traces (e.g., evaluating gain or attenuation).
Data * Memory	Multiplies measured data by a memory trace
Data – Memory	Subtracts a memory trace from measured data.
Data + Memory	Adds measured data and data in the memory trace

Operational Procedure

- Step 1.** Press **Trace Next** or **Trace Max** to activate the trace that you want to save in the memory.
- Step 2.** Press **Trace/View**.
- Step 3.** Press **Data** → **Mem** to store the measured data in memory.
- Step 4.** Press **Data Math**.
- Step 5.** Select the data math operation to perform.

Table 5-24

Softkey	Function
OFF	Turns off data math functions (Do not perform data math)
Data / Mem	Divides measured data by the memory trace and stores result in the data trace
Data * Mem	Multiplies the data trace by the memory trace and stores result in the data trace
Data – Mem	Subtracts the memory trace from data trace and stores result in the data trace
Data + Mem	Add the data trace and memory trace and store the result in the data trace

- Step 6.** Press **Display Trace**.

Data Analysis and Result Output
Comparing Traces/Performing Data Math

Step 7. Select the type of data to display on the screen.

Table 5-25

Softkey	Function
Data	Displays only data trace on the screen
Mem	Displays only memory trace stored by Data → Mem operation on the screen
Data & Mem	Displays data trace and memory trace on the screen (You can now easily compare the data trace and memory trace on the screen.)
Off	Turns off display of the trace

Step 8. Apply the trigger to make measurements.

File Saving and Loading the Instrument Status Settings

You can save the state of the instrument as a file in a hard disk, floppy disk, etc. and recall the file for later use. You can choose one of the two options below for file saving.

Table 5-26 **Content to be Saved**

Type	Content to be saved and used
State Only (State Only)	You can save the E5052A's state settings* ¹ and recall them later to set up the instrument to the same state as previously used.
State and Data	You can save the E5052A's state settings* ¹ and trace (formatted data arrays and formatted memory arrays) and recall them later to set up the instrument to the same state as previously used. Here, the trace can also be recalled and displayed on the screen.

*1. For the content of saving, refer to Appendix C, "List of Default Values."

NOTE Irrespective of the selected measurement window, all of the state settings and settings/data are saved or recalled.

NOTE If an incompatible file is recalled, the settings will be preset due to error.

Compatibility of files related to saving and recalling

Table 5-27 **Compatibility of files**

		Recalling	
		Standard	Option 011
Saving	Standard	Yes	Yes* ¹
	Option 011	Yes	Y

*1. If files saved with the standard model contain data trace, "state & data", having not-allowed parameters such as start offset frequency down to 1 Hz, they cannot be recalled with the option 011. In case that files contain instrument settings only, "state only", which is not available for the option 011, that parameter is automatically set to the initial settings of the option 011.

Table 5-28 Parameters to be set to the initial values when recalling files saved with the incompatible values between the options

Parameter	Value saved with the standard model	Value will be changed when recalling with the option 011
Phase noise - Correlation	Other than 1	1
Phase noise - IF Gain	Other than 10 (dB)	10 (dB)
Phase noise -- Start offset frequency*1	“Analyzer mode”	“Tester mode”
Frequency & power - Trigger mode*2	1 (Hz)	10 (Hz)

*1. The phase noise trace data is not recalled AND warning message as “Incompatible recall file” is displayed, when files saved as “state & data” AND contain 1 Hz start off-set frequency.

*2. A warning message as “Incompatible recall file” is displayed.

Table 5-29 Compatibility between different firmware revisions

			Recalling			
			Newer revision		Older revision	
			Standard	Option 011	Standard	Option 011
Saving	Newer Revision	Standard	Yes	Yes*1	Yes*1	Yes*1
		Option 011	Yes	Yes	Yes*1	Yes*1
	Older Revision	Standard	Yes	Yes*1	Yes	Yes*1
		Option 011	Yes	Yes	Yes	Yes

*1. “Incompatible recall file” warning message may be displayed when files saved with older firmware revision is recalled with the newer one. In this case, the parameters which are incompatible with the older firmware revision are ignored when recalling.

Table 5-30 Content to be Saved

Type	Content to be saved and used
State Only (State Only)	You can save the E5052A’s state settings*1 and recall them later to set up the instrument to the same state as previously used.
State and Data	You can save the E5052A’s state settings*1 and trace (formatted data arrays and formatted memory arrays) and recall them later to set up the instrument to the same state as previously used. Here, the trace can also be recalled and displayed on the screen.

*1. For the content of saving, refer to Appendix C, “List of Default Values.”

Saving Procedure

Selecting Content To Be Saved

NOTE The following steps affect both file saving and memory saving of the instrument state.

- Step 1.** Press **Save/Recall**.
- Step 2.** Press **Save State**.
- Step 3.** Press **Save Type**.
- Step 4.** Press the softkey corresponding to the content of the instrument's state you want to save.

Table 5-31

Softkey	Function
State Only	Selects "State Only" to save only the state settings of the E5052A
State & Data	Selects "State and Data" to save the state settings and the trace of the E5052A

Data Analysis and Result Output

File Saving and Loading the Instrument Status Settings

Saving Data

Follow the steps below to save the internal data of the E5052A.

Step 1. Press **Save/Recall**.

Step 2. Press **Save State**.

Step 3. When you save the state using the defined file on drive F (State01.sta - State06.sta, Autorec.sta):

Press **State01 - State06** or **Autorec**.

NOTE Irrespective of the selected measurement window, all of the state settings and settings/data are saved.

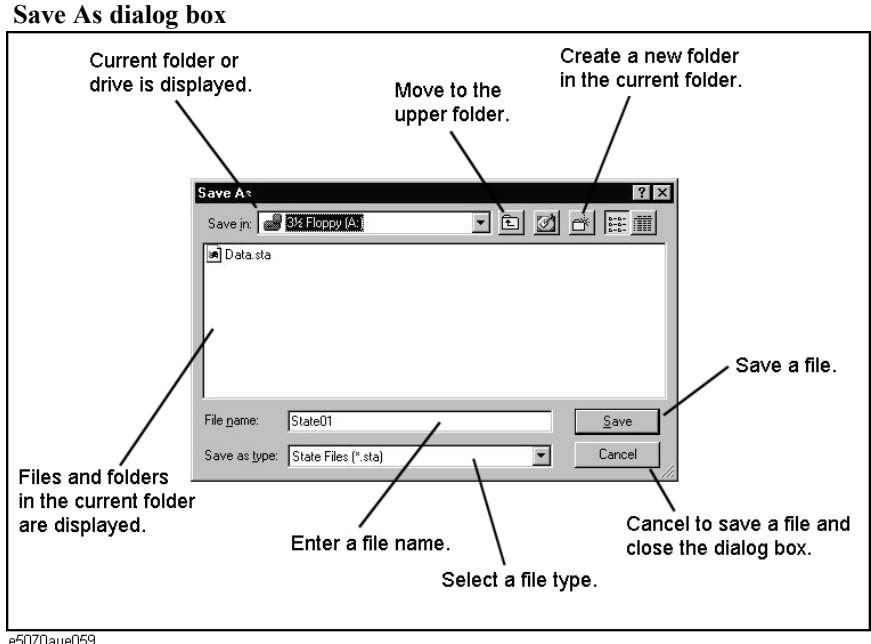
NOTE A:\Autorec.sta (floppy disk) and F:\Autorec.sta (F drive) can be recalled automatically whenever the E5052A is powered on. If both A:\Autorec.sta and F:\Autorec.sta exist, the former is called. To disable the auto recall function, remove Autorec.sta.

NOTE If the file already exists, the “*” mark will appear to the right of the softkey label. If you specified overwrite of the existing file, it will be copied with the name “backup.sta”, and then the original file will be overwritten.

When you save the state with any file name (including files on the floppy disk):

1. Press **File Dialog...** to open the dialog box. This operation should be done with the external keyboard and/or mouse. Figure 5-13 shows the user interface elements in the “Save As” dialog box.
2. Specify any folder, and enter the file name.
3. Press **Save**.

Figure 5-13



The E5052A provides the following drives to save/recall files. Select a drive in the **Save In** area of the dialog box (Figure 5-13).

Table 5-32

Drive name	Description
3.5" Floppy[A:]	Uses a floppy disk drive* ¹ for saving/recalling the file .
[F:]	Uses a hard disk (F) drive for saving/recalling the file.

*1. Use a 1.44-MB floppy disk formatted in DOS when you use the E5052A's built-in floppy disk drive.

NOTE Do not change any content (i.e. folders or files) in the drives other than A and F. Doing this may cause serious damage to the E5052A's functions and performance.

NOTE **Do not press the disk eject button while the floppy disk access lamp is on.** Trying to forcefully pull the floppy disk out while the lamp is on may damage the floppy disk or disk drive.

Recalling Procedure

NOTE In recalling the file in which the trace is saved (**State & Data** is specified for saving the content), the trigger sources are recalled and trigger mode is automatically set to 'HOLD'.

Step 1. Press **Save/Recall**.

Step 2. Press **Recall State**.

Step 3. When you recall State01.sta - State06.sta - Autorec.sta:

Press **State01 - State06** or **Autorec**.

When you recall any file:

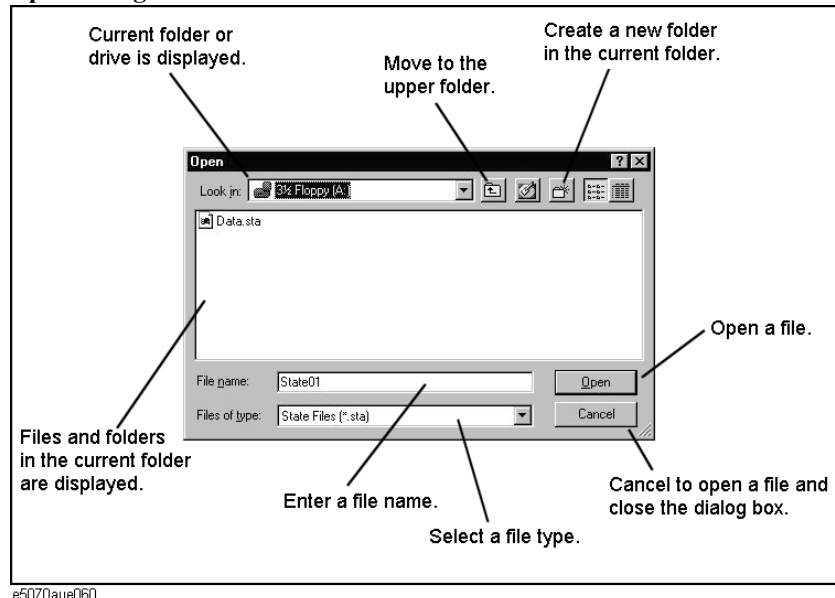
1. Press **File Dialog...** to open the Open dialog box. This operation should be conducted using the external keyboard and/or mouse. The Figure 5-14 shows the user interface elements on the "Open" dialog box.
2. Specify the folder that contains the file, and then select the file. Press **Open** to recall the saved internal data.

NOTE Irrespective of the selected measurement window, all of the state settings and settings/data are recalled.

NOTE **Do not press the disk eject button while the floppy disk access lamp is on.** Trying to forcefully pull the floppy disk out while the lamp is on may damage the floppy disk or disk drive.

Figure 5-14

Open dialog box

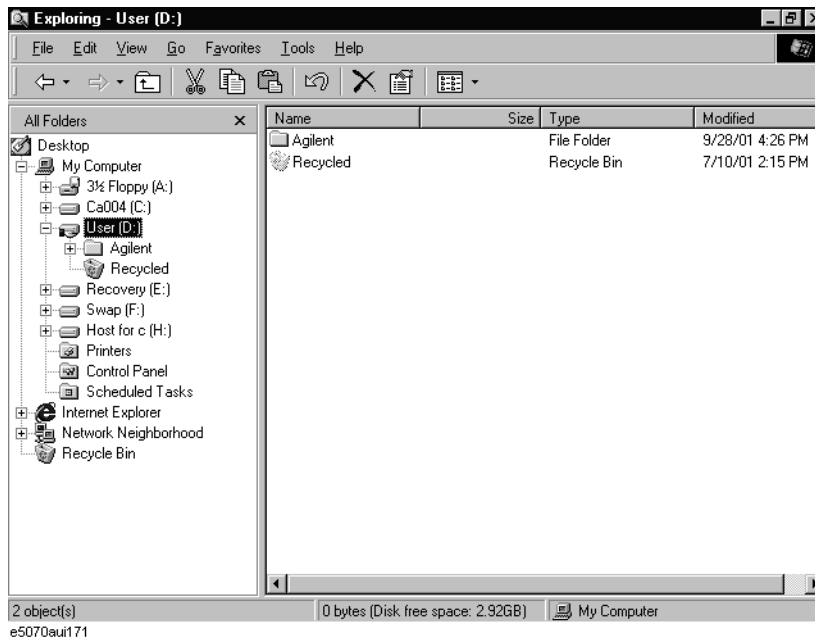


Managing Files/Folders

You can manage the files and folders by using Windows® Explorer, which provides such standard operations as copy, move, remove, change name, and format floppy disk.

Figure 5-15

Windows Explorer



CAUTION

Do not change any content (i.e. folders or files) of the drives other than A and F: This may cause serious damage to the E5052A's functions and performance.

Running Windows Explorer

- Step 1. Press **Save/Recall**.
- Step 2. Press **Explorer...** to open Windows Explorer.

Copying Files/Folders

- Step 1. In Windows Explorer, select any source file or folder for copying.
- Step 2. On the menu bar, select **Edit - Copy**.
- Step 3. Open the target folder for copying.
- Step 4. On the menu bar, select **Edit - Paste**.

Moving Files/Folders

- Step 1. In Windows Explorer, select the file or folder of origin.

Data Analysis and Result Output

Managing Files/Folders

Step 2. On the menu bar, select **Edit - Cut**.

Step 3. Open the destination folder.

Step 4. On the menu bar, select **Edit - Paste**.

Removing Files/Folders

Step 1. In Windows Explorer, select the file or folder to be removed.

Step 2. On the menu bar, select **File - Delete**.

Changing the Name of File/Folder

Step 1. In Windows Explorer, select the file or folder for which you want to change name.

Step 2. On the menu bar, select **File - Rename**.

Step 3. Type the new name for the file or folder and then press on the keyboard.

Formatting the Floppy Disk

NOTE

Formatting the disk removes all of the files and folders currently on it.

Step 1. Insert the floppy disk you want to format into the floppy disk drive of the E5052A.

Step 2. Right-click the mouse on the A: drive in Windows Explorer.

Step 3. Select **Format...** from the shortcut menu that appears.

Step 4. Follow the instructions in the dialog box to format the floppy disk.

Saving a Trace on a File

Saving Trace Data on a File

You can save the trace data of the E5052A's active trace in the CSV format (with the extension of ".csv") to recall them for later use on the PC application software.

The trace data are saved in the following format:

Example 5-1

Example of saved trace data (phase noise measurement)

```
Offset Frequency (Hz),Phase Noise (dBc/Hz)
+1.0000000000e+002,-6.11082572643e+001
+1.01800975118e+002,-6.14881381403e+001
+1.03634385350e+002,-5.77826152313e+001
+1.05500814844e+002,-5.81658293608e+001
```

The first line is a header indicating the trace data items that are output from the second line onward.

From the second line, the trace data are output at an amount equivalent to the number of frequency points.

Operational Procedure

Follow the steps below to save the trace data of the E5052A.

- Step 1.** Press **Trace Next** or **Trace Max** to activate the trace on which you want to save the trace data.
- Step 2.** Press **Save/Recall** to open the Save/Recall menu.
- Step 3.** Press **Save Data Trace** to open the "Save As" dialog box. This operation should be conducted using the external keyboard and/or mouse. For information on the Save As dialog box, refer to the description of Figure 5-13, "Save As dialog box," on page 147. Here, the CSV Files (with the extension of *.csv) are selected for the file type.
- Step 4.** Specify the destination folder for saving, enter file name, and then press **Save** to save the file.

NOTE You cannot recall the trace data while using the Save Data/Memory Trace menu.

NOTE **Do not press the disk eject button while the floppy disk access lamp is on.** Trying to forcefully pull the floppy disk out while the lamp is on may damage the floppy disk or disk drive.

Saving Trace Memory

You can save the trace memory of the E5052A's active trace in the CSV format (with the extension of ".csv") to recall them for later use on the PC application software.

The trace memory is saved in the following format:

Example 5-2

Example of saved trace memory (phase noise measurement)

```
Offset Frequency (Hz),Phase Noise (dBc/Hz)
+1.00000000000e+002,-6.11082572643e+001
+1.01800975118e+002,-6.14881381403e+001
+1.03634385350e+002,-5.77826152313e+001
+1.05500814844e+002,-5.81658293608e+001
```

The first line is a header indicating the trace memory items that are output from the second line onward.

From the second line, the trace memory is output at an amount equivalent to the number of frequency points.

Operational Procedure

Follow the steps below to save the trace memory of the E5052A.

- Step 1.** Press **Trace Next** or **Trace Max** to activate the trace on which you want to save the trace memory.
- Step 2.** Press **Save/Recall** to open the Save/Recall menu.
- Step 3.** Press **Save Memory Trace** to open the "Save As" dialog box. This operation should be done with the external keyboard and/or mouse. For information on the Save As dialog box, refer to the description of Figure 5-13, "Save As dialog box," on page 147. Here, the CSV Files (with the extension of *.csv) are selected for the file type.
- Step 4.** Specify the destination folder for saving, enter the file name, and then press **Save** to save the file.

NOTE You cannot recall the trace memory while using the Save Data/Memory Trace menu.

NOTE **Do not press the disk eject button while the floppy disk access lamp is on.** Trying to forcefully pull the floppy disk out while the lamp is on may damage the floppy disk or disk drive.

Saving Display Screen

You can save the E5052A’s screen image on a file in the bitmap or PNG format. The saved file can be recalled for later use with PC application software.

Operational Procedure

Follow the steps below to save the screen image on a file.

- Step 1.** Display the screen that you want to save on a file.
- Step 2.** Press **System** to display the system menu. Use the following softkey from the System menu.

Table 5-33

Softkey	Function
Dump Screen Image	Saves the screen information on a file

NOTE

The image displayed on the screen just before pressing **System** is saved in the file. For more information, refer to “Images you can print/save” on page 155.

- Step 3.** Press **Dump Screen Image** to open the “Save As” dialog box. For information on the Save As dialog box, refer to the description for Figure 5-13, “Save As dialog box,” on page 147. In this case, either Bitmap Files (with the extension of *.bmp) or Portable Network Graphics (with the extension of *.png) is selected as the file type.
- Step 4.** Select the file type.
- Step 5.** Specify the folder in which you want to save the file and enter the file name. Press **Save** to save the screen image of the E5052A in a file.

Printing Screen Image

Connect your printer to the E5052A's printer parallel port on the rear panel or to the USB port to print screen images from the E5052A.

Supported printers

Table 5-34 shows the types, printer drivers, and ports for the printers you can use with the E5052A.

For the latest information on the E5052A's supported printers, contact Agilent Technologies. For inquiries, see the Customer Contact list at the end of this manual.

Table 5-34 **Supported Printers (as of July 2004)**



Manufacturer	Model	Applicable Printer Driver ^{*1}	Available Ports
Hewlett-Packard	DeskJet 5650	HP Deskjet 5650	Printer parallel port and USB port

*1. You can use the factory-installed drivers on the E5052A. You must install the driver on the E5052A to use newly supported printers after you have purchased the E5052A. For the install steps, refer to "Installing the printer driver" on page 157.

Images you can print/save

You can print/save the images that are stored in the clipboard. However, unless images are stored on the clipboard, the current screen image will be printed/saved.

Storing Images in Clipboard

The  key provides a screen capture function as well. In other words, the image displayed on the screen just before pressing  is saved on the clipboard.

NOTE The images stored on the clipboard are cleared after executing print/save operations.


Printing procedure

Preparing the Printing

Follow the steps below to prepare for printing.

- Step 1.** Power off the E5052A.
- Step 2.** Power on the printer and then connect it to the E5052A.

NOTE Do not connect unsupported printers to the E5052A.


- Step 3.** Power on the E5052A.
- Step 4.** Press .
- Step 5.** Press **Printer Setup** to open the “Printers” window. Select the printer you want to use and set it up by referring to the instruction manual for the printer.
- Step 6.** The Printers window will close.

Data Analysis and Result Output

Printing Screen Image

Printing

Follow the steps below to print the screen image.

- Step 1.** Display the screen that you want to print out.
- Step 2.** Press  to save the current screen image on the clipboard.
- Step 3.** As required, press **Invert Image** to toggle the selection of printing either in the displays's actual colors or in the image's inversed colors. (This can save much ink by, for example, printing with a white rather than black background.)
- Step 4.** Press **Print** to start printing.

Pressing **Abort Printing** during the printing operation stops the printing.

NOTE

If you start printing before the printer is ready (e.g. not powered on yet), the Printers Folder dialog box may be displayed as shown in Figure 5-16. In this case, press **Cancel** to close the Printers Folder dialog box and retry the operation after the printer is ready.

Figure 5-16

Printers Folder dialog box



Installing the printer driver

You must install the appropriate driver on the E5052A to use newly supported printers after you have purchased the E5052A.

Obtain a driver that is dedicated to the E5052A prepared by the Agilent Technologies. You can download printer drivers from the Agilent Technologies product promotion web site.

For information on obtaining printer drivers, contact Agilent Technologies. For inquiries, see the Customer Contact list at the end of this manual or go to the online assistance homepage at “<http://www.agilent.com/find/assist>”.

To install drivers, refer to the instructions supplied with the drivers.

6 Setting and Using the Control and Management Functions

This chapter explains how to set and use the control and management functions that are not directly linked with measurement or analysis.

Setting the GPIB

This section describes how to set the interface necessary to use the GPIB (General Purpose Interface Bus) of the E5052A. For information on the concept and concrete implementation of auto measurement using GPIB, refer to the *Programmers Guide*.

Setting talker/listener GPIB address of E5052A

When controlling the E5052A using GPIB commands from an external controller connected to the GPIB connector, you need to set the talker/listener GPIB address of the E5052A.

Follow these steps to make this setting:

- Step 1.** Press **System**.
- Step 2.** Press **Misc Setup**.
- Step 3.** Press **GPIB Setup**.
- Step 4.** Press **Talker/Listener Address**.
- Step 5.** Enter the address using the ENTRY block keys on the front panel.

Setting system controller (USB/GPIB interface)

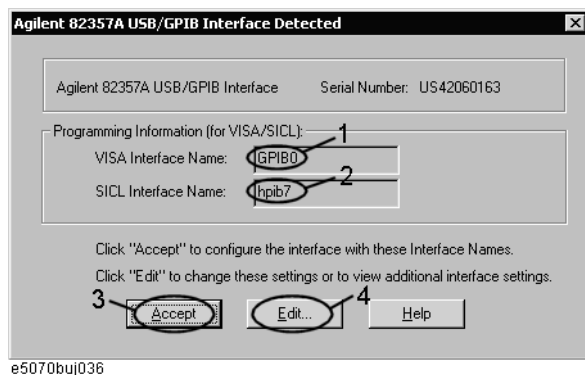
When controlling an external device from the E5052A, connect the USB port of the E5052A and the GPIB port of the external device through the USB/GPIB interface.

Follow these steps to set the USB/GPIB interface:

- Step 1.** Connect the USB port of the E5052A to the USB/GPIB interface. The USB/GPIB Interface Detected dialog box (Figure 6-1) appears.

NOTE Do not connect two or more USB/GPIB interfaces.

Figure 6-1 USB/GPIB Interface Detected dialog box

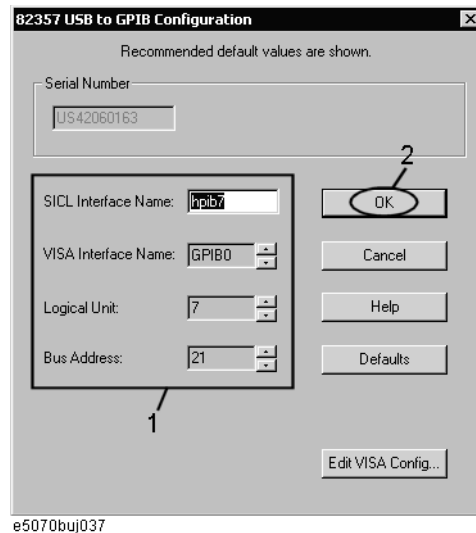


- Step 2.** Confirm that VISA Interface Name is set to GPIB0 (1 in Figure 6-1) and that the SICL

Interface Name is set to hplib7 (2 in Figure 6-1) and then click the **Accept** button (3 in Figure 6-1). If the setting is correct, the procedure is complete. If the setting is different, click the **Edit** button (4 in Figure 6-1).

- Step 3.** The USB to GPIB Configuration dialog box (Figure 6-2) appears. Make the settings as shown in the thick-lined box (1 in Figure 6-2) and then click the **OK** button (2 in Figure 6-2).

Figure 6-2 USB to GPIB Configuration dialog box



If you need to check/change the settings of the USB/GPIB interface after connecting the USB/GPIB interface, follow these steps:

- Step 1.** Press **System**.
- Step 2.** Press **Misc Setup**.
- Step 3.** Press **GPIB Setup**.
- Step 4.** Press **System Controller Configuration**.
- Step 5.** The IO Config dialog box (Figure 6-3) appears. Select (highlight) **GPIB0 hplib7** (1 in Figure 6-3) and then click the **Edit** button (2 in Figure 6-3).

NOTE

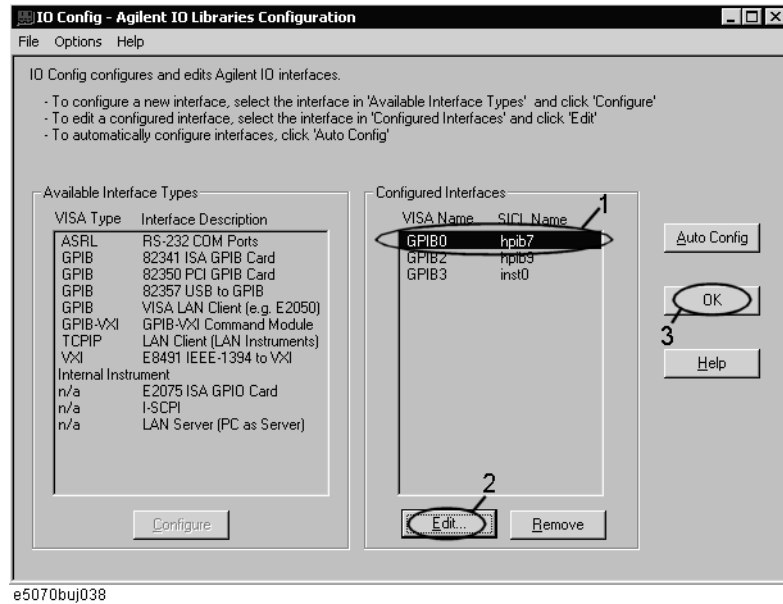
In the IO Config dialog box, do not click buttons other than those specified here and do not change any other settings because doing so may cause serious damage to the functions of the E5052A.

Setting and Using the Control and Management Functions

Setting the GPIB

Figure 6-3

IO Config dialog box



- Step 6.** The USB to GPIB Configuration dialog box (Figure 6-2) appears. Check/change the setting of the USB/GPIB interface and then click the **OK** button (2 in Figure 6-2).
- Step 7.** In the USB to GPIB Configuration dialog box, click the **OK** button (3 in Figure 6-3).

Setting the Mouse

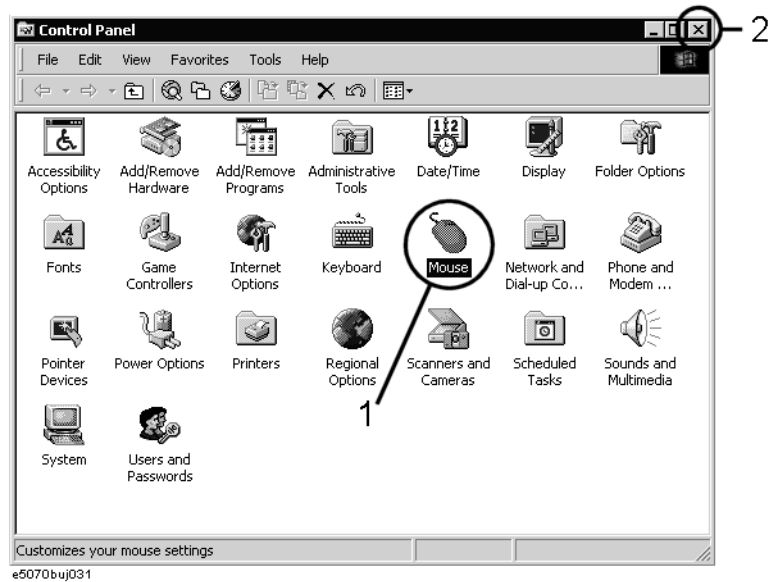
The user can change the setup for the mouse connected to the E5052A and the movement of the pointer.

Setup steps

NOTE Be sure to use a mouse and a keyboard for mouse setup operations.

- Step 1. Press **System**.
- Step 2. Press **Misc Setup**.
- Step 3. Press **Control Panel** to open the Control Panel window.

Figure 6-4 Control Panel window



- Step 4. Double-click the **Mouse** icon (1 in Figure 6-4) in the Control Panel window.

NOTE Do not click icons other than those specified here and do not change other settings because doing so may cause serious damage to the functions of the E5052A.

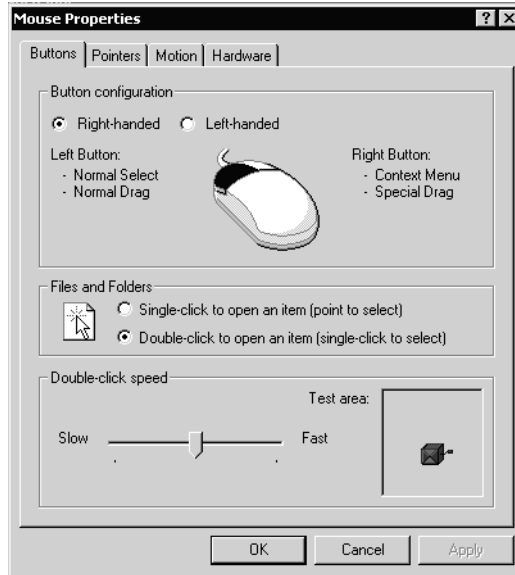
Setting and Using the Control and Management Functions

Setting the Mouse

Step 5. The Mouse Properties dialog box (Figure 6-5) is displayed.

Define the setup for a right-handed/left-handed person in the **Buttons configuration** area. Define the setup for double-click speed in the **Double-click speed** area.

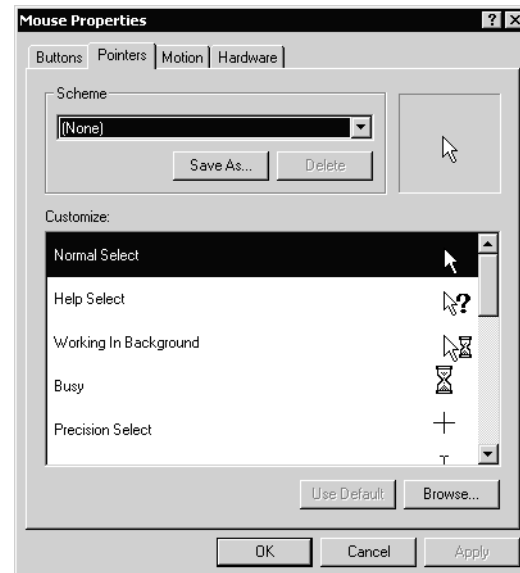
Figure 6-5 Mouse Properties Dialog Box (Buttons tab)



e5070buj028

Step 6. Click the **Pointers** tab (Figure 6-6).

Figure 6-6 Mouse Properties dialog box (Pointers tab)



e5070buj029

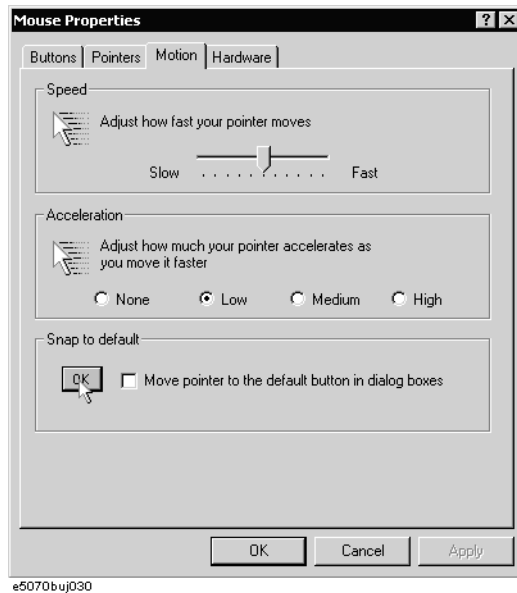
Step 7. Enter a registration name into the **Scheme** box and specify the shapes of pointers for the registration name in the box below.

To create a registration name, click the **Save As...** button. Enter the registration name into the **Save Scheme** dialog box that appears, and click the **OK** button.

Step 8. Click the **Motion** tab (Figure 6-7).

Figure 6-7

Mouse Properties Dialog Box (Motion tab)



Step 9. Specify the pointer speed in the **Pointer speed** area and the pointer trail in the **Pointer trail** area.

Step 10. Click the **OK** button.

Step 11. Click the × button (2 in Figure 6-4) at the corner of the Control Panel window to close the window.

Configuring the Network

NOTE

When you use the E5052A by connecting it to your LAN, consult your network administrator in order to make the LAN settings correctly.

This section describes how to set the following basic items necessary to connect the E5052A to a LAN (Local Area Network).

- ❑ “Enabling/disabling network” on page 166
- ❑ “Setting IP address” on page 167
- ❑ “Specifying computer name” on page 169

If you need detailed network settings, consult your network administrator and perform operations in the same way as for a PC using Windows 2000®.

Enabling/disabling network

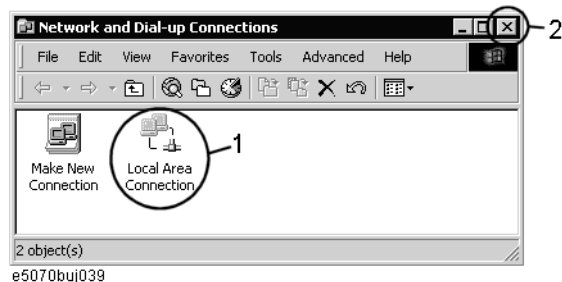
You can enable/disable the network connection function of the E5052A.

Follow these steps to enable/disable the network connection function.

- Step 1.** Use the LAN cable to connect the E5052A to the LAN.
- Step 2.** Press **[System]**.
- Step 3.** Press **Misc Setup**.
- Step 4.** Press **Network Setup**.
- Step 5.** Press **Network Configuration** to open the Network and Dial-up Connections window (Figure 6-8).

Figure 6-8

Network and Dial-up Connections window



Step 6. When switching from disable to enable:

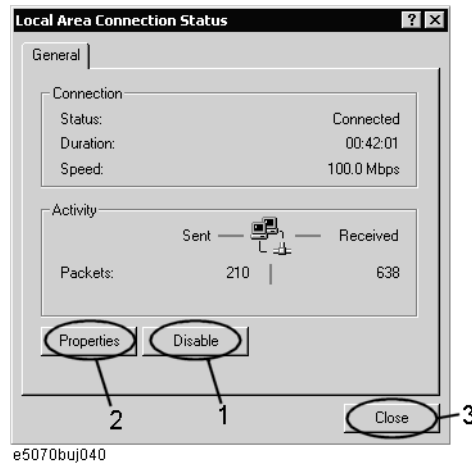
Double-click the Local Area Connection icon (1 in Figure 6-8) in the Network and Dial-up connections window to enable the network connection function.

When switching from enable to disable:

Double-click the Local Area Connection icon (1 in Figure 6-8) in the Network and Dial-up Connections window. The Local Area Connection Status dialog box (Figure 6-9) appears. Click the **Disable** button (1 in Figure 6-9) to disable the network connection function.

Figure 6-9

Local Area Connection Status dialog box



Step 7. Click the × button (2 in Figure 6-8) at the upper right of the Network and Dial-up Connections window to close the window.

Setting IP address

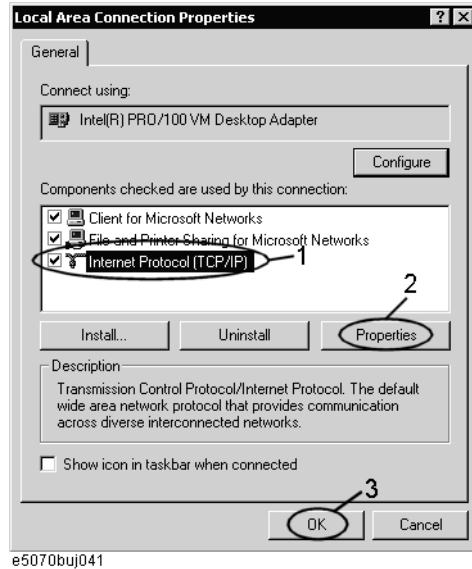
Follow these steps to set the IP address:

- Step 1.** Press **System**.
- Step 2.** Press **Misc Setup**.
- Step 3.** Press **Network Setup**.
- Step 4.** Press **Network Configuration**.
- Step 5.** Double-click the Local Area Connection icon (1 in Figure 6-8) in the Network and Dial-up Connections window. The Local Area Connection Status dialog box (Figure 6-9) appears. Click the **Properties** button (2 in Figure 6-9).

Setting and Using the Control and Management Functions Configuring the Network

Step 6. The Local Area Connection Properties dialog box (Figure 6-10) appears. Select (highlight) **Internet Protocol (TCP/IP)** (1 in Figure 6-10) and then click the **Properties** button (2 in Figure 6-10).

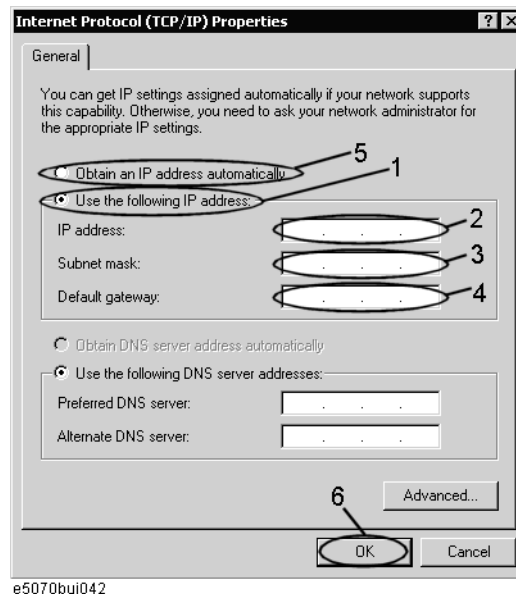
Figure 6-10 Local Area Connection Properties dialog box



Step 7. The Internet Protocol (TCP/IP) Properties dialog box (Figure 6-11) appears. Click (select) **Use the following IP address** (1 in Figure 6-11) and then enter the IP address (2 in Figure 6-11), the subnet mask (3 in Figure 6-11), and the gateway address (4 in Figure 6-11).

If the IP address can be obtained automatically (if a DHCP server can be used), click (select) **Obtain an IP address automatically** (5 in Figure 6-11).

Figure 6-11 Internet Protocol (TCP/IP) Properties dialog box



- Step 8.** In the Internet Protocol (TCP/IP) Properties dialog box, click the **OK** button (6 in Figure 6-11).
- Step 9.** In the Local Area Connection Properties dialog box, click the **OK** button (3 in Figure 6-10).
- Step 10.** In the Local Area Connection Status dialog box, click the **Close** button (3 in Figure 6-9).
- Step 11.** Click the **×** button (2 in Figure 6-8) at the upper right of the Network and Dial-up Connections window to close the window.

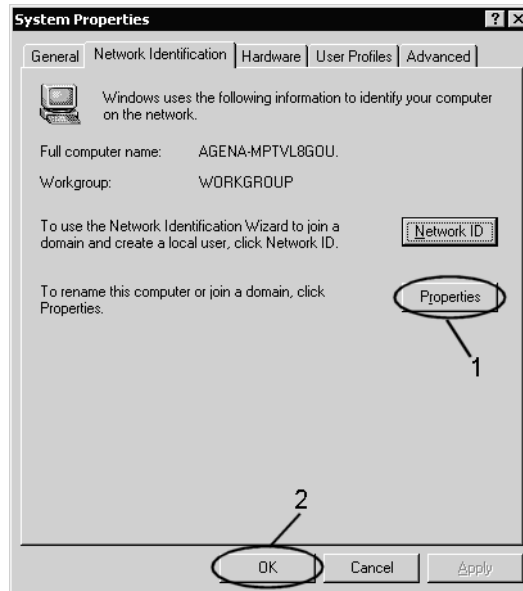
Specifying computer name

Follow these steps to specify the computer name:

- Step 1.** Press **System**.
- Step 2.** Press **Misc Setup**.
- Step 3.** Press **Network Setup**.
- Step 4.** Press **Network Identification**.
- Step 5.** The System Properties dialog box (Figure 6-12) appears. Click the **Properties** button (1 in Figure 6-12).

Figure 6-12

System Properties dialog box



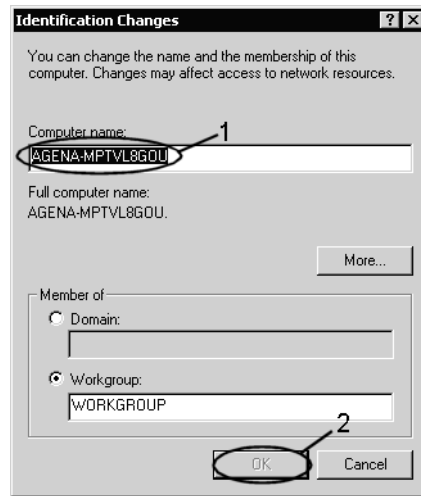
e5070buj043

Setting and Using the Control and Management Functions Configuring the Network

- Step 6.** The Identification Changes dialog box (Figure 6-13) appears. Enter the computer name in the **Computer Name** box (1 in Figure 6-13).

Figure 6-13

Identification Changes dialog box

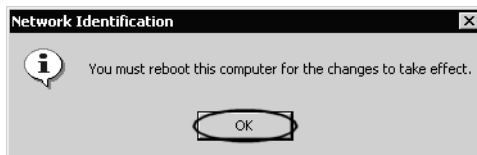


e5070buj044

- Step 7.** The Network Identification dialog box (Figure 6-14) appears. Click the **OK** button.

Figure 6-14

Network Identification dialog box



e5070buj045

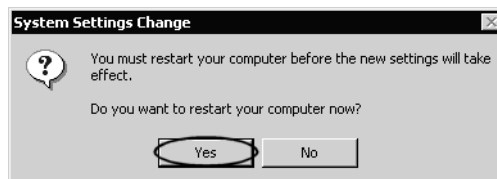
- Step 8.** In the Identification Changes dialog box, click the **OK** button (2 in Figure 6-13).

- Step 9.** In the System Properties dialog box, click the **OK** button (2 in Figure 6-12).

- Step 10.** The System Settings Change dialog box (Figure 6-15) appears. Click the **Yes** button to restart the E5052A.

Figure 6-15

System Settings Change dialog box



e5070buj046

NOTE

The changed settings do not take effect until the E5052A is restarted.

Accessing Hard Disk of E5052A from External PC

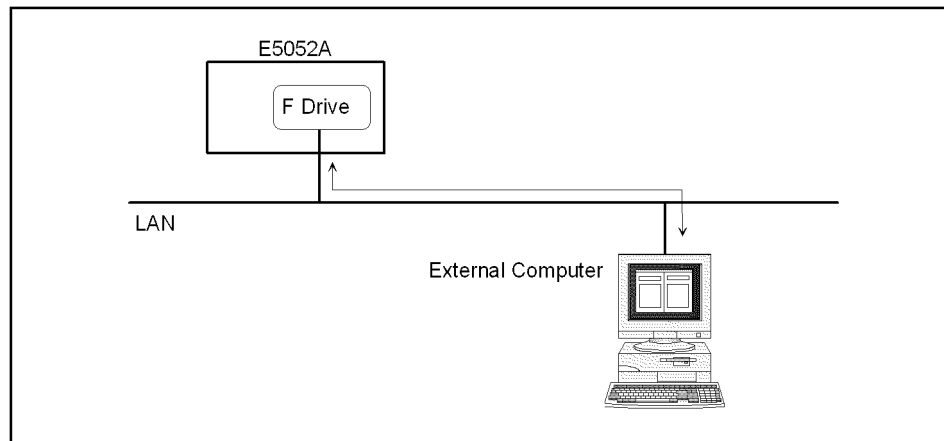
If you connect the E5052A to a LAN, you can access the hard disk (F drive) in the E5052A as a network drive from an external PC connected to the same LAN.

NOTE

See “Connecting Hard Disk (Shared Folder) of External PC” in Chapter 6, “Application Programs” in *VBA Programmer’s Guide* for information on accessing the hard disk of the external PC connected to the same LAN from the E5052A.

Figure 6-16

Accessing drive F of E5052A from external PC



e5052aue014

Enabling access from an external PC

This section shows the simplest procedure to enable access from an external PC.

NOTE

It is recommended that you use settings with relatively high security; please consult your network administrator.

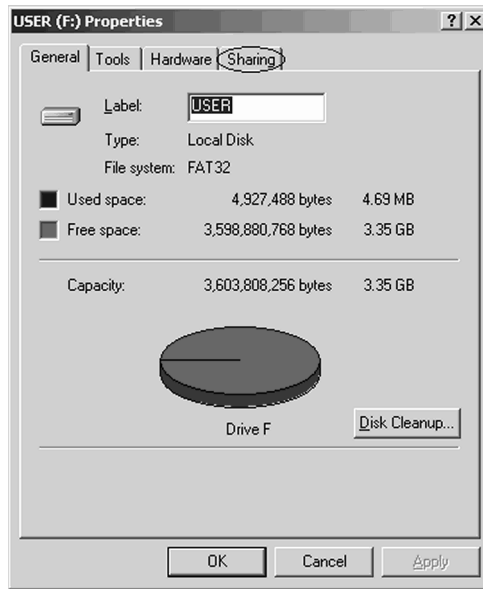
- Step 1.** Press **[Save/Recall]**.
- Step 2.** Press **Explorer...**
- Step 3.** Windows Explorer (Refer to the Figure 5-15 on page 149) opens. Select (highlight) **USER (F:)** and then click **Properties** in the File menu.

Setting and Using the Control and Management Functions
Accessing Hard Disk of E5052A from External PC

Step 4. The USERS(F:) Properties dialog box (Figure 6-17) appears. Select the **Sharing** tab.

Figure 6-17

USERS(F:) Properties dialog box (General tab)

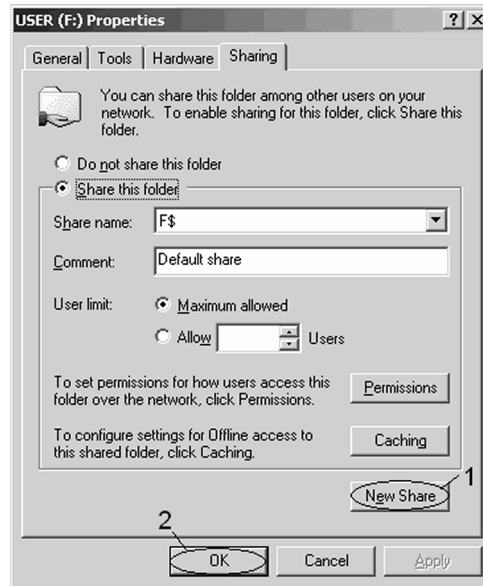


e5052auj047

Step 5. Click the **New Share** button (1 in Figure 6-18).

Figure 6-18

USERS(F:) Properties dialog box (Sharing tab)

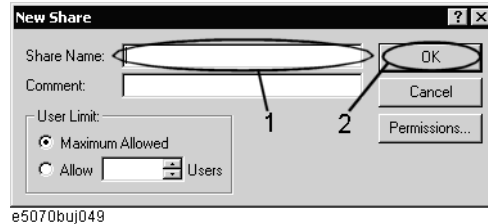


e5052auj048

- Step 6.** The New Share dialog box (Figure 6-19) appears. Enter the share name (name used when accessed from the external PC) in the **Share Name** box (1 in Figure 6-19) and click the **OK** button (2 in Figure 6-19).

Figure 6-19

New Share dialog box



- Step 7.** In the USERS(F:) Properties dialog box, click the **OK** button (2 in Figure 6-18).

Accessing hard disk of E5052A from external PC

This section explains the procedure for accessing the hard disk (F drive) in the E5052A from the external PC, which has been made possible by first following the procedure described in “Enabling access from an external PC” on page 171. In our example below, we use Windows NT ®.

NOTE

For information on network connections, see your PC’s operation manual.

- Step 1.** From the Start menu, click Programs - Windows Explorer to start Explorer.
- Step 2.** From Explorer's menu, click **Tools - Map Network Drive...**
- Step 3.** The Map Network Drive dialog box appears. Select an appropriate drive, enter **\\C_NAME\S_NAME** as the network path, and then click the **OK** button.
- C_NAME** in the network path is the computer name of the E5052A, and **S_NAME** is the share name of the F drive. For information on how to set the computer name, refer to “Specifying computer name” on page 169; for information on how to set the share name, refer to “Enabling access from an external PC” on page 171.
- Step 4.** The dialog box used to enter the user name and the password appears. Enter an appropriate user name and password and then click the **OK** button.

The user name and password differ depending on the setting made when enabling access from the external PC. When you have set them according to “Enabling access from an external PC” on page 171, you can make connection using the user name, **E5052**, without the password.

Locking the Front Keys, Keyboard, and Mouse (Touch Screen)

You can lock (disable) the front keys, keyboard, and mouse (touch screen). This feature prevents erroneous operation caused by inadvertently touching any of these devices.

Locking the front keys, keyboard, and mouse

- Step 1.** Press **System**.
- Step 2.** Press **Misc Setup**.
- Step 3.** Press **Key Lock**.
- Step 4.** Press the corresponding key to switch the lock on/off.

Softkey	Function
Front Panel & Keyboard Lock	Switches the lock for the front panel keys and keyboard on/off.
Touch Screen & Mouse Lock	Switches the lock for the touch screen and mouse on/off.

NOTE

You cannot use a locked device to unlock that same device. To unlock the front panel keys, keyboard, touch screen and mouse when they have all been locked, press the Standby switch to turn off the power supply and then turn it on again. When setting at power-on, the front panel keys, keyboard, touch screen and mouse are all in an unlocked state.

Setting the Beeper (Built-in Speaker)

The E5052A has a built-in speaker that sounds a beep tone. The beeper allows you to make the two types of settings shown in Table 6-1.

Table 6-1

Beeper functions

Type	Function
Operation complete beeper	<p>Sounds a beep tone to inform the user that operations have completed.</p> <ul style="list-style-type: none"> • When calibration data measurements are done • When saving/recalling has completed
Warning beeper	<p>Sounds a beep tone to alert the user of a problem.</p> <ul style="list-style-type: none"> • When an instrument error occurs (an error message appears at the same time)

The warning beeper sounds slightly longer than the operation complete beeper.

Setting the Operation Complete Beeper

- Step 1.** Press **System**.
- Step 2.** Press **Misc Setup**.
- Step 3.** Press **Beeper**.
- Step 4.** Press **Beep Complete** to switch the operation complete beeper on/off.

Pressing **Test Beep Complete** allows you to hear and check the beep tone of the operation complete beeper.

Setting the Warning Beeper

- Step 1.** Press **System**.
- Step 2.** Press **Misc Setup**.
- Step 3.** Press **Beeper**.
- Step 4.** Press **Beep Warning** to switch the warning beeper on/off.

Pressing **Test Beep Warning** allows you to hear and check the beep tone of the warning beeper.

Turning off the LCD Screen Backlight

You can switch off the backlight (illumination) of the E5052A's LCD screen. This extends the life of the backlight when using it continuously over a long period.

Turning off the LCD Screen Backlight

Step 1. Press **System**.

Step 2. Press **Backlight** to switch the backlight on/off.

Switching off the backlight causes indications on the LCD screen to be almost invisible.

A backlight that has been switched off can be turned on again by pressing **Preset**. When the LCD backlight is off, **Preset** works as a key for switching the backlight back on.

Checking the Product Information

Checking the serial number

The serial number of the E5052A can be checked by using the following procedure.

Step 1. Press **System**.

Step 2. Press **Product Information**.

The Product Information dialog box appears.

Step 3. Press **OK** to close the dialog box.

Checking the firmware revision

The revision number of the firmware installed in the E5052A can be checked by using the following procedure.

Step 1. Press **System**.

Step 2. Press **Product Information**.

The Product Information dialog box appears.

Step 3. Press **OK** to close the dialog box.

Checking the option number

The option number of the E5052A can be checked by using the following procedure.

Step 1. Press **System**.

Step 2. Press **Product Information**.

The Product Information dialog box appears.

Step 3. Press **OK** to close the dialog box.

7

Information on Maintenance

This chapter explains the measures you should take to maintain the Agilent E5052A.

Backing Up the Data

Be sure to regularly back up your important data (including program) files in this instrument to a CD-R or other backup medium. Agilent Technologies shall not be liable for any data damages caused by troubles of this instrument.

Making backup files

Making backup files on a floppy disk

You can make backup files on a floppy disk by using the copy function. See “Managing Files/Folders” on page 149 for making a copy.

Making backup files on the hard disk of an external PC

You can make backup files on the hard disk of an external PC by using the following methods.

- You can access drive F: of the E5052A from an external PC via LAN and copy your important data files on drive F: to the external PC. See “Accessing Hard Disk of E5052A from External PC” on page 171 for details.
- You can transfer your important data files on drive F: of the E5052A to an external PC using the :MMEM:TRAN command via GPIB. See *Programmer's Guide* for details.

NOTE

Do not modify any files or folders in drives other than drive A: and drive F:. Doing so will cause malfunctions.

System Recovery

By executing system recovery, you can return the system of the E5052A (the Windows operating system and the firmware) to the factory state (at the time of purchase^{*1}).

Notes on executing system recovery

Executing system recovery results in the following:

- In addition to the Windows operating system and the firmware, the following settings of the E5052A are returned to the factory state.
 - Network setting
 - GPIB setting
 - Printer setting
- The driver for the supported printer installed after purchase is deleted.
- You need to execute initial registration again.

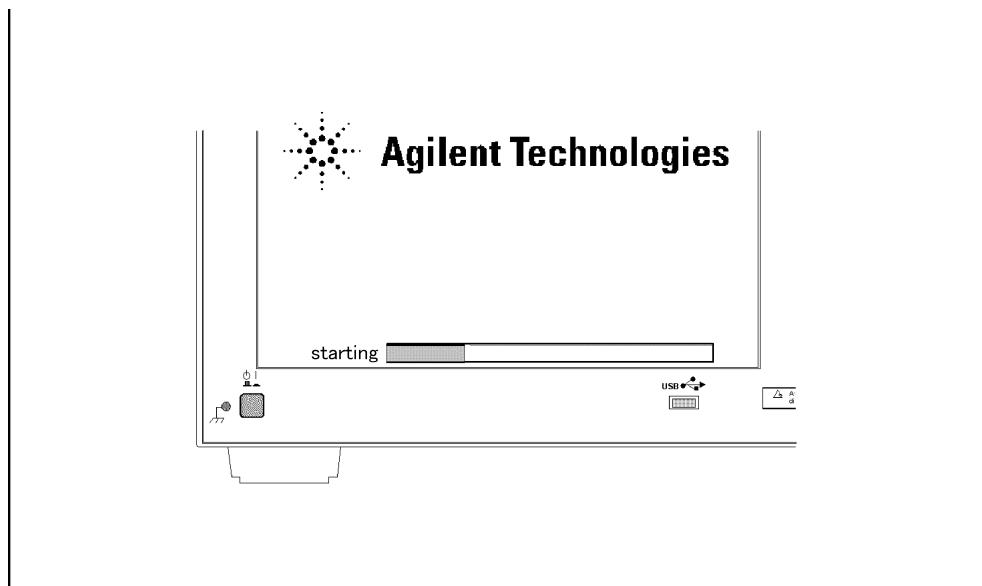
Files you created using the save function (files in the F drive) are not affected, but we recommend backing them up before executing system recovery as a prudent precaution. For more information on backup, refer to “Making backup files” on page 180.

^{*1}. If the hard disk failed and has been replaced after purchase, the state when the replacement was performed is recovered.

Procedure To Execute System Recovery

NOTE You need to use the keyboard for this operation.

- Step 1.** Shut down the E5052A.
- Step 2.** Connect the keyboard to the E5052A.
- Step 3.** Insert the system recovery disk into the floppy disk drive of the E5052A.
- Step 4.** Press the standby switch of the E5052A to turn it on.
- Step 5.** When the screen shown in the figure below appears, press and hold **Esc** on the keyboard until this screen disappears.

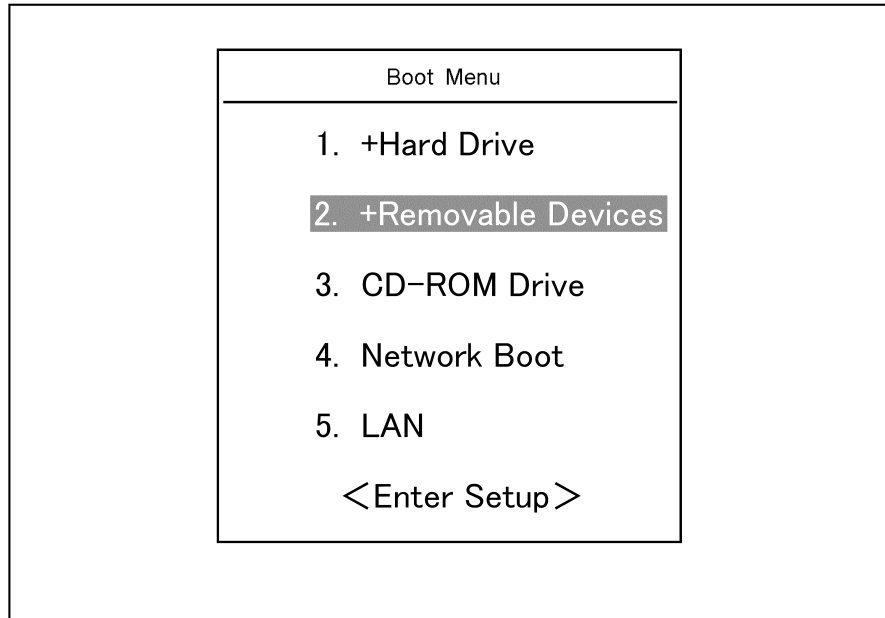


e5061buj034

NOTE After several seconds, the Windows startup screen appears automatically even if you do not press any key, so be sure to execute Step 5 in a timely manner to avoid having to repeat the entire procedure.

If the above message does not appear, the instrument is faulty; contact your local Agilent Customer Center listed at the end of this manual or a distributor.

Step 6. The following screen appears. Select “+Removable Devices” with of the keyboard, and press of the keyboard.



Step 7. The message shown below appears. Press on the keyboard. If you want to cancel the system recovery, press at this point.

```

Agilent Technologies System Utilities
Recovery & Backup Options for the E5052A

```

Choose One of the following:

-
- ```

 1. Recover Factory Backup Image
 2. Exit

```
- 

Enter a Choice: \_

---

**NOTE**

If the above message does not appear, the instrument or the system recovery disk is faulty; contact your local Agilent Customer Center listed at the end of this manual or a distributor.

## Information on Maintenance

### System Recovery

- Step 8.** The message shown below appears. Press **C** on the keyboard. If you want to cancel the system recovery, press **E** at this point.

You chose to Restore your system by installing the original factory installed OS and system software.

WARNING: Press C to Continue only if you are sure that you want to proceed. The C: Drive will be completely overwritten with no chance of recovering any data. Use Option 1 to recover the system from a serious malfunction caused by corrupted or inadvertently deleted files on the system's primary C: partition.

Press C to Continue or E to Exit: \_

- Step 9.** The message shown below appears. Press **C** on the keyboard to start the system recovery. If you want to cancel the system recovery, press **E** at this point.

CAUTION! Interrupting this process may leave the system in an unstable state. Allow the software to complete the backup and recovery process. This may take up to 20 minutes depending on the system configuration.

Press C to Continue or E to Exit: \_

---

#### CAUTION

**Never turn off the power during system recovery: This may cause serious damage to the E5052A.**

- Step 10.** The system recovery will be completed in about 5 minutes. When the system recovery is complete, the message shown below appears. Press **Ctrl**, **Alt**, and **Delete** on the keyboard at the same time to restart.

Remove the disk and Press CLT+ALT+DEL to restart your system.

---

#### NOTE

If the above message does not appear, the instrument is faulty; contact your local Agilent Customer Center listed at the end of this manual or a distributor.

- Step 11.** After restart, the screen for initial registration appears. Execute initial registration. For information on the execution procedure, refer to “Initial Registration of E5052A” on page 66 .
- Step 12.** Execute the calibration of the touch screen. For information on the execution procedure, refer to “Calibration of the Touch Screen” on page 185.



## Calibration of the Touch Screen

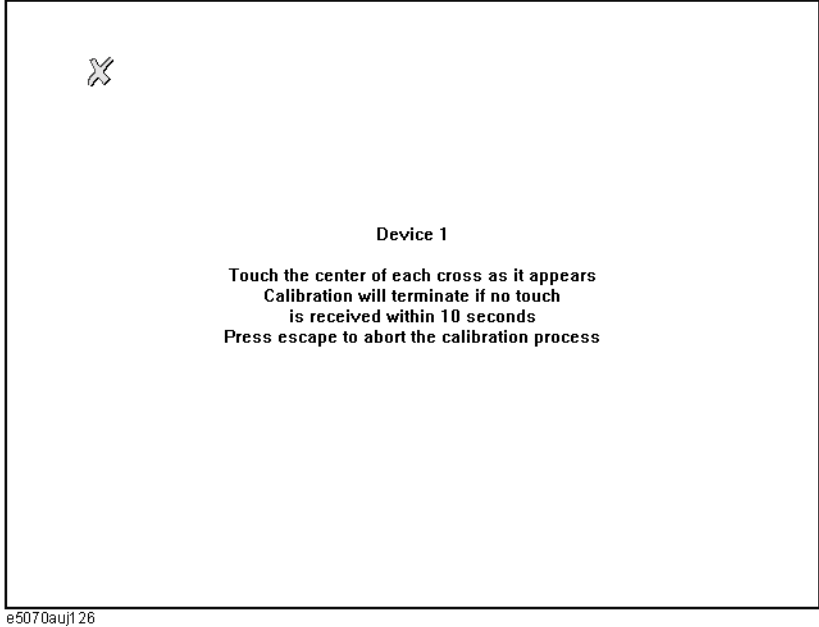
After you have executed system recovery on the E5052A, you have to calibrate the touch screen. Follow the procedure described below to calibrate the touch screen.

- Step 1.** Press **System**.
- Step 2.** Press **Service Menu**.
- Step 3.** Press **Test Menu**.
- Step 4.** Press **Adjust Touch Screen**.

The touch screen calibration screen (Figure 7-1) appears.

Figure 7-1

Touch panel calibration screen



- Step 5.** Touch the x mark on the upper left with your finger. This mark also appears on the lower left, upper right, and lower right. Touch the x marks in that order with your finger. Touching these four locations automatically finishes the touch screen calibration.

**NOTE**

With no operation on the touch screen’s calibration screen at this time, it automatically closes and the previous measurement screen reappears.

## Cleaning the Instrument

This section describes how to clean your Agilent E5052A instrument.

---

**WARNING**

**To protect yourself from electrical shock, be sure to unplug the power cable from the outlet before cleaning the instrument.**

**Never clean the internal components of the instrument.**

---

### Cleaning the LCD

Use one of the following methods to clean the display surface regularly.

- For normal cleaning, rub the surface gently with a dry, soft cloth.
- When stains are difficult to remove, gently wipe the surface with cloth dampened with a small amount of ethanol or isopropyl alcohol.

---

**NOTE**

Do not use chemicals other than ethanol and isopropyl alcohol to wet the cleaning cloth.

Do not wet the cloth with water.

---

### Maintenance of test ports (DUT INTERFACE) and other connectors/ports

The test ports (DUT INTERFACE) on the front panel of the E5052A are fitted with N-type connector (f) and BNC connectors (f). Stains or other damage to these connectors can significantly affect the accuracy in measurements in the RF range. Always take the following precautions.

- Keep the connectors constantly free from stains and dust.
- Do not touch the contact surface on the connectors.
- Do not plug damaged or scratched connectors into the test ports.
- Use compressed air to clean connectors. Do not use abrasives under any circumstance.

The above precautions must also be observed in maintaining connectors and ports other than these test ports.

### Cleaning parts other than the LCD

To remove stains on parts other than the LCD, test ports, and other connectors/ports of the instrument, wipe them gently with a soft cloth that is dry or wetted with a small amount of water and wrung tightly.

## Replacement of Parts with Limited Service Life

This instrument incorporates parts with limited service life as shown in Table 7-1. Using the recommended replacement time shown in Table 7-1 as a guide, request the Agilent Service Center to replace these parts. However, a part may need to be replaced at an earlier time than that listed in the table, depending on such conditions as location, frequency of use, and where it is stored.

**NOTE**

Each service life and recommended replacement time listed below is for reference only and does not imply a guarantee of the part's service life.

**Table 7-1**

**Parts with Limited Service Life**

| Part name                          | Service life (parts supplier reference value)                                        | Recommended replacement time |
|------------------------------------|--------------------------------------------------------------------------------------|------------------------------|
| Hard disk drive* <sup>1</sup>      | 5 years or 20,000 operating hours, whichever comes earlier                           | 3 years                      |
| Floppy disk drive* <sup>2</sup>    | 5 years or 30,000 operating hours, whichever comes earlier                           | 4 years                      |
| Main fan* <sup>2</sup>             | 50,000 operating hours                                                               | 5 years                      |
| Power supply* <sup>2</sup>         | 50,000 operating hours (depends on the service life of the power supply cooling fan) | 5 years                      |
| LCD screen backlight* <sup>3</sup> | 50,000 operating hours                                                               | 5 years                      |
| Touch screen (function)            | One million 'touches'                                                                | 5 years                      |

\*1. Exchanging hard disk drives causes the contents written after shipment from the factory (LAN setup, etc.) to be initialized to the state at the time of shipment. The programs and data stored in Drive F: (user directory) are erased.

\*2. The service life may be significantly shorter when used in a dusty or dirty environment.

\*3. When the unit is used for automatic measurements in a production line and the on-screen information is not required, the life of the LCD backlight can be saved by turning it off. For the method of turning the backlight off, refer to "Turning off the LCD Screen Backlight" on page 176.

## **Cautions Applicable to Requesting Repair, Replacement, Regular Calibration, etc.**

### **Backing up data in the hard disk**

The user is requested to back up the stored programs and data onto external media by using the instrument's storing function before requesting the Agilent Service Center to repair the instrument or replace hard disks.

See "Making backup files" on page 180 for how to make backup files.

Please take note that Agilent Technologies will not be held liable to any extent for potential erasure or change of stored programs or data due to the repair or replacement of hard disks performed by the Agilent. When a hard disk itself fails, the programs and data stored in it cannot be recovered.

### **Devices to be sent back for repair or regular calibration**

If it is necessary to send the unit to the Service Center of Agilent Technologies for repair or regular calibration, please follow the instructions below.

#### **Equipment to be Sent**

When requesting repair or regular calibration of the unit by our Service Center, send only the E5052A main unit without any installed option you may have ordered. Unless specifically instructed, it is not necessary to send accessories.

#### **Packing**

Use the original package and shock absorbers, or equivalent antistatic packing materials, when sending the unit.

#### **Shipping Address**

For the location of the nearest Agilent Technologies Service Center, contact the Customer Contact listed at the end of this guide.

### **Recommended Calibration Period**

The recommended calibration period for this instrument is one year. The user is recommended to request the Agilent Service Center to perform regular calibration every year.

---

## **8 Specifications and Supplemental Information**

This chapter provides specifications and supplemental information for the Agilent E5052A Signal Source Analyzer.

## Definitions

All specifications apply over a 10°C to 40°C range (unless otherwise stated) and 30 minutes after the instrument has been turned on.

**Specification (spec.):** Warranted performance. Specifications include guardbands to account for the expected statistical performance distribution, measurement uncertainties, and changes in performance due to environmental conditions.

Supplemental information is intended to provide information that is helpful for using the instrument but that is not guaranteed by the product warranty. This information is denoted as either typical or nominal.

**Typical (typ.):** Expected performance of an average unit that does not include guardbands. It is not guaranteed by the product warranty.

**Nominal (nom.):** A general, descriptive term that does not imply a level of performance. It is not guaranteed by the product warranty.

## Phase Noise Measurement

**Table 8-1** Phase Noise Measurement

| Description                                                                                          | Specifications                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency Range                                                                                      | 10 M to 7 GHz<br>Frequency Band :<br>10 M to 41 MHz, 39 M to 101 MHz, 99 M to 1.5 GHz, 300 M to 7 GHz                                                          |
| Input Power Level                                                                                    | -20 to + 20 dBm                                                                                                                                                |
| Offset Frequency Range<br>Carrier > 400 MHz<br><br>Carrier < 400 MHz                                 | 1 Hz to 40 MHz (Standard)<br>10 Hz to 40 MHz (Option 011)<br><br>1 Hz to 10% of carrier frequency (Standard)<br>10 Hz to 10% of carrier frequency (Option 011) |
| Enhanced Phase Noise Sensitivity*1                                                                   | Cross-Correlation method (Standard)<br>Number of Correlation : 1 to 10000                                                                                      |
| Frequency Tracking Range                                                                             | 0.4% of Carrier Frequency                                                                                                                                      |
| Built-in LO Phase Noise Optimization                                                                 | < 150 kHz (Optimized for Close-in Phase Noise)<br>> 150 kHz (Optimized for Far-out Phase Noise)<br>See Figure 8-4                                              |
| Accuracy<br>1 to 100 Hz offset<br>100 to 1 kHz offset<br>1 k to 1 MHz offset<br>1 M to 40 MHz offset | < ±4 dB (typical, at 23°C±5°C)<br>< ±4 dB (typical, at 23°C±5°C)<br>< ±2 dB (typical, at 23°C±5°C)<br>< ±3 dB (typical, at 23°C±5°C)                           |
| SSB Phase Noise Sensitivity ( at 23°C±5°C)                                                           | See Table 8-2 through Table 8-4, Figure 8-1 through Figure 8-3                                                                                                 |
| Measurement Time                                                                                     | See Table 8-5                                                                                                                                                  |

\*1. Not available for Option 011.

Specifications and Supplemental Information  
Phase Noise Measurement

**Table 8-2 SSB Phase Noise Sensitivity (Standard, < 150 kHz optim., correlation = 1, +5 dBm input, start frequency = 1 Hz, measurement time = 17.7 sec)**

| Input Frequency |       | Offset from carrier (Hz) |        |        |        |        |        |        |        |        |
|-----------------|-------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                 |       | 1                        | 10     | 100    | 1 k    | 10 k   | 100 k  | 1 M    | 10 M   | 40 M   |
| 10 MHz          | spec. |                          |        |        | -148.5 | -156.5 | -166.5 | -168.5 | -      | -      |
|                 | typ.  | -74.0                    | -117.0 | -144.5 | -152.5 | -160.5 | -170.5 | -172.5 | -      | -      |
| 100 MHz         | spec. |                          |        |        | -148.5 | -156.5 | -163.5 | -168.5 | -170.0 | -      |
|                 | typ.  | -54.0                    | -97.0  | -135.5 | -152.5 | -160.5 | -167.5 | -172.5 | -174.0 | -      |
| 1 GHz           | spec. |                          |        |        | -128.5 | -137.5 | -144.5 | -160.5 | -170.0 | -170.5 |
|                 | typ.  | -34.0                    | -77.0  | -115.5 | -132.5 | -141.5 | -148.5 | -164.5 | -174.0 | -174.5 |
| 3 GHz           | spec. |                          |        |        | -119.0 | -128.0 | -133.7 | -149.7 | -163.2 | -166.7 |
|                 | typ.  | -24.5                    | -67.5  | -106.0 | -123.0 | -132.0 | -137.7 | -153.7 | -167.2 | -170.7 |
| 7 GHz           | spec. |                          |        |        | -111.6 | -120.6 | -127.0 | -143.0 | -156.5 | -160.0 |
|                 | typ.  | -17.1                    | -60.1  | -98.6  | -115.6 | -124.6 | -131.0 | -147.0 | -160.5 | -164.0 |

**Table 8-3 SSB Phase Noise Sensitivity (Option 011, < 150 kHz optim., +5 dBm input, start frequency = 10 Hz, measurement time = 4.4 sec)**

| Input Frequency |       | Offset from carrier (Hz) |        |        |        |        |        |        |        |        |
|-----------------|-------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                 |       | 1                        | 10     | 100    | 1 k    | 10 k   | 100 k  | 1 M    | 10 M   | 40 M   |
| 10 MHz          | spec. |                          |        |        | -145.5 | -153.5 | -160.0 | -160.0 | -      | -      |
|                 | typ.  |                          | -114.0 | -141.5 | -149.5 | -157.5 | -167.5 | -169.5 | -      | -      |
| 100 MHz         | spec. |                          |        |        | -145.5 | -153.5 | -160.0 | -160.0 | -160.0 | -      |
|                 | typ.  |                          | -94.0  | -132.5 | -149.5 | -157.5 | -164.5 | -169.5 | -170.0 | -      |
| 1 GHz           | spec. |                          |        |        | -125.5 | -134.5 | -141.5 | -157.5 | -160.0 | -160.0 |
|                 | typ.  |                          | -74.0  | -112.5 | -129.5 | -138.5 | -145.5 | -161.5 | -170.0 | -170.0 |
| 3 GHz           | spec. |                          |        |        | -116.0 | -125.0 | -130.7 | -146.7 | -160.0 | -160.0 |
|                 | typ.  |                          | -64.5  | -103.0 | -120.0 | -129.0 | -134.7 | -150.7 | -164.2 | -167.7 |
| 7 GHz           | spec. |                          |        |        | -108.6 | -117.6 | -124.0 | -140.0 | -153.5 | -157.0 |
|                 | typ.  |                          | -57.1  | -95.6  | -112.6 | -121.6 | -128.0 | -144.0 | -157.5 | -161.0 |



Table 8-4

SSB Phase Noise Sensitivity Improvement by Correlation

| Number of Correlation | 10   | 100   | 1000  | 10000 |
|-----------------------|------|-------|-------|-------|
| Improvement Factor    | 5 dB | 10 dB | 15 dB | 20 dB |

Figure 8-1

SSB Phase Noise Sensitivity (Standard, < 150 kHz optim., correlation = 1, start frequency = 1 Hz, measurement time = 17.7 sec), supplemental data

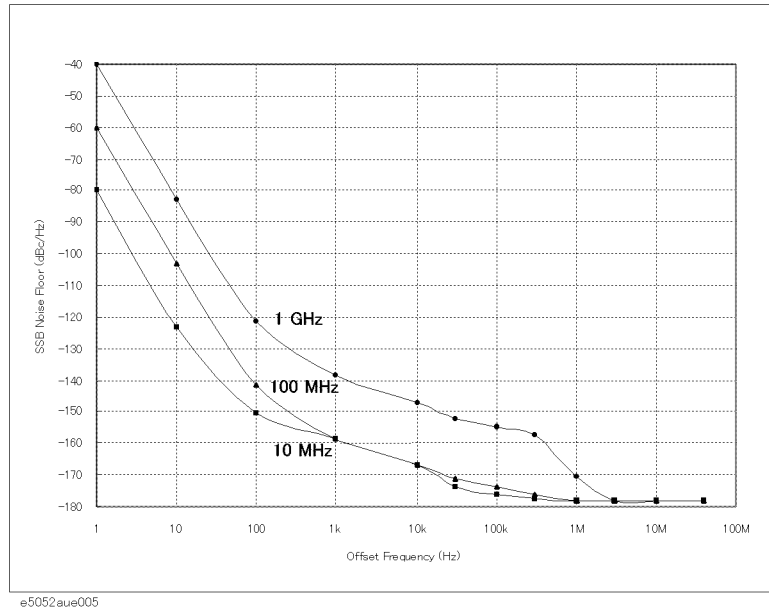


Figure 8-2

SSB Phase Noise Sensitivity (Option 011, < 150 kHz optim., start frequency = 10 Hz, measurement time = 4.4 sec), supplemental data

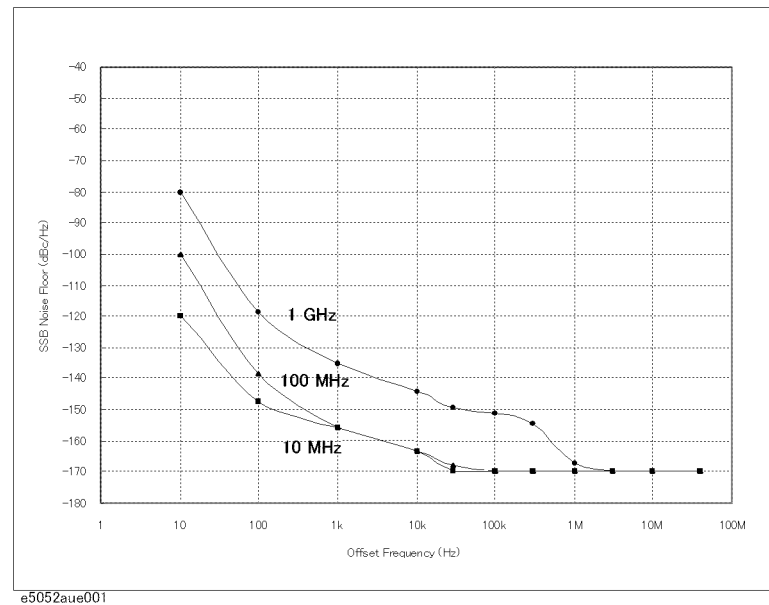


Figure 8-3

SSB Phase Noise Sensitivity (improvement by correlation, 1 GHz, < 150 kHz optim.), supplemental data

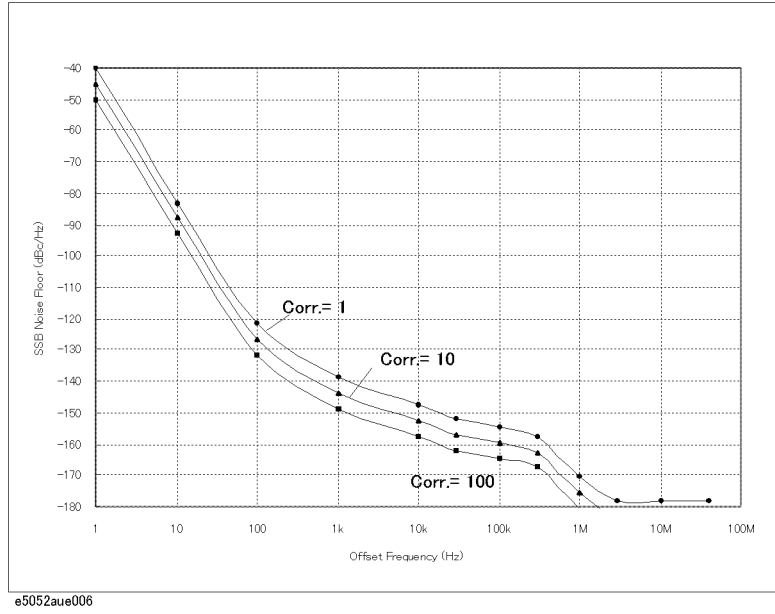
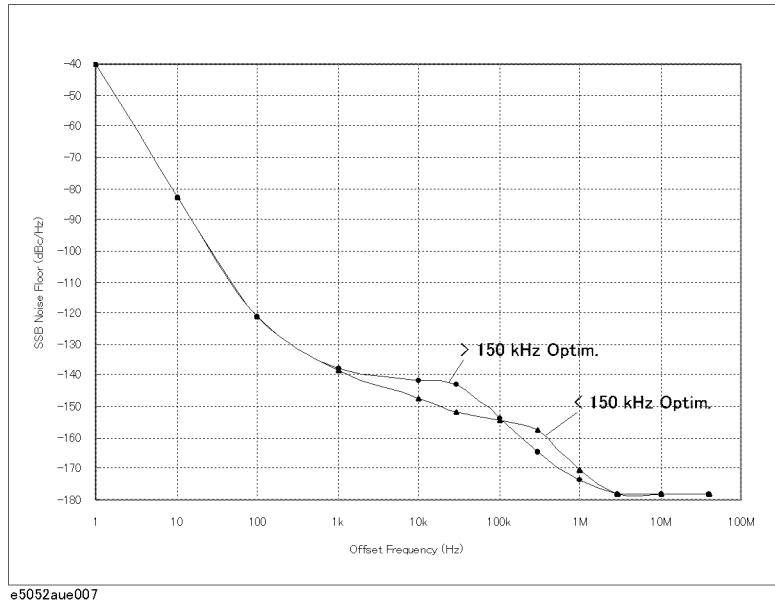


Figure 8-4

SSB Phase Noise Sensitivity of different LO optimizations (Standard, correlation = 1, start frequency = 1 Hz, measurement time = 17.7 sec, 1 GHz), supplemental data



**Table 8-5** Typical measurement time (sec) for phase noise measurement\*<sup>1</sup>

| Stop Frequency (Hz) | Start Frequency (Hz) |      |      |      |
|---------------------|----------------------|------|------|------|
|                     | 1                    | 10   | 100  | 1 k  |
| 100 k               | 10.9                 | 2.70 | 0.34 | 0.04 |
| 1 M                 | 10.7                 | 2.70 | 0.34 | 0.04 |
| 10 M                | 11.1                 | 2.8  | 0.35 | 0.04 |
| 40 M                | 17.7                 | 4.4  | 0.56 | 0.07 |

\*1. Measurement Time (sec) = 0.2 + the above values × number of correlation when applying cross-correlation function (standard only). For Option 011, number of correlation = 1.

### Measurement capabilities

| Phase noise            |                                                                                            |
|------------------------|--------------------------------------------------------------------------------------------|
| Measurement parameters | SSB Phase noise                                                                            |
| Number of trace        | 1 data trace and 1 memory trace                                                            |
| Data formats           | dBc/Hz                                                                                     |
| Measurement Trigger    | Set to continuous, hold, or single, sweep with internal, external, manual, or bus trigger. |

**Table 8-6** Limited functions along with the related SCPI commands when option 011 is installed

| Softkey                   | SCPI Command                | Limitation of values                               |
|---------------------------|-----------------------------|----------------------------------------------------|
| [Start/Center]            | :SENSe:PN:FREQuency:START   | The minimum value is down to 10 (Hz) <sup>*1</sup> |
| [Setup] - [IF Gain]       | :SENSe:PN:IFGain            | The value is fixed as 10 (dB) <sup>*2</sup>        |
| [Average] - [Correlation] | :SENSe:PN:CORRelation:COUNT | The value is fixed as 1 <sup>*2</sup>              |

\*1. The minimum value is always set to 10 (Hz) when this command receives the value less than 10.

\*2. Any values except listed in the table will not be accepted. The softkeys listed in the table are also not available when option 011 is installed.

## Frequency, RF Power, DC current Measurements

**Table 8-7** Frequency Measurement

| Description                  | Specifications                                                    |
|------------------------------|-------------------------------------------------------------------|
| Frequency Range              | 10 M to 7 GHz<br>Frequency Band : 10 M to 1.5 GHz, 300 M to 7 GHz |
| Frequency Resolution         | 10 Hz, 1 kHz, 64 kHz                                              |
| Internal time base stability | $\pm 5$ ppm (at 23°C $\pm 5$ °C)                                  |
| Accuracy                     | $\pm$ (resolution + time base accuracy)                           |

**Table 8-8** RF Power Measurement

| Description                      | Specifications                                                    |
|----------------------------------|-------------------------------------------------------------------|
| Frequency Range                  | 10 M to 7 GHz<br>Frequency Band : 10 M to 1.5 GHz, 300 M to 7 GHz |
| Input Level                      |                                                                   |
| 10 MHz to 30 MHz                 | -15 dBm to +20 dBm                                                |
| 30 MHz to 7 GHz                  | -20 dBm to +20 dBm                                                |
| Resolution                       | 0.01 dB                                                           |
| Accuracy (Peak Voltage Response) |                                                                   |
| 30 MHz to 3 GHz, >-10 dBm        | $\pm 0.5$ dB (at 23°C $\pm 5$ °C)                                 |
| Other than the above             | $\pm 1$ dB (at 23°C $\pm 5$ °C)                                   |

**Table 8-9** DC Current Measurement

| Description   | Specifications                                             |
|---------------|------------------------------------------------------------|
| Current Range | 0 to 80 mA                                                 |
| Resolution    | 10 $\mu$ A                                                 |
| Accuracy      | $\pm$ (0.2% of reading + 160 $\mu$ A) (at 23°C $\pm 5$ °C) |

### Measurement capabilities

| Frequency, Power, and DC current (for Standard) |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Measurement parameters</b>                   | Analyzer mode: *1<br>Frequency versus DC control voltage, dF/dVcontrol (Tuning sensitivity)<br>Frequency versus DC power voltage (Frequency pushing), dF/dVpower<br>RF power versus DC control voltage<br>RF power versus DC power voltage<br>DC current (at DC power port only) versus DC control voltage<br>DC current (at DC power port only) versus DC power voltage<br><br>Tester mode: *1<br>Frequency, power, and DC current (at DC power port) |
| <b>Number of point</b>                          | 2 to 1001 (for analyzer mode only)                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Data formats</b>                             | Hz, Hz/V(Frequency), dBm(RF power), A(DC power port only)                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Measurement Trigger</b>                      | Set to continuous, hold, or single, sweep with internal, external, manual, or bus trigger.                                                                                                                                                                                                                                                                                                                                                             |

\*1. Refer to the chapter 4, “Frequency/power measurement in the frequency/power measurement mode” section for the difference between “Analyzer mode” and “Tester mode”

| Frequency, Power, and DC current (for Option 011) *Point measurement only |                                                                                     |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Measurement parameters</b>                                             | Frequency, power, and DC current (at DC power port) (Numerical Display Only)        |
| <b>Data formats</b>                                                       | Hz (Frequency), dBm(RF power), A(DC power port only).                               |
| <b>Measurement Trigger</b>                                                | Set to continuous, hold, or single with internal, external, manual, or bus trigger. |

### Softkeys and SCPI commands that are not available when using “Tester” mode or option 011 is installed

**Table 8-10**

| Softkeys                         | SCPI commands                                                                                  |
|----------------------------------|------------------------------------------------------------------------------------------------|
| [Format]                         | :CALCulate:FP[1-1]:TRACe[1-3]                                                                  |
| [Display] - [Marker Information] | :DISPlay:FP[1-1]:ANNotation:MARKer:POSition                                                    |
| [Display] - [Relative Y-Scale]   | :DISPlay:FP[1-1]:GRATICule:AXIS:Y:RELative                                                     |
| [Display] - [Y # of Digits]      | :DISPlay:FP[1-1]:GRATICule:AXIS:Y:STATe                                                        |
| [Marker]                         | :CALCulate:FP[1-1]:TRACe[1-3]<br>:CALCulate:FP[1-1]:ALLTrace<br>:DISPlay:FP[1-1]:TABLe[:STATe] |
| [Marker Function]                | :CALCulate:FP[1-1]:TRACe[1-3]<br>:CALCulate:FP[1-1]:ALLTrace                                   |

Specifications and Supplemental Information  
**Frequency, RF Power, DC current Measurements**

**Table 8-10**

|                                     |                                                                                                                          |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| [Marker Search]                     | :CALCulate:FP[1-1]:TRACe[1-3]                                                                                            |
| [Marker To]                         | :SOURce:FP[1-1]:VOLTage                                                                                                  |
| [Save/Recall] - [Save Data Trace]   | :MMEMory:FP[1-1]:TRACe[1-3]:STORe[:DATA]                                                                                 |
| [Save/Recall] - [Save Memory Trace] | :MMEMory:FP[1-1]:TRACe[1-3]:STORe:MEMory                                                                                 |
| [Scale]                             | :DISPlay:FP[1-1]:TRACe[1-3]:Y[:SCALe]<br>:DISPlay:FP[1-1]:ALLTrace:Y[:SCALe]:AUTO<br>:DISPlay:FP[1-1]:Y[:SCALe]:DIVision |
| [Setup] - [Point]                   | :SOURce:FP[1-1]:SWEep:POINT                                                                                              |
| [Setup] - [Sweep Parameter]         | :SOURce:FP[1-1]:SWEep:PARAmeter                                                                                          |
| [Start/Center]                      | :SOURce:FP[1-1]:VOLTage                                                                                                  |
| [Stop/Span]                         | :SOURce:FP[1-1]:VOLTage                                                                                                  |
| [Trace View]                        | :CALCulate:FP[1-1]:TRACe<br>:DISPlay:FP[1-1]:TRACe                                                                       |
|                                     | :CALCulate:FP[1-1]:DATA:RDATa                                                                                            |
|                                     | :CALCulate:FP[1-1]:DATA:XDATa                                                                                            |
|                                     | :DISPlay:FP[1-1]:MAXimize                                                                                                |
|                                     | :SENSe:FP[1-1]:SWEep:TIME:DATA                                                                                           |

## Transient Measurement

**Table 8-11 Transient Measurement**

| Description                                 | Specifications                                                  |
|---------------------------------------------|-----------------------------------------------------------------|
| Measurement Function                        | Frequency, Power, Phase                                         |
| Target Frequency Range                      | 10 MHz to 7 GHz                                                 |
| Input Power Level                           | -20 to +20 dBm                                                  |
| Frequency Transient Range                   |                                                                 |
| Wide Band                                   | See Table 8-12                                                  |
| Narrow Band                                 | 1.6 MHz or 25.6 MHz (Target frequency $\geq$ 200 MHz)           |
| Time Span                                   | 10 $\mu$ sec to 100 msec, 1,2,5 step                            |
| Time resolution                             | 10 nsec to 100 $\mu$ sec                                        |
| Frequency Transient measurement             |                                                                 |
| Accuracy                                    | $\pm$ (frequency resolution <sup>*1</sup> + time base accuracy) |
| Power Transient measurement                 |                                                                 |
| Range                                       | -20 dBm to +20 dBm                                              |
| Accuracy                                    | $\pm$ 2 dB (typical, , at 23°C $\pm$ 5°C)                       |
| Resolution                                  | 0.1 dB (typical)                                                |
| Phase Transient measurement <sup>*2*3</sup> |                                                                 |
| Accuracy                                    | 0.1 deg/GHz (0.1 deg min.) (typical, at 23°C $\pm$ 5°C)         |
| Trace noise                                 | 0.02 deg/GHz (0.02 deg min.) (typical, at 23°C $\pm$ 5°C)       |
| Stability                                   | 10 deg/sec (typical, at 23°C $\pm$ 5°C)                         |

\*1. See Table 8-13 through Table 8-16 for details.

\*2. The time base of DUT is required to lock with the time base of the analyzer.

\*3. When a DUT's frequency is settled to a selected phase reference frequency.

**Table 8-12 Wide Band Frequency Selection Table**

|                     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|
| Frequency Max (MHz) | 150 | 300 | 600 | 900 | 1200 | 1500 | 1800 | 2400 | 3000 | 3600 | 4200 | 4800 | 5400 | 6000 | 6600 | 7200 |
| Frequency Min (MHz) | 50  | 100 | 200 | 300 | 400  | 500  | 600  | 800  | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 | 2200 | 2400 |

Specifications and Supplemental Information  
**Transient Measurement**

**Table 8-13 Wide Band Transient (Time span, Time resolution and number of points)**

|                              |          |          |          |           |           |           |      |      |      |      |     |      |       |
|------------------------------|----------|----------|----------|-----------|-----------|-----------|------|------|------|------|-----|------|-------|
| Time Span (sec)              | 10 $\mu$ | 20 $\mu$ | 50 $\mu$ | 100 $\mu$ | 200 $\mu$ | 500 $\mu$ | 1 m  | 2 m  | 5 m  | 10 m | 20m | 50 m | 100 m |
| Time Resolution ( $\mu$ sec) | 0.01     | 0.02     | 0.05     | 0.1       | 0.2       | 0.5       | 1    | 2    | 6.25 | 12.5 | 25  | 62.5 | 125   |
| Number of point              | 1001     | 1001     | 1001     | 1001      | 1001      | 1001      | 1001 | 1001 | 801  | 801  | 801 | 801  | 801   |

**Table 8-14 Frequency Resolution (Hzrms) of Wide Band Transient**

| Transient Frequency Band (MHz) | Time Span (sec) |          |          |           |           |           |      |      |      |      |      |      |       |
|--------------------------------|-----------------|----------|----------|-----------|-----------|-----------|------|------|------|------|------|------|-------|
|                                | 10 $\mu$        | 20 $\mu$ | 50 $\mu$ | 100 $\mu$ | 200 $\mu$ | 500 $\mu$ | 1 m  | 2 m  | 5 m  | 10 m | 20m  | 50 m | 100 m |
| 50 to 150                      | 28 k            | 28 k     | 28 k     | 28 k      | 10 k      | 3 k       | 1 k  | 1 k  | 1k   | 1 k  | 1 k  | 1 k  | 1 k   |
| 100 to 300                     | 56 k            | 56 k     | 56 k     | 56 k      | 20 k      | 7 k       | 2 k  | 2 k  | 2k   | 2 k  | 2 k  | 2 k  | 2 k   |
| 200 to 600                     | 113 k           | 113 k    | 113 k    | 113 k     | 40 k      | 14 k      | 5 k  | 5 k  | 5k   | 5 k  | 5 k  | 5 k  | 5 k   |
| 300 to 900                     | 169 k           | 169 k    | 169 k    | 169 k     | 60 k      | 21 k      | 7 k  | 7 k  | 7k   | 7 k  | 7 k  | 7 k  | 7 k   |
| 400 to 1200                    | 226 k           | 226 k    | 226 k    | 226 k     | 80 k      | 28 k      | 10 k | 10 k | 10k  | 10 k | 10 k | 10 k | 10 k  |
| 500 to 1500                    | 282 k           | 282 k    | 282 k    | 282 k     | 100 k     | 35 k      | 12 k | 12 k | 12k  | 12 k | 12 k | 12 k | 12 k  |
| 600 to 1800                    | 339 k           | 339 k    | 339 k    | 339 k     | 120 k     | 42 k      | 15 k | 15 k | 15 k | 15 k | 15 k | 15 k | 15 k  |
| 800 to 2400                    | 452 k           | 452 k    | 452 k    | 452 k     | 160 k     | 56 k      | 20 k | 20 k | 20 k | 20 k | 20 k | 20 k | 20 k  |
| 1000 to 3000                   | 565 k           | 565 k    | 565 k    | 565 k     | 200 k     | 70 k      | 25 k | 25 k | 25 k | 25 k | 25 k | 25 k | 25 k  |
| 1200 to 3600                   | 678 k           | 678 k    | 678 k    | 678 k     | 240 k     | 84 k      | 30 k | 30 k | 30 k | 30 k | 30 k | 30 k | 30 k  |
| 1400 to 4200                   | 791 k           | 791 k    | 791 k    | 791 k     | 280 k     | 98 k      | 35 k | 35 k | 35 k | 35 k | 35 k | 35 k | 35 k  |
| 1600 to 4800                   | 905 k           | 905 k    | 905 k    | 905 k     | 320 k     | 113 k     | 40 k | 40 k | 40 k | 40 k | 40 k | 40 k | 40 k  |
| 1800 to 5400                   | 1 M             | 1 M      | 1 M      | 1 M       | 360 k     | 127 k     | 45 k | 45 k | 45 k | 45 k | 45 k | 45 k | 45 k  |
| 2000 to 6000                   | 1 M             | 1 M      | 1 M      | 1 M       | 400 k     | 141 k     | 50 k | 50 k | 50 k | 50 k | 50 k | 50 k | 50 k  |
| 2200 to 6600                   | 1 M             | 1 M      | 1 M      | 1 M       | 440 k     | 155 k     | 55 k | 55 k | 55 k | 55 k | 55 k | 55 k | 55 k  |
| 2400 to 7200                   | 1 M             | 1 M      | 1 M      | 1 M       | 480 k     | 169 k     | 60 k | 60 k | 60 k | 60 k | 60 k | 60 k | 60 k  |

**Table 8-15 Narrow Band Transient (Frequency Transient Range = 1.6 MHz)**

|                              |  |  |  |           |           |           |      |      |      |      |      |      |       |
|------------------------------|--|--|--|-----------|-----------|-----------|------|------|------|------|------|------|-------|
| Time Span (sec)              |  |  |  | 100 $\mu$ | 200 $\mu$ | 500 $\mu$ | 1 m  | 2 m  | 5 m  | 10 m | 20m  | 50 m | 100 m |
| Frequency Resolution (Hzrms) |  |  |  | 110       | 110       | 110       | 39   | 20.5 | 14   | 5    | 5    | 5    | 5     |
| Time Resolution ( $\mu$ sec) |  |  |  | 0.16      | 0.32      | 0.8       | 0.8  | 1.6  | 4    | 8    | 20   | 80   | 160   |
| Number of point              |  |  |  | 626       | 626       | 626       | 1251 | 1251 | 1251 | 1251 | 1001 | 626  | 626   |

**Table 8-16 Narrow Band Transient (Frequency Transient Range = 25.6 MHz)**

|                              |          |          |          |           |           |           |       |       |       |       |       |       |       |
|------------------------------|----------|----------|----------|-----------|-----------|-----------|-------|-------|-------|-------|-------|-------|-------|
| Time Span (sec)              | 10 $\mu$ | 20 $\mu$ | 50 $\mu$ | 100 $\mu$ | 200 $\mu$ | 500 $\mu$ | 1 m   | 2 m   | 5 m   | 10 m  | 20m   | 50 m  | 100 m |
| Frequency Resolution (Hzrms) | 7 k      | 7 k      | 7 k      | 7 k       | 3 k       | 883.9     | 312.5 | 312.5 | 312.5 | 312.5 | 312.5 | 312.5 | 312.5 |
| Time Resolution ( $\mu$ sec) | 0.01     | 0.02     | 0.05     | 0.1       | 0.2       | 0.5       | 1     | 2     | 6.25  | 12.5  | 25    | 62.5  | 125   |
| Number of point              | 1001     | 1001     | 1001     | 1001      | 1001      | 1001      | 1001  | 1001  | 801   | 801   | 801   | 801   | 801   |



**Measurement capabilities**

| <b>Transient</b>              |                                                                                                                                                |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Measurement parameters</b> | Frequency versus time (Wide band)<br>Frequency versus time (Narrow band)<br>Phase versus time (Narrow band)<br>Power versus time (Narrow band) |
| <b>Number of trace</b>        | 1 data trace and 1 memory trace per measurement trace                                                                                          |
| <b>Data formats</b>           | Hz(Frequency versus time), dBm(Power versus time),<br>degree/radian/gradian (phase versus time), wrap phase ON/OFF                             |
| <b>Measurement Trigger</b>    | Set to continuous, hold, or single, sweep with internal, external, manual,<br>bus, or video trigger.                                           |

## Spectrum Monitor

**Table 8-17**      **Spectrum Monitor**

| Description             | Specifications                                                  |
|-------------------------|-----------------------------------------------------------------|
| Frequency Span          | 20% of center frequency (center frequency: 10 MHz to 50 MHz)    |
|                         | 10 MHz (center frequency: 50 MHz to 100 MHz)                    |
|                         | 15 MHz (center frequency : greater equal than 100 MHz)          |
| RBW                     | 1.53 Hz to 400 kHz                                              |
| Absolute Level Accuracy | ±2 dB @-10 dBm, Attenuator = 0 dB (typical, at 23°C±5°C)        |
| Relative Level Accuracy | ±1.5 dB @ratio of -10 dBm to -60 dBm during sweep (at 23°C±5°C) |
| Noise Floor             | -95 dBm @RBW=24.4 Hz (typical, at 23°C±5°C)                     |
| Spurious                |                                                                 |
| Mixer harmonics         | -30 dBc (typical, at 23°C±5°C)                                  |
| IF distortion           | -40 dBc (typical, at 23°C±5°C)                                  |

### Measurement capabilities

| Spectrum monitor           |                                                                                            |
|----------------------------|--------------------------------------------------------------------------------------------|
| <b>Number of trace</b>     | 1 data trace and 1 memory trace per measurement trace                                      |
| <b>Data formats</b>        | dBm, dBV, Watt, Volt, dBm/Hz, dBV/Hz, Watt/Hz, Volt/ $\sqrt{Hz}$                           |
| <b>Measurement Trigger</b> | Set to continuous, hold, or single, sweep with internal, external, manual, or bus trigger. |

## Port Output (DC Power/Control)

**Table 8-18 DC Power Voltage Output**

| Description            | Specifications                             |
|------------------------|--------------------------------------------|
| Voltage Range          | 0 to 16 V                                  |
| Resolution             | 1 mV                                       |
| Setting Accuracy       | $\pm(0.2\% + 2 \text{ mV})$ (at 23°C±5°C)  |
| Maximum output current | 80 mA                                      |
| Noise                  | < 10 nV/√ Hz @10kHz (typical, at 23°C±5°C) |
| Output Resistance      | < 0.3 Ω (typical)                          |

**Table 8-19 DC Control Voltage Output**

| Description            | Specifications                                                                            |
|------------------------|-------------------------------------------------------------------------------------------|
| Voltage Range          | -15 to 35 V                                                                               |
| Resolution             | 0.1 mV                                                                                    |
| Setting Accuracy       |                                                                                           |
| -15 to 0 V             | $\pm((\text{setting} + 15 \text{ V}) \times 0.1\% + 5 \text{ mV})$ (typical, at 23°C±5°C) |
| 0 to 35 V              | $\pm(\text{setting} \times 0.1\% + 2 \text{ mV})$ (typical, at 23°C±5°C)                  |
| Maximum output current | 20 mA (typical)                                                                           |
| Noise                  |                                                                                           |
| 0 to 20 V              | 1 nV/√ Hz @10kHz (typical, at 23°C±5°C)                                                   |
| -15 to 0 V, 20 to 35 V | 1.5 nV/√ Hz @10kHz (typical, at 23°C±5°C)                                                 |
| Output resistance (DC) | < 50 Ω                                                                                    |
| Output resistance (AC) | 50 Ω (nominal)                                                                            |

## Test Port Input

**Table 8-20** RF IN

| Description      | Specifications               |
|------------------|------------------------------|
| Input Level      |                              |
| 10 M to 30 MHz   | -15 to +20 dBm               |
| 30 M to 7 GHz    | -20 to +20 dBm               |
| Input Attenuator | 0 to 35 dB in 5 dB steps     |
| Damage Level     | +23 dBm (nominal)            |
| VSWR             |                              |
| 10 M to 30 MHz   | < 1.6 (at 23°C±5°C)          |
| 30 M to 2 GHz    | < 1.2 (at 23°C±5°C)          |
| 2 G to 3 GHz     | < 1.3 (at 23°C±5°C)          |
| 3 G to 4 GHz     | < 1.3 (typical, at 23°C±5°C) |
| 4 G to 7 GHz     | < 1.5 (typical, at 23°C±5°C) |

## General Information

**Table 8-21 Front Panel Information**

| Description             | Supplemental Information       |
|-------------------------|--------------------------------|
| <b>RF IN</b>            |                                |
| Type                    | Type-N, female, 50 Ω (nominal) |
| <b>DC POWER/CONTROL</b> |                                |
| Type                    | BNC, female, 50 Ω (nominal)    |
| <b>Display</b>          |                                |
| Size                    | 10.4 in TFT color LCD          |
| Resolution              | VGA (640 × 480)*1              |

\*1. Valid pixels are 99.99 % and more. Below 0.01 % (approx. 30 points) of fixed points of black, blue, green or red are not regarded as failure.

**Table 8-22 Rear Panel Information**





| Description                                       | Supplemental Information                                                                                                                                                                                                 |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>External Trigger Connector</b>                 |                                                                                                                                                                                                                          |
| Type                                              | BNC, female                                                                                                                                                                                                              |
| Input level                                       | LOW threshold voltage: 0.5 V<br>HIGH threshold voltage: 2.1 V<br>Input level range: 0 to + 5 V                                                                                                                           |
| Pulse width                                       | $\geq 2 \mu\text{sec}$ , typical                                                                                                                                                                                         |
| Polarity                                          | Positive/Negative selectable                                                                                                                                                                                             |
| <b>External Reference Signal Input Connector</b>  |                                                                                                                                                                                                                          |
| Type                                              | BNC, female                                                                                                                                                                                                              |
| Input Frequency                                   | 10 MHz $\pm$ 10 Hz, typical                                                                                                                                                                                              |
| Input Level                                       | -6 dBm to + 16 dBm, typical                                                                                                                                                                                              |
| <b>Internal Reference Signal Output Connector</b> |                                                                                                                                                                                                                          |
| Type                                              | BNC, female                                                                                                                                                                                                              |
| Output Frequency                                  | 10 MHz $\pm$ 50 Hz, typical                                                                                                                                                                                              |
| Signal Type                                       | Sine Wave, nominal                                                                                                                                                                                                       |
| Output Level                                      | 2.5 dBm $\pm$ 3 dB, typical                                                                                                                                                                                              |
| Output Impedance                                  | 50 $\Omega$ , nominal                                                                                                                                                                                                    |
| <b>VGA Video Output</b>                           | 15-pin mini D-Sub; female; drives VGA compatible monitors                                                                                                                                                                |
| <b>GPIOB</b>                                      | 24-pin D-Sub (Type D-24), female; compatible with IEEE-488                                                                                                                                                               |
| <b>Parallel Port</b>                              | 36-pin D-Sub (Type 1284-C), female; provides connection to printers                                                                                                                                                      |
| <b>USB Port</b>                                   |                                                                                                                                                                                                                          |
| Contact 1                                         | Universal Serial Bus jack, Type A configuration (4 contacts inline, contact 1 on left); female; provides connection to printer, USB/GPIB interface<br>Vcc: 4.75 to 5.25 VDC, 500 mA, maximum<br>-Data<br>+Data<br>Ground |
| Contact 2                                         |                                                                                                                                                                                                                          |
| Contact 3                                         |                                                                                                                                                                                                                          |
| Contact 4                                         |                                                                                                                                                                                                                          |
| <b>LAN</b>                                        | 10/100BaseT Ethernet, 8-pin configuration; auto selects between the two data rates                                                                                                                                       |
| <b>24 Bit I/O Port</b>                            | 36-pin D-sub, female; provides connection to handler system                                                                                                                                                              |

**Table 8-22 Rear Panel Information**

| Description          | Supplemental Information                                  |
|----------------------|-----------------------------------------------------------|
| <b>Line Power</b> *1 |                                                           |
| Frequency            | 47 Hz to 63 Hz                                            |
| Voltage              | 90 to 132 VAC, or 198 to 264 VAC (automatically switched) |
| VA Max               | 500 VA max.                                               |

\*1. A third-wire ground is required.

**Table 8-23 EMC and Safety**

| Description                                                                                           | Supplemental Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EMC</b>                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <br><b>ISM 1-A</b>   | European Council Directive 89/336/EEC, 92/31/EEC, 93/68/EEC<br>IEC 61326-1:1997 +A1:1998 +A2:2000/EN 61326-1:1997 +A1:1998 +A2:2001<br>CISPR 11:1997 +A1:1999/EN 55011:1998 +A1:1999<br>Group 1, Class A<br>IEC 61000-4-2:1995 +A1:1998/EN 61000-4-2:1995 +A1:1998<br>4 kV CD / 8 kV AD<br>IEC 61000-4-3:1995 +A1:1998/EN 61000-4-3:1996 +A1:1998<br>3 V/m, 80-1000 MHz, 80% AM<br>IEC 61000-4-4:1995/EN 61000-4-4:1995<br>1 kV power / 0.5 kV Signal<br>IEC 61000-4-5:1995/EN 61000-4-5:1995<br>0.5 kV Normal / 1 kV Common<br>IEC 61000-4-6:1996/EN 61000-4-6:1996<br>3 V, 0.15-80 MHz, 80% AM<br>IEC 61000-4-11:1994/EN 61000-4-11:1994<br>100% 1cycle European Council Directive |
| <b>ICES/NMB-001</b>                                                                                   | This ISM device complies with Canadian ICES-001:1998.<br>Cet appareil ISM est conforme a la norme NMB-001 du Canada.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|  <b>N10149</b>     | AS/NZS 2064.1/2 Group 1, Class A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Safety</b>                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <br><b>ISM 1-A</b> | European Council Directive 73/23/EEC, 93/68/EEC<br>IEC 61010-1:2001/EN 61010-1:2001<br>Measurement Category I, Pollution Degree 2, Indoor Use<br>IEC60825-1:1994 Class 1 LED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|  <b>LR95111C</b>   | CAN/CSA C22.2 No. 1010.1-92                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**Table 8-24 Analyzer Environment and Dimensions**

| Description                              | Supplemental Information                                     |
|------------------------------------------|--------------------------------------------------------------|
| <b>Operating Environment</b>             |                                                              |
| Temperature                              | +10 °C to +40 °C                                             |
| Humidity                                 | 20% to 80% at wet bulb temperature < +29 °C (non-condensing) |
| Altitude                                 | 0 to 2,000 m (0 to 6,561 feet)                               |
| Vibration                                | 0.5 G maximum, 5 Hz to 500 Hz                                |
| <b>Non-Operating Storage Environment</b> |                                                              |
| Temperature                              | -10 °C to +60 °C                                             |
| Humidity                                 | 20% to 90% at wet bulb temperature < +40 °C (non-condensing) |
| Altitude                                 | 0 to 4,572 m (0 to 15,000 feet)                              |
| Vibration                                | 0.5 G maximum, 5 Hz to 500 Hz                                |
| <b>Dimensions</b>                        | See Figure 8-5 through Figure 8-7.                           |
| <b>Weight (Net)</b>                      | 21 kg                                                        |

**Figure 8-5 Dimensions (front view, in millimeters, nominal)**

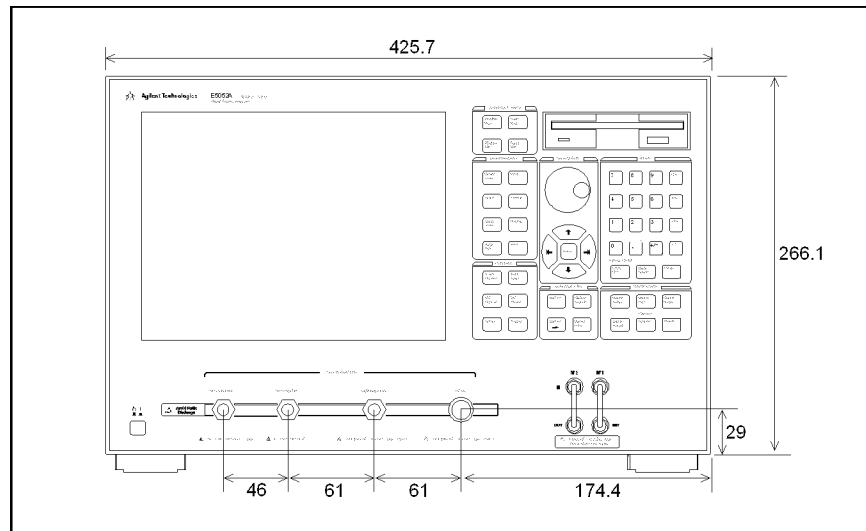
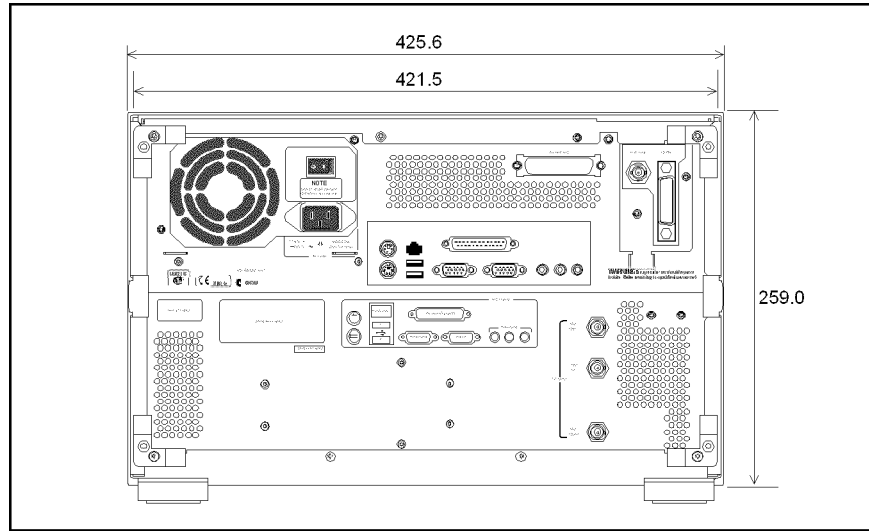




Figure 8-6

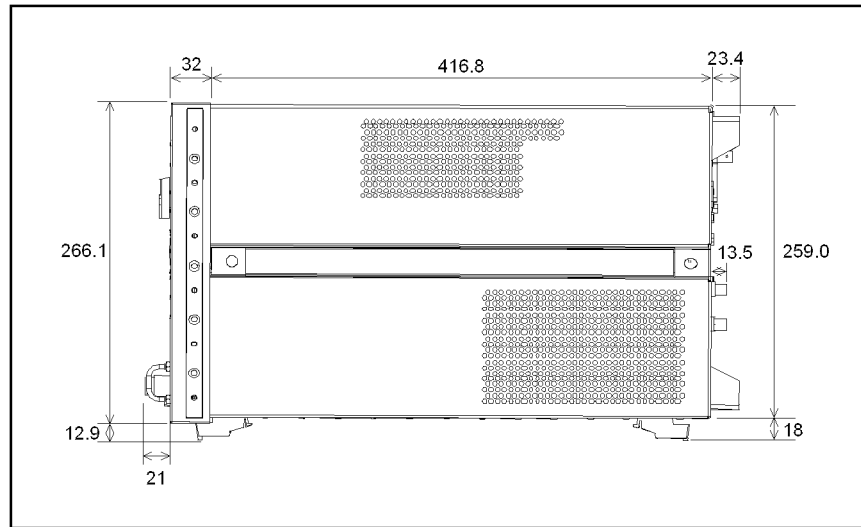
Dimensions (rear view, in millimeters, nominal)



e5052aue002

Figure 8-7

Dimensions (side view, in millimeters, nominal)



e5052aue003

## Measurement capabilities

|                                      |                                                                                                                                                                         |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Number of measurement windows</b> | Up to 4 measurement windows and 1 user defined window.                                                                                                                  |
| <b>Data markers</b>                  | 6 independent markers per trace. Reference marker available for delta marker operation.                                                                                 |
| <b>Marker functions</b>              |                                                                                                                                                                         |
| <b>Marker search</b>                 | Max value, Min value, peak, peak left, peak right, target, target left, target right, multi-peak, multi-target, bandwidth parameters with user-defined bandwidth values |
| <b>Marker-to functions</b>           | Set start, stop, center to active marker stimulus value; set reference to active marker response value.                                                                 |
| <b>Search range</b>                  | User definable                                                                                                                                                          |
| <b>Tracking</b>                      | Performs marker search continuously or on demand                                                                                                                        |
| <b>User defined window</b>           |                                                                                                                                                                         |
| <b>Number of trace</b>               | 8 data traces and 8 memory traces.                                                                                                                                      |

## DC Power/Control Voltage Setting

|                                            |                                             |
|--------------------------------------------|---------------------------------------------|
| <b>Measured number of points per sweep</b> | User definable from 2 to 1001.              |
| <b>Sweep type (parameter)</b>              | Control voltage sweep, power voltage sweep. |
| <b>Control Voltage</b>                     | Set control voltage from -15 V to +35 V.    |
| <b>Power Voltage</b>                       | Set power voltage from 0 V to +16 V.        |

## Trace functions

|                     |                                                                                                       |
|---------------------|-------------------------------------------------------------------------------------------------------|
| <b>Display data</b> | Display current measurement data, memory data, or current measurement and memory data simultaneously. |
| <b>Trace math</b>   | Addition, subtraction, multiplication or division of measured values and memory data.                 |
| <b>Title</b>        | Add custom title to each channel window. Titles are printed on hardcopies of displayed measurements.  |
| <b>Autoscale</b>    | Automatically selects scale resolution and reference value to vertically center the trace.            |
| <b>Statistics</b>   | Calculates and displays mean, standard deviation and peak-to-peak deviation of the data trace.        |

## Storage

|                                 |                                                                                                                                                                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Internal hard disk drive</b> | Store and recall instrument states, calibration data, and trace data on 10 GB, minimum, internal hard drive. Trace data can be saved in CSV (comma separated value) format. All files are MS-DOS® -compatible. Instrument states include all control settings, and memory trace data. |
| <b>File sharing</b>             | Internal hard disk drive (F:) can be accessed from an external Windows® PC through LAN.                                                                                                                                                                                               |
| <b>Disk drive</b>               | Instrument states, calibration data, and trace data can be stored on an internal 3.5 inch 1.4MB floppy disk in MS-DOS® -compatible format.                                                                                                                                            |
| <b>Screen hardcopy</b>          | Printouts of instrument data are directly produced on a printer.                                                                                                                                                                                                                      |

## System capabilities

|                                          |                                                                                                                                                                                                                               |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Familiar graphical user interface</b> | The analyzer employs a graphical user interface based on Windows® operating system. There are three ways to operate the instrument manually: you can use a hardkey interface, a touch screen interface, or a mouse interface. |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

---

## Automation

| Methods                            |                                                                                                                                                                                                      |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Internal analyzer execution</b> | Applications can be developed in a built-in VBA® (Visual Basic for Applications) language. Applications can be executed from within the analyzer via COM (component object model) or using SCPI.     |
| <b>Controlling via GPIB</b>        | The GPIB interface operates to IEEE 488.2 and SCPI protocols. The analyzer can be controlled by a GPIB external controller.<br>The analyzer can control external devices using a USB/GPIB interface. |
| LAN                                |                                                                                                                                                                                                      |
| <b>Standard conformity</b>         | 10 Base-T or 100 Base-TX (automatically switched), Ethertwist, RJ45 connector                                                                                                                        |
| <b>Protocol</b>                    | TCP/IP                                                                                                                                                                                               |
| <b>Function</b>                    | Telnet, SICL-LAN                                                                                                                                                                                     |

---

## **A** **Manual Changes**

This appendix contains the information required to adapt this manual to versions or configurations of the E5052A manufactured earlier than the current printing date of this manual. The information in this manual applies directly to E5052A units having the serial number printed on the title page of this manual.

---

## Manual Changes

To adapt this manual to your E5052A, refer to Table A-1 and Table A-2.

**Table A-1** Manual Changes by Serial Number

| Serial Prefix or Number | Make Manual Changes |
|-------------------------|---------------------|
|                         |                     |

**Table A-2** Manual Changes by Firmware Version

| Version | Make Manual Changes |
|---------|---------------------|
| 1.1     | Change1             |

Agilent Technologies uses a two-part, ten-character serial number that is stamped on the serial number plate (Figure A-1). The first five characters are the serial prefix and the last five digits are the suffix.

**Figure A-1** Example of Serial Number Plate



e5052apj029

## Change 1

The functions listed below are limited when option 011 is installed.

**Table A-3 Limited functions when option 011 is installed**

| Functions            | Limitations                                 |
|----------------------|---------------------------------------------|
| [PN] Start frequency | Minimum value is 10 Hz                      |
| [PN] Correlation     | Not Available (The value is fixed as 1)     |
| [PN] IF Gain         | Not Available (The value is fixed as 10 dB) |
| [FP] Trigger Mode    | Tester mode only                            |

The SCPI commands that related the limited functions above have also the limitations on the initial values and the range of parameters.

Manual Changes  
**Manual Changes**



---

## **B** Troubleshooting

This Chapter explains the steps to take in troubleshooting when your Agilent E5052A appears to be operating improperly. Explanations are also given for the error warning messages displayed on the screen.

## Troubleshooting

This section explains the steps you should take when you believe the Agilent E5052A is operating improperly. The results of these simple investigative procedures may help you avoid the down-time and inconvenience of repair service. The troubleshooting instructions are divided into three categories:

- ❑ “Troubleshooting during Startup” on page 218
- ❑ “Troubleshooting during Operation” on page 219
- ❑ “Troubleshooting for External Devices” on page 221

### Troubleshooting during Startup

#### The system does not start up

- Turning on (I) the standby switch does not start up the system.
  - Confirm that the power cable is properly plugged in.
  - Confirm that the line switch on the rear panel is turned on (○). For information on the line switch on the rear panel, see “7. Line Switch (Always ON)” on page 43.

When taking all of the above measures does not restore normal operation, there is a possibility of a device failure. Unplug the power cable immediately and contact Agilent Technologies’ Customer Contact given at the end of this guide or the company from which you bought the device.

#### The system starts up, but the normal measurement screen does not appear

- The system starts up, but it automatically shuts down immediately.
- The system starts up, but it enters the service mode (the instrument status bar in the lower right part of the screen displays **SVC** in red).
- The measurement screen appears after startup, but the date and time displayed on the instrument status bar in the lower right part of the screen differ greatly from the previous settings.
- The measurement screen appears after startup, but the power-on test fails with Error Message 200 appearing against a red background in the instrument message/warning area in the lower left part of the screen.
  - Execute system recovery. For information on the execution procedure, see “System Recovery” on page 181.

There is a possibility of a device failure. Contact Agilent Technologies’ Customer Contact given at the end of this guide or the company from which you bought the device.

---

#### NOTE

**Occasionally, a few pixels may appear on the screen as a fixed point of blue, green or red. Please note that this is not a failure and does not affect the performance of your product.**

---

## Troubleshooting during Operation

### The sweep action stops during measurement or is not executed

- The sweep action stops during measurement or is not executed, but the front keys and softkeys are operational.

There is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

### The error message “RF level overload” is displayed

- During measurement of the DUT, Error Messages 240 “RF level overload” on page 226 is displayed.  
 This error occurs when the input to the RF IN port exceeds the maximum input level in the measurement. The measurement value obtained in such a case is not correct. In the worst case, a failure (damage to the receiver) may occur.

- Change the measurement condition so that the input to the RF IN port does not exceed the maximum input level.

When this message is displayed with nothing connected to the RF IN port, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

### A clearly abnormal measurement value

- The measurement value is not reproducible, or clearly abnormal.
  - Confirm that the DUT, connection cables, and other parts are connected correctly.
  - Confirm that the connectors and cables used to connect the DUT are free from damage or poor contact.

When taking all of these measures does not result in a correct measurement value, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

### The system cannot be operated manually (front panel keys, keyboard, touch screen and mouse)

- The keyboard or mouse becomes inoperable.
  - Confirm that the keyboard or mouse is connected correctly. When it is connected correctly, turn off the power and restart the system.
- The front panel key or keyboard becomes inoperable.
  - Using the mouse, turn **System – Mics Setup – Key Lock – Front Panel & Keyboard Lock OFF**.
- The touch screen becomes inoperable.
  - Using the front panel keys, turn **System – Mics Setup – Key Lock – Touch Screen & Mouse Lock OFF**.
  - Execute the calibration of the touch screen. For information on the execution procedure, see “Calibration of the Touch Screen” on page 185.
- The mouse becomes inoperable.

## Troubleshooting

### Troubleshooting

- ▶ Using the front panel keys, turn **System – Mics Setup – Key Lock – Touch Screen & Mouse Lock OFF**.
- All of the front panel keys, keyboard, and mouse become inoperable.
  - ▶ Confirm that the keyboard or mouse is connected correctly. When it is connected correctly, turn off the power and restart the system.
- The keyboard and mouse have been connected after power-on.
  - ▶ Turn off the power and restart the system.

When taking all of these measures does not recover operability, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

#### **The screen freezes and all operations become impossible**

- The measurement in progress or screen update is stalled and all of the front panel keys, keyboard, mouse, and touch screen are inoperable.
  - ▶ Press the standby switch to turn off the power and restart the system.

If a similar symptom reappears, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

#### **The System Freezes while in Operation.**

- The system freezes while in operation.
  - ▶ Press the standby switch to turn off the power and restart the system.

#### **The rear cooling fan does not operate**

There is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

#### **You cannot save a file in a floppy disk**

- You cannot save a file on a floppy disk.
  - ▶ Confirm that the floppy disk is initialized. If not, initialize it.
  - ▶ Confirm that the floppy disk is inserted correctly. Insert a floppy disk until the eject button pops up fully.
  - ▶ Confirm that the floppy disk is not write-protected. If it is, unprotect the disk.
  - ▶ Confirm that the floppy disk has free space. If it does not, delete unnecessary files or use a new floppy disk.

When taking all of these measures does not make it possible to save a file, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

### **You cannot read a file from a floppy disk**

- You cannot read a file from a floppy disk.
  - Confirm that the floppy disk is inserted correctly. Insert the floppy disk until the eject button pops up fully.
  - A stored file may be damaged by a magnetic field. Confirm that the file can be read on a PC.

When taking all of these measures does not make it possible to read the file, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

### **An error or warning message appears**

When an error or warning message is displayed on the instrument message/warning area in the lower part of the screen, refer to Error Messages on page 222 and Warning Messages on page 228.

## **Troubleshooting for External Devices**

### **Cannot Output to a Printer**

- Cannot output a measurement screen or data to a printer.
- Attempting to output to a printer causes Error Messages 40 and 41 on page 225 to appear.
  - Confirm that the power to the printer is on and that the power cable is connected correctly.
  - Confirm that the connector cable of the printer is connected correctly.
  - Confirm that the printer is online.
  - Confirm that the printer has not run out of paper.
  - Confirm that the printer has not run out of ink.

When taking all of these measures does not result in printer output, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

### **GPIB does not respond to an external controller/fails to function normally**

- A GPIB device does not respond to the external controller or fails to function normally.
  - Confirm that the GPIB address is defined correctly.
  - Confirm that the GPIB cable is connected.
  - Confirm that another instrument connected by the GPIB cable has the same GPIB address.
  - Confirm that the GPIB cable connection forms a loop.

When taking all of these measures does not result in correct operation of the GPIB device, there is a possibility of a device failure. Contact Agilent Technologies' Customer Contact given at the end of this guide or the company from which you bought the device.

## Error Messages

An error message is displayed against a red background in the instrument message/warning area in the lower-left part of the screen. Touching **Entry Off** key at the front panel or executing the **:DISPlay:MESSage:CLEar** command clears the error message.

Moreover, about a specific error message, when a sweep is started again, the display of an error message may disappear. Errors caused by operation of a front panel key simply appear on the display; with a few exceptions, these are not stored in the error queue.

The log of an error message, a maximum of 100 pieces are recorded, and it can go back and check from the newest error. The following procedures perform the procedure of elimination of an error check and an error log. This operation can be performed only from a front panel. It cannot be operated by the "SCPI" command.

### [System] - Error Log - View Error Log

### [System] - Error Log - Clear Error Log

An error with a positive error number is one uniquely defined for this instrument. On the other hand, an error with a negative error number is basically one defined for common GPIB devices in IEEE488.2

## D

-222

### Data out of range

A data element (not violating the standard) outside the range defined by this instrument has been received. This error occurs, for example, when an integer-based command for which the parameter can be rounded exceeds the range of -65536 to +65536 or when a real-number-based command for which the parameter can be rounded exceeds the range of -9.9e37 to +9.9e37.

280

### DC control overload

The current through the DC CONTROL connector is too large.

270

### DC power overload

The current through the DC POWER connector is too large.

## E

-200

### Execution error

An error associated with execution has been generated for which this instrument cannot specify the error message. This code shows the occurrence of an error associated with execution, as defined in 11.5.1.1.5, IEEE488.2.

## F

72

### Failed to copy file

This error occurs when copying a file (MMEM:COPY command) fails.

74

### Failed to create directory

This error occurs when creating a directory (MMEM:MDIR command) fails.

- 73           **Failed to delete file**  
This error occurs when deleting a file (MMEM:DEL command) fails.
- 91           **Failed to execute user defined key**  
In the user menu function, this error occurs when a disabled softkey is executed.
- 61           **Failed to hide trace**  
In the user window, this error occurs when the show trace “OFF” command is executed to turn off the remaining trace on the window. At least one trace should be visible at all times.
- 60           **Failed to hide window**  
This error occurs when the show window “OFF” command is executed to turn off the remaining window on the screen. At least one window should be visible at all times.
- 70           **Failed to read file**  
This error occurs when a VBA project file (MMEM:LOAD:PROG command) or other type of file cannot be read normally.
- 90           **Failed to stop program**  
This error occurs when stopping a program fails.
- 71           **Failed to write file**  
This error occurs when the display image (MMEM:STOR:IMAG command) for the LCD screen, a VBA project file (MMEM:STOR:PROG command) or other type of file cannot be written normally.
- 257       **File name error**  
A file name error. This message appears when an error exists in the file name and thus a command is not executed correctly. This error occurs, for example, when you try to copy to an improper file name.
- 256       **File name not found**  
The file name specified is not found and thus the command is not executed correctly. This error occurs, for example, when you try to read a file that does not exist in a disk or a disk is not correctly inserted into the drive.
- 80           **File transfer failed**  
This error occurs when writing data into or reading data from a file (MMEM:DATA command) fails.
- I**
- 213       **IF A/D overflow**  
This message appears when the internal IF level is too high and it exceeds the internal A/D converter input range. In the phase noise measurement, check that the DUT’s carrier signal is within the selected frequency band. Also, the message may appear if a DUT that has a large noise level and an unstable output level is measured. When measuring phase noise in such a case, decrease the IF Gain value or increase the sweep start value if possible. In the spectrum monitor measurement, decrease the DUT’s carrier level, or set the reference level or input attenuator value larger than the current setting. In the transient measurement, decrease the DUT’s carrier level, or set the max input level or input attenuator value larger than the current setting.

- 260           **IF Level Overload**  
The IF level is too high. Set the input attenuator value larger than the current setting.
- 312           **IF not found**  
The IF signal cannot be found. In the phase noise measurement, this error occurs when no signal is inputted to the RF IN, or the input level to the RF IN is too low. Also, the message may appear if a DUT that has an unstable output level is measured. Aside from the above reasons, there is the possibility of a device failure. Contact an Agilent Technologies sales office or the company from which you bought the device.
- 224           **Illegal parameter value**  
The parameter value is improperly set.
- 282           **Illegal program name**  
This error occurs when a nonexistent VBA program name is specified by the PROG:SEL:NAME command.
- 213           **Init ignored**  
Because another measurement is in progress, the request for initiating a measurement (“INIT” command) is ignored.
- 250           **Insufficient IF Level**  
The IF level is too low. Set the input attenuator value larger than the current setting.
- 230           **Insufficient RF Level**  
The input level to the RF IN connector is too low.
- L**
- 77            **Load VBA program failed**  
This error occurs when loading a VBA program file fails.
- M**
- 20            **Marker search failed**  
This error occurs when marker search fails.
- 109           **Missing parameter**  
The number of parameters is less than that required for the command, or the parameter has not been entered.
- O**
- 100           **Option not installed**  
The command received has been ignored because of the mismatch between the contents of an option for this instrument and the command.  
This error is not generated by front key operations.



## P

- 220      **Parameter error**
- When a parameter-related error other than Errors -221 through -229 occurs, that error is displayed.
- 108      **Parameter not allowed**
- The number of parameters exceeds that required for the command.
- See the command reference to confirm the required number of parameters.
- 210      **Phase lock loop unlocked**
- This error occurs when the PLL circuit of the instrument becomes unlocked while the measurement is in progress. This message may appear if the DUT's carrier signal is unstable. If this message is displayed in the phase noise measurement, the following problems and corrective actions are shown below.
- The DUT's noise level is too large, or a large level spurious component exists in the measurement range.  
Verify the spectrum of the DUT's output signal.  
Decrease the IF Gain value, or increase the sweep start value when possible.
  - The DUT's output signal is being modulated in frequency.  
Stop the frequency modulation.
  - A large harmonics component is included in the DUT's output signal.  
Insert a low-pass filter between the DUT's output terminal and the E5052A RF IN connector to eliminate the harmonics component.
- 211      **PLL frequency range over**
- This error occurs when the internal PLL circuit becomes unlocked while the measurement is in progress. This error may occur when the frequency of the input signal is out of range.
- 212      **PLL Input overflow**
- This error occurs when the internal PLL circuit becomes unlocked while the measurement is in progress. This error may occur when the level of the input signal is too large.
- 200      **Power on test failed**
- This error occurs when the power-on test fails, indicating a failure of the instrument. Contact an Agilent Technologies sales office or the company from which you bought the instrument.
- 40      **Printer error**
- This error occurs when the previous printing is still in progress or the printer fails (offline, short of paper, etc.) at the time of outputting the display image on the LCD screen to the printer (HCOP:IMM command).
- 41      **Print failed**
- This error occurs when printing fails for reasons other than Error 40, Printer error.
- 284      **Program currently running**
- This error occurs when the PROG:SEL:STAT RUN command is executed when the VBA program is in the Run state.

- 286           **Program runtime error**  
An error occurring when VBA is executed.
- R**
- 75           **Recall failed**  
This error occurs when reading an instrument status file (State01.sta, etc.) (MMEM:LOAD:STAT command) fails.
- 220           **RF freq out of range**  
This error occurs when the DUT's output frequency is not within the measurement range.
- 240           **RF level overload**  
This error occurs when the input to the RF IN port exceeds the maximum input level in the measurement. The measurement value obtained in such a case is not correct. In the worst case, a failure (damage to the receiver) may occur.
- S**
- 76           **Save failed**  
This error occurs when writing an instrument status file (State01.sta, etc.) (MMEM:STOR:STAT command) fails.
- 78           **Save VBA program failed**  
This error occurs when saving a VBA program file fails.
- 310           **System error**  
One of the errors designated as "system errors" in this instrument has occurred.
- T**
- 223           **Too much data**  
The block-, expression-, or character-string-type program data that have been received conform with the standard but exceed the amount that can be processed under the conditions of the memory or conditions specific to memory-related devices. In this instrument, this error occurs when the number of characters exceeds 254 in a character-string parameter.
- 211           **Trigger ignored**  
This instrument receives and detects a trigger command ("TRIG") or an external trigger signal, but it is ignored due to the timing conditions (the instrument is not in the wait-for-trigger state, for example). Change the setup so that a trigger command or an external trigger signal can be sent after the instrument has entered the wait-for-trigger state.
- U**
- 113           **Undefined header**  
A command not defined in this instrument, although not illegal in the syntactic structure, has been received. See the command reference and use correct commands.

311

**Unlock local**

This error occurs when the internal Local signal of the instrument cannot be unlocked. There is the possibility of a device failure. Contact an Agilent Technologies sales office or the company from which you bought the device.

## Warning Message

A warning message is displayed in the instrument message/Warning area in the lower-left part of the display against a gray background. Touching **Entry Off** key at the front panel executing the **:DISPlay:MESSAge:CLEAr** command clears the message. Moreover, about a specific warning message, when a sweep is started again, a warning message may disappear.

This message simply appears on the display, since it is not known to remote environments such as a GPIB. This message is not displayed when another error message (against a red background) has already been displayed in the instrument message/Warning area.

The warning messages for this instrument are as follows:

571

### **DC control out of limit**

This message occurs when the specified DC control voltage or the sweep start/stop DC control voltage for the frequency & power measurement is out of the maximum/minimum allowed voltage of DC control.

570

### **DC power out of limit**

This message occurs when the specified DC power voltage or the sweep start/stop DC power voltage for the frequency & power measurement is out of the maximum/minimum allowance voltage of DC control.

560

### **Incompatible recall file**

This message occurs when an incompatible file is read.

550

### **Marker tracking failed**

This message occurs when marker tracking fails.

503

### **Set RF ATT 0dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 0 dB.

504

### **Set RF ATT 5dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 5 dB.

505

### **Set RF ATT 10dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 10 dB.

506

### **Set RF ATT 15dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 15 dB.

507

### **Set RF ATT 20dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 20 dB.

508

### **Set RF ATT 25dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to

25 dB.

510

**Set RF ATT 30dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 30 dB.

511

**Set RF ATT 35dB**

This message occurs when the input attenuator is set improperly. Set the input attenuator to 35 dB.

Troubleshooting  
**Warning Message**

---

## **C** **List of Default Values**

This appendix gives the default values, settings for Save/Recall of an object, and settings for backing up an object when using the Agilent E5052A.

## List of Default Values, Save/Recall Settings, and Backup Settings

The table below shows the following settings for the Agilent E5052A.

- Factory-shipped settings
- Settings valid when you press **Preset** key (Or when you execute the **:SYST:PRES** command)
- Settings valid when you execute the **\*RST** command
- Settings that permit Save/Recall of a setup state

In the table, states that can be saved/recalled are denoted in the following manner:

\* : Save/Recall can be performed

Blank: Save/Recall cannot be performed

- Settings that are backed up (set state not affected by turning power ON/OFF)

In the table, a setting that is automatically backed up is denoted in the following manner:

\* : Backup operation performed

Blank: Backup operation not performed

- Available means of defining a setting

In the table, the following symbols are used to denote the method(s) that can be used to define a setting.

K: Using the front panel key (including the mouse and keyboard)

C: Using the SCPI command or COM object

---

### NOTE

In the table, the “<<<” symbol shows that the setup is the same as that in the box to the left.



## FP Menu

| Key Operation             | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|---------------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                           |                         | Preset        | *RST |               |        |                                       |
| <b>Attenuator</b>         |                         |               |      |               |        |                                       |
| Input Attenuator          | 5                       | <<            | <<   | *             |        | K/C                                   |
| <b>Average</b>            |                         |               |      |               |        |                                       |
| Averaging                 | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Averaging Restart         |                         |               |      |               |        | K/C                                   |
| Avg Factor                | 16                      | <<            | <<   | *             |        | K/C                                   |
| <b>DC Control Voltage</b> |                         |               |      |               |        |                                       |
| DC Control Delay          | 100m                    | <<            | <<   | *             |        | K/C                                   |
| DC Control Output         | OFF                     | <<            | <<   |               |        | K/C                                   |
| DC Control Voltage        | 0                       | <<            | <<   | *             |        | K/C                                   |
| Max Ctrl Voltage Limit    | 35                      | <<            | <<   | *             |        | K/C                                   |
| Min Ctrl Voltage Limit    | -15                     | <<            | <<   | *             |        | K/C                                   |
| <b>DC Power Voltage</b>   |                         |               |      |               |        |                                       |
| DC Power Delay            | 100m                    | <<            | <<   | *             |        | K/C                                   |
| DC Power Output           | OFF                     | <<            | <<   |               |        | K/C                                   |
| DC Power Voltage          | 0                       | <<            | <<   | *             |        | K/C                                   |
| Max Pwr Voltage Limit     | 16                      | <<            | <<   | *             |        | K/C                                   |
| Min Pwr Voltage Limit     | 0                       | <<            | <<   | *             |        | K/C                                   |
| <b>Display</b>            |                         |               |      |               |        |                                       |
| Edit Title Label          | ""                      | <<            | <<   | *             |        | K/C                                   |
| Marker Information        | LEFT                    | <<            | <<   | *             |        | K/C                                   |
| Meas Condition            | ON                      | <<            | <<   | *             |        | K/C                                   |
| Relative Y-Scale          | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Title Label               | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Update                    | ON                      | <<            | <<   | *             |        | K/C                                   |
| Y # of Digits             | SHORT                   | <<            | <<   | *             |        | K/C                                   |
| <b>Format</b>             |                         |               |      |               |        |                                       |
| Frequency Format          | HZ                      | <<            | <<   | *             |        | K/C                                   |
| Sensitivity Aperture      | 1                       | <<            | <<   | *             |        | K/C                                   |
| <b>Macro Setup</b>        |                         |               |      |               |        |                                       |
| E5052 Event               | OFF                     |               |      |               |        | K/C                                   |
| <b>Echo Window Menu</b>   |                         |               |      |               |        |                                       |
| Clear Echo                |                         |               |      |               |        | K/C                                   |
| Echo Font Size            | 11                      |               |      |               |        | K/C                                   |
| Echo Window               | OFF                     |               |      |               |        | K/C                                   |
| <b>User Menu</b>          |                         |               |      |               |        |                                       |
| User Label 1              |                         |               |      |               |        | K/C                                   |
| <b>Marker</b>             |                         |               |      |               |        |                                       |
| Clear Marker Menu         |                         |               |      |               |        |                                       |

List of Default Values  
FP Menu

| Key Operation      | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Avaible Means of Defining a Setting |
|--------------------|-------------------------|---------------|------|---------------|--------|-------------------------------------|
|                    |                         | Preset        | *RST |               |        |                                     |
| Marker 1           | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Couple             | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Marker List        | OFF                     | <<            | <<   | *             |        | K/C                                 |
| More Functions     |                         |               |      |               |        |                                     |
| Discrete           | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Ref Marker         | 1                       | <<            | <<   | *             |        | K/C                                 |
| Ref Marker Mode    | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Marker Function    |                         |               |      |               |        |                                     |
| Analysis Range (X) | FULLspan                | <<            | <<   | *             |        | K/C                                 |
| Analysis Range (Y) | FULLscale               | <<            | <<   | *             |        | K/C                                 |
| Analysis Type      | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Band Marker X      |                         |               |      |               |        |                                     |
| Band Marker X      | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Center             | 50u                     |               |      |               |        | K/C                                 |
| Span               | 100u                    |               |      |               |        | K/C                                 |
| Start              | 0                       | <<            | <<   | *             |        | K/C                                 |
| Stop               | 100u                    | <<            | <<   | *             |        | K/C                                 |
| Band Marker Y      |                         |               |      |               |        |                                     |
| Band Marker Y      | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Center             | 1.5G                    |               |      |               |        | K/C                                 |
| Span               | 1G                      |               |      |               |        | K/C                                 |
| Start              | 1G                      | <<            | <<   | *             |        | K/C                                 |
| Stop               | 2G                      | <<            | <<   | *             |        | K/C                                 |
| Couple             | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Marker Search      |                         |               |      |               |        |                                     |
| Peak               |                         |               |      |               |        |                                     |
| Peak Excursion     | 0                       | <<            | <<   | *             |        | K/C                                 |
| Peak Polarity      | POSitive                | <<            | <<   | *             |        | K/C                                 |
| Search Left        |                         |               |      |               |        | K/C                                 |
| Search Peak        |                         |               |      |               |        | K/C                                 |
| Search Peak All    |                         |               |      |               |        | K/C                                 |
| Search Right       |                         |               |      |               |        | K/C                                 |
| Search Max         |                         |               |      |               |        | K/C                                 |
| Search Min         |                         |               |      |               |        | K/C                                 |
| Search Range (X)   | FULLspan                | <<            | <<   | *             |        | K/C                                 |
| Search Range (Y)   | FULLscale               | <<            | <<   | *             |        | K/C                                 |
| Target             |                         |               |      |               |        |                                     |
| Search Left        |                         |               |      |               |        | K/C                                 |
| Search Right       |                         |               |      |               |        | K/C                                 |
| Search Target      |                         |               |      |               |        | K/C                                 |
| Search Transition  | BOTH                    | <<            | <<   | *             |        | K/C                                 |
| Search Value       | 0                       | <<            | <<   | *             |        | K/C                                 |

| Key Operation           | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|-------------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                         |                         | Preset        | *RST |               |        |                                       |
| Tracking                | OFF                     | <<            | <<   | *             |        | K/C                                   |
| <b>Measurement View</b> |                         |               |      |               |        |                                       |
| Freq & Power            | PN1                     | <<            | <<   | *             |        | K/C                                   |
| Phase Noise             | PN1                     | <<            | <<   | *             |        | K/C                                   |
| <b>Show Window</b>      |                         |               |      |               |        |                                       |
| Freq & Power            | ON                      | <<            | <<   | *             |        | K/C                                   |
| Phase Noise             | ON                      | <<            | <<   | *             |        | K/C                                   |
| Spectrum Monitor        | ON                      | <<            | <<   | *             |        | K/C                                   |
| Transient               | ON                      | <<            | <<   | *             |        | K/C                                   |
| User                    | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Spectrum Monitor        | PN1                     | <<            | <<   | *             |        | K/C                                   |
| Transient               | PN1                     | <<            | <<   | *             |        | K/C                                   |
| User                    | PN1                     | <<            | <<   | *             |        | K/C                                   |
| <b>Save/Recall</b>      |                         |               |      |               |        |                                       |
| <b>Save State</b>       |                         |               |      |               |        |                                       |
| Save Type               | STAT                    |               |      |               |        | K/C                                   |
| <b>Scale</b>            |                         |               |      |               |        |                                       |
| Auto Scale              |                         |               |      |               |        | K/C                                   |
| Auto Scale All          |                         |               |      |               |        | K/C                                   |
| Divisions               | 10                      | <<            | <<   | *             |        | K/C                                   |
| <b>Marker</b>           |                         |               |      |               |        |                                       |
| Reference               | 1.5G                    | <<            | <<   | *             |        | K/C                                   |
| Reference Position      | 5                       | <<            | <<   | *             |        | K/C                                   |
| Reference Value         | 1.5G                    | <<            | <<   | *             |        | K/C                                   |
| Scale/Div               | 100M                    | <<            | <<   | *             |        | K/C                                   |
| <b>Setup</b>            |                         |               |      |               |        |                                       |
| Freq Resolution         | WIDE                    | <<            | <<   | *             |        | K/C                                   |
| Frequency Band          | HIGH                    | <<            | <<   | *             |        | K/C                                   |
| Point Delay             | 0                       | <<            | <<   | *             |        | K/C                                   |
| Points                  | 201                     | <<            | <<   | *             |        | K/C                                   |
| Sweep Parameter         | CONTRol                 | <<            | <<   | *             |        | K/C                                   |
| <b>Start/Center</b>     |                         |               |      |               |        |                                       |
| DC Control Center       | 50u                     |               |      |               |        | K/C                                   |
| DC Control Span         | 100u                    |               |      |               |        | K/C                                   |
| DC Control Start        | 0                       | <<            | <<   | *             |        | K/C                                   |
| DC Control Stop         | 100u                    | <<            | <<   | *             |        | K/C                                   |
| DC Power Center         | 500u                    |               |      |               |        | K/C                                   |
| DC Power Span           | 1m                      |               |      |               |        | K/C                                   |
| DC Power Start          | 0                       | <<            | <<   | *             |        | K/C                                   |
| DC Power Stop           | 1m                      | <<            | <<   | *             |        | K/C                                   |
| <b>Stop/Span</b>        |                         |               |      |               |        |                                       |
| DC Control Center       | 50u                     |               |      |               |        | K/C                                   |

List of Default Values  
FP Menu

| Key Operation           | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Avaible Means of Defining a Setting |
|-------------------------|-------------------------|---------------|------|---------------|--------|-------------------------------------|
|                         |                         | Preset        | *RST |               |        |                                     |
| DC Control Span         | 100u                    |               |      |               |        | K/C                                 |
| DC Control Start        | 0                       | <<            | <<   | *             |        | K/C                                 |
| DC Control Stop         | 100u                    | <<            | <<   | *             |        | K/C                                 |
| DC Power Center         | 500u                    |               |      |               |        | K/C                                 |
| DC Power Span           | 1m                      |               |      |               |        | K/C                                 |
| DC Power Start          | 0                       | <<            | <<   | *             |        | K/C                                 |
| DC Power Stop           | 1m                      | <<            | <<   | *             |        | K/C                                 |
| <b>System</b>           |                         |               |      |               |        |                                     |
| Abort Printing          |                         |               |      |               |        | K/C                                 |
| Backlight               | ON                      |               |      |               |        | K/C                                 |
| Invert Image            | NORMal                  | <<            | <<   | *             |        | K/C                                 |
| <b>Misc Setup</b>       |                         |               |      |               |        |                                     |
| <b>Beeper</b>           |                         |               |      |               |        |                                     |
| Beep Complete           | ON                      | <<            | <<   | *             |        | K/C                                 |
| Beep Warning            | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Test Beep Complete      |                         |               |      |               |        | K/C                                 |
| Test Beep Warning       |                         |               |      |               |        | K/C                                 |
| <b>Clock Setup</b>      |                         |               |      |               |        |                                     |
| Show Clock              | ON                      | <<            | <<   | *             |        | K/C                                 |
| <b>Trace View</b>       |                         |               |      |               |        |                                     |
| Aperture                | 1.5                     | <<            | <<   | *             |        | K/C                                 |
| Clear Persistent Data   |                         |               |      |               |        | K/C                                 |
| Data Hold               | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Data Math               | NORMal                  | <<            | <<   | *             |        | K/C                                 |
| Display Trace           | DATA                    | <<            | <<   | *             |        | K/C                                 |
| Persistence Mode        | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Smoothing               | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Trace Label             | "Freq"                  | <<            | <<   | *             |        | K/C                                 |
| <b>Trigger</b>          |                         |               |      |               |        |                                     |
| Ext Trig Polarity       | NEGative                | <<            | <<   | *             |        | K/C                                 |
| Mode                    | ANALyzer(standard)      | <<            | <<   | *             |        | K/C                                 |
|                         | TESTer(option 011)      | <<            | <<   | *             |        | K/C                                 |
| Source                  | INTernal                | <<            | <<   | *             |        | K/C                                 |
| Trigger to Freq & Power | PN1                     | <<            | <<   | *             |        | K/C                                 |

## PN Menu

| Key Operation             | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|---------------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                           |                         | Preset        | *RST |               |        |                                       |
| <b>Attenuator</b>         |                         |               |      |               |        |                                       |
| Input Attenuator          | 5                       | <<            | <<   | *             |        | K/C                                   |
| <b>Average</b>            |                         |               |      |               |        |                                       |
| Averaging                 | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Averaging Restart         |                         |               |      |               |        | K/C                                   |
| Avg Factor                | 16                      | <<            | <<   | *             |        | K/C                                   |
| Correlation               | 1                       | <<            | <<   | *             |        | K/C                                   |
| <b>DC Control Voltage</b> |                         |               |      |               |        |                                       |
| DC Control Delay          | 100m                    | <<            | <<   | *             |        | K/C                                   |
| DC Control Output         | OFF                     | <<            | <<   |               |        | K/C                                   |
| DC Control Voltage        | 0                       | <<            | <<   | *             |        | K/C                                   |
| Max Ctrl Voltage Limit    | 35                      | <<            | <<   | *             |        | K/C                                   |
| Min Ctrl Voltage Limit    | -15                     | <<            | <<   | *             |        | K/C                                   |
| <b>DC Power Voltage</b>   |                         |               |      |               |        |                                       |
| DC Power Delay            | 100m                    | <<            | <<   | *             |        | K/C                                   |
| DC Power Output           | OFF                     | <<            | <<   |               |        | K/C                                   |
| DC Power Voltage          | 0                       | <<            | <<   | *             |        | K/C                                   |
| Max Pwr Voltage Limit     | 16                      | <<            | <<   | *             |        | K/C                                   |
| Min Pwr Voltage Limit     | 0                       | <<            | <<   | *             |        | K/C                                   |
| <b>Display</b>            |                         |               |      |               |        |                                       |
| Edit Title Label          | ""                      | <<            | <<   | *             |        | K/C                                   |
| Marker Information        | RIGHT                   | <<            | <<   | *             |        | K/C                                   |
| Meas Condition            | ON                      | <<            | <<   | *             |        | K/C                                   |
| Relative Y-Scale          | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Title Label               | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Update                    | ON                      | <<            | <<   | *             |        | K/C                                   |
| Y # of Digits             | SHORT                   | <<            | <<   | *             |        | K/C                                   |
| <b>Macro Setup</b>        |                         |               |      |               |        |                                       |
| E5052 Event               | OFF                     |               |      |               |        | K/C                                   |
| <b>Echo Window Menu</b>   |                         |               |      |               |        |                                       |
| Clear Echo                |                         |               |      |               |        | K/C                                   |
| Echo Font Size            | 11                      |               |      |               |        | K/C                                   |
| Echo Window               | OFF                     |               |      |               |        | K/C                                   |
| <b>User Menu</b>          |                         |               |      |               |        |                                       |
| User Label 1              |                         |               |      |               |        | K/C                                   |
| <b>Marker</b>             |                         |               |      |               |        |                                       |
| <b>Clear Marker Menu</b>  |                         |               |      |               |        |                                       |
| Marker 1                  | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Marker List               | OFF                     | <<            | <<   | *             |        | K/C                                   |

List of Default Values  
PN Menu

| Key Operation          | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Avaible Means of Defining a Setting |
|------------------------|-------------------------|---------------|------|---------------|--------|-------------------------------------|
|                        |                         | Preset        | *RST |               |        |                                     |
| <b>More Functions</b>  |                         |               |      |               |        |                                     |
| Discrete               | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Ref Marker             | 1                       | <<            | <<   | *             |        | K/C                                 |
| Ref Marker Mode        | OFF                     | <<            | <<   | *             |        | K/C                                 |
| <b>Marker Function</b> |                         |               |      |               |        |                                     |
| Analysis Range (X)     | FULLspan                | <<            | <<   | *             |        | K/C                                 |
| Analysis Range (Y)     | FULLscale               | <<            | <<   | *             |        | K/C                                 |
| Analysis Type          | OFF                     | <<            | <<   | *             |        | K/C                                 |
| <b>Band Marker X</b>   |                         |               |      |               |        |                                     |
| Band Marker X          | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Center                 | 5.0005M                 |               |      |               |        | K/C                                 |
| Span                   | 9.999M                  |               |      |               |        | K/C                                 |
| Start                  | 1k                      | <<            | <<   | *             |        | K/C                                 |
| Stop                   | 10M                     | <<            | <<   | *             |        | K/C                                 |
| <b>Band Marker Y</b>   |                         |               |      |               |        |                                     |
| Band Marker Y          | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Center                 | -100                    |               |      |               |        | K/C                                 |
| Span                   | 160                     |               |      |               |        | K/C                                 |
| Start                  | -180                    | <<            | <<   | *             |        | K/C                                 |
| Stop                   | -20                     | <<            | <<   | *             |        | K/C                                 |
| <b>Marker Search</b>   |                         |               |      |               |        |                                     |
| <b>Peak</b>            |                         |               |      |               |        |                                     |
| Peak Excursion         | 0                       | <<            | <<   | *             |        | K/C                                 |
| Peak Polarity          | POSitive                | <<            | <<   | *             |        | K/C                                 |
| Search Left            |                         |               |      |               |        | K/C                                 |
| Search Peak            |                         |               |      |               |        | K/C                                 |
| Search Peak All        |                         |               |      |               |        | K/C                                 |
| Search Right           |                         |               |      |               |        | K/C                                 |
| Search Max             |                         |               |      |               |        | K/C                                 |
| Search Min             |                         |               |      |               |        | K/C                                 |
| Search Range (X)       | FULLspan                | <<            | <<   | *             |        | K/C                                 |
| Search Range (Y)       | FULLscale               | <<            | <<   | *             |        | K/C                                 |
| <b>Target</b>          |                         |               |      |               |        |                                     |
| Search Left            |                         |               |      |               |        | K/C                                 |
| Search Right           |                         |               |      |               |        | K/C                                 |
| Search Target          |                         |               |      |               |        | K/C                                 |
| Search Transition      | BOTH                    | <<            | <<   | *             |        | K/C                                 |
| Search Value           | 0                       | <<            | <<   | *             |        | K/C                                 |
| Tracking               | OFF                     | <<            | <<   | *             |        | K/C                                 |
| <b>Marker To</b>       |                         |               |      |               |        |                                     |
| <b>Marker</b>          |                         |               |      |               |        |                                     |
| Start                  | 1k                      | <<            | <<   | *             |        | K/C                                 |

| Key Operation           | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|-------------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                         |                         | Preset        | *RST |               |        |                                       |
| Stop                    | 10M                     | <<            | <<   | *             |        | K/C                                   |
| <b>Measurement View</b> |                         |               |      |               |        |                                       |
| Freq & Power            | PN1                     | <<            | <<   | *             |        | K/C                                   |
| Phase Noise             | PN1                     | <<            | <<   | *             |        | K/C                                   |
| <b>Show Window</b>      |                         |               |      |               |        |                                       |
| Freq & Power            | ON                      | <<            | <<   | *             |        | K/C                                   |
| Phase Noise             | ON                      | <<            | <<   | *             |        | K/C                                   |
| Spectrum Monitor        | ON                      | <<            | <<   | *             |        | K/C                                   |
| Transient               | ON                      | <<            | <<   | *             |        | K/C                                   |
| User                    | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Spectrum Monitor        | PN1                     | <<            | <<   | *             |        | K/C                                   |
| Transient               | PN1                     | <<            | <<   | *             |        | K/C                                   |
| User                    | PN1                     | <<            | <<   | *             |        | K/C                                   |
| <b>Save/Recall</b>      |                         |               |      |               |        |                                       |
| <b>Save State</b>       |                         |               |      |               |        |                                       |
| Save Type               | STAT                    |               |      |               |        | K/C                                   |
| <b>Scale</b>            |                         |               |      |               |        |                                       |
| Auto Scale              |                         |               |      |               |        | K/C                                   |
| Divisions               | 16                      | <<            | <<   | *             |        | K/C                                   |
| <b>Marker</b>           |                         |               |      |               |        |                                       |
| Reference               | -20                     | <<            | <<   | *             |        | K/C                                   |
| Reference Position      | 16                      | <<            | <<   | *             |        | K/C                                   |
| Reference Value         | -20                     | <<            | <<   | *             |        | K/C                                   |
| Scale/Div               | 10                      | <<            | <<   | *             |        | K/C                                   |
| <b>Setup</b>            |                         |               |      |               |        |                                       |
| Frequency Band          | BAND4                   | <<            | <<   | *             |        | K/C                                   |
| IF Gain                 | 20                      | <<            | <<   | *             |        | K/C                                   |
| LO PhNoise Optimize     | WIDE                    | <<            | <<   | *             |        | K/C                                   |
| <b>Start</b>            |                         |               |      |               |        |                                       |
| 100Hz                   | 1k                      | <<            | <<   | *             |        | K/C                                   |
| 10Hz                    | 1k                      | <<            | <<   | *             |        | K/C                                   |
| 1Hz                     | 1k                      | <<            | <<   | *             |        | K/C                                   |
| 1kHz                    | 1k                      | <<            | <<   | *             |        | K/C                                   |
| <b>Stop</b>             |                         |               |      |               |        |                                       |
| 100kHz                  | 10M                     | <<            | <<   | *             |        | K/C                                   |
| 10MHz                   | 10M                     | <<            | <<   | *             |        | K/C                                   |
| 1MHz                    | 10M                     | <<            | <<   | *             |        | K/C                                   |
| 40MHz                   | 10M                     | <<            | <<   | *             |        | K/C                                   |
| 5MHz                    | 10M                     | <<            | <<   | *             |        | K/C                                   |
| <b>System</b>           |                         |               |      |               |        |                                       |
| Abort Printing          |                         |               |      |               |        | K/C                                   |
| Backlight               | ON                      |               |      |               |        | K/C                                   |

List of Default Values  
PN Menu

| Key Operation          | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|------------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                        |                         | Preset        | *RST |               |        |                                       |
| Invert Image           | NORMal                  | <<            | <<   | *             |        | K/C                                   |
| Misc Setup             |                         |               |      |               |        |                                       |
| Beeper                 |                         |               |      |               |        |                                       |
| Beep Complete          | ON                      | <<            | <<   | *             |        | K/C                                   |
| Beep Warning           | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Test Beep Complete     |                         |               |      |               |        | K/C                                   |
| Test Beep Warning      |                         |               |      |               |        | K/C                                   |
| Clock Setup            |                         |               |      |               |        |                                       |
| Show Clock             | ON                      | <<            | <<   | *             |        | K/C                                   |
| Trace View             |                         |               |      |               |        |                                       |
| Aperture               | 1.5                     | <<            | <<   | *             |        | K/C                                   |
| Clear Persistent Data  |                         |               |      |               |        | K/C                                   |
| Data Hold              | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Data Math              | NORMal                  | <<            | <<   | *             |        | K/C                                   |
| Display Trace          | DATA                    | <<            | <<   | *             |        | K/C                                   |
| Omitting Spurious      | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Persistence Mode       | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Smoothing              | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Trace Label            | "Phase Noise"           | <<            | <<   | *             |        | K/C                                   |
| Trigger                |                         |               |      |               |        |                                       |
| Ext Trig Polarity      | NEGative                | <<            | <<   | *             |        | K/C                                   |
| Source                 | INTernal                | <<            | <<   | *             |        | K/C                                   |
| Trigger to Phase Noise | PN1                     | <<            | <<   | *             |        | K/C                                   |



## SP Menu

| Key Operation             | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|---------------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                           |                         | Preset        | *RST |               |        |                                       |
| <b>Attenuator</b>         |                         |               |      |               |        |                                       |
| Input Attenuator          | 5                       | <<            | <<   | *             |        | K/C                                   |
| <b>Average/BW</b>         |                         |               |      |               |        |                                       |
| Averaging                 | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Averaging Restart         |                         |               |      |               |        | K/C                                   |
| Averaging Type            | LOGarithmic             | <<            | <<   | *             |        | K/C                                   |
| Avg Factor                | 16                      | <<            | <<   | *             |        | K/C                                   |
| RBW                       | 25k                     | <<            | <<   | *             |        | K/C                                   |
| <b>DC Control Voltage</b> |                         |               |      |               |        |                                       |
| DC Control Delay          | 100m                    | <<            | <<   | *             |        | K/C                                   |
| DC Control Output         | OFF                     | <<            | <<   |               |        | K/C                                   |
| DC Control Voltage        | 0                       | <<            | <<   | *             |        | K/C                                   |
| Max Ctrl Voltage Limit    | 35                      | <<            | <<   | *             |        | K/C                                   |
| Min Ctrl Voltage Limit    | -15                     | <<            | <<   | *             |        | K/C                                   |
| <b>DC Power Voltage</b>   |                         |               |      |               |        |                                       |
| DC Power Delay            | 100m                    | <<            | <<   | *             |        | K/C                                   |
| DC Power Output           | OFF                     | <<            | <<   |               |        | K/C                                   |
| DC Power Voltage          | 0                       | <<            | <<   | *             |        | K/C                                   |
| Max Pwr Voltage Limit     | 16                      | <<            | <<   | *             |        | K/C                                   |
| Min Pwr Voltage Limit     | 0                       | <<            | <<   | *             |        | K/C                                   |
| <b>Display</b>            |                         |               |      |               |        |                                       |
| Edit Title Label          | ""                      | <<            | <<   | *             |        | K/C                                   |
| Marker Information        | LEFT                    | <<            | <<   | *             |        | K/C                                   |
| Meas Condition            | ON                      | <<            | <<   | *             |        | K/C                                   |
| Relative Y-Scale          | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Title Label               | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Update                    | ON                      | <<            | <<   | *             |        | K/C                                   |
| Y # of Digits             | SHORT                   | <<            | <<   | *             |        | K/C                                   |
| <b>Format</b>             |                         |               |      |               |        |                                       |
| Detector Mode             | POSitive                | <<            | <<   | *             |        | K/C                                   |
| Format                    | DBM                     | <<            | <<   | *             |        | K/C                                   |
| <b>Macro Setup</b>        |                         |               |      |               |        |                                       |
| E5052 Event               | OFF                     |               |      |               |        | K/C                                   |
| <b>Echo Window Menu</b>   |                         |               |      |               |        |                                       |
| Clear Echo                |                         |               |      |               |        | K/C                                   |
| Echo Font Size            | 11                      |               |      |               |        | K/C                                   |
| Echo Window               | OFF                     |               |      |               |        | K/C                                   |
| <b>User Menu</b>          |                         |               |      |               |        |                                       |
| User Label 1              |                         |               |      |               |        | K/C                                   |

List of Default Values  
SP Menu

| Key Operation            | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|--------------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                          |                         | Preset        | *RST |               |        |                                       |
| <b>Marker</b>            |                         |               |      |               |        |                                       |
| <b>Clear Marker Menu</b> |                         |               |      |               |        |                                       |
| Marker 1                 | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Marker List              | OFF                     | <<            | <<   | *             |        | K/C                                   |
| <b>More Functions</b>    |                         |               |      |               |        |                                       |
| Discrete                 | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Ref Marker               | 1                       | <<            | <<   | *             |        | K/C                                   |
| Ref Marker Mode          | OFF                     | <<            | <<   | *             |        | K/C                                   |
| <b>Marker Function</b>   |                         |               |      |               |        |                                       |
| Analysis Range (X)       | FULLspan                | <<            | <<   | *             |        | K/C                                   |
| Analysis Range (Y)       | FULLscale               | <<            | <<   | *             |        | K/C                                   |
| Analysis Type            | OFF                     | <<            | <<   | *             |        | K/C                                   |
| <b>Band Marker X</b>     |                         |               |      |               |        |                                       |
| Band Marker X            | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Center                   | 1G                      |               |      |               |        | K/C                                   |
| Span                     | 15M                     |               |      |               |        | K/C                                   |
| Start                    | 992.5M                  | <<            | <<   | *             |        | K/C                                   |
| Stop                     | 1.0075G                 | <<            | <<   | *             |        | K/C                                   |
| <b>Band Marker Y</b>     |                         |               |      |               |        |                                       |
| Band Marker Y            | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Center                   | -40                     |               |      |               |        | K/C                                   |
| Span                     | 100                     |               |      |               |        | K/C                                   |
| Start                    | -90                     | <<            | <<   | *             |        | K/C                                   |
| Stop                     | 10                      | <<            | <<   | *             |        | K/C                                   |
| <b>Marker Search</b>     |                         |               |      |               |        |                                       |
| <b>Peak</b>              |                         |               |      |               |        |                                       |
| Peak Excursion           | 0                       | <<            | <<   | *             |        | K/C                                   |
| Peak Polarity            | POSitive                | <<            | <<   | *             |        | K/C                                   |
| Search Left              |                         |               |      |               |        | K/C                                   |
| Search Peak              |                         |               |      |               |        | K/C                                   |
| Search Peak All          |                         |               |      |               |        | K/C                                   |
| Search Right             |                         |               |      |               |        | K/C                                   |
| Search Max               |                         |               |      |               |        | K/C                                   |
| Search Min               |                         |               |      |               |        | K/C                                   |
| Search Range (X)         | FULLspan                | <<            | <<   | *             |        | K/C                                   |
| Search Range (Y)         | FULLscale               | <<            | <<   | *             |        | K/C                                   |
| <b>Target</b>            |                         |               |      |               |        |                                       |
| Search Left              |                         |               |      |               |        | K/C                                   |
| Search Right             |                         |               |      |               |        | K/C                                   |
| Search Target            |                         |               |      |               |        | K/C                                   |
| Search Transition        | BOTH                    | <<            | <<   | *             |        | K/C                                   |
| Search Value             | 0                       | <<            | <<   | *             |        | K/C                                   |

| Key Operation           | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|-------------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                         |                         | Preset        | *RST |               |        |                                       |
| Tracking                | OFF                     | <<            | <<   | *             |        | K/C                                   |
| <b>Marker To</b>        |                         |               |      |               |        |                                       |
| <b>Marker</b>           |                         |               |      |               |        |                                       |
| Center                  | 1G                      | <<            | <<   | *             |        | K/C                                   |
| Start                   | 992.5M                  | <<            | <<   | *             |        | K/C                                   |
| Stop                    | 1.0075G                 | <<            | <<   | *             |        | K/C                                   |
| <b>Measurement View</b> |                         |               |      |               |        |                                       |
| Freq & Power            | PN1                     | <<            | <<   | *             |        | K/C                                   |
| Phase Noise             | PN1                     | <<            | <<   | *             |        | K/C                                   |
| <b>Show Window</b>      |                         |               |      |               |        |                                       |
| Freq & Power            | ON                      | <<            | <<   | *             |        | K/C                                   |
| Phase Noise             | ON                      | <<            | <<   | *             |        | K/C                                   |
| Spectrum Monitor        | ON                      | <<            | <<   | *             |        | K/C                                   |
| Transient               | ON                      | <<            | <<   | *             |        | K/C                                   |
| User                    | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Spectrum Monitor        | PN1                     | <<            | <<   | *             |        | K/C                                   |
| Transient               | PN1                     | <<            | <<   | *             |        | K/C                                   |
| User                    | PN1                     | <<            | <<   | *             |        | K/C                                   |
| <b>Save/Recall</b>      |                         |               |      |               |        |                                       |
| <b>Save State</b>       |                         |               |      |               |        |                                       |
| Save Type               | STAT                    |               |      |               |        | K/C                                   |
| <b>Scale</b>            |                         |               |      |               |        |                                       |
| Auto Scale              |                         |               |      |               |        | K/C                                   |
| Divisions               | 10                      | <<            | <<   | *             |        | K/C                                   |
| <b>Marker</b>           |                         |               |      |               |        |                                       |
| Reference               | 10                      | <<            | <<   | *             |        | K/C                                   |
| Reference Position      | 10                      | <<            | <<   | *             |        | K/C                                   |
| Reference Value         | 10                      | <<            | <<   | *             |        | K/C                                   |
| Scale/Div               | 10                      | <<            | <<   | *             |        | K/C                                   |
| <b>Setup</b>            |                         |               |      |               |        |                                       |
| Reference Level         | 5                       | <<            | <<   | *             |        | K/C                                   |
| <b>Start/Center</b>     |                         |               |      |               |        |                                       |
| Center                  | 1G                      | <<            | <<   | *             |        | K/C                                   |
| Span                    | 15M                     | <<            | <<   | *             |        | K/C                                   |
| Start                   | 992.5M                  | <<            | <<   | *             |        | K/C                                   |
| Stop                    | 1.0075G                 | <<            | <<   | *             |        | K/C                                   |
| <b>Stop/Span</b>        |                         |               |      |               |        |                                       |
| Center                  | 1G                      | <<            | <<   | *             |        | K/C                                   |
| Span                    | 15M                     | <<            | <<   | *             |        | K/C                                   |
| Start                   | 992.5M                  | <<            | <<   | *             |        | K/C                                   |
| Stop                    | 1.0075G                 | <<            | <<   | *             |        | K/C                                   |
| <b>System</b>           |                         |               |      |               |        |                                       |

List of Default Values  
SP Menu

| Key Operation               | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Avaible Means of Defining a Setting |
|-----------------------------|-------------------------|---------------|------|---------------|--------|-------------------------------------|
|                             |                         | Preset        | *RST |               |        |                                     |
| Abort Printing              |                         |               |      |               |        | K/C                                 |
| Backlight                   | ON                      |               |      |               |        | K/C                                 |
| Invert Image                | NORMal                  | <<            | <<   | *             |        | K/C                                 |
| Misc Setup                  |                         |               |      |               |        |                                     |
| Beeper                      |                         |               |      |               |        |                                     |
| Beep Complete               | ON                      | <<            | <<   | *             |        | K/C                                 |
| Beep Warning                | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Test Beep Complete          |                         |               |      |               |        | K/C                                 |
| Test Beep Warning           |                         |               |      |               |        | K/C                                 |
| Clock Setup                 |                         |               |      |               |        |                                     |
| Show Clock                  | ON                      | <<            | <<   | *             |        | K/C                                 |
| Trace View                  |                         |               |      |               |        |                                     |
| Aperture                    | 1.5                     | <<            | <<   | *             |        | K/C                                 |
| Clear Persistent Data       |                         |               |      |               |        | K/C                                 |
| Data Hold                   | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Data Math                   | NORMal                  | <<            | <<   | *             |        | K/C                                 |
| Display Trace               | DATA                    | <<            | <<   | *             |        | K/C                                 |
| Persistence Mode            | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Smoothing                   | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Trace Label                 | "Spectrum"              | <<            | <<   | *             |        | K/C                                 |
| Trigger                     |                         |               |      |               |        |                                     |
| Ext Trig Polarity           | NEGative                | <<            | <<   | *             |        | K/C                                 |
| Source                      | INTernal                | <<            | <<   | *             |        | K/C                                 |
| Trigger to Spectrum Monitor | PN1                     | <<            | <<   | *             |        | K/C                                 |

## TR Menu

| Key Operation             | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|---------------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                           |                         | Preset        | *RST |               |        |                                       |
| <b>Attenuator</b>         |                         |               |      |               |        |                                       |
| Input Attenuator          | 5                       | <<            | <<   | *             |        | K/C                                   |
| <b>Average</b>            |                         |               |      |               |        |                                       |
| Averaging                 | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Averaging Restart         |                         |               |      |               |        | K/C                                   |
| Avg Factor                | 16                      | <<            | <<   | *             |        | K/C                                   |
| <b>DC Control Voltage</b> |                         |               |      |               |        |                                       |
| DC Control Delay          | 100m                    | <<            | <<   | *             |        | K/C                                   |
| DC Control Output         | OFF                     | <<            | <<   |               |        | K/C                                   |
| DC Control Voltage        | 0                       | <<            | <<   | *             |        | K/C                                   |
| Max Ctrl Voltage Limit    | 35                      | <<            | <<   | *             |        | K/C                                   |
| Min Ctrl Voltage Limit    | -15                     | <<            | <<   | *             |        | K/C                                   |
| <b>DC Power Voltage</b>   |                         |               |      |               |        |                                       |
| DC Power Delay            | 100m                    | <<            | <<   | *             |        | K/C                                   |
| DC Power Output           | OFF                     | <<            | <<   |               |        | K/C                                   |
| DC Power Voltage          | 0                       | <<            | <<   | *             |        | K/C                                   |
| Max Pwr Voltage Limit     | 16                      | <<            | <<   | *             |        | K/C                                   |
| Min Pwr Voltage Limit     | 0                       | <<            | <<   | *             |        | K/C                                   |
| <b>Display</b>            |                         |               |      |               |        |                                       |
| Edit Title Label          | ""                      | <<            | <<   | *             |        | K/C                                   |
| Marker Information        | LEFT                    | <<            | <<   | *             |        | K/C                                   |
| Meas Condition            | ON                      | <<            | <<   | *             |        | K/C                                   |
| Relative Y-Scale          | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Title Label               | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Update                    | ON                      | <<            | <<   | *             |        | K/C                                   |
| Y # of Digits             | SHORT                   | <<            | <<   | *             |        | K/C                                   |
| <b>Format</b>             |                         |               |      |               |        |                                       |
| Phase Unit                | DEG                     | <<            | <<   | *             |        | K/C                                   |
| Wrap Phase                | ON                      | <<            | <<   | *             |        | K/C                                   |
| <b>Macro Setup</b>        |                         |               |      |               |        |                                       |
| E5052 Event               | OFF                     |               |      |               |        | K/C                                   |
| <b>Echo Window Menu</b>   |                         |               |      |               |        |                                       |
| Clear Echo                |                         |               |      |               |        | K/C                                   |
| Echo Font Size            | 11                      |               |      |               |        | K/C                                   |
| Echo Window               | OFF                     |               |      |               |        | K/C                                   |
| <b>User Menu</b>          |                         |               |      |               |        |                                       |
| User Label 1              |                         |               |      |               |        | K/C                                   |
| <b>Marker</b>             |                         |               |      |               |        |                                       |
| Clear Marker Menu         |                         |               |      |               |        |                                       |

List of Default Values  
TR Menu

| Key Operation      | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|--------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                    |                         | Preset        | *RST |               |        |                                       |
| Marker 1           | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Couple             | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Marker List        | OFF                     | <<            | <<   | *             |        | K/C                                   |
| More Functions     |                         |               |      |               |        |                                       |
| Discrete           | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Ref Marker         | 1                       | <<            | <<   | *             |        | K/C                                   |
| Ref Marker Mode    | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Marker Function    |                         |               |      |               |        |                                       |
| Analysis Range (X) | FULLspan                | <<            | <<   | *             |        | K/C                                   |
| Analysis Range (Y) | FULLscale               | <<            | <<   | *             |        | K/C                                   |
| Analysis Type      | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Band Marker X      |                         |               |      |               |        |                                       |
| Band Marker X      | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Center             | 25m                     |               |      |               |        | K/C                                   |
| Span               | 50m                     |               |      |               |        | K/C                                   |
| Start              | -50m                    | <<            | <<   | *             |        | K/C                                   |
| Stop               | 50m                     | <<            | <<   | *             |        | K/C                                   |
| Band Marker Y      |                         |               |      |               |        |                                       |
| Band Marker Y      | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Center             | 800M                    |               |      |               |        | K/C                                   |
| Span               | 800M                    |               |      |               |        | K/C                                   |
| Start              | 400M                    | <<            | <<   | *             |        | K/C                                   |
| Stop               | 1.2G                    | <<            | <<   | *             |        | K/C                                   |
| Couple             | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Marker Search      |                         |               |      |               |        |                                       |
| Peak               |                         |               |      |               |        |                                       |
| Peak Excursion     | 0                       | <<            | <<   | *             |        | K/C                                   |
| Peak Polarity      | POSitive                | <<            | <<   | *             |        | K/C                                   |
| Search Left        |                         |               |      |               |        | K/C                                   |
| Search Peak        |                         |               |      |               |        | K/C                                   |
| Search Peak All    |                         |               |      |               |        | K/C                                   |
| Search Right       |                         |               |      |               |        | K/C                                   |
| Search Max         |                         |               |      |               |        | K/C                                   |
| Search Min         |                         |               |      |               |        | K/C                                   |
| Search Range (X)   | FULLspan                | <<            | <<   | *             |        | K/C                                   |
| Search Range (Y)   | FULLscale               | <<            | <<   | *             |        | K/C                                   |
| Target             |                         |               |      |               |        |                                       |
| Search Left        |                         |               |      |               |        | K/C                                   |
| Search Right       |                         |               |      |               |        | K/C                                   |
| Search Target      |                         |               |      |               |        | K/C                                   |
| Search Transition  | BOTH                    | <<            | <<   | *             |        | K/C                                   |
| Search Value       | 0                       | <<            | <<   | *             |        | K/C                                   |

| Key Operation           | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|-------------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                         |                         | Preset        | *RST |               |        |                                       |
| Tracking                | OFF                     | <<            | <<   | *             |        | K/C                                   |
| <b>Marker To</b>        |                         |               |      |               |        |                                       |
| <b>Marker</b>           |                         |               |      |               |        |                                       |
| Phase Reference         | 1G                      | <<            | <<   | *             |        | K/C                                   |
| Target Freq             | 1G                      | <<            | <<   | *             |        | K/C                                   |
| <b>Measurement View</b> |                         |               |      |               |        |                                       |
| Freq & Power            | PN1                     | <<            | <<   | *             |        | K/C                                   |
| Phase Noise             | PN1                     | <<            | <<   | *             |        | K/C                                   |
| <b>Show Window</b>      |                         |               |      |               |        |                                       |
| Freq & Power            | ON                      | <<            | <<   | *             |        | K/C                                   |
| Phase Noise             | ON                      | <<            | <<   | *             |        | K/C                                   |
| Spectrum Monitor        | ON                      | <<            | <<   | *             |        | K/C                                   |
| Transient               | ON                      | <<            | <<   | *             |        | K/C                                   |
| User                    | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Spectrum Monitor        | PN1                     | <<            | <<   | *             |        | K/C                                   |
| Transient               | PN1                     | <<            | <<   | *             |        | K/C                                   |
| User                    | PN1                     | <<            | <<   | *             |        | K/C                                   |
| <b>Save/Recall</b>      |                         |               |      |               |        |                                       |
| <b>Save State</b>       |                         |               |      |               |        |                                       |
| Save Type               | STAT                    |               |      |               |        | K/C                                   |
| <b>Scale</b>            |                         |               |      |               |        |                                       |
| <b>Auto Scale</b>       |                         |               |      |               |        |                                       |
| Auto Scale All          |                         |               |      |               |        | K/C                                   |
| Divisions               | 10                      | <<            | <<   | *             |        | K/C                                   |
| <b>Marker</b>           |                         |               |      |               |        |                                       |
| Reference               | 800M                    | <<            | <<   | *             |        | K/C                                   |
| Reference Position      | 5                       | <<            | <<   | *             |        | K/C                                   |
| Reference Value         | 800M                    | <<            | <<   | *             |        | K/C                                   |
| Scale/Div               | 80M                     | <<            | <<   | *             |        | K/C                                   |
| <b>Setup</b>            |                         |               |      |               |        |                                       |
| Freq Range              | R25_6                   | <<            | <<   | *             |        | K/C                                   |
| Max Input Level         | 0                       | <<            | <<   | *             |        | K/C                                   |
| Phase Reference         | 1G                      | <<            | <<   | *             |        | K/C                                   |
| Target Freq             | 1G                      | <<            | <<   | *             |        | K/C                                   |
| <b>Video Trigger</b>    |                         |               |      |               |        |                                       |
| Minimum Power Level     | -20                     | <<            | <<   | *             |        | K/C                                   |
| Narrow Freq             | 1G                      | <<            | <<   | *             |        | K/C                                   |
| Wide Freq               | 1G                      | <<            | <<   | *             |        | K/C                                   |
| <b>Span</b>             |                         |               |      |               |        |                                       |
| Narrow Ref Position     | CENTer                  | <<            | <<   | *             |        | K/C                                   |
| Narrow Span             | 100m                    | <<            | <<   | *             |        | K/C                                   |

List of Default Values  
TR Menu

| Key Operation         | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Avaible Means of Defining a Setting |
|-----------------------|-------------------------|---------------|------|---------------|--------|-------------------------------------|
|                       |                         | Preset        | *RST |               |        |                                     |
| Narrow Time Offset    | 0                       | <<            | <<   | *             |        | K/C                                 |
| Wide Ref Position     | CENTer                  | <<            | <<   | *             |        | K/C                                 |
| Wide Span             | 100m                    | <<            | <<   | *             |        | K/C                                 |
| Wide Time Offset      | 0                       | <<            | <<   | *             |        | K/C                                 |
| <b>System</b>         |                         |               |      |               |        |                                     |
| Abort Printing        |                         |               |      |               |        | K/C                                 |
| Backlight             | ON                      |               |      |               |        | K/C                                 |
| Invert Image          | NORMal                  | <<            | <<   | *             |        | K/C                                 |
| Misc Setup            |                         |               |      |               |        |                                     |
| Beeper                |                         |               |      |               |        |                                     |
| Beep Complete         | ON                      | <<            | <<   | *             |        | K/C                                 |
| Beep Warning          | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Test Beep Complete    |                         |               |      |               |        | K/C                                 |
| Test Beep Warning     |                         |               |      |               |        | K/C                                 |
| Clock Setup           |                         |               |      |               |        |                                     |
| Show Clock            | ON                      | <<            | <<   | *             |        | K/C                                 |
| <b>Time Offset</b>    |                         |               |      |               |        |                                     |
| Narrow Ref Position   | CENTer                  | <<            | <<   | *             |        | K/C                                 |
| Narrow Span           | 100m                    | <<            | <<   | *             |        | K/C                                 |
| Narrow Time Offset    | 0                       | <<            | <<   | *             |        | K/C                                 |
| Wide Ref Position     | CENTer                  | <<            | <<   | *             |        | K/C                                 |
| Wide Span             | 100m                    | <<            | <<   | *             |        | K/C                                 |
| Wide Time Offset      | 0                       | <<            | <<   | *             |        | K/C                                 |
| <b>Trace View</b>     |                         |               |      |               |        |                                     |
| Aperture              | 1.5                     | <<            | <<   | *             |        | K/C                                 |
| Clear Persistent Data |                         |               |      |               |        | K/C                                 |
| Data Hold             | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Data Math             | NORMal                  | <<            | <<   | *             |        | K/C                                 |
| Display Trace         | DATA                    | <<            | <<   | *             |        | K/C                                 |
| Persistence Mode      | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Smoothing             | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Trace Label           | "WB Freq"               | <<            | <<   | *             |        | K/C                                 |
| <b>Trigger</b>        |                         |               |      |               |        |                                     |
| Ext Trig Polarity     | NEGative                | <<            | <<   | *             |        | K/C                                 |
| Source                | INTernal                | <<            | <<   | *             |        | K/C                                 |
| Trigger to Transient  | PN1                     | <<            | <<   | *             |        | K/C                                 |



## USER Menu

| Key Operation             | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|---------------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                           |                         | Preset        | *RST |               |        |                                       |
| <b>Attenuator</b>         |                         |               |      |               |        |                                       |
| Input Attenuator          | 5                       | <<            | <<   | *             |        | K/C                                   |
| <b>DC Control Voltage</b> |                         |               |      |               |        |                                       |
| DC Control Delay          | 100m                    | <<            | <<   | *             |        | K/C                                   |
| DC Control Output         | OFF                     | <<            | <<   |               |        | K/C                                   |
| DC Control Voltage        | 0                       | <<            | <<   | *             |        | K/C                                   |
| Max Ctrl Voltage Limit    | 35                      | <<            | <<   | *             |        | K/C                                   |
| Min Ctrl Voltage Limit    | -15                     | <<            | <<   | *             |        | K/C                                   |
| <b>DC Power Voltage</b>   |                         |               |      |               |        |                                       |
| DC Power Delay            | 100m                    | <<            | <<   | *             |        | K/C                                   |
| DC Power Output           | OFF                     | <<            | <<   |               |        | K/C                                   |
| DC Power Voltage          | 0                       | <<            | <<   | *             |        | K/C                                   |
| Max Pwr Voltage Limit     | 16                      | <<            | <<   | *             |        | K/C                                   |
| Min Pwr Voltage Limit     | 0                       | <<            | <<   | *             |        | K/C                                   |
| <b>Display</b>            |                         |               |      |               |        |                                       |
| Edit Title Label          | ""                      | <<            | <<   | *             |        | K/C                                   |
| Marker Information        | LEFT                    | <<            | <<   | *             |        | K/C                                   |
| Meas Condition            | ON                      | <<            | <<   | *             |        | K/C                                   |
| Relative Y-Scale          | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Title Label               | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Update                    | ON                      | <<            | <<   | *             |        | K/C                                   |
| Y # of Digits             | SHORT                   | <<            | <<   | *             |        | K/C                                   |
| <b>Macro Setup</b>        |                         |               |      |               |        |                                       |
| E5052 Event               | OFF                     |               |      |               |        | K/C                                   |
| <b>Echo Window Menu</b>   |                         |               |      |               |        |                                       |
| Clear Echo                |                         |               |      |               |        | K/C                                   |
| Echo Font Size            | 11                      |               |      |               |        | K/C                                   |
| Echo Window               | OFF                     |               |      |               |        | K/C                                   |
| <b>User Menu</b>          |                         |               |      |               |        |                                       |
| User Label 1              |                         |               |      |               |        | K/C                                   |
| <b>Marker</b>             |                         |               |      |               |        |                                       |
| <b>Clear Marker Menu</b>  |                         |               |      |               |        |                                       |
| Marker 1                  | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Couple                    | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Marker List               | OFF                     | <<            | <<   | *             |        | K/C                                   |
| <b>More Functions</b>     |                         |               |      |               |        |                                       |
| Discrete                  | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Ref Marker                | 1                       | <<            | <<   | *             |        | K/C                                   |
| Ref Marker Mode           | OFF                     | <<            | <<   | *             |        | K/C                                   |

List of Default Values  
**USER Menu**

| Key Operation           | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Avaible Means of Defining a Setting |
|-------------------------|-------------------------|---------------|------|---------------|--------|-------------------------------------|
|                         |                         | Preset        | *RST |               |        |                                     |
| <b>Marker Function</b>  |                         |               |      |               |        |                                     |
| Analysis Range (X)      | FULLspan                | <<            | <<   | *             |        | K/C                                 |
| Analysis Range (Y)      | FULLscale               | <<            | <<   | *             |        | K/C                                 |
| Analysis Type           | OFF                     | <<            | <<   | *             |        | K/C                                 |
| <b>Band Marker X</b>    |                         |               |      |               |        |                                     |
| Band Marker X           | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Center                  | 50                      |               |      |               |        | K/C                                 |
| Span                    | 100                     |               |      |               |        | K/C                                 |
| Start                   | 0                       | <<            | <<   | *             |        | K/C                                 |
| Stop                    | 100                     | <<            | <<   | *             |        | K/C                                 |
| <b>Band Marker Y</b>    |                         |               |      |               |        |                                     |
| Band Marker Y           | OFF                     | <<            | <<   | *             |        | K/C                                 |
| Center                  | -40                     |               |      |               |        | K/C                                 |
| Span                    | 100                     |               |      |               |        | K/C                                 |
| Start                   | -90                     | <<            | <<   | *             |        | K/C                                 |
| Stop                    | 10                      | <<            | <<   | *             |        | K/C                                 |
| Couple                  | OFF                     | <<            | <<   | *             |        | K/C                                 |
| <b>Marker Search</b>    |                         |               |      |               |        |                                     |
| <b>Peak</b>             |                         |               |      |               |        |                                     |
| Peak Excursion          | 0                       | <<            | <<   | *             |        | K/C                                 |
| Peak Polarity           | POSitive                | <<            | <<   | *             |        | K/C                                 |
| Search Left             |                         |               |      |               |        | K/C                                 |
| Search Peak             |                         |               |      |               |        | K/C                                 |
| Search Peak All         |                         |               |      |               |        | K/C                                 |
| Search Right            |                         |               |      |               |        | K/C                                 |
| Search Max              |                         |               |      |               |        | K/C                                 |
| Search Min              |                         |               |      |               |        | K/C                                 |
| Search Range (X)        | FULLspan                | <<            | <<   | *             |        | K/C                                 |
| Search Range (Y)        | FULLscale               | <<            | <<   | *             |        | K/C                                 |
| <b>Target</b>           |                         |               |      |               |        |                                     |
| Search Left             |                         |               |      |               |        | K/C                                 |
| Search Right            |                         |               |      |               |        | K/C                                 |
| Search Target           |                         |               |      |               |        | K/C                                 |
| Search Transition       | BOTH                    | <<            | <<   | *             |        | K/C                                 |
| Search Value            | 0                       | <<            | <<   | *             |        | K/C                                 |
| Tracking                | OFF                     | <<            | <<   | *             |        | K/C                                 |
| <b>Measurement View</b> |                         |               |      |               |        |                                     |
| Freq & Power            | PN1                     | <<            | <<   | *             |        | K/C                                 |
| Phase Noise             | PN1                     | <<            | <<   | *             |        | K/C                                 |
| <b>Show Window</b>      |                         |               |      |               |        |                                     |
| Freq & Power            | ON                      | <<            | <<   | *             |        | K/C                                 |
| Phase Noise             | ON                      | <<            | <<   | *             |        | K/C                                 |

| Key Operation             | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|---------------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                           |                         | Preset        | *RST |               |        |                                       |
| Spectrum Monitor          | Spectrum Monitor        | ON            | <<   | <<            | *      | K/C                                   |
|                           | Transient               | ON            | <<   | <<            | *      | K/C                                   |
|                           | User                    | OFF           | <<   | <<            | *      | K/C                                   |
|                           | Spectrum Monitor        | PN1           | <<   | <<            | *      | K/C                                   |
|                           | Transient               | PN1           | <<   | <<            | *      | K/C                                   |
|                           | User                    | PN1           | <<   | <<            | *      | K/C                                   |
| <b>Save/Recall</b>        |                         |               |      |               |        |                                       |
| Save State                |                         |               |      |               |        |                                       |
|                           | Save Type               | STAT          |      |               |        | K/C                                   |
| <b>Scale</b>              |                         |               |      |               |        |                                       |
| Auto Scale                |                         |               |      |               |        | K/C                                   |
| Auto Scale All            |                         |               |      |               |        | K/C                                   |
| Divisions                 | 10                      | <<            | <<   | *             |        | K/C                                   |
| Marker                    |                         |               |      |               |        |                                       |
| Reference                 | -40                     | <<            | <<   | *             |        | K/C                                   |
| Reference Position        | 5                       | <<            | <<   | *             |        | K/C                                   |
| Reference Value           | -40                     | <<            | <<   | *             |        | K/C                                   |
| Scale/Div                 | 10                      | <<            | <<   | *             |        | K/C                                   |
| X Unit                    | "U"                     | <<            | <<   | *             |        | K/C                                   |
| Y Unit                    | "U"                     | <<            | <<   | *             |        | K/C                                   |
| <b>System</b>             |                         |               |      |               |        |                                       |
| Abort Printing            |                         |               |      |               |        | K/C                                   |
| Backlight                 | ON                      |               |      |               |        | K/C                                   |
| Invert Image              | NORMal                  | <<            | <<   | *             |        | K/C                                   |
| Misc Setup                |                         |               |      |               |        |                                       |
| Beeper                    |                         |               |      |               |        |                                       |
| Beep Complete             | ON                      | <<            | <<   | *             |        | K/C                                   |
| Beep Warning              | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Test Beep Complete        |                         |               |      |               |        | K/C                                   |
| Test Beep Warning         |                         |               |      |               |        | K/C                                   |
| Clock Setup               |                         |               |      |               |        |                                       |
| Show Clock                | ON                      | <<            | <<   | *             |        | K/C                                   |
| <b>Trace View</b>         |                         |               |      |               |        |                                       |
| Aperture                  | 1.5                     | <<            | <<   | *             |        | K/C                                   |
| Clear All Persistent Data |                         |               |      |               |        | K/C                                   |
| Data Hold                 | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Data Math                 | NORMal                  | <<            | <<   | *             |        | K/C                                   |
| Display Trace             | DATA                    | <<            | <<   | *             |        | K/C                                   |
| Enable Trace              |                         |               |      |               |        |                                       |
| Trace 1                   | ON                      | <<            | <<   | *             |        | K/C                                   |

List of Default Values  
**USER Menu**

| Key Operation    | Factory-shipped Setting | Default Value |      | Save / Recall | Backup | Available Means of Defining a Setting |
|------------------|-------------------------|---------------|------|---------------|--------|---------------------------------------|
|                  |                         | Preset        | *RST |               |        |                                       |
| Persistence Mode | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Smoothing        | OFF                     | <<            | <<   | *             |        | K/C                                   |
| Trace Label      | "Tr1"                   | <<            | <<   | *             |        | K/C                                   |

---

## **D**      **Softkey Functions**

This appendix explains the functions of softkeys and hardkeys supplied on the Agilent E5052A.

Softkey Functions  
Phanse Noise Menu (Top Menu)

**Phanse Noise Menu (Top Menu)**

| Key Operation                                  | Function                                                                                                                                                        |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Double-click on each softkey menu title</b> | Displays the top menu of each menu item below. A preset operation will not cancel the menu display. Refer the PN menu about detail of following each menu item. |
| <b>Measurement View</b>                        | Same as <b>Meas</b> .                                                                                                                                           |
| <b>Input</b>                                   | Same as <b>Scale</b> .                                                                                                                                          |
| <b>Scale</b>                                   | Same as <b>Scale</b> .                                                                                                                                          |
| <b>Format</b>                                  | Same as <b>Format</b> .                                                                                                                                         |
| <b>Display</b>                                 | Same as <b>Display</b> .                                                                                                                                        |
| <b>Average</b>                                 | Same as <b>Avg</b> .                                                                                                                                            |
| <b>Attenuator</b>                              | Same as <b>Cal</b> .                                                                                                                                            |
| <b>Start</b>                                   | Displays the same softkey for setting up the sweep range that appears when <b>Start</b> , or <b>Span</b> is pressed.                                            |
| <b>Stop</b>                                    | Displays the same softkey for setting up the sweep range that appears when <b>Start</b> , or <b>Span</b> is pressed.                                            |
| <b>DC Conrol Voltage</b>                       | Same as <b>Sweep Setup</b> .                                                                                                                                    |
| <b>DC Power Voltage</b>                        | Same as <b>Sweep Setup</b> .                                                                                                                                    |
| <b>Setup</b>                                   | Same as <b>Sweep Setup</b> .                                                                                                                                    |
| <b>Trigger</b>                                 | Same as <b>Trigger</b> .                                                                                                                                        |
| <b>Marker</b>                                  | Same as <b>Marker</b> .                                                                                                                                         |
| <b>Marker Search</b>                           | Same as <b>Marker Search</b> .                                                                                                                                  |
| <b>Marker To</b>                               | Same as <b>Marker Search</b> .                                                                                                                                  |
| <b>Marker Function</b>                         | Same as <b>Marker Fctn</b> .                                                                                                                                    |
| <b>Macro Setup</b>                             | Same as <b>Macro Setup</b> .                                                                                                                                    |
| <b>Save/Recall</b>                             | Same as <b>Save/Recall</b> .                                                                                                                                    |
| <b>System</b>                                  | Same as <b>System</b> .                                                                                                                                         |
| <b>Preset</b>                                  | Same as <b>Preset</b> .                                                                                                                                         |

## PN Menu

| Key Operation               | Function                                        | SCPI Command                  |
|-----------------------------|-------------------------------------------------|-------------------------------|
| <b>Attenuator</b>           |                                                 |                               |
| Input Attenuator            | Sets/reads Input Attenuator level on 5dB Step   | :SENS:ATT:LEV                 |
| <b>Average</b>              |                                                 |                               |
| Averaging                   | Turns on/off averaging function                 | :SENS:PN[1-1]:AVER:STAT       |
| Averaging Restart           | Restart averaging                               | :SENS:PN[1-1]:AVER:CLE        |
| Avg Factor                  | Sets/reads average count                        | :SENS:PN[1-1]:AVER:COUN       |
| Correlation                 | Sets/reads the number of correlation            | :SENS:PN[1-1]:CORR:COUN       |
| <b>DC Control Voltage</b>   |                                                 |                               |
| Control Voltage Cal         | Enables DC Control voltage calibration          | :SOUR:VOLT:CONT:CORR[:STAT]   |
| DC Control Delay            | Sets/reads DC Control delay (sec)               | :SOUR:VOLT:CONT:DEL           |
| DC Control Output           | Turns on/off DC Control voltage                 | :SOUR:VOLT:CONT:LEV:STAT      |
| DC Control Voltage          | Sets/reads DC Control voltage                   | :SOUR:VOLT:CONT:LEV:AMPL      |
| Execute Control Voltage Cal | Execute DC control voltage calibration          | :SOUR:VOLT:CONT:CORR:COLL:ACQ |
| Max Ctrl Voltage Limit      | Sets/reads the maximum DC control voltage limit | :SOUR:VOLT:CONT:LIM:HIGH      |
| Min Ctrl Voltage Limit      | Sets/reads the minimum DC control voltage limit | :SOUR:VOLT:CONT:LIM:LOW       |
| <b>DC Power Voltage</b>     |                                                 |                               |
| DC Power Delay              | Sets/reads DC Power delay (sec)                 | :SOUR:VOLT:POW:DEL            |
| DC Power Output             | Turns on/off DC Power voltage                   | :SOUR:VOLT:POW:LEV:STAT       |
| DC Power Voltage            | Sets/reads DC Power voltage                     | :SOUR:VOLT:POW:LEV:AMPL       |
| Max Pwr Voltage Limit       | Sets/reads the maximum DC Power voltage limit   | :SOUR:VOLT:POW:LIM:HIGH       |
| Min Pwr Voltage Limit       | Sets/reads the minimum DC Power voltage limit   | :SOUR:VOLT:POW:LIM:LOW        |
| <b>Display</b>              |                                                 |                               |
| Edit Title Label            | Edit the measurement window title label         | :DISP:PN[1-1]:LAB:DATA        |
| Marker Information          | Sets/reads the marker information position      | :DISP:PN[1-1]:ANN:MARK:POS    |
| Meas Condition              | Turns on/off measurement conditions             | :DISP:PN[1-1]:ANN:MEAS:STAT   |
| Relative Y-Scale            | Turns on/off relative Y-scale                   | :DISP:PN[1-1]:GRAT:AXIS:Y:REL |

Softkey Functions  
PN Menu

| Key Operation            | Function                                                  | SCPI Command                           |
|--------------------------|-----------------------------------------------------------|----------------------------------------|
| <b>Title Label</b>       | Turns on/off the measurement window title label           | :DISP:PN[1-1]:LAB:STAT                 |
| <b>Update</b>            | Turns on/off the trace updates                            | :DISP:ENAB                             |
| <b>Y # of Digits</b>     | Selects the number of digits (Y-axis)                     | :DISP:PN[1-1]:GRAT:AXIS:Y:STAT         |
| <b>Macro Setup</b>       |                                                           |                                        |
| <b>E5052 Event</b>       | Turns on/off the E5052 VBA event callback function        | :PROG:COM:EVEN                         |
| <b>Echo Window Menu</b>  |                                                           |                                        |
| <b>Clear Echo</b>        | Clears echo window                                        | :DISP:ECHO:CLE                         |
| <b>Echo Font Size</b>    | Sets/reads the font size on Echo window                   | :DISP:ECHO:FSIZ                        |
| <b>Echo Window</b>       | Turns on./off the Echo window                             | :DISP:ECHO:STAT                        |
| <b>Select Macro</b>      | Sets/reads the name of the program to be selected         | :PROG:SEL:NAME                         |
| <b>Stop</b>              | Set/reads the state of the selected program               | :PROG:SEL:STAT                         |
| <b>User Menu</b>         |                                                           |                                        |
| <b>User Label 1</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 2</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 3</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 4</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 5</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 6</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 7</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 8</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>VBA Editor Menu</b>   |                                                           |                                        |
| <b>Close Editor</b>      | Close VBA editor                                          |                                        |
| <b>Load Project</b>      | Loads program                                             | :MMEM:LOAD:PROG                        |
| <b>New Project</b>       | Open new VBA project                                      |                                        |
| <b>Open Editor</b>       | Open VBA editor                                           |                                        |
| <b>Save Project</b>      | Save VBA project                                          | :MMEM:STOR:PROG                        |
| <b>Marker</b>            |                                                           |                                        |
| <b>Clear Marker Menu</b> |                                                           |                                        |
| <b>All OFF</b>           | Clears all the markers                                    |                                        |
| <b>Marker 1</b>          | Turns on/off marker 1                                     | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 2</b>          | Turns on/off marker 2                                     | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 3</b>          | Turns on/off marker 3                                     | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT |



| Key Operation             | Function                                         | SCPI Command                           |
|---------------------------|--------------------------------------------------|----------------------------------------|
| <b>Marker 4</b>           | Turns on/off marker 4                            | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 5</b>           | Turns on/off marker 5                            | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 6</b>           | Turns on/off marker 6                            | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 1</b>           | Turns on/off marker 1                            | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 2</b>           | Turns on/off marker 2                            | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 3</b>           | Turns on/off marker 3                            | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 4</b>           | Turns on/off marker 4                            | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 5</b>           | Turns on/off marker 5                            | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 6</b>           | Turns on/off marker 6                            | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker List</b>        | Turns on/off the marker list                     | :DISP:PN[1-1]:TABL[:STAT]              |
| <b>More Functions</b>     |                                                  |                                        |
| <b>Discrete</b>           | Sets/reads marker movement (Continuous/Discrete) | :CALC:PN[1-1]:ALLT:MARK:DISC:STAT      |
| <b>Ref Marker</b>         | Sets/reads marker reference number               | :CALC:PN[1-1]:ALLT:MARK:REF:NUMB       |
| <b>Ref Marker Mode</b>    | Turns on/off delta marker mode                   | :CALC:PN[1-1]:ALLT:MARK:REF:STAT       |
| <b>Marker Function</b>    |                                                  |                                        |
| <b>Analysis Range (X)</b> | Sets/reads analysis/search range (X-axis)        | :CALC:PN[1-1]:TRAC[1-1]:FUNCTION:DOM:X |
| <b>Analysis Range (Y)</b> | Sets/reads analysis/search range (Y-axis)        | :CALC:PN[1-1]:TRAC[1-1]:FUNCTION:DOM:Y |
| <b>Analysis Type</b>      | Sets/reads analysis type                         | :CALC:PN[1-1]:TRAC[1-1]:FUNCTION:TYPE  |
| <b>Band Marker X</b>      |                                                  |                                        |
| <b>Band Marker X</b>      | Turns on/off bandmarker X                        | :CALC:PN[1-1]:TRAC[1-1]:BDM:X:STAT     |
| <b>Center</b>             | Sets/reads the center value of bandmarker X      | :CALC:PN[1-1]:TRAC[1-1]:BDM:X:CENT     |
| <b>Span</b>               | Sets/reads the span value of bandmarker X        | :CALC:PN[1-1]:TRAC[1-1]:BDM:X:SPAN     |
| <b>Start</b>              | Sets/reads the start value of bandmarker X       | :CALC:PN[1-1]:TRAC[1-1]:BDM:X:STAR     |

Softkey Functions  
PN Menu

| Key Operation         | Function                                    | SCPI Command                                    |
|-----------------------|---------------------------------------------|-------------------------------------------------|
| <b>Stop</b>           | Sets/reads the stop value of bandmarker X   | :CALC:PN[1-1]:TRAC[1-1]:BDM:X:STOP              |
| <b>Band Marker Y</b>  |                                             |                                                 |
| <b>Band Marker Y</b>  | Turns on/off bandmarker Y                   | :CALC:PN[1-1]:TRAC[1-1]:BDM:Y:STAT              |
| <b>Center</b>         | Sets/reads the center value of bandmarker Y | :CALC:PN[1-1]:TRAC[1-1]:BDM:Y:CENT              |
| <b>Span</b>           | Sets/reads the span value of bandmarker Y   | :CALC:PN[1-1]:TRAC[1-1]:BDM:Y:SPAN              |
| <b>Start</b>          | Sets/reads the start value of bandmarker Y  | :CALC:PN[1-1]:TRAC[1-1]:BDM:Y:STAR              |
| <b>Stop</b>           | Sets/reads the stop value of bandmarker Y   | :CALC:PN[1-1]:TRAC[1-1]:BDM:Y:STOP              |
| <b>Marker Search</b>  |                                             |                                                 |
| <b>Band Marker X</b>  |                                             |                                                 |
| <b>Band Marker X</b>  | Turns on/off bandmarker X                   | :CALC:PN[1-1]:TRAC[1-1]:BDM:X:STAT              |
| <b>Center</b>         | Sets/reads the center value of bandmarker X | :CALC:PN[1-1]:TRAC[1-1]:BDM:X:CENT              |
| <b>Span</b>           | Sets/reads the span value of bandmarker X   | :CALC:PN[1-1]:TRAC[1-1]:BDM:X:SPAN              |
| <b>Start</b>          | Sets/reads the start value of bandmarker X  | :CALC:PN[1-1]:TRAC[1-1]:BDM:X:STAR              |
| <b>Stop</b>           | Sets/reads the stop value of bandmarker X   | :CALC:PN[1-1]:TRAC[1-1]:BDM:X:STOP              |
| <b>Band Marker Y</b>  |                                             |                                                 |
| <b>Band Marker Y</b>  | Turns on/off bandmarker Y                   | :CALC:PN[1-1]:TRAC[1-1]:BDM:Y:STAT              |
| <b>Center</b>         | Sets/reads the center value of bandmarker Y | :CALC:PN[1-1]:TRAC[1-1]:BDM:Y:CENT              |
| <b>Span</b>           | Sets/reads the span value of bandmarker Y   | :CALC:PN[1-1]:TRAC[1-1]:BDM:Y:SPAN              |
| <b>Start</b>          | Sets/reads the start value of bandmarker Y  | :CALC:PN[1-1]:TRAC[1-1]:BDM:Y:STAR              |
| <b>Stop</b>           | Sets/reads the stop value of bandmarker Y   | :CALC:PN[1-1]:TRAC[1-1]:BDM:Y:STOP              |
| <b>Peak</b>           |                                             |                                                 |
| <b>Peak Excursion</b> | Sets/reads the peak excursion value         | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:PEAK:EXC |
| <b>Peak Polarity</b>  | Sets/reads the marker peak-search polarity  | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:PEAK:POL |

| Key Operation             | Function                                                      | SCPI Command                                     |
|---------------------------|---------------------------------------------------------------|--------------------------------------------------|
| <b>Search Left</b>        | Execute marker peak search left                               | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:LPE  |
| <b>Search Peak</b>        | Execute marker peak search                                    | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:PEAK |
| <b>Search Peak All</b>    | Execute marker search all                                     | :CALC:PN[1-1]:TRAC[1-1]:ALLM:SEAR:PEAK           |
| <b>Search Right</b>       | Execute marker peak search right                              | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:RPE  |
| <b>Search Max</b>         | Execute marker search maximum                                 | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:MAX  |
| <b>Search Min</b>         | Execute marker search minimum                                 | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:MIN  |
| <b>Search Range (X)</b>   | Sets/reads marker search range (X-axis)                       | :CALC:PN[1-1]:TRAC[1-1]:ALLM:SEAR:DOM:X          |
| <b>Search Range (Y)</b>   | Sets/reads marker search range (Y-axis)                       | :CALC:PN[1-1]:TRAC[1-1]:ALLM:SEAR:DOM:Y          |
| <b>Target</b>             |                                                               |                                                  |
| <b>Search Left</b>        | Execute marker target search left                             | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:LTAR |
| <b>Search Right</b>       | Execute marker target search right                            | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:RTAR |
| <b>Search Target</b>      | Execute marker target search                                  | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:TARG |
| <b>Target Transition</b>  | Sets/reads the target transition definition                   | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:TARG:TRAN |
| <b>Target Value</b>       | Sets/reads the marker target value                            | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:TARG:Y    |
| <b>Tracking</b>           | Sets/reads the marker tracking type                           | :CALC:PN[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:TRAC:TYPE |
| <b>Marker To</b>          |                                                               |                                                  |
| <b>Marker -&gt; Start</b> | Sets/reads the marker value to the start value                | :SENS:PN[1-1]:FREQ:STAR                          |
| <b>Marker -&gt; Stop</b>  | Sets/reads the marker value to the stop value                 | :SENS:PN[1-1]:FREQ:STOP                          |
| <b>Measurement View</b>   |                                                               |                                                  |
| <b>Freq &amp; Power</b>   | Selects frequency, power and DC current measurement window    | :DISP:WIND:ACT                                   |
| <b>Phase Noise</b>        | Selects phase noise measurement window                        | :DISP:WIND:ACT                                   |
| <b>Show Window</b>        |                                                               |                                                  |
| <b>Freq &amp; Power</b>   | Turns on/off frequency, power and DC current measurement mode | :DISP:FP[1-1]:STAT                               |
| <b>Phase Noise</b>        | Turns on/off phase noise measurement mode                     | :DISP:PN[1-1]:STAT                               |
| <b>Spectrum Monitor</b>   | Turns on/off spectrum monitor mode                            | :DISP:SP[1-1]:STAT                               |
| <b>Transient</b>          | Turns on/off transient measurement mode                       | :DISP:TR[1-1]:STAT                               |

Softkey Functions  
PN Menu

| Key Operation       | Function                                                       | SCPI Command                              |
|---------------------|----------------------------------------------------------------|-------------------------------------------|
| User                | Turns on/off user defined window                               | :DISP:USER[1-1]:STAT                      |
| Spectrum Monitor    | Selects spectrum monitor mode                                  | :DISP:WIND:ACT                            |
| Transient           | Selects transient measurement mode                             | :DISP:WIND:ACT                            |
| User                | Selects user defined window                                    | :DISP:WIND:ACT                            |
| <b>Preset</b>       |                                                                |                                           |
| OK                  | Preset instrument                                              | :SYST:PRES                                |
| <b>Save/Recall</b>  |                                                                |                                           |
| Explorer...         | Open windows explorer                                          |                                           |
| <b>Recall State</b> |                                                                |                                           |
| Autorec             | Recalls settings                                               | :MMEM:LOAD:STAT                           |
| File Dialog...      | Open file dialog                                               |                                           |
| State01             | Recalls state file from register 1                             | :MMEM:LOAD:STAT                           |
| State02             | Recalls state file from register 2                             | :MMEM:LOAD:STAT                           |
| State03             | Recalls state file from register 3                             | :MMEM:LOAD:STAT                           |
| State04             | Recalls state file from register 4                             | :MMEM:LOAD:STAT                           |
| State05             | Recalls state file from register 5                             | :MMEM:LOAD:STAT                           |
| State06             | Recalls state file from register 6                             | :MMEM:LOAD:STAT                           |
| Save Data Trace     | Saves trace data                                               | :MMEM:PN[1-1]:TRAC[1-1]:ST<br>OR[:DATA]   |
| Save Memory Trace   | Saves memory trace data                                        | :MMEM:PN[1-1]:TRAC[1-1]:ST<br>OR:MEM      |
| <b>Save State</b>   |                                                                |                                           |
| Autorec             | Save settings                                                  | :MMEM:STOR:STAT                           |
| File Dialog...      | Open file dialog                                               |                                           |
| Save Type           | Select instrument state type (Entire or instrument state only) | :MMEM:STOR:STYP                           |
| State01             | Save state file to register 1                                  | :MMEM:STOR:STAT                           |
| State02             | Save state file to register 2                                  | :MMEM:STOR:STAT                           |
| State03             | Save state file to register 3                                  | :MMEM:STOR:STAT                           |
| State04             | Save state file to register 4                                  | :MMEM:STOR:STAT                           |
| State05             | Save state file to register 5                                  | :MMEM:STOR:STAT                           |
| State06             | Save state file to register 6                                  | :MMEM:STOR:STAT                           |
| <b>Scale</b>        |                                                                |                                           |
| Auto Scale          | Execute autoscale                                              | :DISP:PN[1-1]:TRAC[1-1]:Y[:SC<br>AL]:AUTO |
| Divisions           | Sets/reads Y-scale divisions                                   | :DISP:PN[1-1]:Y[:SCAL]:DIV                |

| Key Operation                 | Function                                             | SCPI Command                          |
|-------------------------------|------------------------------------------------------|---------------------------------------|
| <b>Marker -&gt; Reference</b> | Sets the marker value to the reference level         | :DISP:PN[1-1]:TRAC[1-1]:Y[:SCAL]:RLEV |
| <b>Reference Position</b>     | Sets/reads reference position                        | :DISP:PN[1-1]:TRAC[1-1]:Y[:SCAL]:RPOS |
| <b>Reference Value</b>        | Sets/reads the reference level value                 | :DISP:PN[1-1]:TRAC[1-1]:Y[:SCAL]:RLEV |
| <b>Scale/Div</b>              | Sets/reads scale per division                        | :DISP:PN[1-1]:TRAC[1-1]:Y[:SCAL]:PDIV |
| <b>Setup</b>                  |                                                      |                                       |
| <b>Frequency Band</b>         | Selects frequency band                               | :SENS:PN[1-1]:FBAN                    |
| <b>IF Gain</b>                | Sets/reads the IF Gain                               | :SENS:PN[1-1]:IFG                     |
| <b>LO PhNoise Optimize</b>    | Sets/reads phase noise Local bandwidth optimization. | :SENS:PN[1-1]:LOB                     |
| <b>Start</b>                  |                                                      |                                       |
| <b>100Hz</b>                  | Sets 100Hz to the start frequency                    | :SENS:PN[1-1]:FREQ:STAR               |
| <b>10Hz</b>                   | Sets 10Hz to the start frequency                     | :SENS:PN[1-1]:FREQ:STAR               |
| <b>1Hz</b>                    | Sets 1Hz to the start frequency                      | :SENS:PN[1-1]:FREQ:STAR               |
| <b>1kHz</b>                   | Sets 1kHz to the start frequency                     | :SENS:PN[1-1]:FREQ:STAR               |
| <b>Stop</b>                   |                                                      |                                       |
| <b>100kHz</b>                 | Sets 100kHz to the stop frequency                    | :SENS:PN[1-1]:FREQ:STOP               |
| <b>10MHz</b>                  | Sets 10MHz to the stop frequency                     | :SENS:PN[1-1]:FREQ:STOP               |
| <b>1MHz</b>                   | Sets 1MHz to the stop frequency                      | :SENS:PN[1-1]:FREQ:STOP               |
| <b>40MHz</b>                  | Sets 40MHz to the stop frequency                     | :SENS:PN[1-1]:FREQ:STOP               |
| <b>5MHz</b>                   | Sets 5MHz to the stop frequency                      | :SENS:PN[1-1]:FREQ:STOP               |
| <b>System</b>                 |                                                      |                                       |
| <b>Abort Printing</b>         | Aborts printing                                      | :HCOP:ABOR                            |
| <b>Backlight</b>              | Turns on/off backlight                               | :SYST:BACK:STAT                       |
| <b>Dump Screen Image</b>      | Save screen image                                    | :MMEM:STOR:IMAG                       |
| <b>Error Log</b>              |                                                      |                                       |
| <b>Clear Error Log</b>        | Clear error log                                      |                                       |
| <b>View Error Log...</b>      | Display error log                                    |                                       |
| <b>Invert Image</b>           | Selects print mode                                   | :HCOP:IMAG                            |
| <b>Misc Setup</b>             |                                                      |                                       |
| <b>Beeper</b>                 |                                                      |                                       |
| <b>Beep Complete</b>          | Turns on/off the beep for operation completion       | :SYST:BEEP:COMP:STAT                  |
| <b>Beep Warning</b>           | Turns on/off the beep for warning                    | :SYST:BEEP:WARN:STAT                  |

Softkey Functions  
PN Menu

| Key Operation                          | Function                                                                 | SCPI Command                     |
|----------------------------------------|--------------------------------------------------------------------------|----------------------------------|
| <b>Test Beep Complete</b>              | Makes beep sound for operation completion                                | :SYST:BEEP:COMP:IMM              |
| <b>Test Beep Warning</b>               | Makes beep sound for warning                                             | :SYST:BEEP:WARN:IMM              |
| <b>Clock Setup</b>                     |                                                                          |                                  |
| <b>Set Date and Time</b>               | Set/reads system time<br>Set/reads system date                           | :SYST:TIME<br>:SYST:DATE         |
| <b>Show Clock</b>                      | Turns on/off internal clock display                                      | :DISP:CLOC                       |
| <b>Control Panel ...</b>               | Open control panel                                                       |                                  |
| <b>GPIB Setup</b>                      |                                                                          |                                  |
| <b>System Controller Configuration</b> | Turns on/off system controller mode                                      |                                  |
| <b>Talker/Listener Address</b>         | Sets/the address for controlling the analyzer from a controller via GPIB |                                  |
| <b>Key Lock</b>                        |                                                                          |                                  |
| <b>Front Panel &amp; Keyboard Lock</b> | Disables from panel/keyboard operations                                  | :SYST:KLOC:KBD                   |
| <b>Touch Screen &amp; Mouse Lock</b>   | Disables from touch screen/mouse operations                              | :SYST:KLOC:MOUS                  |
| <b>Network Setup</b>                   |                                                                          |                                  |
| <b>MAC Address</b>                     | Sets MAC address                                                         |                                  |
| <b>Network Configuration ...</b>       | Enables/disables network connections                                     |                                  |
| <b>Network Identification ...</b>      | Sets network ID of the instrument                                        |                                  |
| <b>SICL-LAN Address</b>                | Sets SICL-LAN address                                                    |                                  |
| <b>SICL-LAN Server</b>                 | Enables/disables SICL-LAN server                                         |                                  |
| <b>Socket Server</b>                   | Enables/disables Socket server                                           |                                  |
| <b>Telnet Server</b>                   | Enables/disables Telnet server                                           |                                  |
| <b>Print</b>                           | Outputs print                                                            | :HCOP:IMM                        |
| <b>Printer Setup ...</b>               | Executes printer setup                                                   |                                  |
| <b>Product Information</b>             | Reads product information                                                |                                  |
| <b>Trace View</b>                      |                                                                          |                                  |
| <b>Aperture</b>                        | Smoothing aperture                                                       | :CALC:PN[1-1]:TRAC[1-1]:SMO:APER |

| Key Operation                 | Function                                                                                           | SCPI Command                            |
|-------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Clear Persistent Data</b>  | Clears persistence mode                                                                            | :DISP:PN[1-1]:TRAC[1-1]:PERS<br>:CLE    |
| <b>Data -&gt; Mem</b>         | Copy data to memory                                                                                | :CALC:PN[1-1]:TRAC[1-1]:MAT<br>H:MEM    |
| <b>Data Hold</b>              | Data hold                                                                                          | :CALC:PN[1-1]:TRAC[1-1]:HOL<br>D        |
| <b>Data Math</b>              | Sets/reads math operation type                                                                     | :CALC:PN[1-1]:TRAC[1-1]:MAT<br>H:FUNC   |
| <b>Display Trace</b>          | Shows data and/or memory trace                                                                     | :DISP:PN[1-1]:TRAC[1-1]:MOD<br>E        |
| <b>Omitting Spurious</b>      | Spurious display omission ON/OFF                                                                   | :CALC:PN[1-1]:TRAC[1-1]:SPU<br>R:OMIS   |
| <b>Persistence Mode</b>       | Sets/reads persistence mode                                                                        | :DISP:PN[1-1]:TRAC[1-1]:PERS<br>:STAT   |
| <b>Smoothing</b>              | Smoothing on/off                                                                                   | :CALC:PN[1-1]:TRAC[1-1]:SM<br>O:STAT    |
| <b>Trace Label</b>            | Edit trace title label                                                                             | :DISP:PN[1-1]:TRAC[1-1]:LAB:<br>DATA    |
| <b>Trigger</b>                |                                                                                                    |                                         |
| <b>Continuous</b>             | Sets/reads trigger continuous mode                                                                 | :INIT:PN[1-1]:CONT<br>:INIT:PN[1-1]:IMM |
| <b>Ext Trig Polarity</b>      | External trigger polarity                                                                          | :TRIG:EXT:SLOP                          |
| <b>Hold</b>                   | Sets trigger mode to waiting-for-trigger state                                                     | :INIT:PN[1-1]:IMM                       |
| <b>Manual Trigger</b>         | move once to waiting-for-trigger state                                                             | :INIT:PN[1-1]:IMM                       |
| <b>Restart</b>                | move once to waiting-for-trigger state                                                             | :INIT:PN[1-1]:IMM                       |
| <b>Single</b>                 | always move to waiting-for-trigger state after measuring<br>move once to waiting-for-trigger state | :INIT:PN[1-1]:CONT<br>:INIT:PN[1-1]:IMM |
| <b>Source</b>                 | trigger source                                                                                     | :TRIG:PN[1-1]:SOUR                      |
| <b>Trigger to Phase Noise</b> | select measurement mode                                                                            | :TRIG:MODE                              |

Softkey Functions  
Spectrum Monitor Menu (Top Menu)

## Spectrum Monitor Menu (Top Menu)

| Key Operation                                  | Function                                                                                                             |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Double-click on each softkey menu title</b> | Displays the top menu of each menu item below. Refer the SP menu about detail of following each menu item.           |
| <b>Measurement View</b>                        | Same as <b>Meas</b> .                                                                                                |
| <b>Input</b>                                   | Same as <b>Scale</b> .                                                                                               |
| <b>Scale</b>                                   | Same as <b>Scale</b> .                                                                                               |
| <b>Format</b>                                  | Same as <b>Format</b> .                                                                                              |
| <b>Display</b>                                 | Same as <b>Display</b> .                                                                                             |
| <b>Average</b>                                 | Same as <b>Avg</b> .                                                                                                 |
| <b>Attenuator</b>                              | Same as <b>Cal</b> .                                                                                                 |
| <b>Start/Center</b>                            | Displays the same softkey for setting up the sweep range that appears when <b>Start</b> , or <b>Span</b> is pressed. |
| <b>Stop/Span</b>                               | Displays the same softkey for setting up the sweep range that appears when <b>Start</b> , or <b>Span</b> is pressed. |
| <b>DC Conrol Voltage</b>                       | Same as <b>Sweep Setup</b> .                                                                                         |
| <b>DC Power Voltage</b>                        | Same as <b>Sweep Setup</b> .                                                                                         |
| <b>Setup</b>                                   | Same as <b>Sweep Setup</b> .                                                                                         |
| <b>Trigger</b>                                 | Same as <b>Trigger</b> .                                                                                             |
| <b>Marker</b>                                  | Same as <b>Marker</b> .                                                                                              |
| <b>Marker Search</b>                           | Same as <b>Marker Search</b> .                                                                                       |
| <b>Marker To</b>                               | Same as <b>Marker Search</b> .                                                                                       |
| <b>Marker Function</b>                         | Same as <b>Marker Fctn</b> .                                                                                         |
| <b>Macro Setup</b>                             | Same as <b>Macro Setup</b> .                                                                                         |
| <b>Save/Recall</b>                             | Same as <b>Save/Recall</b> .                                                                                         |
| <b>System</b>                                  | Same as <b>System</b> .                                                                                              |
| <b>Preset</b>                                  | Same as <b>Preset</b> .                                                                                              |



## SP Menu

| Key Operation               | Function                                        | SCPI Command                  |
|-----------------------------|-------------------------------------------------|-------------------------------|
| <b>Attenuator</b>           |                                                 |                               |
| Input Attenuator            | Sets/reads Input Attenuator level on 5dB Step   | :SENS:ATT:LEV                 |
| <b>Average/BW</b>           |                                                 |                               |
| Averaging                   | Turns on/off averaging function                 | :SENS:SP[1-1]:AVER:STAT       |
| Averaging Restart           | Restart averaging                               | :SENS:SP[1-1]:AVER:CLE        |
| Averaging Type              | Sets/reads averaging type                       | :SENS:SP[1-1]:AVER:TYPE       |
| Avg Factor                  | Sets/reads the averaging count                  | :SENS:SP[1-1]:AVER:COUN       |
| RBW                         | Sets/reads RBW value                            | :SENS:SP[1-1]:BAND:RES        |
| <b>DC Control Voltage</b>   |                                                 |                               |
| Control Voltage Cal         | Enables DC Control voltage calibration          | :SOUR:VOLT:CONT:CORR[:STAT]   |
| DC Control Delay            | Sets/reads DC Control delay (sec)               | :SOUR:VOLT:CONT:DEL           |
| DC Control Output           | Turns on/off DC Control voltage                 | :SOUR:VOLT:CONT:LEV:STAT      |
| DC Control Voltage          | Sets/reads DC Control voltage                   | :SOUR:VOLT:CONT:LEV:AMPL      |
| Execute Control Voltage Cal | Execute DC Control voltage calibration          | :SOUR:VOLT:CONT:CORR:COLL:ACQ |
| Max Ctrl Voltage Limit      | Sets/reads the maximum DC Control voltage limit | :SOUR:VOLT:CONT:LIM:HIGH      |
| Min Ctrl Voltage Limit      | Sets/reads the minimum DC Control voltage limit | :SOUR:VOLT:CONT:LIM:LOW       |
| <b>DC Power Voltage</b>     |                                                 |                               |
| DC Power Delay              | Sets/reads DC Power delay (sec)                 | :SOUR:VOLT:POW:DEL            |
| DC Power Output             | Turns on/off DC Power voltage                   | :SOUR:VOLT:POW:LEV:STAT       |
| DC Power Voltage            | Sets/reads DC Power voltage                     | :SOUR:VOLT:POW:LEV:AMPL       |
| Max Pwr Voltage Limit       | Sets/reads the maximum DC Power voltage limit   | :SOUR:VOLT:POW:LIM:HIGH       |
| Min Pwr Voltage Limit       | Sets/reads the minimum DC Power voltage limit   | :SOUR:VOLT:POW:LIM:LOW        |
| <b>Display</b>              |                                                 |                               |
| Edit Title Label            | Edits the measurement window title label        | :DISP:SP[1-1]:LAB:DATA        |
| Marker Information          | Sets/reads the marker information position      | :DISP:SP[1-1]:ANN:MARK:POS    |
| Meas Condition              | Turns on/off measurement conditions             | :DISP:SP[1-1]:ANN:MEAS:STAT   |

Softkey Functions  
SP Menu

| Key Operation            | Function                                                  | SCPI Command                   |
|--------------------------|-----------------------------------------------------------|--------------------------------|
| <b>Relative Y-Scale</b>  | Turns on/off relative Y-scale                             | :DISP:SP[1-1]:GRAT:AXIS:Y:REL  |
| <b>Title Label</b>       | Turns on/off measurement window title label               | :DISP:SP[1-1]:LAB:STAT         |
| <b>Update</b>            | Turns on/off trace updates                                | :DISP:ENAB                     |
| <b>Y # of Digits</b>     | Selects the number of digits (Y-axis)                     | :DISP:SP[1-1]:GRAT:AXIS:Y:STAT |
| <b>Format</b>            |                                                           |                                |
| <b>Detector Mode</b>     | Sets/reads the detector mode                              | :SENS:SP[1-1]:DET:FUNC         |
| <b>Format</b>            | SP format                                                 | :CALC:SP[1-1]:TRAC[1-1]:FORM   |
| <b>Macro Setup</b>       |                                                           |                                |
| <b>E5052 Event</b>       | Turns on/off the E5052 VBA event callback function        | :PROG:COM:EVENT                |
| <b>Echo Window Menu</b>  |                                                           |                                |
| <b>Clear Echo</b>        | Clears Echo window                                        | :DISP:ECHO:CLE                 |
| <b>Echo Font Size</b>    | Sets/reads the font size on Echo window                   | :DISP:ECHO:FSIZ                |
| <b>Echo Window</b>       | Turns on/off the Echo window                              | :DISP:ECHO:STAT                |
| <b>Select Macro</b>      | Sets/reads the name of the program to be selected         | :PROG:SEL:NAME                 |
| <b>Stop</b>              | Set/reads the state of the selected program               | :PROG:SEL:STAT                 |
| <b>User Menu</b>         |                                                           |                                |
| <b>User Label 1</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM       |
| <b>User Label 2</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM       |
| <b>User Label 3</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM       |
| <b>User Label 4</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM       |
| <b>User Label 5</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM       |
| <b>User Label 6</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM       |
| <b>User Label 7</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM       |
| <b>User Label 8</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM       |
| <b>VBA Editor Menu</b>   |                                                           |                                |
| <b>Close Editor</b>      | Close VBA editor                                          |                                |
| <b>Load Project</b>      | Loads program                                             | :MMEM:LOAD:PROG                |
| <b>New Project</b>       | Open new VBA project                                      |                                |
| <b>Open Editor</b>       | Open VBA editor                                           |                                |
| <b>Save Project</b>      | Save VBA project                                          | :MMEM:STOR:PROG                |
| <b>Marker</b>            |                                                           |                                |
| <b>Clear Marker Menu</b> |                                                           |                                |

| Key Operation             | Function                                         | SCPI Command                           |
|---------------------------|--------------------------------------------------|----------------------------------------|
| <b>All OFF</b>            | Clears all the markers                           |                                        |
| <b>Marker 1</b>           | Turns on/off marker 1                            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 2</b>           | Turns on/off marker 2                            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 3</b>           | Turns on/off marker 3                            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 4</b>           | Turns on/off marker 4                            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 5</b>           | Turns on/off marker 5                            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 6</b>           | Turns on/off marker 6                            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 1</b>           | Turns on/off marker 1                            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 2</b>           | Turns on/off marker 2                            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 3</b>           | Turns on/off marker 3                            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 4</b>           | Turns on/off marker 4                            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 5</b>           | Turns on/off marker 5                            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker 6</b>           | Turns on/off marker 6                            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:STAT |
| <b>Marker List</b>        | Turns on/off the marker list                     | :DISP:SP[1-1]:TABL[:STAT]              |
| <b>More Functions</b>     |                                                  |                                        |
| <b>Discrete</b>           | Sets/reads marker movement (Continuous/Discrete) | :CALC:SP[1-1]:ALLT:MARK:DISC:STAT      |
| <b>Ref Marker</b>         | Sets/reads marker reference number               | :CALC:SP[1-1]:ALLT:MARK:REF:NUMB       |
| <b>Ref Marker Mode</b>    | Turns on/off delta marker mode                   | :CALC:SP[1-1]:ALLT:MARK:REF:STAT       |
| <b>Marker Function</b>    |                                                  |                                        |
| <b>Analysis Range (X)</b> | Sets/reads analysis/search range (X-axis)        | :CALC:SP[1-1]:TRAC[1-1]:FUNCTION:DOM:X |
| <b>Analysis Range (Y)</b> | Sets/reads analysis/search range (Y-axis)        | :CALC:SP[1-1]:TRAC[1-1]:FUNCTION:DOM:Y |
| <b>Analysis Type</b>      | Sets/reads analysis type                         | :CALC:SP[1-1]:TRAC[1-1]:FUNCTION:TYPE  |
| <b>Band Marker X</b>      |                                                  |                                        |

Softkey Functions  
SP Menu

| Key Operation        | Function                                    | SCPI Command                           |
|----------------------|---------------------------------------------|----------------------------------------|
| <b>Band Marker X</b> | Turns on/off bandmarker X                   | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:X:STAT |
| <b>Center</b>        | Sets/reads the center value of bandmarker X | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:X:CENT |
| <b>Span</b>          | Sets/reads the span value of bandmarker X   | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:X:SPAN |
| <b>Start</b>         | Sets/reads the start value of bandmarker X  | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:X:STAR |
| <b>Stop</b>          | Sets/reads the stop value of bandmarker X   | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:X:STOP |
| <b>Band Marker Y</b> |                                             |                                        |
| <b>Band Marker Y</b> | Turns on/off bandmarker Y                   | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:Y:STAT |
| <b>Center</b>        | Sets/reads the center value of bandmarker Y | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:Y:CENT |
| <b>Span</b>          | Sets/reads the span value of bandmarker Y   | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:Y:SPAN |
| <b>Start</b>         | Sets/reads the start value of bandmarker Y  | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:Y:STAR |
| <b>Stop</b>          | Sets/reads the stop value of bandmarker Y   | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:Y:STOP |
| <b>Marker Search</b> |                                             |                                        |
| <b>Band Marker X</b> |                                             |                                        |
| <b>Band Marker X</b> | Turns on/off bandmarker X                   | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:X:STAT |
| <b>Center</b>        | Sets/reads the center value of bandmarker X | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:X:CENT |
| <b>Span</b>          | Sets/reads the span value of bandmarker X   | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:X:SPAN |
| <b>Start</b>         | Sets/reads the start value of bandmarker X  | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:X:STAR |
| <b>Stop</b>          | Sets/reads the stop value of bandmarker X   | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:X:STOP |
| <b>Band Marker Y</b> |                                             |                                        |
| <b>Band Marker Y</b> | Turns on/off bandmarker Y                   | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:Y:STAT |
| <b>Center</b>        | Sets/reads the center value of bandmarker Y | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:Y:CENT |
| <b>Span</b>          | Sets/reads the span value of bandmarker Y   | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:Y:SPAN |
| <b>Start</b>         | Sets/reads the start value of bandmarker Y  | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:Y:STAR |

| Key Operation              | Function                                      | SCPI Command                                     |
|----------------------------|-----------------------------------------------|--------------------------------------------------|
| <b>Stop</b>                | Sets/reads the stop value of bandmarker Y     | :CALC:SP[1-1]:TRAC[1-1]:BDM<br>:Y:STOP           |
| <b>Peak</b>                |                                               |                                                  |
| <b>Peak Excursion</b>      | Sets/reads the peak excursion value           | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:PEAK:EXC  |
| <b>Peak Polarity</b>       | Sets/reads the marker peak-search polarity    | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:PEAK:POL  |
| <b>Search Left</b>         | Execute marker peak search left               | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:LPE  |
| <b>Search Peak</b>         | Execute marker peak search                    | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:PEAK |
| <b>Search Peak All</b>     | Execute marker search all                     | :CALC:SP[1-1]:TRAC[1-1]:ALLM:SEAR:PEAK           |
| <b>Search Right</b>        | Execute marker peak search right              | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:RPE  |
| <b>Search Max</b>          | Execute marker search maximum                 | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:MAX  |
| <b>Search Min</b>          | Execute marker search minimum                 | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:MIN  |
| <b>Search Range (X)</b>    | Sets/reads marker search range (X-axis)       | :CALC:SP[1-1]:TRAC[1-1]:ALLM:SEAR:DOM:X          |
| <b>Search Range (Y)</b>    | Sets/reads marker search range (Y-axis)       | :CALC:SP[1-1]:TRAC[1-1]:ALLM:SEAR:DOM:Y          |
| <b>Target</b>              |                                               |                                                  |
| <b>Search Left</b>         | Execute marker target search left             | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:LTAR |
| <b>Search Right</b>        | Execute marker target search right            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:RTAR |
| <b>Search Target</b>       | Execute marker target search                  | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:EXEC:TARG |
| <b>Target Transition</b>   | Sets/reads the target transition definition   | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:TARG:TRAN |
| <b>Target Value</b>        | Sets/reads the marker target value            | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:TARG:Y    |
| <b>Tracking</b>            | Sets/reads the marker tracking type           | :CALC:SP[1-1]:TRAC[1-1]:MARK[1-6]:SEAR:TRAC:TYPE |
| <b>Marker To</b>           |                                               |                                                  |
| <b>Marker -&gt; Center</b> | Sets/reads the center value of frequency span | :SENS:SP[1-1]:FREQ:CENT                          |
| <b>Marker -&gt; Start</b>  | Sets/reads the start value of frequency span  | :SENS:SP[1-1]:FREQ:STAR                          |
| <b>Marker -&gt; Stop</b>   | Sets/reads the stop value of frequency span   | :SENS:SP[1-1]:FREQ:STOP                          |
| <b>Measurement View</b>    |                                               |                                                  |

Softkey Functions  
SP Menu

| Key Operation            | Function                                                       | SCPI Command                        |
|--------------------------|----------------------------------------------------------------|-------------------------------------|
| <b>Freq &amp; Power</b>  | Selects frequency, power and DC current measurement window     | :DISP:WIND:ACT                      |
| <b>Phase Noise</b>       | Selects phase noise measurement window                         | :DISP:WIND:ACT                      |
| <b>Show Window</b>       |                                                                |                                     |
| <b>Freq &amp; Power</b>  | Turn on/off frequency, power and DC current measurement mode   | :DISP:FP[1-1]:STAT                  |
| <b>Phase Noise</b>       | Turns on/off phase noise measurement mode                      | :DISP:PN[1-1]:STAT                  |
| <b>Spectrum Monitor</b>  | Turns on/off spectrum monitor mode                             | :DISP:SP[1-1]:STAT                  |
| <b>Transient</b>         | Turns on/off transient measurement mode                        | :DISP:TR[1-1]:STAT                  |
| <b>User</b>              | Turns on/off user defined window                               | :DISP:USER[1-1]:STAT                |
| <b>Spectrum Monitor</b>  | Selects spectrum monitor mode                                  | :DISP:WIND:ACT                      |
| <b>Transient</b>         | Selects transient measurement mode                             | :DISP:WIND:ACT                      |
| <b>User</b>              | Selects user defined window                                    | :DISP:WIND:ACT                      |
| <b>Preset</b>            |                                                                |                                     |
| <b>OK</b>                | Preset instrument                                              | :SYST:PRES                          |
| <b>Save/Recall</b>       |                                                                |                                     |
| <b>Explorer...</b>       | Open windows explorer                                          |                                     |
| <b>Recall State</b>      |                                                                |                                     |
| <b>Autorec</b>           | Recalls settings                                               | :MMEM:LOAD:STAT                     |
| <b>File Dialog...</b>    | Open file dialog                                               |                                     |
| <b>State01</b>           | Recalls state file from register 1                             | :MMEM:LOAD:STAT                     |
| <b>State02</b>           | Recalls state file from register 2                             | :MMEM:LOAD:STAT                     |
| <b>State03</b>           | Recalls state file from register 3                             | :MMEM:LOAD:STAT                     |
| <b>State04</b>           | Recalls state file from register 4                             | :MMEM:LOAD:STAT                     |
| <b>State05</b>           | Recalls state file from register 5                             | :MMEM:LOAD:STAT                     |
| <b>State06</b>           | Recalls state file from register 6                             | :MMEM:LOAD:STAT                     |
| <b>Save Data Trace</b>   | Saves trace data                                               | :MMEM:SP[1-1]:TRAC[1-1]:STOR[:DATA] |
| <b>Save Memory Trace</b> | Saves memory trace data                                        | :MMEM:SP[1-1]:TRAC[1-1]:STOR:MEM    |
| <b>Save State</b>        |                                                                |                                     |
| <b>Autorec</b>           | Save settings                                                  | :MMEM:STOR:STAT                     |
| <b>File Dialog...</b>    | Open file dialog                                               |                                     |
| <b>Save Type</b>         | Select instrument state type (Entire or instrument state only) | :MMEM:STOR:STYP                     |
| <b>State01</b>           | Save state file to register 1                                  | :MMEM:STOR:STAT                     |
| <b>State02</b>           | Save state file to register 2                                  | :MMEM:STOR:STAT                     |

| Key Operation                 | Function                                         | SCPI Command                          |
|-------------------------------|--------------------------------------------------|---------------------------------------|
| <b>State03</b>                | Save state file to register 3                    | :MMEM:STOR:STAT                       |
| <b>State04</b>                | Save state file to register 4                    | :MMEM:STOR:STAT                       |
| <b>State05</b>                | Save state file to register 5                    | :MMEM:STOR:STAT                       |
| <b>State06</b>                | Save state file to register 6                    | :MMEM:STOR:STAT                       |
| <b>Scale</b>                  |                                                  |                                       |
| <b>Auto Scale</b>             | Execute autoscale                                | :DISP:SP[1-1]:TRAC[1-1]:Y[:SCAL]:AUTO |
| <b>Divisions</b>              | Sets/reads Y-scale divisions                     | :DISP:SP[1-1]:Y[:SCAL]:DIV            |
| <b>Marker -&gt; Reference</b> | Sets the marker value to the reference level     | :DISP:SP[1-1]:TRAC[1-1]:Y[:SCAL]:RLEV |
| <b>Reference Position</b>     | Sets/reads the reference position                | :DISP:SP[1-1]:TRAC[1-1]:Y[:SCAL]:RPOS |
| <b>Reference Value</b>        | Sets/reads the reference level value             | :DISP:SP[1-1]:TRAC[1-1]:Y[:SCAL]:RLEV |
| <b>Scale/Div</b>              | Sets/reads scale per division                    | :DISP:SP[1-1]:TRAC[1-1]:Y[:SCAL]:PDIV |
| <b>Setup</b>                  |                                                  |                                       |
| <b>Reference Level</b>        | Sets/reads the reference level of frequency span | :SENS:SP[1-1]:POW:RLEV                |
| <b>Start/Center</b>           |                                                  |                                       |
| <b>Center</b>                 | Sets/reads the center value of frequency span    | :SENS:SP[1-1]:FREQ:CENT               |
| <b>Span</b>                   | Sets/reads the span value of frequency span      | :SENS:SP[1-1]:FREQ:SPAN               |
| <b>Start</b>                  | Sets/reads the start value of frequency span     | :SENS:SP[1-1]:FREQ:STAR               |
| <b>Stop</b>                   | Sets/reads the stop value of frequency span      | :SENS:SP[1-1]:FREQ:STOP               |
| <b>Stop/Span</b>              |                                                  |                                       |
| <b>Center</b>                 | Sets/reads the center value of frequency span    | :SENS:SP[1-1]:FREQ:CENT               |
| <b>Span</b>                   | Sets/reads the span value of frequency span      | :SENS:SP[1-1]:FREQ:SPAN               |
| <b>Start</b>                  | Sets/reads the start value of frequency span     | :SENS:SP[1-1]:FREQ:STAR               |
| <b>Stop</b>                   | Sets/reads the stop value of frequency span      | :SENS:SP[1-1]:FREQ:STOP               |
| <b>System</b>                 |                                                  |                                       |
| <b>Abort Printing</b>         | Aborts printing                                  | :HCOP:ABOR                            |
| <b>Backlight</b>              | Turns on/off backlight                           | :SYST:BACK:STAT                       |
| <b>Dump Screen Image</b>      | Save screen image                                | :MMEM:STOR:IMAG                       |
| <b>Error Log</b>              |                                                  |                                       |
| <b>Clear Error Log</b>        | Clear error log                                  |                                       |
| <b>View Error Log...</b>      | Display error log                                |                                       |
| <b>Invert Image</b>           | Selects print mode                               | :HCOP:IMAG                            |

Softkey Functions  
SP Menu

| Key Operation                          | Function                                                                  | SCPI Command             |
|----------------------------------------|---------------------------------------------------------------------------|--------------------------|
| <b>Misc Setup</b>                      |                                                                           |                          |
| <b>Beeper</b>                          |                                                                           |                          |
| <b>Beep Complete</b>                   | Turns on/off the beep for operation completion                            | :SYST:BEEP:COMP:STAT     |
| <b>Beep Warning</b>                    | Turns on/off the beep for warning                                         | :SYST:BEEP:WARN:STAT     |
| <b>Test Beep Complete</b>              | Makes beep sound for operation completion                                 | :SYST:BEEP:COMP:IMM      |
| <b>Test Beep Warning</b>               | Makes beep sound for warning                                              | :SYST:BEEP:WARN:IMM      |
| <b>Clock Setup</b>                     |                                                                           |                          |
| <b>Set Date and Time</b>               | Set/reads system time<br>Set/reads system date                            | :SYST:TIME<br>:SYST:DATE |
| <b>Show Clock</b>                      | Turns on/off internal clock display                                       | :DISP:CLOC               |
| <b>Control Panel ...</b>               | Open control panel                                                        |                          |
| <b>GPIB Setup</b>                      |                                                                           |                          |
| <b>System Controller Configuration</b> | Turns on/off system controller mode                                       |                          |
| <b>Talker/Listener Address</b>         | Sets the address for controlling the analyzer from a controller via GPIB. |                          |
| <b>Key Lock</b>                        |                                                                           |                          |
| <b>Front Panel &amp; Keyboard Lock</b> | Disables from panel / keyboard operations                                 | :SYST:KLOC:KBD           |
| <b>Touch Screen &amp; Mouse Lock</b>   | Disables from touch screen / mouse operations                             | :SYST:KLOC:MOUS          |
| <b>Network Setup</b>                   |                                                                           |                          |
| <b>MAC Address</b>                     | Sets MAC address                                                          |                          |
| <b>Network Configuration ...</b>       | Enables/disables network connections                                      |                          |
| <b>Network Identification ...</b>      | Sets network ID of the instrument                                         |                          |
| <b>SICL-LAN Address</b>                | Sets SICL-LAN address                                                     |                          |
| <b>SICL-LAN Server</b>                 | Enables/disables SICL-LAN server                                          |                          |
| <b>Socket Server</b>                   | Enables/disables Socket server                                            |                          |
| <b>Telnet Server</b>                   | Enables/disables Telnet server                                            |                          |
| <b>Print</b>                           | Outputs print                                                             | :HCOP:IMM                |



| Key Operation                      | Function                                                                                           | SCPI Command                            |
|------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Printer Setup ...</b>           | Execute printer setup                                                                              |                                         |
| <b>Product Information</b>         | Reads product information                                                                          |                                         |
| <b>Trace View</b>                  |                                                                                                    |                                         |
| <b>Aperture</b>                    | Smoothing aperture                                                                                 | :CALC:SP[1-1]:TRAC[1-1]:SMO<br>:APER    |
| <b>Clear Persistent Data</b>       | Clears persistence mode                                                                            | :DISP:SP[1-1]:TRAC[1-1]:PERS:<br>CLE    |
| <b>Data -&gt; Mem</b>              | Copy data to memory                                                                                | :CALC:SP[1-1]:TRAC[1-1]:MAT<br>H:MEM    |
| <b>Data Hold</b>                   | Data hold                                                                                          | :CALC:SP[1-1]:TRAC[1-1]:HOL<br>D        |
| <b>Data Math</b>                   | Sets/reads math operation type                                                                     | :CALC:SP[1-1]:TRAC[1-1]:MAT<br>H:FUNC   |
| <b>Display Trace</b>               | Shows data and/or memory trace                                                                     | :DISP:SP[1-1]:TRAC[1-1]:MOD<br>E        |
| <b>Persistence Mode</b>            | Sets/reads persistence mode                                                                        | :DISP:SP[1-1]:TRAC[1-1]:PERS:<br>STAT   |
| <b>Smoothing</b>                   | Smoothing on/off                                                                                   | :CALC:SP[1-1]:TRAC[1-1]:SMO<br>:STAT    |
| <b>Trace Label</b>                 | Edits trace title label                                                                            | :DISP:SP[1-1]:TRAC[1-1]:LAB:<br>DATA    |
| <b>Trigger</b>                     |                                                                                                    |                                         |
| <b>Continuous</b>                  | Sets/reads trigger continuous mode                                                                 | :INIT:SP[1-1]:CONT<br>:INIT:SP[1-1]:IMM |
| <b>Ext Trig Polarity</b>           | External trigger polarity                                                                          | :TRIG:EXT:SLOP                          |
| <b>Hold</b>                        | Sets trigger mode to waiting-for-trigger state                                                     | :INIT:SP[1-1]:IMM                       |
| <b>Manual Trigger</b>              | move once to waiting-for-trigger state                                                             | :INIT:SP[1-1]:IMM                       |
| <b>Restart</b>                     | move once to waiting-for-trigger state                                                             | :INIT:SP[1-1]:IMM                       |
| <b>Single</b>                      | always move to waiting-for-trigger state after measuring<br>move once to waiting-for-trigger state | :INIT:SP[1-1]:CONT<br>:INIT:SP[1-1]:IMM |
| <b>Source</b>                      | trigger source                                                                                     | :TRIG:SP[1-1]:SOUR                      |
| <b>Trigger to Spectrum Monitor</b> | select measurement mode                                                                            | :TRIG:MODE                              |

Softkey Functions  
**Frequency Power Menu (Top Menu)**

**Frequency Power Menu (Top Menu)**

| Key Operation                                  | Function                                                                                                             |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Double-click on each softkey menu title</b> | Displays the top menu of each menu item below. Refer the FP menu about detail of following each menu item.           |
| <b>Measurement View</b>                        | Same as <b>Meas</b> .                                                                                                |
| <b>Input</b>                                   | Same as <b>Scale</b> .                                                                                               |
| <b>Scale</b>                                   | Same as <b>Scale</b> .                                                                                               |
| <b>Format</b>                                  | Same as <b>Format</b> .                                                                                              |
| <b>Display</b>                                 | Same as <b>Display</b> .                                                                                             |
| <b>Average</b>                                 | Same as <b>Avg</b> .                                                                                                 |
| <b>Attenuator</b>                              | Same as <b>Cal</b> .                                                                                                 |
| <b>Start/Center</b>                            | Displays the same softkey for setting up the sweep range that appears when <b>Start</b> , or <b>Span</b> is pressed. |
| <b>Stop/Span</b>                               | Displays the same softkey for setting up the sweep range that appears when <b>Start</b> , or <b>Span</b> is pressed. |
| <b>DC Conrol Voltage</b>                       | Same as <b>Sweep Setup</b> .                                                                                         |
| <b>DC Power Voltage</b>                        | Same as <b>Sweep Setup</b> .                                                                                         |
| <b>Setup</b>                                   | Same as <b>Sweep Setup</b> .                                                                                         |
| <b>Trigger</b>                                 | Same as <b>Trigger</b> .                                                                                             |
| <b>Marker</b>                                  | Same as <b>Marker</b> .                                                                                              |
| <b>Marker Search</b>                           | Same as <b>Marker Search</b> .                                                                                       |
| <b>Marker To</b>                               | Same as <b>Marker Search</b> .                                                                                       |
| <b>Marker Function</b>                         | Same as <b>Marker Fctn</b> .                                                                                         |
| <b>Macro Setup</b>                             | Same as <b>Macro Setup</b> .                                                                                         |
| <b>Save/Recall</b>                             | Same as <b>Save/Recall</b> .                                                                                         |
| <b>System</b>                                  | Same as <b>System</b> .                                                                                              |
| <b>Preset</b>                                  | Same as <b>Preset</b> .                                                                                              |

## FP Menu

| Key Operation               | Function                                        | SCPI Command                  |
|-----------------------------|-------------------------------------------------|-------------------------------|
| <b>Attenuator</b>           |                                                 |                               |
| Input Attenuator            | Sets/reads Input Attenuator level on 5dB Step   | :SENS:ATT:LEV                 |
| <b>Average</b>              |                                                 |                               |
| Averaging                   | Turns on/off averaging function                 | :SENS:FP[1-1]:AVER:STAT       |
| Averaging Restart           | Restart averaging                               | :SENS:FP[1-1]:AVER:CLE        |
| Avg Factor                  | Sets/reads averaging count                      | :SENS:FP[1-1]:AVER:COUN       |
| <b>DC Control Voltage</b>   |                                                 |                               |
| Control Voltage Cal         | Enables DC Control voltage calibration          | :SOUR:VOLT:CONT:CORR[:STAT]   |
| DC Control Delay            | Sets/reads DC Control delay (sec)               | :SOUR:VOLT:CONT:DEL           |
| DC Control Output           | Turns on/off DC Control voltage                 | :SOUR:VOLT:CONT:LEV:STAT      |
| DC Control Voltage          | Sets/reads DC Control voltage                   | :SOUR:VOLT:CONT:LEV:AMPL      |
| Execute Control Voltage Cal | Execute DC Control voltage calibration          | :SOUR:VOLT:CONT:CORR:COLL:ACQ |
| Max Ctrl Voltage Limit      | Sets/reads the maximum DC Control voltage limit | :SOUR:VOLT:CONT:LIM:HIGH      |
| Min Ctrl Voltage Limit      | Sets/reads the minimum DC Control voltage limit | :SOUR:VOLT:CONT:LIM:LOW       |
| <b>DC Power Voltage</b>     |                                                 |                               |
| DC Power Delay              | Sets/reads DC Power delay (sec)                 | :SOUR:VOLT:POW:DEL            |
| DC Power Output             | Turns on/off DC Power voltage                   | :SOUR:VOLT:POW:LEV:STAT       |
| DC Power Voltage            | Sets/reads DC Power voltage                     | :SOUR:VOLT:POW:LEV:AMPL       |
| Max Pwr Voltage Limit       | Sets/reads the maximum DC Power voltage limit   | :SOUR:VOLT:POW:LIM:HIGH       |
| Min Pwr Voltage Limit       | Sets/reads the minimum DC Power voltage limit   | :SOUR:VOLT:POW:LIM:LOW        |
| <b>Display</b>              |                                                 |                               |
| Edit Title Label            | Edit the measurement window title label         | :DISP:FP[1-1]:LAB:DATA        |
| Marker Information          | Sets/reads the marker information position      | :DISP:FP[1-1]:ANN:MARK:POS    |
| Meas Condition              | Turns on/off measurement conditions             | :DISP:FP[1-1]:ANN:MEAS:STAT   |
| Relative Y-Scale            | Turns on/off relative Y-scale                   | :DISP:FP[1-1]:GRAT:AXIS:Y:REL |
| Title Label                 | Turns on/off the measurement window title label | :DISP:FP[1-1]:LAB:STAT        |

Softkey Functions  
FP Menu

| Key Operation               | Function                                                  | SCPI Command                           |
|-----------------------------|-----------------------------------------------------------|----------------------------------------|
| <b>Update</b>               | Turns on/off the trace updates                            | :DISP:ENAB                             |
| <b>Y # of Digits</b>        | Selects the number of digits (Y-axis)                     | :DISP:FP[1-1]:GRAT:AXIS:Y:STAT         |
| <b>Format</b>               |                                                           |                                        |
| <b>Frequency Format</b>     | Selects frequency format (Hz or Hz/V)                     | :CALC:FP[1-1]:TRAC[1-3]:FORM:FREQ      |
| <b>Sensitivity Aperture</b> | Sets/reads the sensitivity aperture                       | :CALC:FP[1-1]:TRAC[1-3]:SAP            |
| <b>Macro Setup</b>          |                                                           |                                        |
| <b>E5052 Event</b>          | Turns on/off the E5052 VBA event callback function        | :PROG:COM:EVENT                        |
| <b>Echo Window Menu</b>     |                                                           |                                        |
| <b>Clear Echo</b>           | Clears Echo window                                        | :DISP:ECHO:CLE                         |
| <b>Echo Font Size</b>       | Sets/reads the font size on Echo window                   | :DISP:ECHO:FSIZ                        |
| <b>Echo Window</b>          | Turns on/off the Echo window                              | :DISP:ECHO:STAT                        |
| <b>Select Macro</b>         | Sets/reads the name of the program to be selected         | :PROG:SEL:NAME                         |
| <b>Stop</b>                 | Sets/reads the state of the selected program              | :PROG:SEL:STAT                         |
| <b>User Menu</b>            |                                                           |                                        |
| <b>User Label 1</b>         | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 2</b>         | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 3</b>         | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 4</b>         | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 5</b>         | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 6</b>         | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 7</b>         | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 8</b>         | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>VBA Editor Menu</b>      |                                                           |                                        |
| <b>Close Editor</b>         | close VBA editor                                          |                                        |
| <b>Load Project</b>         | Load program                                              | :MMEM:LOAD:PROG                        |
| <b>New Project</b>          | Open new VBA project                                      |                                        |
| <b>Open Editor</b>          | Open VBA editor                                           |                                        |
| <b>Save Project</b>         | Save VBA Project                                          | :MMEM:STOR:PROG                        |
| <b>Marker</b>               |                                                           |                                        |
| <b>Clear Marker Menu</b>    |                                                           |                                        |
| <b>All OFF</b>              | Clears all the markers                                    |                                        |
| <b>Marker 1</b>             | Turns on/off marker 1                                     | :CALC:FP[1-1]:TRAC[1-3]:MARK[1-6]:STAT |

| Key Operation             | Function                                         | SCPI Command                           |
|---------------------------|--------------------------------------------------|----------------------------------------|
| <b>Marker 2</b>           | Turns on/off marker 2                            | :CALC:FP[1-1]:TRAC[1-3]:MARK[1-6]:STAT |
| <b>Marker 3</b>           | Turns on/off marker 3                            | :CALC:FP[1-1]:TRAC[1-3]:MARK[1-6]:STAT |
| <b>Marker 4</b>           | Turns on/off marker 4                            | :CALC:FP[1-1]:TRAC[1-3]:MARK[1-6]:STAT |
| <b>Marker 5</b>           | Turns on/off marker 5                            | :CALC:FP[1-1]:TRAC[1-3]:MARK[1-6]:STAT |
| <b>Marker 6</b>           | Turns on/off marker 6                            | :CALC:FP[1-1]:TRAC[1-3]:MARK[1-6]:STAT |
| <b>Couple</b>             | Turns on/off marker coupling function            | :CALC:FP[1-1]:ALLT:MARK:COUP:STAT      |
| <b>Marker 1</b>           | Turns on/off marker 1                            | :CALC:FP[1-1]:TRAC[1-3]:MARK[1-6]:STAT |
| <b>Marker 2</b>           | Turns on/off marker 2                            | :CALC:FP[1-1]:TRAC[1-3]:MARK[1-6]:STAT |
| <b>Marker 3</b>           | Turns on/off marker 3                            | :CALC:FP[1-1]:TRAC[1-3]:MARK[1-6]:STAT |
| <b>Marker 4</b>           | Turns on/off marker 4                            | :CALC:FP[1-1]:TRAC[1-3]:MARK[1-6]:STAT |
| <b>Marker 5</b>           | Turns on/off marker 5                            | :CALC:FP[1-1]:TRAC[1-3]:MARK[1-6]:STAT |
| <b>Marker 6</b>           | Turns on/off marker 6                            | :CALC:FP[1-1]:TRAC[1-3]:MARK[1-6]:STAT |
| <b>Marker List</b>        | Turns on/off the marker list                     | :DISP:FP[1-1]:TABL[:STAT]              |
| <b>More Functions</b>     |                                                  |                                        |
| <b>Discrete</b>           | Sets/reads marker movement (Continuous/Discrete) | :CALC:FP[1-1]:ALLT:MARK:DISC:STAT      |
| <b>Ref Marker</b>         | Sets/reads marker reference number               | :CALC:FP[1-1]:ALLT:MARK:REF:NUMB       |
| <b>Ref Marker Mode</b>    | Turns on/off delta marker mode                   | :CALC:FP[1-1]:ALLT:MARK:REF:STAT       |
| <b>Marker Function</b>    |                                                  |                                        |
| <b>Analysis Range (X)</b> | Sets/reads analysis/search range (X-axis)        | :CALC:FP[1-1]:TRAC[1-3]:FUNC:DOM:X     |
| <b>Analysis Range (Y)</b> | Sets/reads analysis/search range (Y-axis)        | :CALC:FP[1-1]:TRAC[1-3]:FUNC:DOM:Y     |
| <b>Analysis Type</b>      | Sets/reads analysis type                         | :CALC:FP[1-1]:TRAC[1-3]:FUNC:TYPE      |
| <b>Band Marker X</b>      |                                                  |                                        |
| <b>Band Marker X</b>      | Turns on/off bandmarker X                        | :CALC:FP[1-1]:TRAC[1-3]:BDM:X:STAT     |

Softkey Functions  
FP Menu

| Key Operation        | Function                                    | SCPI Command                           |
|----------------------|---------------------------------------------|----------------------------------------|
| <b>Center</b>        | Sets/reads the center value of bandmarker X | :CALC:FP[1<br>1]:TRAC[1-3]:BDM:X:CENT  |
| <b>Span</b>          | Sets/reads the span value of bandmarker X   | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:X:SPAN |
| <b>Start</b>         | Sets/reads the start value of bandmarker X  | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:X:STAR |
| <b>Stop</b>          | Sets/reads the stop value of bandmarker X   | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:X:STOP |
| <b>Band Marker Y</b> |                                             |                                        |
| <b>Band Marker Y</b> | Turns on/off bandmarker Y                   | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:Y:STAT |
| <b>Center</b>        | Sets/reads the center value of bandmarker Y | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:Y:CENT |
| <b>Span</b>          | Sets/reads the span value of bandmarker Y   | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:Y:SPAN |
| <b>Start</b>         | Sets/reads the start value of bandmarker Y  | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:Y:STAR |
| <b>Stop</b>          | Sets/reads the stop value of bandmarker Y   | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:Y:STOP |
| <b>Couple</b>        | Turns on/off bandmarker coupling function   | :CALC:FP[1-1]:ALLT:BDM:X:C<br>OUP:STAT |
| <b>Marker Search</b> |                                             |                                        |
| <b>Band Marker X</b> |                                             |                                        |
| <b>Band Marker X</b> | Turns on/off bandmarker X                   | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:X:STAT |
| <b>Center</b>        | Sets/reads the center value of bandmarker X | :CALC:FP[1<br>1]:TRAC[1-3]:BDM:X:CENT  |
| <b>Span</b>          | Sets/reads the span value of bandmarker X   | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:X:SPAN |
| <b>Start</b>         | Sets/reads the start value of bandmarker X  | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:X:STAR |
| <b>Stop</b>          | Sets/reads the stop value of bandmarker X   | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:X:STOP |
| <b>Band Marker Y</b> |                                             |                                        |
| <b>Band Marker Y</b> | Turns on/off bandmarker Y                   | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:Y:STAT |
| <b>Center</b>        | Sets/reads the center value of bandmarker Y | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:Y:CENT |
| <b>Span</b>          | Sets/reads the span value of bandmarker Y   | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:Y:SPAN |
| <b>Start</b>         | Sets/reads the start value of bandmarker Y  | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:Y:STAR |

| Key Operation              | Function                                                                                                                         | SCPI Command                                                        |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <b>Stop</b>                | Sets/reads the stop value of bandmarker Y                                                                                        | :CALC:FP[1-1]:TRAC[1-3]:BDM<br>:Y:STOP                              |
| <b>Couple</b>              | Turns on/off bandmarker coupling function                                                                                        | :CALC:FP[1-1]:ALLT:BDM:X:C<br>OUP:STAT                              |
| <b>Peak</b>                |                                                                                                                                  |                                                                     |
| <b>Peak Excursion</b>      | Sets/reads the peak excursion value                                                                                              | :CALC:FP[1-1]:TRAC[1-3]:MAR<br>K[1-6]:SEAR:PEAK:EXC                 |
| <b>Peak Polarity</b>       | Sets/reads the marker peak-search polarity                                                                                       | :CALC:FP[1-1]:TRAC[1-3]:MAR<br>K[1-6]:SEAR:PEAK:POL                 |
| <b>Search Left</b>         | Execute marker peak search left                                                                                                  | :CALC:FP[1-1]:TRAC[1-3]:MAR<br>K[1-6]:SEAR:EXEC:LPE                 |
| <b>Search Peak</b>         | Execute marker peak search                                                                                                       | :CALC:FP[1-1]:TRAC[1-3]:MAR<br>K[1-6]:SEAR:EXEC:PEAK                |
| <b>Search Peak All</b>     | Execute marker search all                                                                                                        | :CALC:FP[1-1]:TRAC[1-3]:ALL<br>M:SEAR:PEAK                          |
| <b>Search Right</b>        | Execute marker peak search right                                                                                                 | :CALC:FP[1-1]:TRAC[1-3]:MAR<br>K[1-6]:SEAR:EXEC:RPE                 |
| <b>Search Max</b>          | Execute marker search maximum                                                                                                    | :CALC:FP[1-1]:TRAC[1-3]:MAR<br>K[1-6]:SEAR:EXEC:MAX                 |
| <b>Search Min</b>          | Execute marker search minimum                                                                                                    | :CALC:FP[1-1]:TRAC[1-3]:MAR<br>K[1-6]:SEAR:EXEC:MIN                 |
| <b>Search Range (X)</b>    | Sets/reads marker search range (X-axis)                                                                                          | :CALC:FP[1-1]:TRAC[1-3]:ALL<br>M:SEAR:DOM:X                         |
| <b>Search Range (Y)</b>    | Sets/reads marker search range (Y-axis)                                                                                          | :CALC:FP[1-1]:TRAC[1-3]:ALL<br>M:SEAR:DOM:Y                         |
| <b>Target</b>              |                                                                                                                                  |                                                                     |
| <b>Search Left</b>         | Execute marker target search left                                                                                                | :CALC:FP[1-1]:TRAC[1-3]:MAR<br>K[1-6]:SEAR:EXEC:LTAR                |
| <b>Search Right</b>        | Execute marker target search right                                                                                               | :CALC:FP[1-1]:TRAC[1-3]:MAR<br>K[1-6]:SEAR:EXEC:RTAR                |
| <b>Search Target</b>       | Execute marker target search                                                                                                     | :CALC:FP[1-1]:TRAC[1-3]:MAR<br>K[1-6]:SEAR:EXEC:TARG                |
| <b>Target Transition</b>   | Sets/reads the target transition definition                                                                                      | :CALC:FP[1-1]:TRAC[1-3]:MAR<br>K[1-6]:SEAR:TARG:TRAN                |
| <b>Target Value</b>        | Sets/reads the marker target value                                                                                               | :CALC:FP[1-1]:TRAC[1-3]:MAR<br>K[1-6]:SEAR:TARG:Y                   |
| <b>Tracking</b>            | Sets/reads the marker tracking type                                                                                              | :CALC:FP[1-1]:TRAC[1-3]:MAR<br>K[1-6]:SEAR:TRAC:TYPE                |
| <b>Marker To</b>           |                                                                                                                                  |                                                                     |
| <b>Marker -&gt; Center</b> | Sets the marker value to the center value of DC Control voltage<br>Sets the marker value to the center value of DC Power voltage | :SOUR:FP[1-1]:VOLT:CONT:CE<br>NT<br>:SOUR:FP[1-1]:VOLT:POW:CEN<br>T |

Softkey Functions  
FP Menu

| Key Operation             | Function                                                                                                                       | SCPI Command                                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| <b>Marker -&gt; Start</b> | Sets the marker value to the start value of DC Control voltage<br>Sets the marker value to the start value of DC Power voltage | :SOUR:FP[1-1]:VOLT:CONT:STAR<br>:SOUR:FP[1-1]:VOLT:POW:STAR |
| <b>Marker -&gt; Stop</b>  | Sets the marker value to the stop value of DC Control voltage<br>Sets the marker value to the stop value of DC Power voltage   | :SOUR:FP[1-1]:VOLT:CONT:STOP<br>:SOUR:FP[1-1]:VOLT:POW:STOP |
| <b>Measurement View</b>   |                                                                                                                                |                                                             |
| <b>Freq &amp; Power</b>   | Selects frequency,power and DC current measurement window                                                                      | :DISP:WIND:ACT                                              |
| <b>Phase Noise</b>        | Selects phase noise measurement window                                                                                         | :DISP:WIND:ACT                                              |
| <b>Show Window</b>        |                                                                                                                                |                                                             |
| <b>Freq &amp; Power</b>   | Turns on/off frequency,power and DC current measurement mode                                                                   | :DISP:FP[1-1]:STAT                                          |
| <b>Phase Noise</b>        | Turns on/off noise measurement mode                                                                                            | :DISP:PN[1-1]:STAT                                          |
| <b>Spectrum Monitor</b>   | Turns on/off spectrum monitor mode                                                                                             | :DISP:SP[1-1]:STAT                                          |
| <b>Transient</b>          | Turns on/off transient measurement mode                                                                                        | :DISP:TR[1-1]:STAT                                          |
| <b>User</b>               | Turns on/off user defined window                                                                                               | :DISP:USER[1-1]:STAT                                        |
| <b>Spectrum Monitor</b>   | Selects spectrum monitor mode                                                                                                  | :DISP:WIND:ACT                                              |
| <b>Transient</b>          | Selects transient monitor mode                                                                                                 | :DISP:WIND:ACT                                              |
| <b>User</b>               | Selects user defined window                                                                                                    | :DISP:WIND:ACT                                              |
| <b>Preset</b>             |                                                                                                                                |                                                             |
| <b>OK</b>                 | Preset instrument                                                                                                              | :SYST:PRES                                                  |
| <b>Save/Recall</b>        |                                                                                                                                |                                                             |
| <b>Explorer...</b>        | Open windows explorer                                                                                                          |                                                             |
| <b>Recall State</b>       |                                                                                                                                |                                                             |
| <b>Autorec</b>            | Recalls settings                                                                                                               | :MMEM:LOAD:STAT                                             |
| <b>File Dialog...</b>     | Open file dialog                                                                                                               |                                                             |
| <b>State01</b>            | Recalls state file from register 1                                                                                             | :MMEM:LOAD:STAT                                             |
| <b>State02</b>            | Recalls state file from register 2                                                                                             | :MMEM:LOAD:STAT                                             |
| <b>State03</b>            | Recalls state file from register 3                                                                                             | :MMEM:LOAD:STAT                                             |
| <b>State04</b>            | Recalls state file from register 4                                                                                             | :MMEM:LOAD:STAT                                             |
| <b>State05</b>            | Recalls state file from register 5                                                                                             | :MMEM:LOAD:STAT                                             |
| <b>State06</b>            | Recalls state file from register 6                                                                                             | :MMEM:LOAD:STAT                                             |
| <b>Save Data Trace</b>    | Saves trace data                                                                                                               | :MMEM:FP[1-1]:TRAC[1-3]:STOR[:DATA]                         |



| Key Operation                 | Function                                                                              | SCPI Command                          |
|-------------------------------|---------------------------------------------------------------------------------------|---------------------------------------|
| <b>Save Memory Trace</b>      | Saves memory trace data                                                               | :MMEM:FP[1-1]:TRAC[1-3]:STOR:MEM      |
| <b>Save State</b>             |                                                                                       |                                       |
| <b>Autorec</b>                | Save settings                                                                         | :MMEM:STOR:STAT                       |
| <b>File Dialog...</b>         | Open file dialog                                                                      |                                       |
| <b>Save Type</b>              | Selects instrument state type (Entire or instrument state only)                       | :MMEM:STOR:STYP                       |
| <b>State01</b>                | Save state file to register 1                                                         | :MMEM:STOR:STAT                       |
| <b>State02</b>                | Save state file to register 2                                                         | :MMEM:STOR:STAT                       |
| <b>State03</b>                | Save state file to register 3                                                         | :MMEM:STOR:STAT                       |
| <b>State04</b>                | Save state file to register 4                                                         | :MMEM:STOR:STAT                       |
| <b>State05</b>                | Save state file to register 5                                                         | :MMEM:STOR:STAT                       |
| <b>State06</b>                | Save state file to register 6                                                         | :MMEM:STOR:STAT                       |
| <b>Scale</b>                  |                                                                                       |                                       |
| <b>Auto Scale</b>             | Execute autoscale                                                                     | :DISP:FP[1-1]:TRAC[1-3]:Y[:SCAL]:AUTO |
| <b>Auto Scale All</b>         | Execute autoscale for all traces on frequency,power and DC current measurement window | :DISP:FP[1-1]:ALLT:Y:SCAL:AUTO        |
| <b>Divisions</b>              | Sets/reads Y-scale divisions                                                          | :DISP:FP[1-1]:Y[:SCAL]:DIV            |
| <b>Marker -&gt; Reference</b> | Sets the marker value to the reference level                                          | :DISP:FP[1-1]:TRAC[1-3]:Y[:SCAL]:RLEV |
| <b>Reference Position</b>     | Sets/reads reference position                                                         | :DISP:FP[1-1]:TRAC[1-3]:Y[:SCAL]:RPOS |
| <b>Reference Value</b>        | Sets/reads the reference level value                                                  | :DISP:FP[1-1]:TRAC[1-3]:Y[:SCAL]:RLEV |
| <b>Scale/Div</b>              | Sets/reads scale per division                                                         | :DISP:FP[1-1]:TRAC[1-3]:Y[:SCAL]:PDIV |
| <b>Setup</b>                  |                                                                                       |                                       |
| <b>Freq Resolution</b>        | Sets/reads frequency resolution                                                       | :SENS:FP[1-1]:FREQ:RES                |
| <b>Frequency Band</b>         | Selects frequency band                                                                | :SENS:FP[1-1]:FBAN                    |
| <b>Point Delay</b>            | Sets/reads the point delay value                                                      | :SENS:FP[1-1]:SWE:DWEL                |
| <b>Points</b>                 | Sets/reads the number of measurement points                                           | :SOUR:FP[1-1]:SWE:POIN                |
| <b>Sweep Parameter</b>        | Sets/reads sweep parameter                                                            | :SOUR:FP[1-1]:SWE:PAR                 |
| <b>Start/Center</b>           |                                                                                       |                                       |
| <b>DC Control Center</b>      | Sets/reads the center value of DC Control voltage                                     | :SOUR:FP[1-1]:VOLT:CONT:CENT          |
| <b>DC Control Span</b>        | Sets/reads the span value of DC Control voltage                                       | :SOUR:FP[1-1]:VOLT:CONT:SPAN          |

Softkey Functions  
FP Menu

| Key Operation            | Function                                         | SCPI Command                      |
|--------------------------|--------------------------------------------------|-----------------------------------|
| <b>DC Control Start</b>  | Sets/reads the start value of DC Control voltage | :SOUR:FP[1-1]:VOLT:CONT:STAR      |
| <b>DC Control Stop</b>   | Sets/reads the stop value of DC Control voltage  | :SOUR:FP[1-1]:VOLT:CONT:STOP      |
| <b>DC Power Center</b>   | Sets/reads the center value of DC Power voltage  | :SOUR:FP[1-1]:VOLT:POW:CEN<br>T   |
| <b>DC Power Span</b>     | Sets/reads the span value of DC Power voltage    | :SOUR:FP[1-1]:VOLT:POW:SPA<br>N   |
| <b>DC Power Start</b>    | Sets/reads the start value of DC Power voltage   | :SOUR:FP[1-1]:VOLT:POW:STA<br>R   |
| <b>DC Power Stop</b>     | Sets/reads the stop value of DC Power voltage    | :SOUR:FP[1-1]:VOLT:POW:STO<br>P   |
| <b>Stop/Span</b>         |                                                  |                                   |
| <b>DC Control Center</b> | Sets/reads the center value of DC Power voltage  | :SOUR:FP[1-1]:VOLT:CONT:CE<br>NT  |
| <b>DC Control Span</b>   | Sets/reads the span value of DC Power voltage    | :SOUR:FP[1-1]:VOLT:CONT:SP<br>AN  |
| <b>DC Control Start</b>  | Sets/reads the start value of DC Power voltage   | :SOUR:FP[1-1]:VOLT:CONT:STAR<br>R |
| <b>DC Control Stop</b>   | Sets/reads the stop value of DC Control voltage  | :SOUR:FP[1-1]:VOLT:CONT:ST<br>OP  |
| <b>DC Power Center</b>   | Sets/reads the center value of DC Power voltage  | :SOUR:FP[1-1]:VOLT:POW:CEN<br>T   |
| <b>DC Power Span</b>     | Sets/reads the span value of DC Power voltage    | :SOUR:FP[1-1]:VOLT:POW:SPA<br>N   |
| <b>DC Power Start</b>    | Sets/reads the start value of DC Power voltage   | :SOUR:FP[1-1]:VOLT:POW:STA<br>R   |
| <b>DC Power Stop</b>     | Sets/reads the stop value of DC Power voltage    | :SOUR:FP[1-1]:VOLT:POW:STO<br>P   |
| <b>System</b>            |                                                  |                                   |
| <b>Abort Printing</b>    | Aborts printing                                  | :HCOP:ABOR                        |
| <b>Backlight</b>         | Turns on/off backlight                           | :SYST:BACK:STAT                   |
| <b>Dump Screen Image</b> | Save screen image                                | :MMEM:STOR:IMAG                   |
| <b>Error Log</b>         |                                                  |                                   |
| <b>Clear Error Log</b>   | Clear error log                                  |                                   |
| <b>View Error Log...</b> | Display error log                                |                                   |
| <b>Invert Image</b>      | Selects print mode                               | :HCOP:IMAG                        |
| <b>Misc Setup</b>        |                                                  |                                   |
| <b>Beeper</b>            |                                                  |                                   |
| <b>Beep Complete</b>     | Turns on/off the beep for operation completion   | :SYST:BEEP:COMP:STAT              |

| Key Operation                          | Function                                       | SCPI Command                     |
|----------------------------------------|------------------------------------------------|----------------------------------|
| <b>Beep Warning</b>                    | Turns on/off the beep for warning              | :SYST:BEEP:WARN:STAT             |
| <b>Test Beep Complete</b>              | Make beep sound for operation completion       | :SYST:BEEP:COMP:IMM              |
| <b>Test Beep Warning</b>               | Makes beep sound for warning                   | :SYST:BEEP:WARN:IMM              |
| <b>Clock Setup</b>                     |                                                |                                  |
| <b>Set Date and Time</b>               | Sets/reads system time                         | :SYST:TIME                       |
|                                        | Sets/reads system date                         | :SYST:DATE                       |
| <b>Show Clock</b>                      | Turns on/off internal clock display            | :DISP:CLOC                       |
| <b>Control Panel ...</b>               | Open control panel                             |                                  |
| <b>GPIB Setup</b>                      |                                                |                                  |
| <b>System Controller Configuration</b> | Turns on/off system controller mode            |                                  |
| <b>Talker/Listener Address</b>         | Sets/reads talker/listener GPIB address of the |                                  |
| <b>Key Lock</b>                        |                                                |                                  |
| <b>Front Panel &amp; Keyboard Lock</b> | Disables from panelkeyboard operations         | :SYST:KLOC:KBD                   |
| <b>Touch Screen &amp; Mouse Lock</b>   | Disables from mouse/touch screen operations    | :SYST:KLOC:MOUS                  |
| <b>Network Setup</b>                   |                                                |                                  |
| <b>MAC Address</b>                     | Sets MAC address                               |                                  |
| <b>Network Configuration ...</b>       | Enables/disables network connections           |                                  |
| <b>Network Identification ...</b>      | Sets network ID of the instrument              |                                  |
| <b>SICL-LAN Address</b>                | Sets SICL-LAN address                          |                                  |
| <b>SICL-LAN Server</b>                 | Enables/disables SICL-LAN server               |                                  |
| <b>Socket Server</b>                   | Enables/disables Socket server                 |                                  |
| <b>Telnet Server</b>                   | Enables/disables telnet server                 |                                  |
| <b>Print</b>                           | Output print                                   | :HCOP:IMM                        |
| <b>Printer Setup ...</b>               | Execute printer setup                          |                                  |
| <b>Trace View</b>                      |                                                |                                  |
| <b>Aperture</b>                        | Smoothing aperture                             | :CALC:FP[1-1]:TRAC[1-3]:SMO:APER |

Softkey Functions  
FP Menu

| Key Operation                      | Function                                                                                           | SCPI Command                            |
|------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Clear Persistent Data</b>       | Clear Persistent mode                                                                              | :DISP:FP[1-1]:TRAC[1-3]:PERS:CLE        |
| <b>Data -&gt; Mem</b>              | Copy data to memory                                                                                | :CALC:FP[1-1]:TRAC[1-3]:MATH:MEM        |
| <b>Data Hold</b>                   | Data hold                                                                                          | :CALC:FP[1-1]:TRAC[1-3]:HOLD            |
| <b>Data Math</b>                   | Sets/reads math operation type                                                                     | :CALC:FP[1-1]:TRAC[1-3]:MATH:FUNC       |
| <b>Display Trace</b>               | Shows data and/or memory trace                                                                     | :DISP:FP[1-1]:TRAC[1-3]:MODE            |
| <b>Persistence Mode</b>            | Sets/reads persistence mode                                                                        | :DISP:FP[1-1]:TRAC[1-3]:PERS:STAT       |
| <b>Smoothing</b>                   | Smoothing on/off                                                                                   | :CALC:FP[1-1]:TRAC[1-3]:SMO:STAT        |
| <b>Trace Label</b>                 | Edits trace title label                                                                            | :DISP:FP[1-1]:TRAC[1-3]:LAB:DATA        |
| <b>Trigger</b>                     |                                                                                                    |                                         |
| <b>Continuous</b>                  | always move to waiting-for-trigger state after measuring<br>move once to waiting-for-trigger state | :INIT:FP[1-1]:CONT<br>:INIT:FP[1-1]:IMM |
| <b>Ext Trig Polarity</b>           | External trigger polarity                                                                          | :TRIG:EXT:SLOP                          |
| <b>Hold</b>                        | Sets trigger mode to waiting-for-trigger state                                                     | :INIT:FP[1-1]:IMM                       |
| <b>Manual Trigger</b>              | move once to waiting-for-trigger state                                                             | :INIT:FP[1-1]:IMM                       |
| <b>Mode</b>                        | Sets/reads instrument mode to analyzer or tester mode <sup>*1</sup>                                | :TRIG:FP[1-1]:MODE <sup>*2</sup>        |
| <b>Restart</b>                     | move once to waiting-for-trigger state                                                             | :INIT:FP[1-1]:IMM                       |
| <b>Single</b>                      | always move to waiting-for-trigger state after measuring<br>move once to waiting-for-trigger state | :INIT:FP[1-1]:CONT<br>:INIT:FP[1-1]:IMM |
| <b>Source</b>                      | trigger source                                                                                     | :TRIG:FP[1-1]:SOUR                      |
| <b>Trigger to Freq &amp; Power</b> | select measurement mode                                                                            | :TRIG:MODE                              |

\*1. Only “Tester” mode is available when option 011 is installed.

\*2. “Option not installed” error message is generated when setting the trigger mode to analyzer mode with the instrument for the option 011.

## Transient Menu (Top Menu)

| Key Operation                                  | Function                                                                                                             |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Double-click on each softkey menu title</b> | Displays the top menu of each menu item below. Refer the TR menu about detail of following each menu item.           |
| Measurement View                               | Same as <b>Meas</b> .                                                                                                |
| Input                                          | Same as <b>Scale</b> .                                                                                               |
| Scale                                          | Same as <b>Scale</b> .                                                                                               |
| Format                                         | Same as <b>Format</b> .                                                                                              |
| Display                                        | Same as <b>Display</b> .                                                                                             |
| Average                                        | Same as <b>Avg</b> .                                                                                                 |
| Attenuator                                     | Same as <b>Cal</b> .                                                                                                 |
| Time Offset                                    | Displays the same softkey for setting up the sweep range that appears when <b>Start</b> , or <b>Span</b> is pressed. |
| Span                                           | Displays the same softkey for setting up the sweep range that appears when <b>Start</b> , or <b>Span</b> is pressed. |
| DC Control Voltage                             | Same as <b>Sweep Setup</b> .                                                                                         |
| DC Power Voltage                               | Same as <b>Sweep Setup</b> .                                                                                         |
| Setup                                          | Same as <b>Sweep Setup</b> .                                                                                         |
| Trigger                                        | Same as <b>Trigger</b> .                                                                                             |
| Marker                                         | Same as <b>Marker</b> .                                                                                              |
| Marker Search                                  | Same as <b>Marker Search</b> .                                                                                       |
| Marker To                                      | Same as <b>Marker Search</b> .                                                                                       |
| Marker Function                                | Same as <b>Marker Fctn</b> .                                                                                         |
| Macro Setup                                    | Same as <b>Macro Setup</b> .                                                                                         |
| Save/Recall                                    | Same as <b>Save/Recall</b> .                                                                                         |
| System                                         | Same as <b>System</b> .                                                                                              |
| Preset                                         | Same as <b>Preset</b> .                                                                                              |

## TR Menu

| Key Operation                      | Function                                        | SCPI Command                  |
|------------------------------------|-------------------------------------------------|-------------------------------|
| <b>Attenuator</b>                  |                                                 |                               |
| <b>Input Attenuator</b>            | Sets/reads Input Attenuator level on 5dB Step   | :SENS:ATT:LEV                 |
| <b>Average</b>                     |                                                 |                               |
| <b>Averaging</b>                   | Turn on/off averaging function                  | :SENS:TR[1-1]:AVER:STAT       |
| <b>Averaging Restart</b>           | Restart averaging                               | :SENS:TR[1-1]:AVER:CLE        |
| <b>Avg Factor</b>                  | Sets/reads averaging count                      | :SENS:TR[1-1]:AVER:COUN       |
| <b>DC Control Voltage</b>          |                                                 |                               |
| <b>Control Voltage Cal</b>         | Enables DC Control voltage calibration          | :SOUR:VOLT:CONT:CORR[:STAT]   |
| <b>DC Control Delay</b>            | Sets/reads DC Control delay (sec)               | :SOUR:VOLT:CONT:DEL           |
| <b>DC Control Output</b>           | Turns on/off DC Control voltage                 | :SOUR:VOLT:CONT:LEV:STAT      |
| <b>DC Control Voltage</b>          | Sets/reads DC Control voltage                   | :SOUR:VOLT:CONT:LEV:AMPL      |
| <b>Execute Control Voltage Cal</b> | Execute DC Control voltage calibration          | :SOUR:VOLT:CONT:CORR:COLL:ACQ |
| <b>Max Ctrl Voltage Limit</b>      | Sets/reads the maximum DC control voltage limit | :SOUR:VOLT:CONT:LIM:HIGH      |
| <b>Min Ctrl Voltage Limit</b>      | Sets/reads the minimum DC control voltage limit | :SOUR:VOLT:CONT:LIM:LOW       |
| <b>DC Power Voltage</b>            |                                                 |                               |
| <b>DC Power Delay</b>              | Sets/reads DC Power delay (sec)                 | :SOUR:VOLT:POW:DEL            |
| <b>DC Power Output</b>             | Turns on/off DC Power voltage                   | :SOUR:VOLT:POW:LEV:STAT       |
| <b>DC Power Voltage</b>            | Sets/reads DC Power voltage                     | :SOUR:VOLT:POW:LEV:AMPL       |
| <b>Max Pwr Voltage Limit</b>       | Sets/reads the maximum DC Power voltage limit   | :SOUR:VOLT:POW:LIM:HIGH       |
| <b>Min Pwr Voltage Limit</b>       | Sets/reads the minimum DC Power voltage limit   | :SOUR:VOLT:POW:LIM:LOW        |
| <b>Display</b>                     |                                                 |                               |
| <b>Edit Title Label</b>            | Edits the measurement window title label        | :DISP:TR[1-1]:LAB:DATA        |
| <b>Marker Information</b>          | Sets/reads the marker information position      | :DISP:TR[1-1]:ANN:MARK:POS    |
| <b>Meas Condition</b>              | Turns on/off measurement conditions             | :DISP:TR[1-1]:ANN:MEAS:STAT   |
| <b>Relative Y-Scale</b>            | Turns on/off relative Y-scale                   | :DISP:TR[1-1]:GRAT:AXIS:Y:REL |
| <b>Title Label</b>                 | Turns on/off the measurement window title lable | :DISP:TR[1-1]:LAB:STAT        |

| Key Operation            | Function                                                  | SCPI Command                           |
|--------------------------|-----------------------------------------------------------|----------------------------------------|
| <b>Update</b>            | Turns on/off trace updates                                | :DISP:ENAB                             |
| <b>Y # of Digits</b>     | Selects the number of digits (Y-axis)                     | :DISP:TR[1-1]:GRAT:AXIS:Y:STAT         |
| <b>Format</b>            |                                                           |                                        |
| <b>Phase Unit</b>        | Selects phase format on transient measurement             | :CALC:TR[1-1]:TRAC[1-4]:FORM:PHAS:UNIT |
| <b>Wrap Phase</b>        | Turns on/off wrap-phase                                   | :CALC:TR[1-1]:TRAC[1-4]:FORM:PHAS:WRAP |
| <b>Macro Setup</b>       |                                                           |                                        |
| <b>E5052 Event</b>       | Turns on/off the E5052 VBA event callback function        | :PROG:COM:EVEN                         |
| <b>Echo Window Menu</b>  |                                                           |                                        |
| <b>Clear Echo</b>        | Clears Echo window                                        | :DISP:ECHO:CLE                         |
| <b>Echo Font Size</b>    | Sets/reads the font size on Echo window                   | :DISP:ECHO:FSIZ                        |
| <b>Echo Window</b>       | Turns on/off the Echo window                              | :DISP:ECHO:STAT                        |
| <b>Select Macro</b>      | Sets/reads the name of the program to be selected         | :PROG:SEL:NAME                         |
| <b>Stop</b>              | Set/reads the state of the selected program               | :PROG:SEL:STAT                         |
| <b>User Menu</b>         |                                                           |                                        |
| <b>User Label 1</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 2</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 3</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 4</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 5</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 6</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 7</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>User Label 8</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM               |
| <b>VBA Editor Menu</b>   |                                                           |                                        |
| <b>Close Editor</b>      | Close VBA editor                                          |                                        |
| <b>Load Project</b>      | Loads program                                             | :MMEM:LOAD:PROG                        |
| <b>New Project</b>       | Open new VBA project                                      |                                        |
| <b>Open Editor</b>       | Open VBA editor                                           |                                        |
| <b>Save Project</b>      | Save VBA project                                          | :MMEM:STOR:PROG                        |
| <b>Marker</b>            |                                                           |                                        |
| <b>Clear Marker Menu</b> |                                                           |                                        |
| <b>All OFF</b>           | Clears all the markers                                    |                                        |
| <b>Marker 1</b>          | Turns on/off marker 1                                     | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT |

Softkey Functions  
TR Menu

| Key Operation             | Function                                         | SCPI Command                           |
|---------------------------|--------------------------------------------------|----------------------------------------|
| <b>Marker 2</b>           | Turns on/off marker 2                            | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT |
| <b>Marker 3</b>           | Turns on/off marker 3                            | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT |
| <b>Marker 4</b>           | Turns on/off marker 4                            | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT |
| <b>Marker 5</b>           | Turns on/off marker 5                            | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT |
| <b>Marker 6</b>           | Turns on/off marker 6                            | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT |
| <b>Couple</b>             | Turns on/off marker coupling function            | :CALC:TR[1-1]:ALLT:MARK:COUP:STAT      |
| <b>Marker 1</b>           | Turns on/off marker 1                            | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT |
| <b>Marker 2</b>           | Turns on/off marker 2                            | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT |
| <b>Marker 3</b>           | Turns on/off marker 3                            | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT |
| <b>Marker 4</b>           | Turns on/off marker 4                            | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT |
| <b>Marker 5</b>           | Turns on/off marker 5                            | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT |
| <b>Marker 6</b>           | Turns on/off marker 6                            | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:STAT |
| <b>Marker List</b>        | Turns on/off the marker list                     | :DISP:TR[1-1]:TABL[:STAT]              |
| <b>More Functions</b>     |                                                  |                                        |
| <b>Discrete</b>           | Sets/reads marker movement (Continuous/Discrete) | :CALC:TR[1-1]:ALLT:MARK:DISC:STAT      |
| <b>Ref Marker</b>         | Sets/reads marker reference number               | :CALC:TR[1-1]:ALLT:MARK:REF:NUMB       |
| <b>Ref Marker Mode</b>    | Turns on/off delta marker mode                   | :CALC:TR[1-1]:ALLT:MARK:REF:STAT       |
| <b>Marker Function</b>    |                                                  |                                        |
| <b>Analysis Range (X)</b> | Sets/reads analysis/search range (X-axis)        | :CALC:TR[1-1]:TRAC[1-4]:FUNCTION:DOM:X |
| <b>Analysis Range (Y)</b> | Sets/reads analysis/search range (Y-axis)        | :CALC:TR[1-1]:TRAC[1-4]:FUNCTION:DOM:Y |
| <b>Analysis Type</b>      | Sets/reads analysis type                         | :CALC:TR[1-1]:TRAC[1-4]:FUNCTION:TYPE  |
| <b>Band Marker X</b>      |                                                  |                                        |
| <b>Band Marker X</b>      | Turn on/off bandmarker X                         | :CALC:TR[1-1]:TRAC[1-4]:BDM:X:STAT     |



| Key Operation        | Function                                    | SCPI Command                       |
|----------------------|---------------------------------------------|------------------------------------|
| <b>Center</b>        | Sets/reads the center value of bandmarker X | :CALC:TR[1-1]:TRAC[1-4]:BDM:X:CENT |
| <b>Span</b>          | Sets/reads the span value of bandmarker X   | :CALC:TR[1-1]:TRAC[1-4]:BDM:X:SPAN |
| <b>Start</b>         | Sets/reads the start value of bandmarker X  | :CALC:TR[1-1]:TRAC[1-4]:BDM:X:STAR |
| <b>Stop</b>          | Sets/reads the stop value of bandmarker X   | :CALC:TR[1-1]:TRAC[1-4]:BDM:X:STOP |
| <b>Band Marker Y</b> |                                             |                                    |
| <b>Band Marker Y</b> | Turn on/off bandmarker Y                    | :CALC:TR[1-1]:TRAC[1-4]:BDM:Y:STAT |
| <b>Center</b>        | Sets/reads the center value of bandmarker Y | :CALC:TR[1-1]:TRAC[1-4]:BDM:Y:CENT |
| <b>Span</b>          | Sets/reads the span value of bandmarker Y   | :CALC:TR[1-1]:TRAC[1-4]:BDM:Y:SPAN |
| <b>Start</b>         | Sets/reads the start value of bandmarker Y  | :CALC:TR[1-1]:TRAC[1-4]:BDM:Y:STAR |
| <b>Stop</b>          | Sets/reads the stop value of bandmarker Y   | :CALC:TR[1-1]:TRAC[1-4]:BDM:Y:STOP |
| <b>Couple</b>        | Turns on/off bandmarker coupling function   | :CALC:TR[1-1]:ALLT:BDM:X:COUP:STAT |
| <b>Marker Search</b> |                                             |                                    |
| <b>Band Marker X</b> |                                             |                                    |
| <b>Band Marker X</b> | Turn on/off bandmarker X                    | :CALC:TR[1-1]:TRAC[1-4]:BDM:X:STAT |
| <b>Center</b>        | Sets/reads the center value of bandmarker X | :CALC:TR[1-1]:TRAC[1-4]:BDM:X:CENT |
| <b>Span</b>          | Sets/reads the span value of bandmarker X   | :CALC:TR[1-1]:TRAC[1-4]:BDM:X:SPAN |
| <b>Start</b>         | Sets/reads the start value of bandmarker X  | :CALC:TR[1-1]:TRAC[1-4]:BDM:X:STAR |
| <b>Stop</b>          | Sets/reads the stop value of bandmarker X   | :CALC:TR[1-1]:TRAC[1-4]:BDM:X:STOP |
| <b>Band Marker Y</b> |                                             |                                    |
| <b>Band Marker Y</b> | Turn on/off bandmarker Y                    | :CALC:TR[1-1]:TRAC[1-4]:BDM:Y:STAT |
| <b>Center</b>        | Sets/reads the center value of bandmarker Y | :CALC:TR[1-1]:TRAC[1-4]:BDM:Y:CENT |
| <b>Span</b>          | Sets/reads the span value of bandmarker Y   | :CALC:TR[1-1]:TRAC[1-4]:BDM:Y:SPAN |
| <b>Start</b>         | Sets/reads the start value of bandmarker Y  | :CALC:TR[1-1]:TRAC[1-4]:BDM:Y:STAR |

Softkey Functions  
TR Menu

| Key Operation                       | Function                                    | SCPI Command                                     |
|-------------------------------------|---------------------------------------------|--------------------------------------------------|
| <b>Stop</b>                         | Sets/reads the stop value of bandmarker Y   | :CALC:TR[1-1]:TRAC[1-4]:BDM:Y:STOP               |
| <b>Couple</b>                       | Turns on/off bandmarker coupling function   | :CALC:TR[1-1]:ALLT:BDM:X:COUP:STAT               |
| <b>Peak</b>                         |                                             |                                                  |
| <b>Peak Excursion</b>               | Sets/reads the peak excursion value         | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:PEAK:EXC  |
| <b>Peak Polarity</b>                | Sets/reads the marker peak-search polarity  | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:PEAK:POL  |
| <b>Search Left</b>                  | Execute marker peak search left             | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:LPE  |
| <b>Search Peak</b>                  | Execute marker peak search                  | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:PEAK |
| <b>Search Peak All</b>              | Execute marker search all                   | :CALC:TR[1-1]:TRAC[1-4]:ALLM:SEAR:PEAK           |
| <b>Search Right</b>                 | Execute marker peak search right            | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:RPE  |
| <b>Search Max</b>                   | Execute marker search maximum               | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:MAX  |
| <b>Search Min</b>                   | Execute marker search minimum               | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:MIN  |
| <b>Search Range (X)</b>             | Sets/reads marker search range (X-axis)     | :CALC:TR[1-1]:TRAC[1-4]:ALLM:SEAR:DOM:X          |
| <b>Search Range (Y)</b>             | Sets/reads marker search range (Y-axis)     | :CALC:TR[1-1]:TRAC[1-4]:ALLM:SEAR:DOM:Y          |
| <b>Target</b>                       |                                             |                                                  |
| <b>Search Left</b>                  | Execute marker target search left           | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:LTAR |
| <b>Search Right</b>                 | Execute marker target search right          | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:RTAR |
| <b>Search Target</b>                | Execute marker target search                | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:EXEC:TARG |
| <b>Target Transition</b>            | Sets/reads the target transition definition | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:TARG:TRAN |
| <b>Target Value</b>                 | Sets/reads the marker target value          | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:TARG:Y    |
| <b>Tracking</b>                     | Sets/reads the marker tracking type         | :CALC:TR[1-1]:TRAC[1-4]:MARK[1-6]:SEAR:TRAC:TYPE |
| <b>Marker To</b>                    |                                             |                                                  |
| <b>Marker -&gt; Phase Reference</b> | phase reference frequency                   | :SENS:TR[1-1]:NARR:FREQ:PREF                     |
| <b>Marker -&gt; Target Freq</b>     | target frequency                            | :SENS:TR[1-1]:NARR:FREQ:TARG                     |

| Key Operation            | Function                                                        | SCPI Command                            |
|--------------------------|-----------------------------------------------------------------|-----------------------------------------|
| <b>Measurement View</b>  |                                                                 |                                         |
| <b>Freq &amp; Power</b>  | Selects frequency, power and DC current measurement window      | :DISP:WIND:ACT                          |
| <b>Phase Noise</b>       | Selects phase noise measurement window                          | :DISP:WIND:ACT                          |
| <b>Show Window</b>       |                                                                 |                                         |
| <b>Freq &amp; Power</b>  | Turns on/off frequency, power and DC current measurement mode   | :DISP:FP[1-1]:STAT                      |
| <b>Phase Noise</b>       | Turns on/off phase noise measurement mode                       | :DISP:PN[1-1]:STAT                      |
| <b>Spectrum Monitor</b>  | Turns on/off spectrum monitor mode                              | :DISP:SP[1-1]:STAT                      |
| <b>Transient</b>         | Turns on/off transient measurement mode                         | :DISP:TR[1-1]:STAT                      |
| <b>User</b>              | Turns on/off user defined window                                | :DISP:USER[1-1]:STAT                    |
| <b>Spectrum Monitor</b>  | Selects spectrum monitor mode                                   | :DISP:WIND:ACT                          |
| <b>Transient</b>         | Selects transient measurement mode                              | :DISP:WIND:ACT                          |
| <b>User</b>              | Selects user defined window                                     | :DISP:WIND:ACT                          |
| <b>Preset</b>            |                                                                 |                                         |
| <b>OK</b>                | Preset instrument                                               | :SYST:PRES                              |
| <b>Save/Recall</b>       |                                                                 |                                         |
| <b>Explorer...</b>       | Open windows explorer                                           |                                         |
| <b>Recall State</b>      |                                                                 |                                         |
| <b>Autorec</b>           | Recalls settings                                                | :MMEM:LOAD:STAT                         |
| <b>File Dialog...</b>    | Open file dialog                                                |                                         |
| <b>State01</b>           | Recalls state file from register 1                              | :MMEM:LOAD:STAT                         |
| <b>State02</b>           | Recalls state file from register 2                              | :MMEM:LOAD:STAT                         |
| <b>State03</b>           | Recalls state file from register 3                              | :MMEM:LOAD:STAT                         |
| <b>State04</b>           | Recalls state file from register 4                              | :MMEM:LOAD:STAT                         |
| <b>State05</b>           | Recalls state file from register 5                              | :MMEM:LOAD:STAT                         |
| <b>State06</b>           | Recalls state file from register 6                              | :MMEM:LOAD:STAT                         |
| <b>Save Data Trace</b>   | Saves trace data                                                | :MMEM:TR[1-1]:TRAC[1-4]:ST<br>OR[:DATA] |
| <b>Save Memory Trace</b> | Saves memory trace data                                         | :MMEM:TR[1-1]:TRAC[1-4]:ST<br>OR:MEM    |
| <b>Save State</b>        |                                                                 |                                         |
| <b>Autorec</b>           | Save settings                                                   | :MMEM:STOR:STAT                         |
| <b>File Dialog...</b>    | Open file dialog                                                |                                         |
| <b>Save Type</b>         | Selects instrument state type (Entire or instrument state only) | :MMEM:STOR:STYP                         |
| <b>State01</b>           | Save state file to register 1                                   | :MMEM:STOR:STAT                         |

Softkey Functions  
TR Menu

| Key Operation             | Function                                                             | SCPI Command                          |                 |
|---------------------------|----------------------------------------------------------------------|---------------------------------------|-----------------|
| State                     | State02                                                              | Save state file to register 2         | :MMEM:STOR:STAT |
|                           | State03                                                              | Save state file to register 3         | :MMEM:STOR:STAT |
|                           | State04                                                              | Save state file to register 4         | :MMEM:STOR:STAT |
|                           | State05                                                              | Save state file to register 5         | :MMEM:STOR:STAT |
|                           | State06                                                              | Save state file to register 6         | :MMEM:STOR:STAT |
| <b>Scale</b>              |                                                                      |                                       |                 |
| Auto Scale                | Execute autoscale                                                    | :DISP:TR[1-1]:TRAC[1-4]:Y[:SCAL]:AUTO |                 |
| Auto Scale All            | Execute autoscale for all traces on transient measurement window     | :DISP:TR[1-1]:ALLT:Y:SCAL:AUTO        |                 |
| Divisions                 | Sets/reads Y-scale divisions                                         | :DISP:TR[1-1]:Y[:SCAL]:DIV            |                 |
| Marker -> Reference       | Sets the marker value to the reference level                         | :DISP:TR[1-1]:TRAC[1-4]:Y[:SCAL]:RLEV |                 |
| Reference Position        | Sets/reads reference position                                        | :DISP:TR[1-1]:TRAC[1-4]:Y[:SCAL]:RPOS |                 |
| Reference Value           | Sets/reads reference level value                                     | :DISP:TR[1-1]:TRAC[1-4]:Y[:SCAL]:RLEV |                 |
| Scale/Div                 | Sets/reads scale per division                                        | :DISP:TR[1-1]:TRAC[1-4]:Y[:SCAL]:PDIV |                 |
| Trigger Freq -> Reference | Sets the trigger frequency to the reference level                    | :DISP:TR[1-1]:TRAC[1-4]:Y[:SCAL]:RLEV |                 |
| <b>Setup</b>              |                                                                      |                                       |                 |
| Freq Range                | Sets/reads frequency transient range (Narrowband)                    | :SENS:TR[1-1]:NARR:FREQ:RANG          |                 |
| Max Input Level           | Sets/reads maximum input level                                       | :SENS:TR[1-1]:POW:INP:LEV:MAX         |                 |
| Phase Reference           | Sets/reads phase reference frequency                                 | :SENS:TR[1-1]:NARR:FREQ:PREF          |                 |
| Target Freq               | Sets/reads target frequency                                          | :SENS:TR[1-1]:NARR:FREQ:TARG          |                 |
| <b>Video Trigger</b>      |                                                                      |                                       |                 |
| Minimum Power Level       | Sets/reads video trigger threshold level relative to max input level | :TRIG:TR[1-1]:NARR:VID:THR            |                 |
| Narrow Freq               | Sets/reads video trigger frequency value (Narrowband)                | :TRIG:TR[1-1]:NARR:VID:FREQ:CENT      |                 |
| Wide Freq                 | Sets/reads video trigger frequency value (Wideband)                  | :TRIG:TR[1-1]:WIDE:VID:FREQ:CENT      |                 |
| Wide Freq Range           | Set/reads transient frequency range (Wideband)                       | :SENS:TR[1-1]:WIDE:FREQ:MAX           |                 |
| <b>Span</b>               |                                                                      |                                       |                 |

| Key Operation                     | Function                                                      | SCPI Command                 |
|-----------------------------------|---------------------------------------------------------------|------------------------------|
| <b>Narrow Ref Position</b>        | Sets/reads reference position for time span                   | :SENS:TR[1-1]:NARR:TIME:REF  |
| <b>Narrow Settings -&gt; Wide</b> | Sets narrowband mode settings to wideband mode settings       |                              |
| <b>Narrow Span</b>                | Sets/reads time span (Narrowband)                             | :SENS:TR[1-1]:NARR:TIME:SPAN |
| <b>Narrow Time Offset</b>         | Sets/reads time offset(delay) relative to the reference point | :SENS:TR[1-1]:NARR:TIME:OFFS |
| <b>Wide Ref Position</b>          | Sets/reads reference position                                 | :SENS:TR[1-1]:WIDE:TIME:REF  |
| <b>Wide Settings -&gt; Narrow</b> | Sets wideband mode settings to narrowband mode settings       |                              |
| <b>Wide Span</b>                  | Sets/reads time span (Wideband)                               | :SENS:TR[1-1]:WIDE:TIME:SPAN |
| <b>Wide Time Offset</b>           | Sets/reads time offset(delay) relative to the reference point | :SENS:TR[1-1]:WIDE:TIME:OFFS |
| <b>System</b>                     |                                                               |                              |
| <b>Abort Printing</b>             | Aborts printing                                               | :HCOP:ABOR                   |
| <b>Backlight</b>                  | Turns on/off backlight                                        | :SYST:BACK:STAT              |
| <b>Dump Screen Image</b>          | Save screen image                                             | :MMEM:STOR:IMAG              |
| <b>Error Log</b>                  |                                                               |                              |
| <b>Clear Error Log</b>            | Clear error log                                               |                              |
| <b>View Error Log...</b>          | Display error log                                             |                              |
| <b>Invert Image</b>               | Selects print mode                                            | :HCOP:IMAG                   |
| <b>Misc Setup</b>                 |                                                               |                              |
| <b>Beeper</b>                     |                                                               |                              |
| <b>Beep Complete</b>              | Turns on/off the beep for operation completion                | :SYST:BEEP:COMP:STAT         |
| <b>Beep Warning</b>               | Turns on/off the beep for warning                             | :SYST:BEEP:WARN:STAT         |
| <b>Test Beep Complete</b>         | Makes beep sound for operation completion                     | :SYST:BEEP:COMP:IMM          |
| <b>Test Beep Warning</b>          | Makes beep sound for warning                                  | :SYST:BEEP:WARN:IMM          |
| <b>Clock Setup</b>                |                                                               |                              |
| <b>Set Date and Time</b>          | Set/reads system time<br>Set/reads system date                | :SYST:TIME<br>:SYST:DATE     |
| <b>Show Clock</b>                 | Turns on/off internal clock display                           | :DISP:CLOC                   |
| <b>Control Panel ...</b>          | Open control panel                                            |                              |
| <b>GPIB Setup</b>                 |                                                               |                              |

Softkey Functions  
TR Menu

| Key Operation                          | Function                                                                 | SCPI Command                 |
|----------------------------------------|--------------------------------------------------------------------------|------------------------------|
| <b>System Controller Configuration</b> | Turns on/off system controller mode                                      |                              |
| <b>Talker/Listener Address</b>         | Sets the address for controlling the analyzer from a controller via GPIB |                              |
| <b>Key Lock</b>                        |                                                                          |                              |
| <b>Front Panel &amp; Keyboard Lock</b> | Disables front panel / keyboard operations                               | :SYST:KLOC:KBD               |
| <b>Touch Screen &amp; Mouse Lock</b>   | Disables touch screen / mouse operations                                 | :SYST:KLOC:MOUS              |
| <b>Network Setup</b>                   |                                                                          |                              |
| <b>MAC Address</b>                     | Sets MAC address                                                         |                              |
| <b>Network Configuration ...</b>       | Enables/disables network connections                                     |                              |
| <b>Network Identification ...</b>      | Sets network ID of the instrument                                        |                              |
| <b>SICL-LAN Address</b>                | Sets SICL-LAN address                                                    |                              |
| <b>SICL-LAN Server</b>                 | Enables/disables SICL-LAN server                                         |                              |
| <b>Socket Server</b>                   | Enables/disables Socket server                                           |                              |
| <b>Telnet Server</b>                   | Enables/disables Telnet server                                           |                              |
| <b>Print</b>                           | Outputs print                                                            | :HCOP:IMM                    |
| <b>Printer Setup ...</b>               | Execute printer setup                                                    |                              |
| <b>Product Information</b>             | Reads product information                                                |                              |
| <b>Time Offset</b>                     |                                                                          |                              |
| <b>Narrow Ref Position</b>             | Sets/reads reference position for time span (Narrowband mode)            | :SENS:TR[1-1]:NARR:TIME:REF  |
| <b>Narrow Settings -&gt; Wide</b>      | Sets narrowband mode settings to wideband mode settings                  |                              |
| <b>Narrow Span</b>                     | Sets/reads time span (Narrowband mode)                                   | :SENS:TR[1-1]:NARR:TIME:SPAN |
| <b>Narrow Time Offset</b>              | Sets/reads time offset(delay) relative to the reference point            | :SENS:TR[1-1]:NARR:TIME:OFFS |
| <b>Wide Ref Position</b>               | Sets/reads reference position for time span (Wideband mode)              | :SENS:TR[1-1]:WIDE:TIME:REF  |
| <b>Wide Settings -&gt; Narrow</b>      | Sets wideband mode settings to narrowband mode settings                  |                              |
| <b>Wide Span</b>                       | Sets/reads time span (Wideband mode)                                     | :SENS:TR[1-1]:WIDE:TIME:SPAN |

| Key Operation                | Function                                                                                           | SCPI Command                            |
|------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Wide Time Offset</b>      | Sets/reads time offset(delay) relative to the reference point                                      | :SENS:TR[1-1]:WIDE:TIME:OFFS            |
| <b>Trace View</b>            |                                                                                                    |                                         |
| <b>Aperture</b>              | Sets/reads smoothing aperture value                                                                | :CALC:TR[1-1]:TRAC[1-4]:SMO:APER        |
| <b>Clear Persistent Data</b> | Clears persistence mode                                                                            | :DISP:TR[1-1]:TRAC[1-4]:PERS:CLE        |
| <b>Data -&gt; Mem</b>        | Copy data to memory                                                                                | :CALC:TR[1-1]:TRAC[1-4]:MATH:MEM        |
| <b>Data Hold</b>             | Data hold                                                                                          | :CALC:TR[1-1]:TRAC[1-4]:HOLD            |
| <b>Data Math</b>             | Sets/reads math operation type                                                                     | :CALC:TR[1-1]:TRAC[1-4]:MATH:FUNC       |
| <b>Display Trace</b>         | Shows data and/or memory trace                                                                     | :DISP:TR[1-1]:TRAC[1-4]:MODE            |
| <b>Persistence Mode</b>      | Sets/reads persistence mode                                                                        | :DISP:TR[1-1]:TRAC[1-4]:PERS:STAT       |
| <b>Smoothing</b>             | Turn on/off smoothing function                                                                     | :CALC:TR[1-1]:TRAC[1-4]:SMO:STAT        |
| <b>Trace Label</b>           | Edit trace title label                                                                             | :DISP:TR[1-1]:TRAC[1-4]:LAB:DATA        |
| <b>Trigger</b>               |                                                                                                    |                                         |
| <b>Continuous</b>            | Sets/reads trigger continuous mode                                                                 | :INIT:TR[1-1]:CONT<br>:INIT:TR[1-1]:IMM |
| <b>Ext Trig Polarity</b>     | External trigger polarity                                                                          | :TRIG:EXT:SLOP                          |
| <b>Hold</b>                  | Sets trigger mode to waiting-for-trigger state                                                     | :INIT:TR[1-1]:IMM                       |
| <b>Manual Trigger</b>        | move once to waiting-for-trigger state                                                             | :INIT:TR[1-1]:IMM                       |
| <b>Restart</b>               | move once to waiting-for-trigger state                                                             | :INIT:TR[1-1]:IMM                       |
| <b>Single</b>                | always move to waiting-for-trigger state after measuring<br>move once to waiting-for-trigger state | :INIT:TR[1-1]:CONT<br>:INIT:TR[1-1]:IMM |
| <b>Source</b>                | trigger source                                                                                     | :TRIG:TR[1-1]:SOUR                      |
| <b>Trigger to Transient</b>  | select measurement mode                                                                            | :TRIG:MODE                              |

Softkey Functions  
 User Defined Menu (Top Menu)

**User Defined Menu (Top Menu)**

| Key Operation                                  | Function                                                                                                             |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Double-click on each softkey menu title</b> | Displays the top menu of each menu item below. Refer the USER menu about detail of following each menu item.         |
| <b>Measurement View</b>                        | Same as <b>Meas</b> .                                                                                                |
| <b>Input</b>                                   | Same as <b>Scale</b> .                                                                                               |
| <b>Scale</b>                                   | Same as <b>Scale</b> .                                                                                               |
| <b>Format</b>                                  | Same as <b>Format</b> .                                                                                              |
| <b>Display</b>                                 | Same as <b>Display</b> .                                                                                             |
| <b>Average</b>                                 | Same as <b>Avg</b> .                                                                                                 |
| <b>Attenuator</b>                              | Same as <b>Cal</b> .                                                                                                 |
| <b>Start/Center</b>                            | Displays the same softkey for setting up the sweep range that appears when <b>Start</b> , or <b>Span</b> is pressed. |
| <b>Stop/Span</b>                               | Displays the same softkey for setting up the sweep range that appears when <b>Start</b> , or <b>Span</b> is pressed. |
| <b>DC Conrol Voltage</b>                       | Same as <b>Sweep Setup</b> .                                                                                         |
| <b>DC Power Voltage</b>                        | Same as <b>Sweep Setup</b> .                                                                                         |
| <b>Setup</b>                                   | Same as <b>Sweep Setup</b> .                                                                                         |
| <b>Trigger</b>                                 | Same as <b>Trigger</b> .                                                                                             |
| <b>Marker</b>                                  | Same as <b>Marker</b> .                                                                                              |
| <b>Marker Search</b>                           | Same as <b>Marker Search</b> .                                                                                       |
| <b>Marker To</b>                               | Same as <b>Marker Search</b> .                                                                                       |
| <b>Marker Function</b>                         | Same as <b>Marker Fctn</b> .                                                                                         |
| <b>Macro Setup</b>                             | Same as <b>Macro Setup</b> .                                                                                         |
| <b>Save/Recall</b>                             | Same as <b>Save/Recall</b> .                                                                                         |
| <b>System</b>                                  | Same as <b>System</b> .                                                                                              |
| <b>Preset</b>                                  | Same as <b>Preset</b> .                                                                                              |



## USER Menu

| Key Operation               | Function                                        | SCPI Command                     |
|-----------------------------|-------------------------------------------------|----------------------------------|
| <b>Attenuator</b>           |                                                 |                                  |
| Input Attenuator            | Sets/reads Input Attenuator level on 5dB Step   | :SENS:ATT:LEV                    |
| <b>DC Control Voltage</b>   |                                                 |                                  |
| Control Voltage Cal         | Enables DC Control voltage calibration          | :SOUR:VOLT:CONT:CORR[:STAT]      |
| DC Control Delay            | Sets/reads DC Control delay (sec)               | :SOUR:VOLT:CONT:DEL              |
| DC Control Output           | Turns on/off DC Control voltage                 | :SOUR:VOLT:CONT:LEV:STAT         |
| DC Control Voltage          | Sets/reads DC Control voltage                   | :SOUR:VOLT:CONT:LEV:AMPL         |
| Execute Control Voltage Cal | Execute DC Control voltage calibration          | :SOUR:VOLT:CONT:CORR:COLL:ACQ    |
| Max Ctrl Voltage Limit      | Sets/reads the maximum DC Control voltage limit | :SOUR:VOLT:CONT:LIM:HIGH         |
| Min Ctrl Voltage Limit      | Sets/reads the minimum DC Control voltage limit | :SOUR:VOLT:CONT:LIM:LOW          |
| <b>DC Power Voltage</b>     |                                                 |                                  |
| DC Power Delay              | Sets/reads DC Power delay (sec)                 | :SOUR:VOLT:POW:DEL               |
| DC Power Output             | Turns on/off DC Power voltage                   | :SOUR:VOLT:POW:LEV:STAT          |
| DC Power Voltage            | Sets/reads DC Power voltage                     | :SOUR:VOLT:POW:LEV:AMPL          |
| Max Pwr Voltage Limit       | Sets/reads the maximum DC Power voltage limit   | :SOUR:VOLT:POW:LIM:HIGH          |
| Min Pwr Voltage Limit       | Sets/reads the minimum DC Power voltage limit   | :SOUR:VOLT:POW:LIM:LOW           |
| <b>Display</b>              |                                                 |                                  |
| Edit Title Label            | Edit the measurement window title label         | :DISP:USER[1-1]:LAB:DATA         |
| Marker Information          | Sets/reads the marker information position      | :DISP:USER[1-1]:ANN:MARK:POS     |
| Meas Condition              | Turns on/off measurement conditions             | :DISP:USER[1-1]:ANN:MEAS:STAT    |
| Relative Y-Scale            | Turns on/off relative Y-scale                   | :DISP:USER[1-1]:GRAT:AXIS:Y:REL  |
| Title Label                 | Turns on/off the measurement window title label | :DISP:USER[1-1]:LAB:STAT         |
| Update                      | Turns on/off the trace updates                  | :DISP:ENAB                       |
| Y # of Digits               | Selects the number of digits (Y-axis)           | :DISP:USER[1-1]:GRAT:AXIS:Y:STAT |
| <b>Macro Setup</b>          |                                                 |                                  |

Softkey Functions  
**USER Menu**

| Key Operation            | Function                                                  | SCPI Command                                 |
|--------------------------|-----------------------------------------------------------|----------------------------------------------|
| <b>E5052 Event</b>       | Turns on/off the E5052 VBA event callback function        | :PROG:COM:EVEN                               |
| <b>Echo Window Menu</b>  |                                                           |                                              |
| <b>Clear Echo</b>        | Clears Echo window                                        | :DISP:ECHO:CLE                               |
| <b>Echo Font Size</b>    | Sets/reads the font size on Echo window                   | :DISP:ECHO:FSIZ                              |
| <b>Echo Window</b>       | Turn on/off the Echo window                               | :DISP:ECHO:STAT                              |
| <b>Select Macro</b>      | Sets/reads the name of the program to be selected         | :PROG:SEL:NAME                               |
| <b>Stop</b>              | Sets/reads the state of the selected program              | :PROG:SEL:STAT                               |
| <b>User Menu</b>         |                                                           |                                              |
| <b>User Label 1</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM                     |
| <b>User Label 2</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM                     |
| <b>User Label 3</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM                     |
| <b>User Label 4</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM                     |
| <b>User Label 5</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM                     |
| <b>User Label 6</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM                     |
| <b>User Label 7</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM                     |
| <b>User Label 8</b>      | Execute the macro assigned under the user defined softkey | :PROG:SKEY:ITEM[1-8]:IMM                     |
| <b>VBA Editor Menu</b>   |                                                           |                                              |
| <b>Close Editor</b>      | Close VBA editor                                          |                                              |
| <b>Load Project</b>      | Loads program                                             | :MMEM:LOAD:PROG                              |
| <b>New Project</b>       | Open new VBA project                                      |                                              |
| <b>Open Editor</b>       | Open VBA editor                                           |                                              |
| <b>Save Project</b>      | Save VBA project                                          | :MMEM:STOR:PROG                              |
| <b>Marker</b>            |                                                           |                                              |
| <b>Clear Marker Menu</b> |                                                           |                                              |
| <b>All OFF</b>           | Clears all the markers                                    |                                              |
| <b>Marker 1</b>          | Turns on/off marker 1                                     | :CALC:USER[1-1]:TRAC[1-8]:<br>MARK[1-6]:STAT |
| <b>Marker 2</b>          | Turns on/off marker 2                                     | :CALC:USER[1-1]:TRAC[1-8]:<br>MARK[1-6]:STAT |
| <b>Marker 3</b>          | Turns on/off marker 3                                     | :CALC:USER[1-1]:TRAC[1-8]:<br>MARK[1-6]:STAT |
| <b>Marker 4</b>          | Turns on/off marker 4                                     | :CALC:USER[1-1]:TRAC[1-8]:<br>MARK[1-6]:STAT |
| <b>Marker 5</b>          | Turns on/off marker 5                                     | :CALC:USER[1-1]:TRAC[1-8]:<br>MARK[1-6]:STAT |
| <b>Marker 6</b>          | Turns on/off marker 6                                     | :CALC:USER[1-1]:TRAC[1-8]:<br>MARK[1-6]:STAT |

| Key Operation             | Function                                         | SCPI Command                                 |
|---------------------------|--------------------------------------------------|----------------------------------------------|
| <b>Couple</b>             | Turns on/off marker coupling function            | :CALC:USER[1-1]:ALLT:MARK<br>:COUP:STAT      |
| <b>Marker 1</b>           | Turns on/off marker 1                            | :CALC:USER[1-1]:TRAC[1-8]:<br>MARK[1-6]:STAT |
| <b>Marker 2</b>           | Turns on/off marker 2                            | :CALC:USER[1-1]:TRAC[1-8]:<br>MARK[1-6]:STAT |
| <b>Marker 3</b>           | Turns on/off marker 3                            | :CALC:USER[1-1]:TRAC[1-8]:<br>MARK[1-6]:STAT |
| <b>Marker 4</b>           | Turns on/off marker 4                            | :CALC:USER[1-1]:TRAC[1-8]:<br>MARK[1-6]:STAT |
| <b>Marker 5</b>           | Turns on/off marker 5                            | :CALC:USER[1-1]:TRAC[1-8]:<br>MARK[1-6]:STAT |
| <b>Marker 6</b>           | Turns on/off marker 6                            | :CALC:USER[1-1]:TRAC[1-8]:<br>MARK[1-6]:STAT |
| <b>Marker List</b>        | Turns on/off the marker list                     | :DISP:USER[1-1]:TABL[:STAT]                  |
| <b>More Functions</b>     |                                                  |                                              |
| <b>Discrete</b>           | Sets/reads marker movement (Continuous/Discrete) | :CALC:USER[1-1]:ALLT:MARK<br>:DISC:STAT      |
| <b>Ref Marker</b>         | Sets/reads marker reference number               | :CALC:USER[1-1]:ALLT:MARK<br>:REF:NUMB       |
| <b>Ref Marker Mode</b>    | Turns on/off delta marker mode                   | :CALC:USER[1-1]:ALLT:MARK<br>:REF:STAT       |
| <b>Marker Function</b>    |                                                  |                                              |
| <b>Analysis Range (X)</b> | Sets/reads analysis/search range (X-axis)        | :CALC:USER[1-1]:TRAC[1-8]:F<br>UNC:DOM:X     |
| <b>Analysis Range (Y)</b> | Sets/reads analysis/search range (Y-axis)        | :CALC:USER[1-1]:TRAC[1-8]:F<br>UNC:DOM:Y     |
| <b>Analysis Type</b>      | Sets/reads analysis type                         | :CALC:USER[1-1]:TRAC[1-8]:F<br>UNC:TYPE      |
| <b>Band Marker X</b>      |                                                  |                                              |
| <b>Band Marker X</b>      | Turns on/off bandmarker X                        | :CALC:USER[1-1]:TRAC[1-8]:B<br>DM:X:STAT     |
| <b>Center</b>             | Sets/reads the center value of bandmarker X      | :CALC:USER[1-1]:TRAC[1-8]:B<br>DM:X:CENT     |
| <b>Span</b>               | Sets/reads the span value of bandmarker X        | :CALC:USER[1-1]:TRAC[1-8]:B<br>DM:X:SPAN     |
| <b>Start</b>              | Sets/reads the start value of bandmarker X       | :CALC:USER[1-1]:TRAC[1-8]:B<br>DM:X:STAR     |
| <b>Stop</b>               | Sets/reads the stop value of bandmarker X        | :CALC:USER[1-1]:TRAC[1-8]:B<br>DM:X:STOP     |
| <b>Band Marker Y</b>      |                                                  |                                              |

Softkey Functions  
**USER Menu**

| Key Operation         | Function                                    | SCPI Command                                      |
|-----------------------|---------------------------------------------|---------------------------------------------------|
| <b>Band Marker Y</b>  | Turns on/off bandmarker Y                   | :CALC:USER[1-1]:TRAC[1-8]:BDM:Y:STAT              |
| <b>Center</b>         | Sets/reads the center value of bandmarker Y | :CALC:USER[1-1]:TRAC[1-8]:BDM:Y:CENT              |
| <b>Span</b>           | Sets/reads the span value of bandmarker Y   | :CALC:USER[1-1]:TRAC[1-8]:BDM:Y:SPAN              |
| <b>Start</b>          | Sets/reads the start value of bandmarker Y  | :CALC:USER[1-1]:TRAC[1-8]:BDM:Y:STAR              |
| <b>Stop</b>           | Sets/reads the stop value of bandmarker Y   | :CALC:USER[1-1]:TRAC[1-8]:BDM:Y:STOP              |
| <b>Couple</b>         | Turns on/off bandmarker coupling function   | :CALC:USER[1-1]:ALLT:BDM:X:COUP:STAT              |
| <b>Marker Search</b>  |                                             |                                                   |
| <b>Band Marker X</b>  |                                             |                                                   |
| <b>Band Marker X</b>  | Turns on/off bandmarker X                   | :CALC:USER[1-1]:TRAC[1-8]:BDM:X:STAT              |
| <b>Center</b>         | Sets/reads the center value of bandmarker X | :CALC:USER[1-1]:TRAC[1-8]:BDM:X:CENT              |
| <b>Span</b>           | Sets/reads the span value of bandmarker X   | :CALC:USER[1-1]:TRAC[1-8]:BDM:X:SPAN              |
| <b>Start</b>          | Sets/reads the start value of bandmarker X  | :CALC:USER[1-1]:TRAC[1-8]:BDM:X:STAR              |
| <b>Stop</b>           | Sets/reads the stop value of bandmarker X   | :CALC:USER[1-1]:TRAC[1-8]:BDM:X:STOP              |
| <b>Band Marker Y</b>  |                                             |                                                   |
| <b>Band Marker Y</b>  | Turns on/off bandmarker Y                   | :CALC:USER[1-1]:TRAC[1-8]:BDM:Y:STAT              |
| <b>Center</b>         | Sets/reads the center value of bandmarker Y | :CALC:USER[1-1]:TRAC[1-8]:BDM:Y:CENT              |
| <b>Span</b>           | Sets/reads the span value of bandmarker Y   | :CALC:USER[1-1]:TRAC[1-8]:BDM:Y:SPAN              |
| <b>Start</b>          | Sets/reads the start value of bandmarker Y  | :CALC:USER[1-1]:TRAC[1-8]:BDM:Y:STAR              |
| <b>Stop</b>           | Sets/reads the stop value of bandmarker Y   | :CALC:USER[1-1]:TRAC[1-8]:BDM:Y:STOP              |
| <b>Couple</b>         | Turns on/off bandmarker coupling function   | :CALC:USER[1-1]:ALLT:BDM:X:COUP:STAT              |
| <b>Peak</b>           |                                             |                                                   |
| <b>Peak Excursion</b> | Sets/reads the peak excursion value         | :CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:PEAK:EXC |
| <b>Peak Polarity</b>  | Sets/reads the marker peak-search polarity  | :CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:PEAK:POL |

| Key Operation            | Function                                                      | SCPI Command                                       |
|--------------------------|---------------------------------------------------------------|----------------------------------------------------|
| <b>Search Left</b>       | Execute marker peak search left                               | :CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:LPE  |
| <b>Search Peak</b>       | Execute marker peak search                                    | :CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:PEAK |
| <b>Search Peak All</b>   | Execute marker search all                                     | :CALC:USER[1-1]:TRAC[1-8]:ALLM:SEAR:PEAK           |
| <b>Search Right</b>      | Execute marker peak search right                              | :CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:RPE  |
| <b>Search Max</b>        | Execute marker search maximum                                 | :CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:MAX  |
| <b>Search Min</b>        | Execute marker search minimum                                 | :CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:MIN  |
| <b>Search Range (X)</b>  | Sets/reads marker search range (X-axis)                       | :CALC:USER[1-1]:TRAC[1-8]:ALLM:SEAR:DOM:X          |
| <b>Search Range (Y)</b>  | Sets/reads marker search range (Y-axis)                       | :CALC:USER[1-1]:TRAC[1-8]:ALLM:SEAR:DOM:Y          |
| <b>Target</b>            |                                                               |                                                    |
| <b>Search Left</b>       | Execute marker target search left                             | :CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:LTAR |
| <b>Search Right</b>      | Execute marker target search right                            | :CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:RTAR |
| <b>Search Target</b>     | Execute marker target search                                  | :CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:EXEC:TARG |
| <b>Target Transition</b> | Sets/reads the target transition definition                   | :CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:TARG:TRAN |
| <b>Target Value</b>      | Sets/reads the marker target value                            | :CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:TARG:Y    |
| <b>Tracking</b>          | Sets/reads the marker tracking type                           | :CALC:USER[1-1]:TRAC[1-8]:MARK[1-6]:SEAR:TRAC:TYPE |
| <b>Measurement View</b>  |                                                               |                                                    |
| <b>Freq &amp; Power</b>  | Selects frequency, power and DC current measurement window    | :DISP:WIND:ACT                                     |
| <b>Phase Noise</b>       | Selects phase noise measurement window                        | :DISP:WIND:ACT                                     |
| <b>Show Window</b>       |                                                               |                                                    |
| <b>Freq &amp; Power</b>  | Turns on/off frequency, power and DC current measurement mode | :DISP:FP[1-1]:STAT                                 |
| <b>Phase Noise</b>       | Turns on/off phase noise measurement mode                     | :DISP:PN[1-1]:STAT                                 |
| <b>Spectrum Monitor</b>  | Turns on/off spectrum monitor mode                            | :DISP:SP[1-1]:STAT                                 |
| <b>Transient</b>         | Turns on/off transient measurement mode                       | :DISP:TR[1-1]:STAT                                 |
| <b>User</b>              | Turns on/off user defined window                              | :DISP:USER[1-1]:STAT                               |
| <b>Spectrum Monitor</b>  | Selects spectrum monitor mode                                 | :DISP:WIND:ACT                                     |
| <b>Transient</b>         | Selects transient measurement mode                            | :DISP:WIND:ACT                                     |

Softkey Functions  
USER Menu

| Key Operation                 | Function                                                        | SCPI Command                            |
|-------------------------------|-----------------------------------------------------------------|-----------------------------------------|
| <b>User</b>                   | Selects user defined window                                     | :DISP:WIND:ACT                          |
| <b>Preset</b>                 |                                                                 |                                         |
| <b>OK</b>                     | Preset instrument                                               | :SYST:PRES                              |
| <b>Save/Recall</b>            |                                                                 |                                         |
| <b>Explorer...</b>            | Open windows explorer                                           |                                         |
| <b>Recall State</b>           |                                                                 |                                         |
| <b>Autorec</b>                | Recalls settings                                                | :MMEM:LOAD:STAT                         |
| <b>File Dialog...</b>         | Open file dialog                                                |                                         |
| <b>State01</b>                | Recalls state file from register 1                              | :MMEM:LOAD:STAT                         |
| <b>State02</b>                | Recalls state file from register 2                              | :MMEM:LOAD:STAT                         |
| <b>State03</b>                | Recalls state file from register 3                              | :MMEM:LOAD:STAT                         |
| <b>State04</b>                | Recalls state file from register 4                              | :MMEM:LOAD:STAT                         |
| <b>State05</b>                | Recalls state file from register 5                              | :MMEM:LOAD:STAT                         |
| <b>State06</b>                | Recalls state file from register 6                              | :MMEM:LOAD:STAT                         |
| <b>Save Data Trace</b>        | Saves trace data                                                | :MMEM:USER[1-1]:TRAC[1-8]:STOR[:DATA]   |
| <b>Save Memory Trace</b>      | Saves memory trace data                                         | :MMEM:USER[1-1]:TRAC[1-8]:STOR:MEM      |
| <b>Save State</b>             |                                                                 |                                         |
| <b>Autorec</b>                | Save settings                                                   | :MMEM:STOR:STAT                         |
| <b>File Dialog...</b>         | Open file dialog                                                |                                         |
| <b>Save Type</b>              | Selects instrument state type (Entire or instrument state only) | :MMEM:STOR:STYP                         |
| <b>State01</b>                | Save state file to register 1                                   | :MMEM:STOR:STAT                         |
| <b>State02</b>                | Save state file to register 2                                   | :MMEM:STOR:STAT                         |
| <b>State03</b>                | Save state file to register 3                                   | :MMEM:STOR:STAT                         |
| <b>State04</b>                | Save state file to register 4                                   | :MMEM:STOR:STAT                         |
| <b>State05</b>                | Save state file to register 5                                   | :MMEM:STOR:STAT                         |
| <b>State06</b>                | Save state file to register 6                                   | :MMEM:STOR:STAT                         |
| <b>Scale</b>                  |                                                                 |                                         |
| <b>Auto Scale</b>             | Execute autoscale                                               | :DISP:USER[1-1]:TRAC[1-8]:Y[:SCAL]:AUTO |
| <b>Auto Scale All</b>         | Execute autoscale for all traces on user defined window         | :DISP:USER[1-1]:ALLT:Y:SCAL:AUTO        |
| <b>Divisions</b>              | Sets/reads Y-scale divisions                                    | :DISP:USER[1-1]:Y[:SCAL]:DIV            |
| <b>Marker -&gt; Reference</b> | Sets the marker value to the reference level                    | :DISP:USER[1-1]:TRAC[1-8]:Y[:SCAL]:RLEV |

| Key Operation                          | Function                                                                 | SCPI Command                            |
|----------------------------------------|--------------------------------------------------------------------------|-----------------------------------------|
| <b>Reference Position</b>              | Sets/reads reference position                                            | :DISP:USER[1-1]:TRAC[1-8]:Y[:SCAL]:RPOS |
| <b>Reference Value</b>                 | Sets/reads the reference level value                                     | :DISP:USER[1-1]:TRAC[1-8]:Y[:SCAL]:RLEV |
| <b>Scale/Div</b>                       | Sets/reads scale per division                                            | :DISP:USER[1-1]:TRAC[1-8]:Y[:SCAL]:PDIV |
| <b>X Unit</b>                          | Sets/reads X-axis unit                                                   | :DISP:USER[1-1]:TRAC[1-8]:X:UNIT        |
| <b>Y Unit</b>                          | Sets/reads Y-axis unit                                                   | :DISP:USER[1-1]:TRAC[1-8]:Y:UNIT        |
| <b>System</b>                          |                                                                          |                                         |
| <b>Abort Printing</b>                  | Aborts printing                                                          | :HCOP:ABOR                              |
| <b>Backlight</b>                       | Turns on/off backlight                                                   | :SYST:BACK:STAT                         |
| <b>Dump Screen Image</b>               | Save screen image                                                        | :MMEM:STOR:IMAG                         |
| <b>Error Log</b>                       |                                                                          |                                         |
| <b>Clear Error Log</b>                 | Clear error log                                                          |                                         |
| <b>View Error Log...</b>               | Display error log                                                        |                                         |
| <b>Invert Image</b>                    | Selects print mode                                                       | :HCOP:IMAG                              |
| <b>Misc Setup</b>                      |                                                                          |                                         |
| <b>Beeper</b>                          |                                                                          |                                         |
| <b>Beep Complete</b>                   | Turns on/off the beep for operation completion                           | :SYST:BEEP:COMP:STAT                    |
| <b>Beep Warning</b>                    | Turns on/off the beep for warning                                        | :SYST:BEEP:WARN:STAT                    |
| <b>Test Beep Complete</b>              | Makes beep sound for operation completion                                | :SYST:BEEP:COMP:IMM                     |
| <b>Test Beep Warning</b>               | Makes beep sound for warning                                             | :SYST:BEEP:WARN:IMM                     |
| <b>Clock Setup</b>                     |                                                                          |                                         |
| <b>Set Date and Time</b>               | Set/reads system time<br>Set/reads system date                           | :SYST:TIME<br>:SYST:DATE                |
| <b>Show Clock</b>                      | Turns on/off internal clock display                                      | :DISP:CLOC                              |
| <b>Control Panel ...</b>               | Open control panel                                                       |                                         |
| <b>GPIB Setup</b>                      |                                                                          |                                         |
| <b>System Controller Configuration</b> | Turns on/off system controller mode                                      |                                         |
| <b>Talker/Listener Address</b>         | Sets the address for controlling the analyzer from a controller via GPIB |                                         |
| <b>Key Lock</b>                        |                                                                          |                                         |

Softkey Functions  
USER Menu

| Key Operation                          | Function                                  | SCPI Command                        |
|----------------------------------------|-------------------------------------------|-------------------------------------|
| <b>Front Panel &amp; Keyboard Lock</b> | Disables from panel / keyboard operations | :SYST:KLOC:KBD                      |
| <b>Touch Screen &amp; Mouse Lock</b>   | Disables touch screen / mouse operations  | :SYST:KLOC:MOUS                     |
| <b>Network Setup</b>                   |                                           |                                     |
| <b>MAC Address</b>                     | Sets MAC address                          |                                     |
| <b>Network Configuration</b>           | Enables/disables network connections      |                                     |
| <b>Network Identification</b>          | Sets network ID of the instrument         |                                     |
| <b>SICL-LAN Address</b>                | Sets SICL-LAN address                     |                                     |
| <b>SICL-LAN Server</b>                 | Enables/disables SICL-LAN server          |                                     |
| <b>Socket Server</b>                   | Enables/disables Socket server            |                                     |
| <b>Telnet Server</b>                   | Enables/disables Telnet server            |                                     |
| <b>Print</b>                           | Outputs print                             | :HCOP:IMM                           |
| <b>Printer Setup ...</b>               | Execute printer setup                     |                                     |
| <b>Product Information</b>             | Reads product information                 |                                     |
| <b>Trace View</b>                      |                                           |                                     |
| <b>Aperture</b>                        | Smoothing aperture                        | :CALC:USER[1-1]:TRAC[1-8]:SMO:APER  |
| <b>Clear All Persistent Data</b>       | clear all persistence mode                | :DISP:USER[1-1]:ALLT:PERS:CLE       |
| <b>Data -&gt; Mem</b>                  | Copy data to memory                       | :CALC:USER[1-1]:TRAC[1-8]:MATH:MEM  |
| <b>Data Hold</b>                       | Data hold                                 | :CALC:USER[1-1]:TRAC[1-8]:HOLD      |
| <b>Data Math</b>                       | Sets/reads math operation type            | :CALC:USER[1-1]:TRAC[1-8]:MATH:FUNC |
| <b>Display Trace</b>                   | Shows data and/or memory trace            | :DISP:USER[1-1]:TRAC[1-8]:MODE      |
| <b>Enable Trace</b>                    |                                           |                                     |
| <b>Trace 1</b>                         | Enables/disables data trace 1             | :DISP:USER[1-1]:TRAC[1-8]:STAT      |
| <b>Trace 2</b>                         | Enables/disables data trace 2             | :DISP:USER[1-1]:TRAC[1-8]:STAT      |
| <b>Trace 3</b>                         | Enables/disables data trace 3             | :DISP:USER[1-1]:TRAC[1-8]:STAT      |



| Key Operation           | Function                      | SCPI Command                         |
|-------------------------|-------------------------------|--------------------------------------|
| <b>Trace 4</b>          | Enables/disables data trace 4 | :DISP:USER[1-1]:TRAC[1-8]:STAT<br>AT |
| <b>Trace 5</b>          | Enables/disables data trace 5 | :DISP:USER[1-1]:TRAC[1-8]:STAT<br>AT |
| <b>Trace 6</b>          | Enables/disables data trace 6 | :DISP:USER[1-1]:TRAC[1-8]:STAT<br>AT |
| <b>Trace 7</b>          | Enables/disables data trace 7 | :DISP:USER[1-1]:TRAC[1-8]:STAT<br>AT |
| <b>Trace 8</b>          | Enables/disables data trace 8 | :DISP:USER[1-1]:TRAC[1-8]:STAT<br>AT |
| <b>Persistence Mode</b> | Sets/reads persistence mode   | :DISP:USER[1-1]:TRAC[1-8]:PERS:STAT  |
| <b>Smoothing</b>        | Smoothing on/off              | :CALC:USER[1-1]:TRAC[1-8]:SMO:STAT   |
| <b>Trace Label</b>      | Edits trace title label       | :DISP:USER[1-1]:TRAC[1-8]:LABEL:DATA |

Softkey Functions  
**USER Menu**

**A**

active measurement window, 20  
 active trace, 20  
 analyzer mode, 74  
 assistance, 5  
 Attenuator, 84, 86, 88, 94, 100, 109, 111, 113, 115  
 Averaging, 77, 92, 97, 105

**B**

Backing Up the Data, 180  
 Bandmarker, 126  
 Bandmarker Coupling, 128  
 Basic Measurement, 73  
 Beeper, 175

**C**

Calibration of the Touch Screen, 185  
 Carrier Frequency Band, 91  
 certification, 5  
 Cleaning the Instrument, 186  
 Clipboard, 155  
 Comparing Traces, 141  
 Configuring the Network, 166  
 Connecting a LAN cable, 59  
 Connecting a printer, 60  
 Connecting the mouse and keyboard, 58

**D**

Data Analysis, 117  
 Data Entry Bar, 31  
 Data Math, 141  
 Data Trace, 141  
 DC Control Voltage, 79  
 DC Control Voltage Calibration, 34, 79  
 DC control voltage delay, 81  
 DC Power Voltage, 79  
 DC power voltage delay, 81  
 Detector Mode, 99  
 Discrete Marker Mode, 123  
 documentation map, 7  
 Documentation Warranty, 5  
 DUT Interface, 28

**E**

Error Messages, 222  
 exclusive remedies, 5  
 External Reference Signal Input Connector, 44  
 External Trigger, 107  
 External Trigger Input Connector, 43

**F**

File Recall, 143, 148  
 File Save, 143, 145  
 Firmware Revision, 177  
 Firmware Version, 214

Format, 99  
 Frequency Format, 83  
 Frequency Reference Signal, 44  
 Frequency Resolution, 76  
 Frequency/Power Measurement, 74  
 Front Panel, 18  
 Fuses, 61

**G**

GPIB, 43, 160  
 GPIB Address, 160  
 GPIB Connector, 43

**H**

Handle Kit, 55, 56  
 High Stability Frequency Reference Output Connector, 44  
 history,  
     manual printing, 2

**I**

IF Gain, 94  
 Information on Maintenance, 179  
 Initial Registration, 66  
 Installation, 47  
 Instrument Status Bar, 34  
 Internal Clock, 69  
 Internal Reference Signal Output Connector, 44  
 Invert Image, 156  
 IP Address, 167

**L**

LAN, 43, 59, 166  
 LAN Port, 43  
 LCD Screen, 19  
 LCD Screen Backlight, 176  
 List of Default Values, 231  
 Locking the Front Keys, Keyboard, and Mouse, 174

**M**

Maintenance, 71  
 Making backup files, 180  
 Managing Files/Folders, 149  
 Manual Changes, 213  
 manual printing history, 2  
 Marker, 40, 118  
 Marker Coupling, 124  
 Marker Information, 40  
 Marker List, 125  
 Marker Response, 119  
 Marker Search, 118, 126  
 Mean, 139  
 Measurement Resolution Bandwidth, 97  
 Measurement Status, 34  
 Measurement Window, 37  
 Memory Trace, 141

Mouse, 163

## O

Offset Frequency, 90  
Operating environment, 52  
Operational Manual, 7  
Option Number, 177  
Overview of Functions, 17

## P

Parts with Limited Service Life, 187  
Peak Deviation, 134  
Peak Polarity, 134  
Peak Search, 134  
Peak Search All, 137  
Peak-to-Peak, 139  
Phase Noise, 90  
phase noise characteristics, 91  
Phase Noise Measurement, 90  
Phase Unit, 114  
Point Delay, 81  
Power Cable, 61  
Power Cable Receptacle, 44  
Power Supply, 61  
Precautions, 15  
Printer Driver, 157  
Printing Screen Image, 154  
Product Information, 177  
Programming Manual, 7  
PtoP, 139

## R

Rack-mount and Handle Kit, 55, 57  
Rack-mount Kit, 55, 57  
Rear Panel, 42  
Recommended Calibration Period, 188  
Reference Marker, 122  
Reference Marker Mode, 122  
Reference Position, 103, 104  
Regular Calibration, 188  
Relative Value, 122  
Repair, 188  
Replacement, 188  
Result Output, 117

## S

safety  
symbols, 4  
safety summary, 3  
Sample Program, 7  
Saving Display Screen, 153  
Scale, 118  
Screen Capture, 155  
SDev, 139  
Search Tracking, 130  
Search Transition, 132

Self-test, 71

Sensitivity Aperture, 83  
Serial Number, 44, 177, 214  
Setting the GPIB, 160  
Setting the Mouse, 163  
Smoothing, 84, 87, 89, 94, 100, 109, 111, 113, 115  
Softkey Functions, 253  
Softkey Menu Bar, 32  
Specifications, 189  
Automation, 212  
DC Power/Control Voltage Setting, 210  
Frequency/Rf Power/DC Current Measurements, 196  
General Information, 205  
Measurement capabilities, 210  
Phase Noise Measurement, 191  
Port Output (DC Power/Control), 203  
Spectrum Monitor, 202  
Storage, 211  
System capabilities, 211  
Test Port Input, 204  
Trace functions, 211  
Transient Measurement, 199  
Specifications and Supplemental Information, 189  
Spectrum Monitor Measurement, 96  
Standard Deviation, 139  
Standby Switch, 19  
Statistics Data, 40  
Stimulus, 118  
Supported printers, 154  
Sweep Offset, 103, 104  
Sweep Parameter, 76, 81  
Sweep Time, 103, 104  
System Recovery, 181

## T

Target Frequency, 102  
Target Search, 132  
tester mode, 74  
The Control and Management Functions, 159  
touch screen, 19  
Trace Data, 151  
Trace Memory, 152  
Transient Measurement, 102  
Trigger Source, 34, 77, 92, 97, 105  
Troubleshooting, 217  
Turning the Power OFF, 64  
Turning the Power ON, 64  
typeface conventions, 6

## U

USB/GPIB Interface, 160

## V

Video Trigger, 106

---

**W**

Warning Message, 228

Windows 2000, 66

Wrap Phase, 114