E5504B E17
Phase Noise System

Modification Note

Notice

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

Agilent Technologies makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Agilent Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Agilent Technologies assumes no responsibility for the use or reliability of its software on equipment that is not furnished by Agilent Technologies.

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

Restricted Rights Legend

Use, duplication, or disclosure by the U.S. Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 for DOD agencies, and subparagraphs (c)(1) and (c)(2) of the Commercial Computer Software Restricted Rights clause at FAR 52.227-19 for other agencies.

Agilent Technologies
1400 Fountaingrove Parkway
Santa Rosa, CA 95403-1799, U.S.A.

© Copyright Agilent Technologies 2000

Warranty

Custom systems are warranted by contractual agreement between Agilent Technologies and the Customer.

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 (NIST, formerly NBS), to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members.

Assistance

Product maintenance agreements and other customer assistance agreements are available for Agilent Technologies products.

For assistance, call your local Agilent Technologies Sales and Service Office (refer to "Service and Support" on page vi).

vii

Service and Support

Any adjustment, maintenance, or repair of this product must be performed by qualified personnel. Contact your customer engineer through your local Agilent Technologies Service Center. You can find a list of Agilent Technologies Service Centers on the web at

`http://www.agilent.com.`

If you do not have access to the Internet, one of these Agilent Technologies centers can direct you to your nearest Agilent Technologies representative:

United States:	Agilent Technologies Test and Measurement Call Center PO Box 4026 Englewood, CO 80155-4026 (800) 452 4844 (toll-free in US)
Canada:	Agilent Technologies Canada Ltd. 5150 Spectrum Way Mississauga, Ontario L4W 5G1 (905) 206 4725
Europe:	Agilent Technologies European Marketing Centre Postbox 999 1180 AZ Amstelveen The Netherlands (31 20) 547 9900
Japan:	Yokogawa-Agilent Technologies Ltd. Measurement Assistance Center 9-1, Takakura-Cho, Hachioji-Shi Tokyo 192, Japan (81) 426 56 7832 (81) 426 56 7840 (FAX)
Latin America:	Agilent Technologies Latin American Region Headquarters 5200 Blue Lagoon Drive, 9th Floor Miami, Florida 33126, U.S.A. (305) 267 4245 (305) 267 4288 (FAX)
Australia/New Zealand:	Agilent Technologies Australia Ltd. 31-41 Joseph Street Blackburn, Victoria 3130 Australia 1 800 629 485 (toll-free)
Asia-Pacific:	Agilent Technologies Asia Pacific Ltd. 17-21/F Shell Tower, Times Square 1 Matheson Street, Causeway Bay Hong Kong (852) 2599 7777 (852) 2506 9285 (FAX)

Safety and Regulatory Information

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate the instrument. This product has been designed and tested in accordance with international standards.

WARNING

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

CAUTION

The **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

Instrument Markings

⚠	When you see this symbol on your instrument, you should refer to the instrument's instruction manual for important information.
⚡	This symbol indicates hazardous voltages.
☀	The laser radiation symbol is marked on products that have a laser output.
∼	This symbol indicates that the instrument requires alternating current (ac) input.
CE	The CE mark is a registered trademark of the European Community. If it is accompanied by a year, it indicates the year the design was proven.
CSA	The CSA mark is a registered trademark of the Canadian Standards Association.

1SM1-A	This text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPER 11, Clause 4).
	This symbol indicates that the power line switch is ON.
	This symbol indicates that the power line switch is OFF or in STANDBY position.

Safety Earth Ground

This is a Safety Class I product (provided with a protective earthing terminal). An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and secured against any unintended operation.

Before Applying Power

Verify that the product is configured to match the available main power source as described in the input power configuration instructions in this manual. If this product is to be powered by autotransformer, make sure the common terminal is connected to the neutral (grounded) side of the ac power supply.

Typeface Conventions

Italics
- Used to emphasize important information:
  Use this software *only* with the Agilent Technologies xxxxxX system.

- Used for the title of a publication:
  Refer to the *Agilent Technologies xxxxxX System-Level User's Guide*.

- Used to indicate a variable:
  Type `LOAD BIN` *filename*.

`Instrument Display`
- Used to show on-screen prompts and messages that you will see on the display of an instrument:
  The Agilent Technologies xxxxxX will display the message `CAL1 SAVED`.

[Keycap]
- Used for labeled keys on the front panel of an instrument or on a computer keyboard:
  Press **[Return]**.

{Softkey}
- Used for simulated keys that appear on an instrument display:
  Press *{Prior Menu}*.

`User Entry`
- Used to indicate text that you will enter using the computer keyboard; text shown in this typeface must be typed *exactly* as printed:
  Type `LOAD PARMFILE`

- Used for examples of programming code:
  ```
  #endif // ifndef NO_CLASS
  ```

`Path Name`
- Used for a subdirectory name or file path:
  Edit the file `usr/local/bin/sample.txt`

Computer Display
- Used to show messages, prompts, and window labels that appear on a computer monitor:
  The **Edit Parameters** window will appear on the screen.

- Used for menus, lists, dialog boxes, and button boxes on a computer monitor from which you make selections using the mouse or keyboard:
  Double-click **EXIT** to quit the program.

Contents

General Description

The E5500 phase noise measurement solution series contains four standard hardware configurations in four frequency ranges.

Model number	Frequency range
E5501A/B	50 KHz to 1.6 GHz
E5502A/B	50 KHz to 6 GHz
E5503A/B	50 KHz to 18 GHz
E5504A/B	50 KHz to 26.5 GHz

A-Series Systems

The standard A-series configurations are automatic test equipment (ATE) subsystems consisting of software, a VXI mainframe, an MMS mainframe, and plug-in instruments. Computers and other ancillary instruments are not included with the A-series systems unless added by special options. A-series subsystems use a VXI digitizer and have an offset frequency range from 0.01 Hz to 4 MHz.

Typically, A-series ATE solutions are equipment configurations that are installed into, and function as subsystems of, a customer's manufacturing test system. This type of subsystem is not installed in a system cabinet initially and may be used in a bench top arrangement. However, depending upon the instruments and options chosen, portions of the equipment may require further integration.

B-Series Systems

The standard B-series configurations are complete tested systems consisting of a computer with preconfigured software, an MMS mainframe, plug-in instruments, and a spectrum analyzer. B-series systems include a PC digitizer card, an RF spectrum analyzer, and have an offset frequency range from 0.1 Hz to 100 MHz.

Typically, the B-series systems are bench-top, research and development oriented systems, but can also be installed in system cabinets in many combinations.

The E17 Special Option

The E5504B E17 phase noise system is an E5504B system mounted in a 1.6 meter tall cabinet. The E5504B E17 is also an ordering convenience package that includes an E5504B standard options 201 and 402. The E5504B standard Option 201 adds a microwave phase detector to the test set. The E5504B standard Option 402 adds an 8663A RF signal generator and it's asset control module E5485A.

General Description

The personal computer (PC) monitor is mounted on a swing arm on the side of the cabinet. The PC keyboard mounts to a keyboard caddy attached to the bottom of the work surface. The PC controller is not mounted in the rack.

Monitor and Swing Arm

The swing arm has been tested to its full extension with the monitor in place and will not destabilize a loaded system cabinet. The mounting bar inside the cabinet is very heavy and puts most of the assembly's weight onto the cabinet wheels. Users should not, however, place anything that weighs more than ten pounds on the monitor or swing arm.

WARNING

If it becomes necessary to remove more than one of the larger instruments from inside the cabinet, take the monitor off of the swing arm. An unbalanced cabinet could topple, causing injury to personnel and damage to equipment.

The monitor attaches to the swing arm stage with Seisma-Lok™ strapping. The Seisma-Lok kit consists of eight adhesive-backed fastening clamps and a roll of thick plastic strapping. Four fasteners are attached to the monitor and four fasteners are attached beneath them on the swing arm stage. The monitor pedestal has been removed to lower the center of gravity of the monitor. A control door has been provided for accessibility because the monitor is mounted directly to the swing arm stage.

A 2-in hole has been cut in the cabinet side panel immediately behind the monitor swing arm for the video and power cables.

Monitor Installation

1. Remove the plastic pedestal (if present) from the monitor. The monitor will mount directly to the swing arm platform.

2. Remove the plastic door covering the control buttons. With the monitor flush upon the platform, there will not be room to fold down the plastic control door.

3. Place the monitor platform's spindle into the swing arm hole and position the assembly near the cabinet side.

4. Carefully lift the monitor and set it directly on the swing arm platform.

5. Align the Siesma-Lok clamps on the monitor's sides with those on the swing arm platform. Pull a 5-in length of strapping through each pair of clamps.

6. Check the monitor's positioning again, pull the straps tight, close the clamps and trim off any excess strapping.

7. Route the monitor cable through the hole behind the swing arm and down the inside of the cabinet.

8. Plug the cable into the monitor connector on the back of the computer.

Standard Input and Output Connections

All of the standard instruments used in E5500 systems have front-panel inputs and outputs as the standard configuration. This allows maximum re-use of expensive assets. Most of the instruments can also be used for measurements other than phase noise. Typically, the test set, converter, and source are configured for measurements in which front panel cabling is convenient. The measurement setups are illustrated in the software.

System Cabling

Cable Routing and the 46298N Work Surface

The 46298N work surface does not meet the cabinet chassis at the rear corners. This space allows for cabling to be routed around the rear corners of the work surface to devices mounted below. The work surface mounting slot is also open underneath to allow cable access. When mounting the 46298N, the RF source cable will be routed under the work surface and around the left, rear corner to the test set.

Cable Routing and the Keyboard Caddy

Computer cabling for keyboard, mouse, and digitizer is routed through holes in the caddy mounting bracket (the underside of the work surface) and into the system cabinet. The RF source cable and modulation cable are routed through a hole on one side of the caddy mount bracket, out through a hole on the opposite side, and around the rear corner of the work surface to the test set. RF source cable routing is much easier if done before the 46298N work surface is installed or while the work surface is extended.

Keyboard Caddy

The system keyboard will mount to the work surface with a commercial caddy adapted to the work surface. A special mounting bracket (part number 83467-00005) adapts the caddy track to the underside of the work surface, allowing the keyboard to be stored under the work surface or to be extended out to the work surface edge. When installed, the adapting bracket fills the space between the work surface rails, leaving a cavity inside. Cabling is routed through holes at the back of the bracket and through the cavity.

To Recess or Lower the Tray

Place your hand in the center of the keyboard, loosen the locking handle and gently push the tray into the desired position.

NOTE

The plastic keyboard tray is attached to a spring-loaded mechanism. Do not loosen the locking handle without placing your hand upon the keyboard or it will pop up abruptly.

Keyboard Caddy Installation

The caddy track was shortened at the factory to allow the 46298N work surface to recess fully. This still allows the keyboard to be stored beneath the work surface. The mount mechanism slides into the caddy track and the work surface slides onto its chassis rails.

CAUTION

The caddy track has rubber bumpers at each end to retain the mount mechanism. If the work surface assembly is tilted without the bumpers in place, the entire assembly will slide out, resulting in possible damage to equipment.

---

1. Turn the 46298N upside down on a soft surface and ensure that the caddy track is attached securely to its under side.

2. Unpack the keyboard mount mechanism. The mount should be attached to the keyboard tray.

3. Unscrew the rear bumper from the caddy track and slide the mount mechanism into the track. Be sure to orient the keyboard tray forward, toward the front of the work surface. Reattach the rubber bumper so that the mount cannot leave the caddy track.

4. Feed two BNC cables through the holes on the caddy mount bracket. These will attach to the source and test set. Inserting these cables now will simplify cabling the system later.

5. Invert the entire assembly, keeping the track perpendicular to the floor and slide the 46298N onto its chassis rails.

NOTE

Avoid tilting the track. The entire mount assembly will slide freely if the track is tilted.

E5504B Standard Components

A standard E5504B phase noise system consists of the following components. This configuration is the basis to which other options may be added.

Description	Part Number	Qty
Mainframe, MMS	70001A	1
Phase noise test set	70420A	1
Down converter	70427A	1
Economy spectrum analyzer	E4411A	1
Option, parallel I/O	E4411A-A4H	1
ACM, PC digitizer software control module	E5481A	1
Monitor, 15"	E2500-80006	1
PC Vectra D7962T	E5500-80009	1
ACM, RFSA software control module	E5483A	1
GPIB card (Installed)	82341C	1
Adapter, GPIB	10834A	1
PC digitizer (Installed)	E5500-60004	1
Adapter, PC digitizer	E5500-60003	1
Manual, *E5500 Installation Guide*	E5500-90002	1
Manual, *E5500 Users Guide*	E5500-90004	1
Cable, RF signal-in, SMA	E5504-20001	1
Cable, GPIB 24C 24F-24F	8120-3444	1
Cable, GPIB 6ft 24C 24F-24F	8120-3446	1
Cable, BNC 8ft 2438C	8120-5370	2
Cable, SMB/BNC 2235C	84000-60451	2
Cable, BNC	8120-2582	3
Adapter, N(m)/BNC(f)	1250-0780	3
Termination, BNC 50 ohm	1250-0207	1

E17 Option Components

The E5504B option E17 includes the following additions and deletions to the basic E5504B system.

Description	Part Number	Qty
Add:		
Drawer, storage	35181M	1
Work surface assembly	46298S	1
Rack mount kit	5062-4072	1
U-wave PH detector	70420A opt 201	1
Keyboard park	7101-1015	1
Bracket, keyboard holder	83467-00005	1
Bracket, shuttle	83467-20002	1
Signal generator, 1280 MHz	8663A opt 908	1
Rack, 1.6 M	E3661B opt AW5	1
Rails	E3663-00001	6
Kit-rack mount	E4401-60057	1
Fan, external, 220 V	E4471A	1
8662-63 ACM	E5485A	1
Cart shuttle	E5500-80005	1
Mouse tray	E5503-80001	1
E5504B E17 System Modification Note	E5500-90010	1
Rack panel, filler 2U	E7732A	1
Rack panel, filler 3U	E7733A	3
Rack panel, filler 4U	E7734A	1

Component Addresses

The E5504B E17 system was configured at the factory with the following addresses.

Instrument	Address
8663A	19 (GPIB)
70420A opt 001	20 (GPIB)
70427A H05	28 (GPIB)
PC digitizer card	320 (PCI)
E4411B	17 (GPIB)

AGILENT
E5504B E17

15 INCH MONITOR

SYSTEM RACK
MOUNT DIAGRAM

NOTE: THE SYSTEM PC
CONTROLLER IS NOT MOUNTED
IN THE RACK.

FILE: E5504BE17rmd

E3661B - 1.6 METER RACK

E7733A FILLER PANEL
3 EIA

E7733A FILLER PANEL
3 EIA

E7732A FILLER PANEL
2 EIA

E4411B
opt. A4H
5 EIA

70420A opt. 201   70427A

70001A   4 EIA

WORK SURFACE/KEYBOARD CADDY   1 EIA

8663A 4 EIA

E7733A FILLER PANEL
3 EIA

E7734A FILLER PANEL
4 EIA

35181M DRAWER
3 EIA

— 32 —
— 31 —
— 30 —
— 29 —
— 28 —
— 27 —
— 26 —
— 25 —
— 24 —
— 23 —
— 22 —
— 21 —
— 20 —
— 19 —
— 18 —
— 17 —
— 16 —
— 15 —
— 14 —
— 13 —
— 12 —
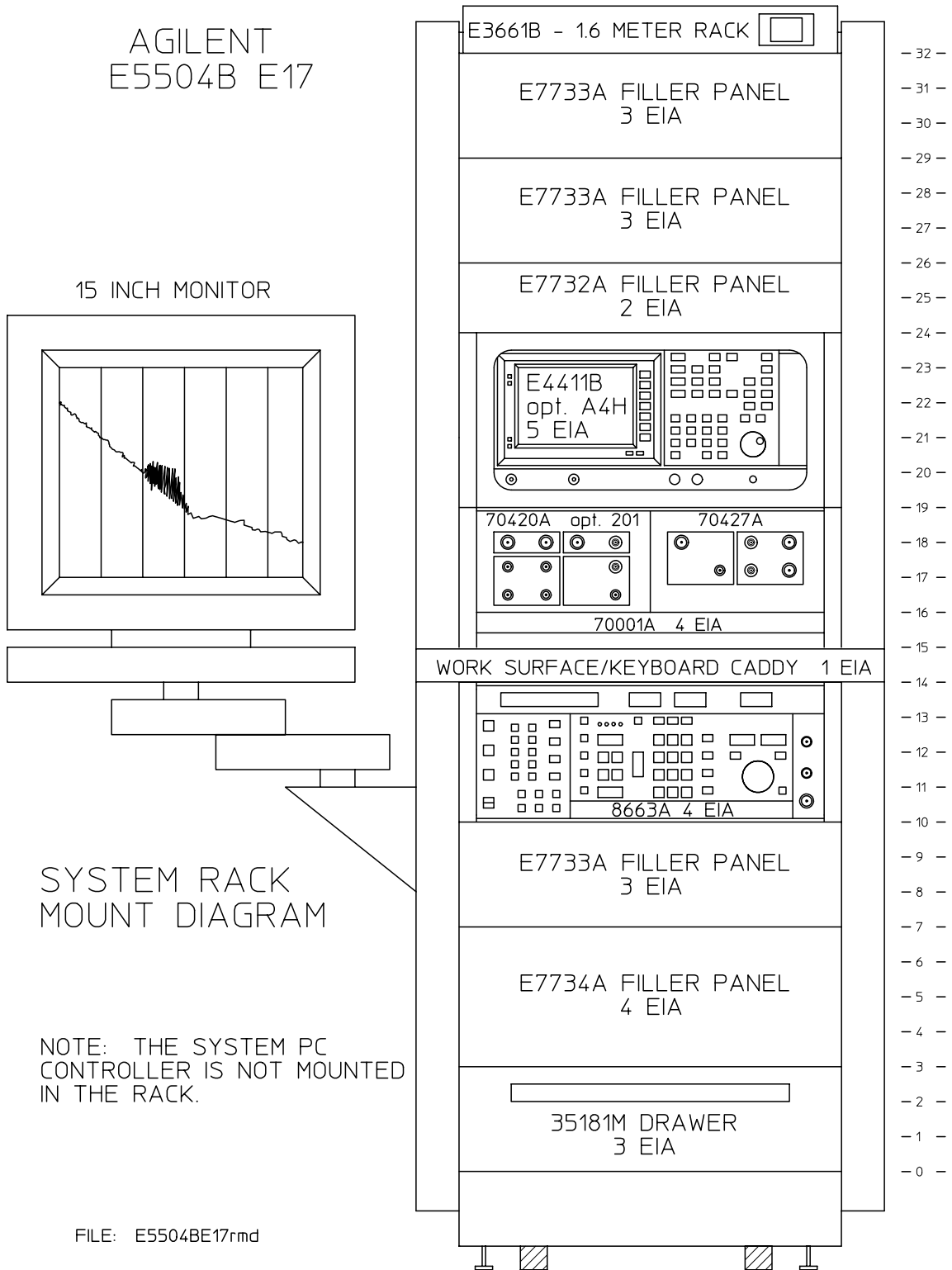— 11 —
— 10 —
— 9 —
— 8 —
— 7 —
— 6 —
— 5 —
— 4 —
— 3 —
— 2 —
— 1 —
— 0 —

Figure 1   E5504B E17 Rack Diagram