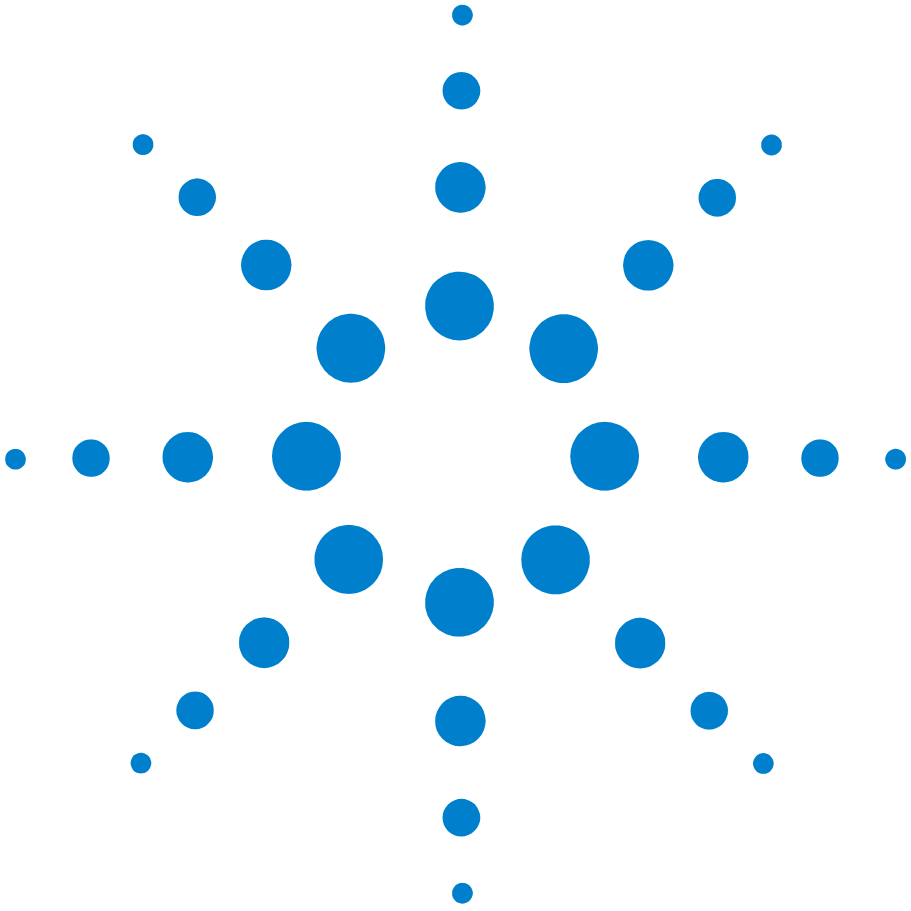
E5500
Phase Noise Measurement System
Version A.02.00

Installation Guide for E5500B



Agilent Technologies

DOCUMENT PART NO. E5500-90022
PRINTED IN USA
MARCH 2002
EDITION 1.0

Notices

Warranty

The material 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.

Assistance

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

For assistance, call your nearest Agilent Technologies Sales and Service Office (see Table 2 on page 6).

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

CAUTION: A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, 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.

Safety summary

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies, Inc. assumes no liability for the customer's failure to comply with these requirements.

General

This product is a Safety Class 1 instrument (provided with a protective earth terminal). The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

All light emitting diodes (LEDs) used in this product are Class 1 LEDs as per IEC 60825-1.

WARNING: DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE
Do not operate the instrument in the presence of flammable gases or flames.

WARNING: DO NOT REMOVE THE INSTRUMENT COVER
Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel. Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

Environmental conditions

Unless otherwise noted in the specifications, this instrument or system is intended for indoor use in an installation category II, pollution degree 2 environment. It is designed to operate at a maximum relative humidity of 95% and at altitudes of up to 2000 meters. Refer to the specifications tables for the ac mains voltage requirements and ambient operating temperature range.

Before applying power

Verify that the product is set to match the available line voltage, the correct fuse is installed, and all safety precautions are taken. Note the instrument's external markings described in Table 1.

Ground the instrument

To minimize shock hazard, the instrument chassis and cover must be connected to an electrical protective earth ground. The instrument must be connected to the ac power mains through a grounded power cable, with the ground wire firmly connected to an electrical ground (safety ground) at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.

Fuses

Use only fuses with the required rated current, voltage, and specified type (normal blow, time delay). Do not use repaired fuses or short-circuited fuse holders. To do so could cause a shock or fire hazard.

Safety symbols and instrument markings

Symbols and markings in manuals and on instruments alert you to potential risks, provide information about conditions, and comply with international regulations. Table 1 defines the symbols and markings you may find in a manual or on an instrument.

Table 1 Safety symbols and instrument markings

Safety symbols	
	Warning: risk of electric shock.
	Warning: hot surface
	Caution: refer to accompanying documents.
	Laser radiation symbol: marked on products that have a laser output.
	Alternating current.
	Both direct and alternating current.
	Three-phase alternating current.
	Earth (ground) terminal
	Protective earth (ground) terminal

Table 1 Safety symbols and instrument markings (continued)

Safety symbols	
	Frame or chassis terminal
	Terminal is at earth potential. Used for measurement and control circuits designed to be operated with one terminal at earth potential.
	Terminal for neutral conductor on permanently installed equipment.
	Terminal for line conductor on permanently installed equipment.
	Standby (supply); units with this symbol are not completely disconnected from ac mains when this switch is off. To completely disconnect the unit from ac mains, either disconnect the power cord, or have a qualified electrician install an external switch.
Instrument markings	
	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.
	The CSA mark is a registered trademark of the Canadian Standards Association.
	The C-tick mark is a registered trademark of the Spectrum Management Agency of Australia. This signifies compliance with the Australian EMC Framework regulations under the terms of the Radio Communications Act of 1992.
1SM1-A	This text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPER 11, Clause 4).

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.

Agilent on the Web

You can find information about technical and professional services, product support, and equipment repair and service on the Web:

http://www.agilent.com/contacts/English/noscript.html

Double-click the link to **Test & Measurement**. Select your country from the drop-down menus. The Web page that appears next has contact information specific for your country.

Agilent by Phone

If you do not have access to the Internet, call one of the numbers in Table 2.

Table 2 Agilent Call Centers and Regional Headquarters

United States and Canada:	Test and Measurement Call Center (800) 452 4844 (toll-free in US)
Europe:	(41 22) 780 8111
Japan:	Measurement Assistance Center (81) 0426 56 7832
Latin America:	305 269 7548
Asia-Pacific:	(85 22) 599 7777

1 E5500B Phase Noise Measurement System

2 Connect Diagrams

1

E5500B Phase Noise Measurement System

Introduction

Table 1-1 shows which procedures in this document to follow depending on the system you purchased. This installation guide take you through the process of installing both the hardware and the E5500 Phase Noise software. If you ordered a preconfigured system from Agilent Technologies, follow the alternate steps in the right column of Table 1-1. A confidence test is also included as the last step in the installation procedure.

Table 1-1 Installation Steps

Procedures in this Document	Pertain to Option 1FF (without a computer)	Pertain to a preconfigured E5500B system
"System Requirements" on page 1-3	X	N/A
"Unpacking Your System" on page 1-4	X	X
"Installing the Hardware" on page 1-5	X	N/A
"Installing the Agilent I/O Libraries" on page 1-13	X	N/A
"Configuring the Agilent I/O Libraries" on page 1-14	X	N/A
"Installing the PC Digitizer Software" on page 1-17	X	N/A
"Installing the Measurement Software" on page 1-19	X	N/A
"Locating Documents that Support the E5500" on page 1-20	X	X
"Using the Asset Manager to Configure your System" on page 1-21	X	N/A
"Entering the License Key for the Phase Noise Test Set" on page 1-32	X	N/A
"Starting the Measurement Software" on page 1-35	X	X
"Using Server Hardware Connections to Specify Assets for the Confidence Test" on page 1-37	X	X
"Running the Software Confidence Test" on page 1-39	X	X

System Requirements

The setup program in the E5500 Phase Noise Measurement Software makes installation easy. In case you want a quick review of the system requirements, we have listed them first.

The system requirements for the phase noise measurement software include items in the following list and the connectors and adapters shown in Table 1-2:

- Pentium II® microprocessor or greater (100 MHz or greater)
- Minimum of 128 megabytes (MB) of memory (RAM)
- 10 gigabyte (GB) hard disk
- Super Video Graphics Array (SVGA)
- 2 additional slots available for the phase noise system hardware.

  1 ISA slot for PC Digitizer

  1 PCI slot for GPIB Interface Card
- Microsoft® Windows® 2000
- Agilent 82350A GPIB Interface Card)

Table 1-2 Connectors and Adapters

Part Number	Description	Agilent 70420A	Agilent 70420A Option 001	Agilent 70420A Option 201	Agilent 70422A
1250-0207	BNC, 50 ohm Termination	1	1	1	
1250-0780	Adapter, N(m) - BMC(f)	3	2	3	1
1250-1250	Adapter, N(m) - SMA(f)		1		2
1250-2015	Adapter, SMA(f) - BNC(m)				1
5061-5311	Adapter/Saver, 3.5mm(f) - 3.5mm(f)		2	2	
1250-1200	Adapter, SMA(m) - BNC(f)		2		

Unpacking Your System

1 Unpack and inspect the shipping container and its contents thoroughly to ensure that nothing was damaged during shipment.

NOTE: If the container or packing material is damaged, the contents should be checked both mechanically and electrically. If the contents are damaged or defective, contact your nearest Agilent Technologies Sales and Service office. Keep the shipping materials for the carrier's inspection.

---

2 Verify that all parts and materials were included in the shipping container:

- E5500 Phase Noise Measurement System CD-ROM
- E5500 Software Keyword Licence Certificate
- E5500B Installation Guide (part no. E5500-90022)
- E5500A/B User's Guide (part no. E5500-90024)
- 9300-1408 Disposable Grounding Strap (Option 1FF)
- 5957-4369 Electrostatic Discharge (ESD) Warning Pamphlet
- PC Digitizer Card (Option 1FF)

Installing the Hardware

NOTE: If you have ordered a preconfigured phase noise system from Agilent Technologies, skip this step and proceed to "Starting the Measurement Software" on page 1-35.

CAUTION: Refer to your computer's documentation for installation safety instructions and specific instructions for opening your computer.

Preparing for Installation

1 Power down the computer and all its peripherals.

2 Disconnect the power cord from the computer.

3 Remove the cover from the computer. This gives access to the I/O slots. See the computer documentation for detailed instructions.

Accessing Your Computer's Expansion Slots

1 Look for suitable expansion slots for both the GPIB and PC Digitizer cards and remove the back panel's cover plates. Choose slots that give good access to the GPIB and PC Digitizer connectors.

Figure 1-1 shows a view of the expansion slots vertically mounted; your computer's expansion slots may be horizontally mounted, but the process is the same

.

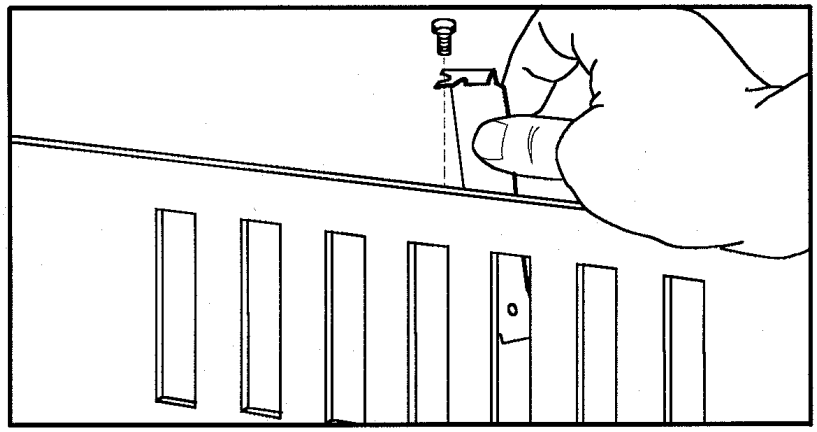


Figure 1-1 Vertically-mounted Expansion Slots

Taking ESD Precautions

CAUTION: To prevent possible ESD damage, you must be properly grounded with a grounding wrist strap before touching the PC Digitizer or GPIB (customer supplied) Interface Cards. While inserting the cards, be sure to hold the cards by their edges.

1 Using the disposable grounding strap, supplied with the PC Digitizer interface card, unwrap the first two folds of the wrist strap and wrap the exposed adhesive side firmly around your wrist.

CAUTION: Wear this grounding wrist strap before unpacking or touching the PC Digitizer or GPIB interface cards; it is provided for control of static electricity. Failure to use the grounding wrist strap properly can result in damage to electronic devices and assemblies.

2 Unroll the rest of the wrist strap and peel the liner from the copper foil at the opposite end.

3 Attach the copper foil to a convenient and exposed electrical ground somewhere on the computer's chassis. This should be an unpainted surface of the computer cabinet.

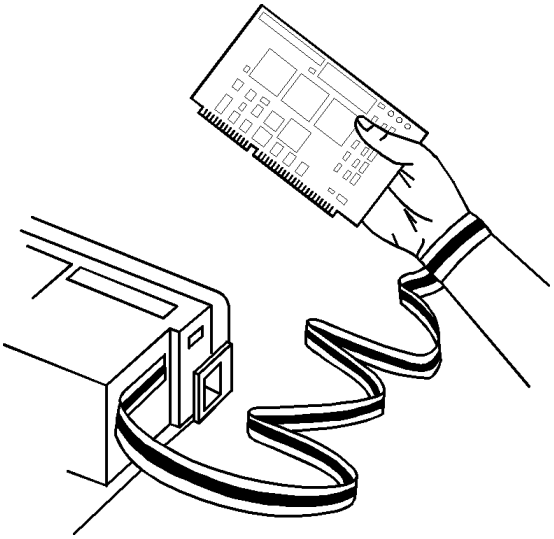


Figure 1-2 Use Grounding Straps Before Handling Cards

Installing the GPIB Interface Card

4 Insert the GPIB interface edge connector into the expansion slot connector of the computer. Make sure the interface is fully seated by pushing firmly on the edge of the card with the palm of your hand. The GPIB connector should extend through the back panel opening to allow cable installation.

NOTE: You may need a GPIB connector extender to provide adequate clearance between the GPIB cable and the computer chassis.

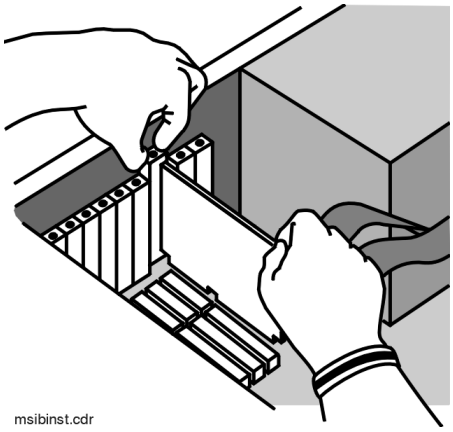


Figure 1-3 Inserting GPIB Card

5 Replace the GPIB back-panel cover plate screw to hold the interface in place. (Save the blank cover plate for use if the interface is removed later.)

Installing the PC Digitizer Card

1 Verify the jumper and DIP switch settings shown in Figure 1-4 prior to installing the PC Digitizer card.

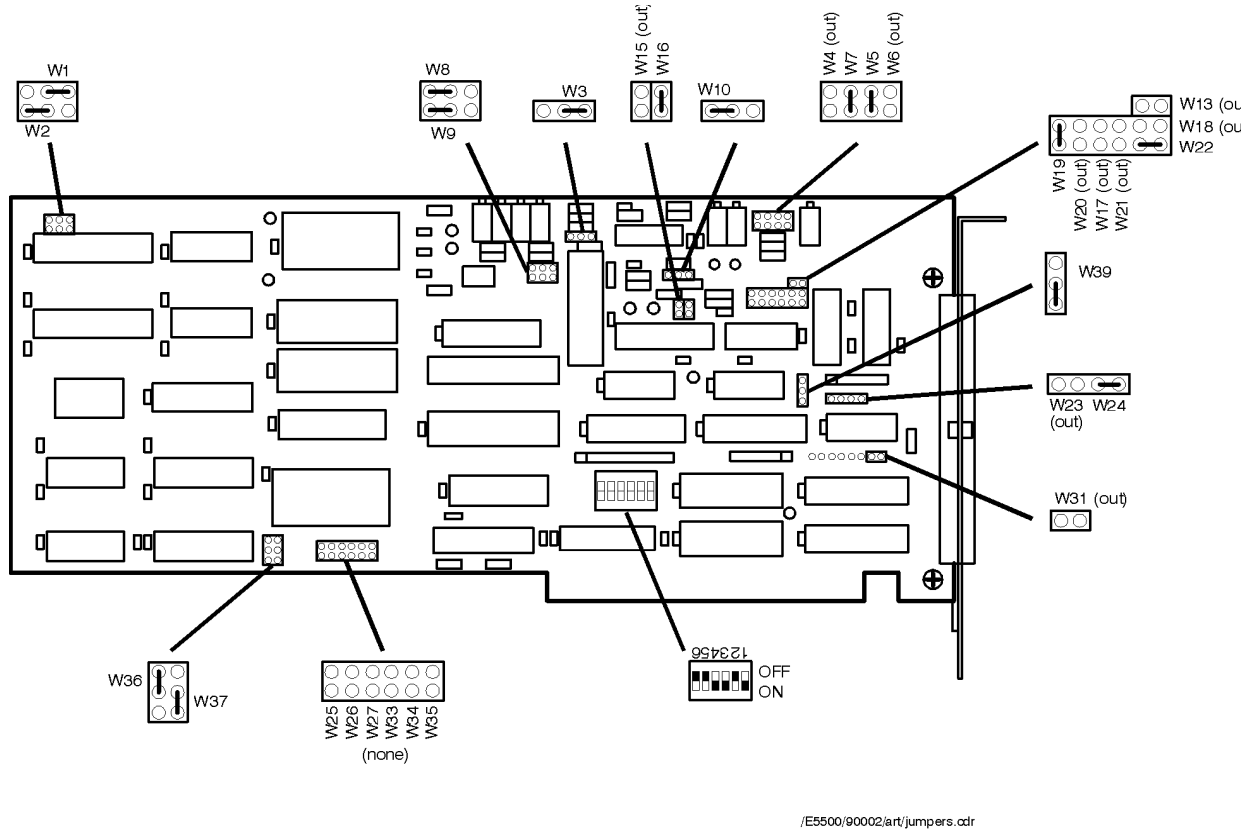


Figure 1-4 Jumper and DIP Switch Settings on the PC Digitizer Card

2 Insert the PC Digitizer card edge connector into the expansion slot connector of the computer. Make sure the card is fully seated by pushing firmly on the edge of the card with the palm of your hand.

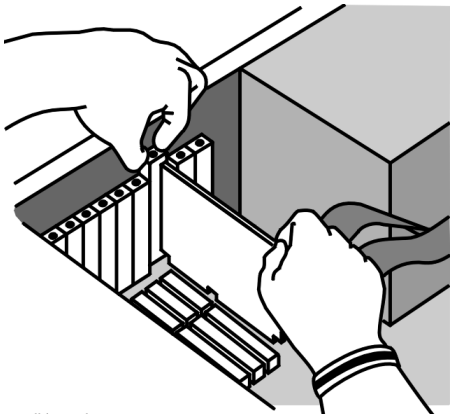


Figure 1-5 Inserting PC Digitizer Card

3 Replace the PC Digitizer back-panel cover plate screw to hold the card in place.

4 Replace the computer's cover as described in you computer's documentation.

5 Connect the Digitizer Adapter (Figure 1-6) to the back of the PC Digitizer card.

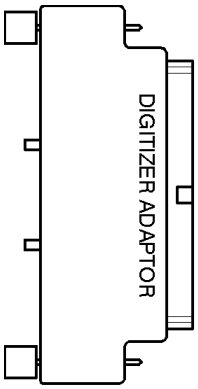


Figure 1-6 Digitizer Adapter

Making System Connections

1 Connect the following cables between the PC Digitizer card and the Agilent 70420A Test Set:

- SMB (f) to BNC (m) cable between the PC Digitizer card adapter's input connector and the Agilent 70420A Test Set's front-panel <100 kHz output connector.

- SMB (f) to BNC (m) cable between the PC Digitizer card adapter's output connector and the Agilent 70420A Test Set's rear-panel Noise Source Input connector.

2 Refer to Figure 1-7 and Figure 1-8 for examples of system interconnections:

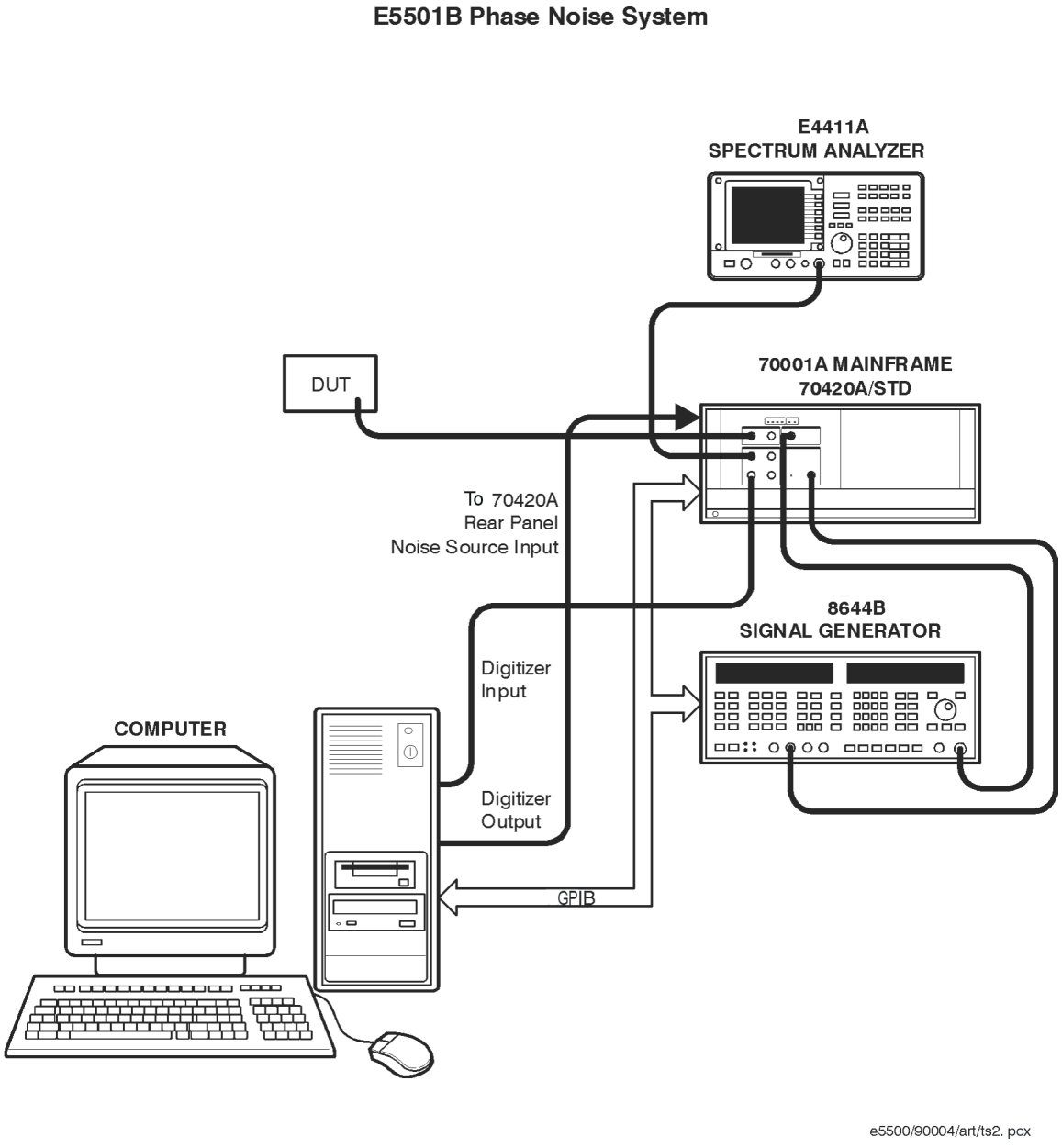


Figure 1-7 E5501B Connect Diagram Example

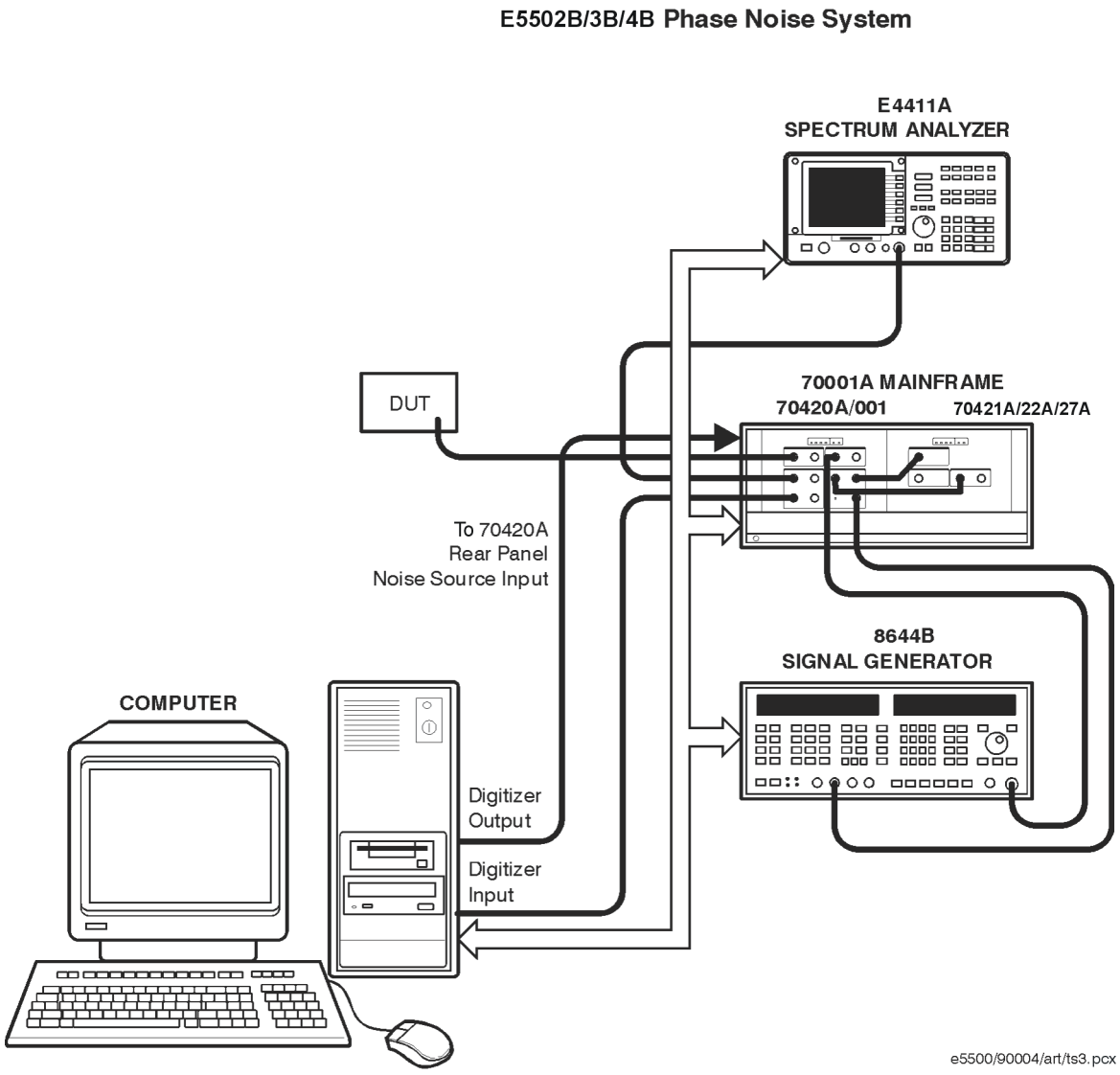


Figure 1-8 E5502B/3B/4B Connect Diagram Example

Installing the Agilent I/O Libraries

NOTE: If you have ordered a preconfigured phase noise system from Agilent Technologies, skip this step and proceed to "Starting the Measurement Software" on page 1-35.

NOTE: If you must re-install the Agilent I/O Libraries at a later date, you must also re-install the E5500 Measurement Software **after** the I/O Library installation.

1. Make sure your computer and monitor are turned on.
2. Place the E5500 Phase Noise Measurement Software CD-ROM in the CD-ROM drive.
3. Double-click on **Agilent_IO_libs**, then on **setup.exe**. Follow the instructions in **setup.exe**, accepting the default settings.Do **not** restart your computer at this time.
4. Restart your computer at this time.

Configuring the Agilent I/O Libraries

1 Make sure your computer and monitor are turned on.

2 Referring to Figure 1-9, navigate to the **I/O Config**.

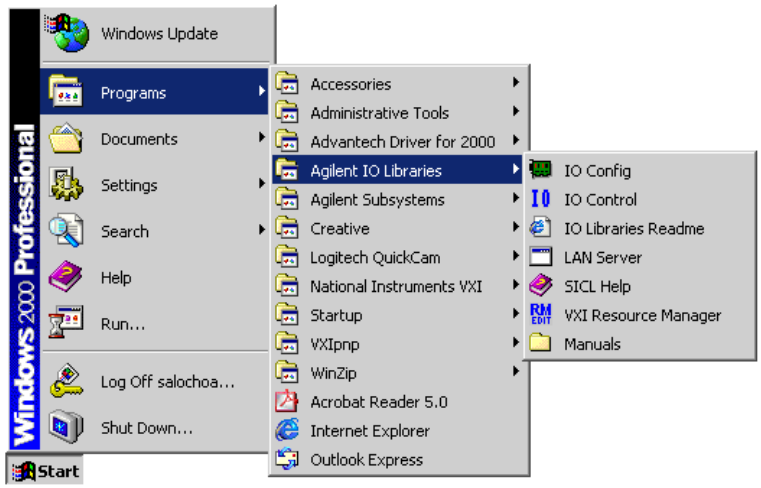


Figure 1-9 Navigate to I/O Config

3 Double click on **I/O Config**.

4 When the **I/O Config** screen appears, select **Auto Config**. This action adds all configured interfaces. See Figure 1-10.

5 When **Auto Config** completes, select GPIB0 in the **Configured Interfaces** field. Then press **Edit** at the bottom of the field. See Figure 1-10. The **82350 PCI GPIB Card Configuration** dialog appears.

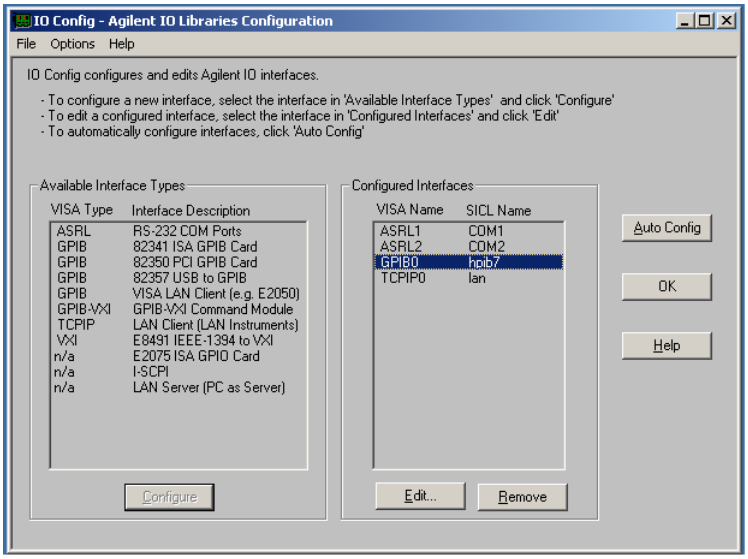


Figure 1-10 I/O Config Screen

6 At the bottom of the **82350 PCI GPIB Card Configuration** dialog, press **Edit VISA Config...**. See Figure 1-11. The **Show Devices** dialog appears.

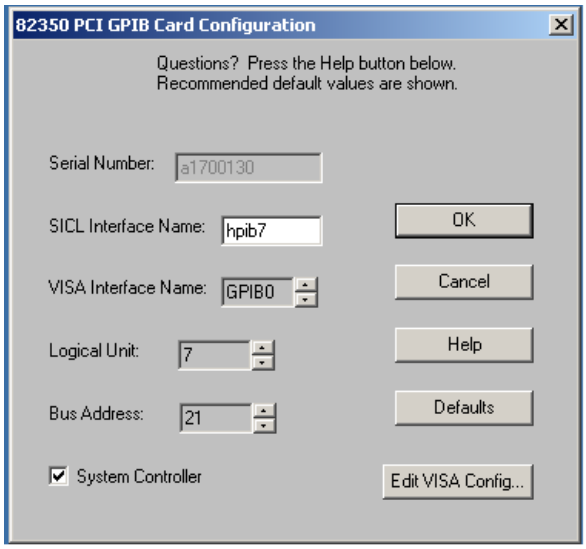


Figure 1-11 Bring up Show Devices Dialog

7 In the **Show Devices** dialog, click **Auto Add devices.** See Figure 1-12.

Figure 1-12 Make Selections in Show Devices

8 Also in the **Show Devices** dialog, deselect **Identify devices at run-time**. See Figure 1-12.

9 Press OK on each dialog until you have exited the I/O Config program.

10 Restart your computer at this time.

Installing the PC Digitizer Software

NOTE: If you have ordered a preconfigured phase noise system from Agilent Technologies, skip this step and proceed to "Starting the Measurement Software" on page 1-35.

1. Make sure your computer and monitor are turned on.
2. Place the E5500 Phase Noise Measurement Software CD-ROM in the CD-ROM drive.
3. Double-click on **PC_Digitizer**, then on **Setup.exe. See** Figure 1-13**.** Follow the instructions in **Setup.exe**, accepting the default settings**.**

NOTE: If you receive the following Warning/Error messages during setup, disregard them, and allow the **setup.exe** to complete the installation process.

- Error: String variable is not large enough for string, check the string declarations. Error 401.
- CreateService Error: mastr_nt could not be installed. Error 997.

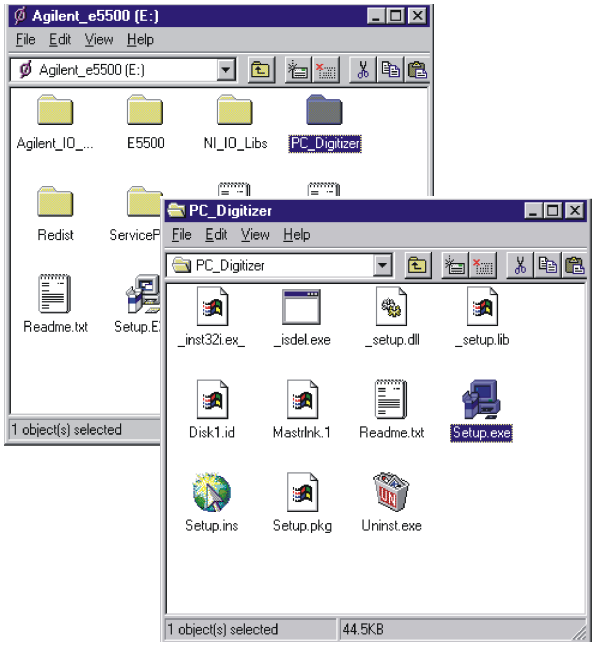


Figure 1-13 Navigate to Setup.exe

NOTE: Do **not** restart your computer at this time.

Installing the Measurement Software

NOTE: If you have ordered a preconfigured phase noise system from Agilent Technologies, skip this step and proceed to "Starting the Measurement Software" on page 1-35.

1 Make sure your computer and monitor are turned on.

2 Place the E5500 Phase Noise Measurement Software CD-ROM in the CD-ROM drive. The dialog box shown in Figure 1-14 appears.

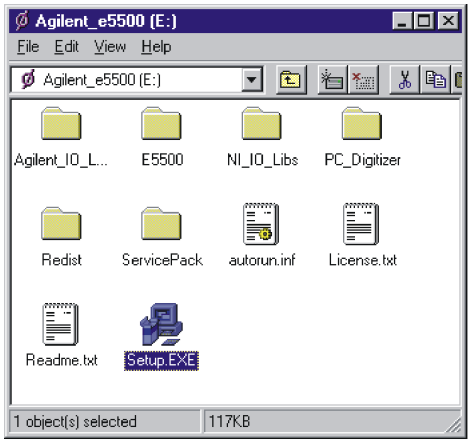


Figure 1-14 Contents of E5500 Phase Noise Measurement Software CD-ROM

3 Double click on **Setup.exe**. Follow the instructions in **Setup.exe**, accepting the default settings.

4 Restart your computer at this time.

Locating Documents that Support the E5500

1. Make sure your computer and monitor are turned on.
2. Place the E5500 Phase Noise Measurement Software CD-ROM in the CD-ROM drive.
3. Referring to Figure 1-15, navigate to Documents. You can view all documents that support the E5500 on-line using Adobe Acrobat Reader® (supplied).

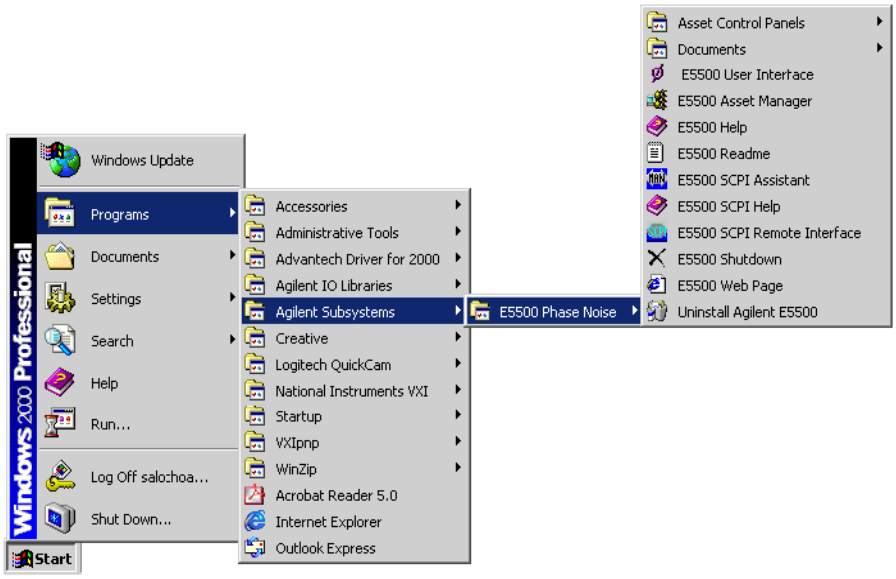


Figure 1-15 Navigate to Documents

Using the Asset Manager to Configure your System

NOTE: If you have ordered a preconfigured phase noise system from Agilent Technologies, skip this step and proceed to "Starting the Measurement Software" on page 1-35.

1 Make sure your computer and monitor are turned on.

2 Place the E5500 Phase Noise Measurement Software CD-ROM in the CD-ROM drive.

3 Referring to Figure 1-16, navigate to the **E5500 Asset Manager**.

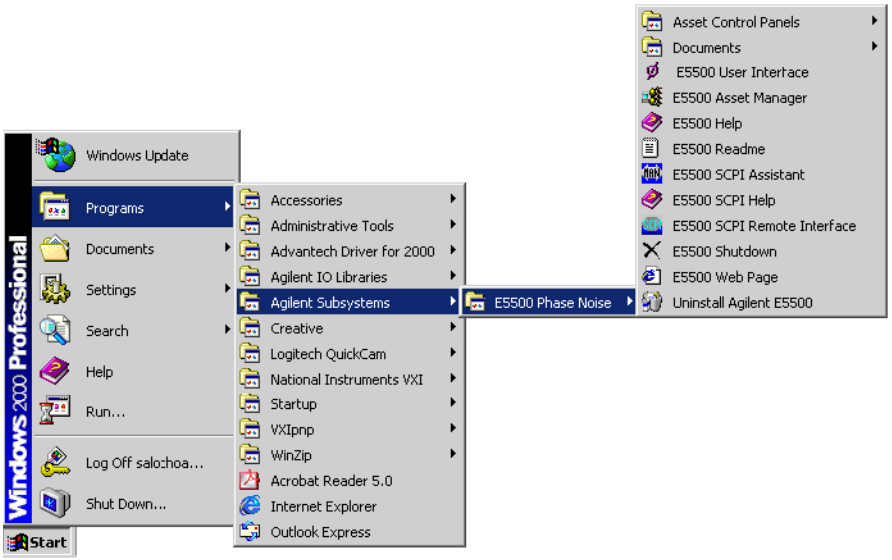


Figure 1-16 Navigate to Asset Manager

4 To place the Asset Manager in non-demo mode, either deselect the DM icon in the tool bar, or deselect **Demo Mode** from the **Options** menu. See Figure 1-17.

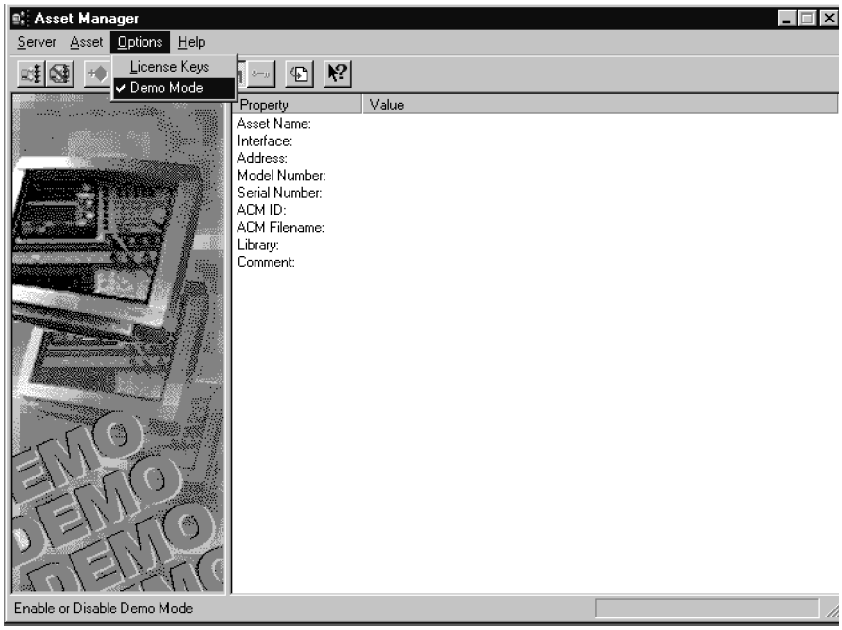


Figure 1-17 Deselect Demo Mode

5 Click **OK.** The Asset Manager can be invoked from within the phase noise measurement software. If Asset Manager is invoked from within the software, restart the software for any Asset Manager changes to take effect.

Configuring the Agilent 70420A Test Set

1 To configure the Agilent 70420A Phase Noise Test Set using the Asset Manager Asset Wizard, select the **Asset Wizard** button from **Auto Asset Wizard**. See Figure 1-18.

Figure 1-18 Start Asset Wizard

2 From the **Asset Type** pull-down list, select **Test Set,** then click the **Next** button. See Figure 1-19.

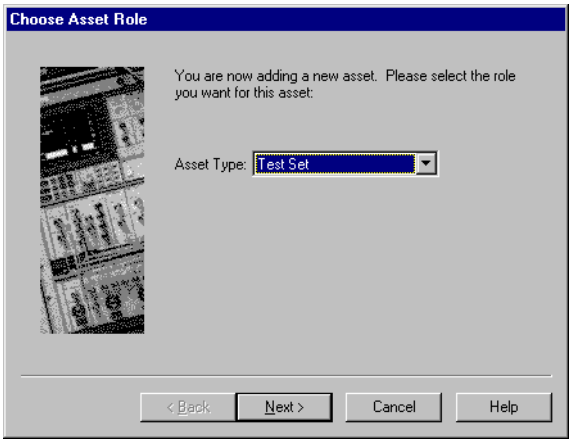


Figure 1-19 Choose Asset Type

3 In the **Choose Supporting ACM** box, click on the **Agilent 70420A, then** select **Next**.

4 In the Select Interface and Address box (Figure 1-20):

a Select **GPIBO** From the **Interface** pull-down list.

b Type 20, the default address for the Agilent 70420A Phase Noise Test Set, in the **Address** field**.** Table 1-3 shows Agilent-used default device addresses.

c Use the default in the **Library** pull-down list. The Library does not apply to this example. It applies specifically to either the Agilent Technologies GPIB or the National GPIB interface cards.

5 Select **Next**.

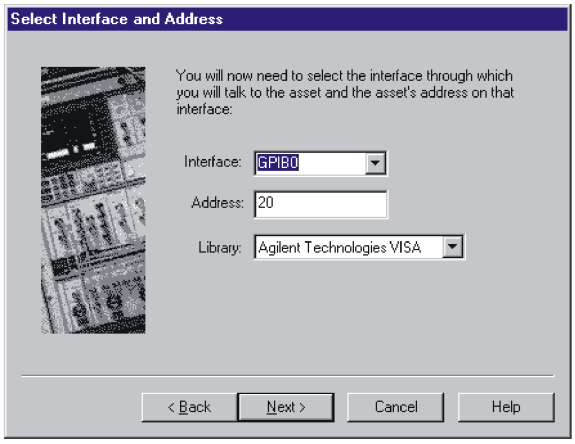


Figure 1-20 Choose the Interface and Address for the Agilent 70420A

Table 1-3 Agilent-used Default Device Addresses

Instrument	Address
Agilent 70420A Test Set	20
Agilent 70421A Downconverter	28
Agilent 70422A Downconverter	28
Agilent 70427A Downconverter	28
RF Analyzer	17
FFT Analyzer	18
Source # 1	19
Source # 2	23
Counter	3
Agilent E1430 VXI Digitizer	129
Agilent E1437 VXI Digitizer	192
Agilent E1420B VXI Counter	48
Agilent E1441 VXI Arb	80

CAUTION: If an address is a single digit address, for example (3), do not add a leading zero (03) to the address. The phase noise software treats these (3 and 03) as different addresses.

6 In the **Set Model & Serial Numbers** box (Figure 1-21):

a Type Agilent 70420A in the Asset Name field**.**

b Type the serial number for your Agilent 70420A test set in the **Serial Number (optional)** field.

7 Select **Next**.

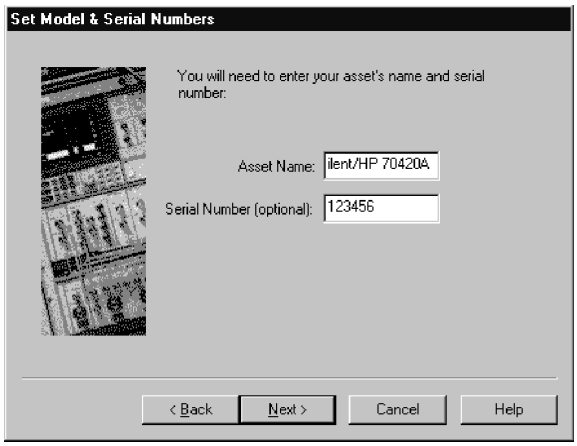


Figure 1-21 Choose Model and Serial Number

8 You may type a comment in the **Enter a Comment** box (Figure 1-22). The comment associates itself with the asset you have just configured.

Figure 1-22 Enter a Comment About the Configured Asset

9 Select **Finish**. The Asset Manager window appears. See Figure 1-23.

The left pane shows either the demo mode, or in this case, a list of assets or asset roles. An asset is any piece of hardware (Agilent 70420A) that you want configured for system use. An asset role is the general category for hardware (test sets, downconverters, counters, for example). The right pane is information only. The information can be changed by double-clicking a specific asset.

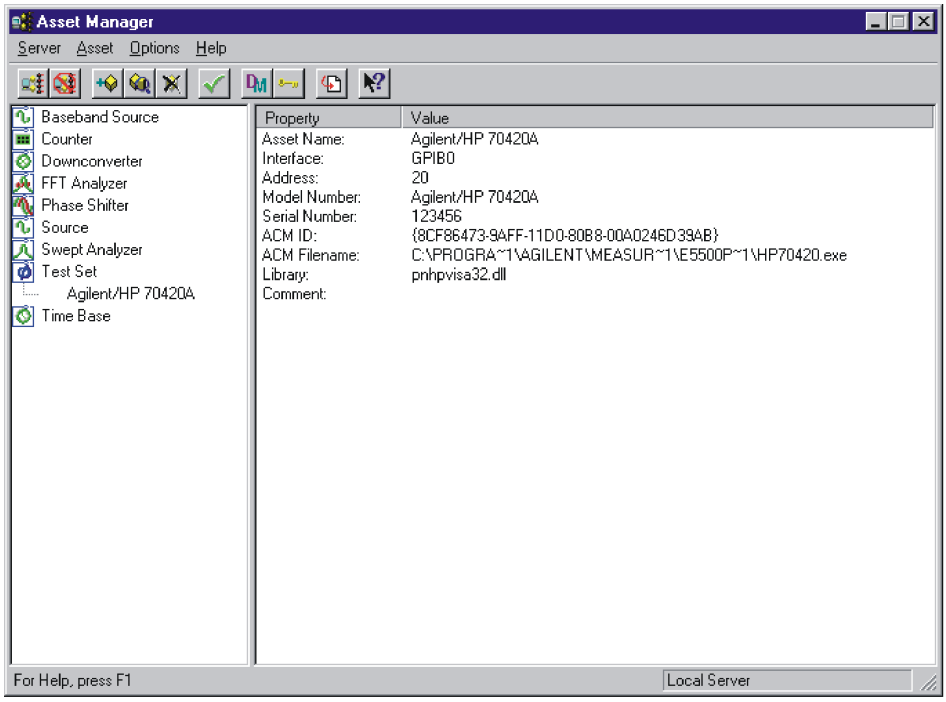


Figure 1-23 Asset Manager Main Screen Showing Configured Agilent 70420A Test Set

You have just used the Asset Manager to configure the Agilent 70420A test set. The process for configuring any asset is essentially the same.

Both the test set and PC Digitizer are required to perform the confidence test at the end of this chapter.

Configuring the PC Digitizer

This procedure shows how to configure the PC Digitizer using Asset Manager Wizard from within the Asset Manager. This is the most common way to add assets

1 From Asset Manager click **Asset,** then click **Add.** See Figure 1-24.

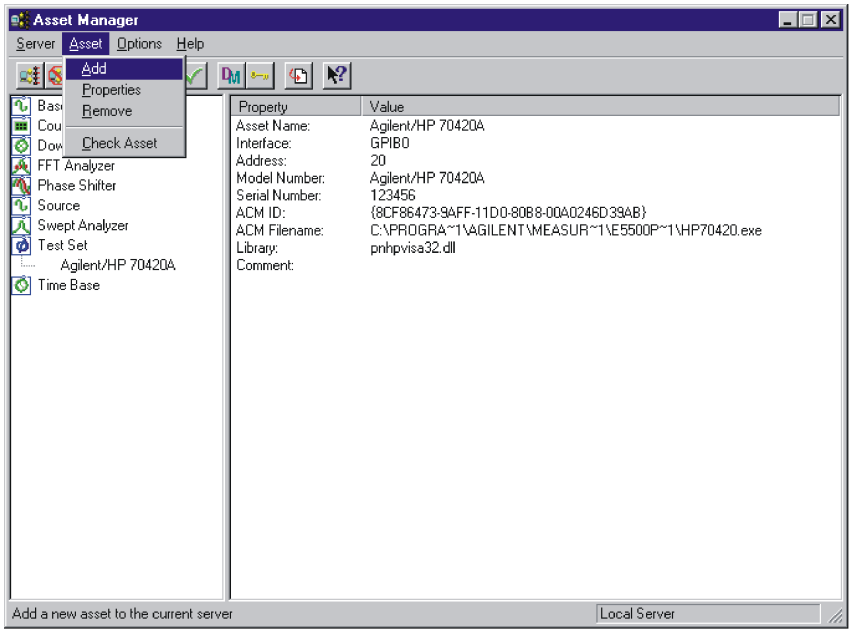


Figure 1-24 Add Assets

2 From the **Asset Type** pull-down list (Figure 1-25), select **FFT Analyzer,** then select **Next**.

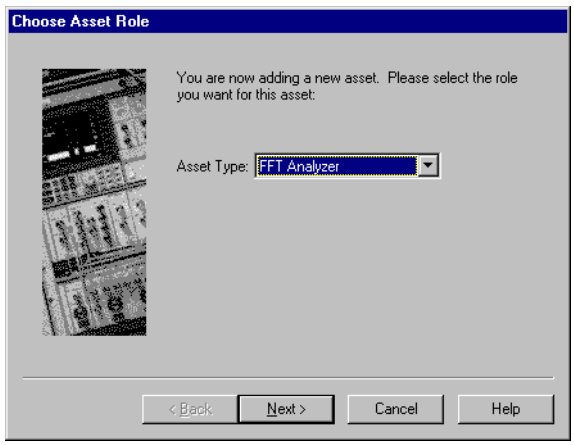


Figure 1-25 Choose Asset Type

3 In the **Choose Supporting ACM** dialog, click on **II PCI20428W-1,** then click the **Next** button. See Figure 1-26.

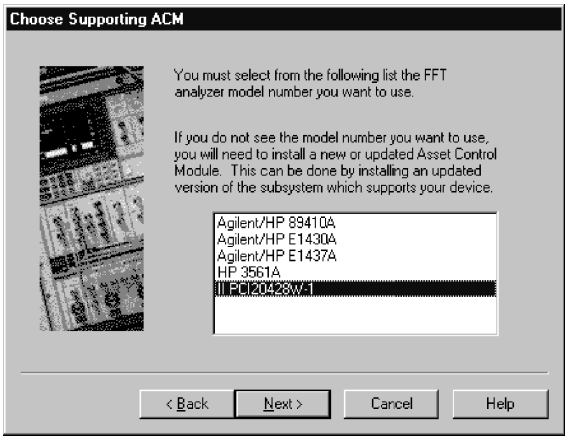


Figure 1-26 Select Supporting ACM

4 In the **Select Interface and Address** dialog:

a Select **PCI** From the **Interface** pull-down list.

b Type 320, the default address for the II20428 PC Digitizer, in the **Address** box. Table 1-4 shows Agilent-used default device addresses.

c The **Library** pull-down list does not apply to this example. It applies specifically to either the Agilent GPIB or the National GPIB interface cards.

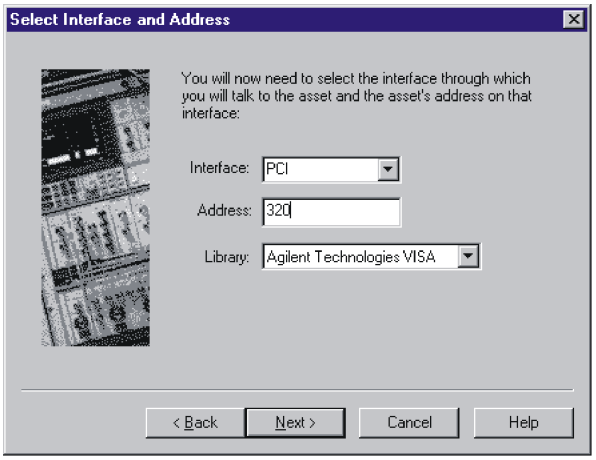


Figure 1-27 Choose the Interface and Address for the PC Digitizer

Table 1-4 Agilent-used Default Device Addresses

Instrument	Address
Agilent 70420A Test Set	20
Agilent 70422A Downconverter	28
PC Digitizer	320
RF Analyzer	18
Source	19
Counter	3

CAUTION: If an address is a single digit address, for example (3), do not add a leading zero (03) to the address. The phase noise software treats these (3 and 03) as different addresses.

5 Select **Next**.

6 In the **Set Model & Serial Numbers** box (Figure 1-28):

   a Type **II PCI20428W-1** in the **Asset Name** box.

   b Type the serial number for your PC Digitizer in the **Serial Number (optional)** box.

7 Select **Next**.

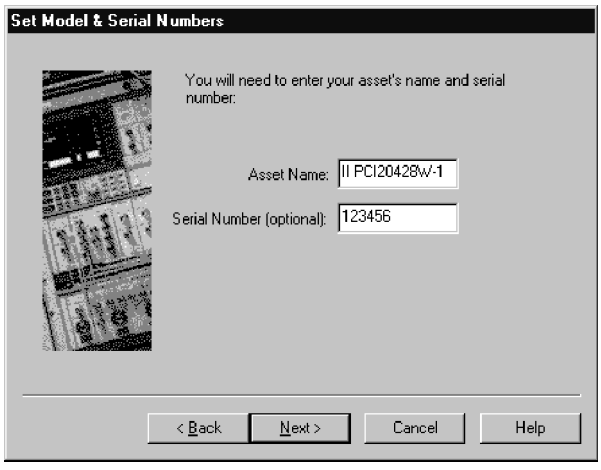


Figure 1-28 Choose Model and Serial Number

8 From the **Baseband Source** pull-down list in the **Select FFT Analyzer Options** box, select (**internal)**. See Figure 1-29. This designates the noise source on the PC Digitizer board as the noise source to be used for loop suppression verification.

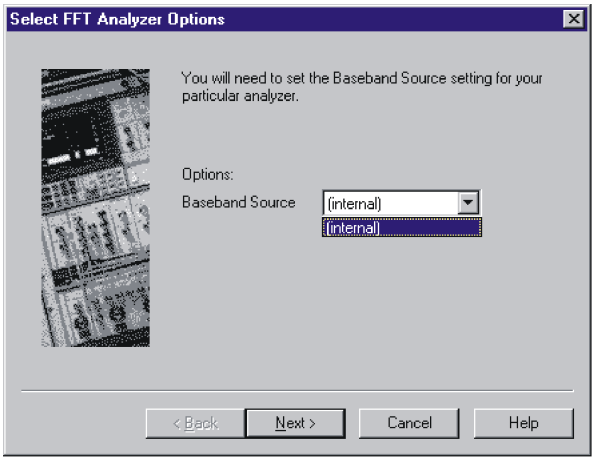


Figure 1-29 Select **(internal)** in Baseboard Source

9 Click the **Next** button.

10 You can type a comment in the **Enter a Comment** box (Figure 1-30). The comment associates itself with the asset you have just configured.

Figure 1-30 Enter a Comment About the Configured Asset

11 Click the **Finish** button. The Asset manager window appears. See Figure 1-31.

You have just used the Asset Manager to configure the PC Digitizer. The process you have used to configure both the Agilent 70420A and PC Digitizer is the same process you will use to add software controlled assets to the phase noise measurement software.

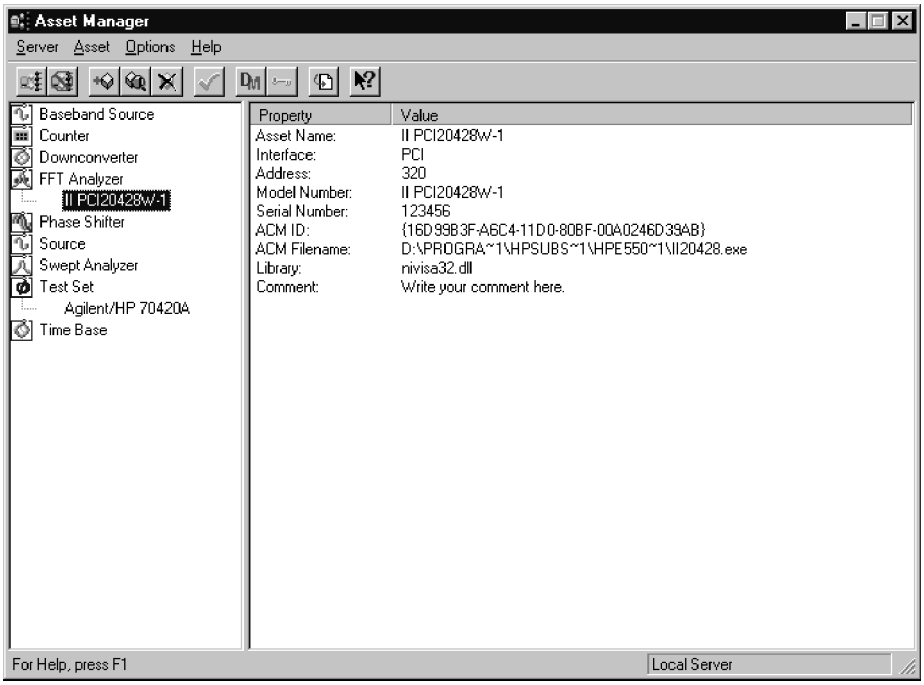


Figure 1-31 Asset Manager Screen Showing Configured PC Digitizer

Configuring the Agilent E4411A/B (ESA-L1500A) Swept Analyzer

1. To configure the Agilent E4411A/B Swept Analyzer, follow the same steps you used to configure the Agilent 70420A Test Set (refer to "Configuring the Agilent 70420A Test Set" on page 1-23).
2. In the Select Interface and Address box, use 8, the default GPIB address for the Agilent E4411A/B. Refer to Table 1-4.
3. Click **Server,** then click **Exit** to exit the Asset Manager.

Entering the License Key for the Phase Noise Test Set

Use this procedure to enter your keyword for your Agilent 70420A Phase Noise Test Set.

NOTE: If you have ordered a preconfigured phase noise system from Agilent Technologies, skip this step and proceed to "Starting the Measurement Software" on page 1-35.

---

1 Make sure your computer and monitor are turned on.

2 Referring to Table 1-32, navigate to the **E5500 Asset Manager**.

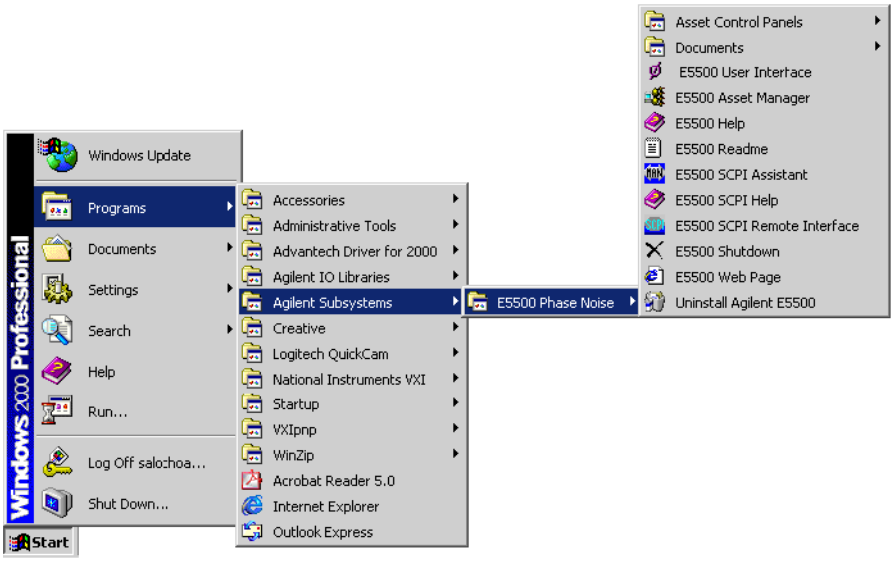


Figure 1-32 Navigate to E5500 Asset Manager

3 Click **Options,** and then click **License Keys** Figure 1-33**.**

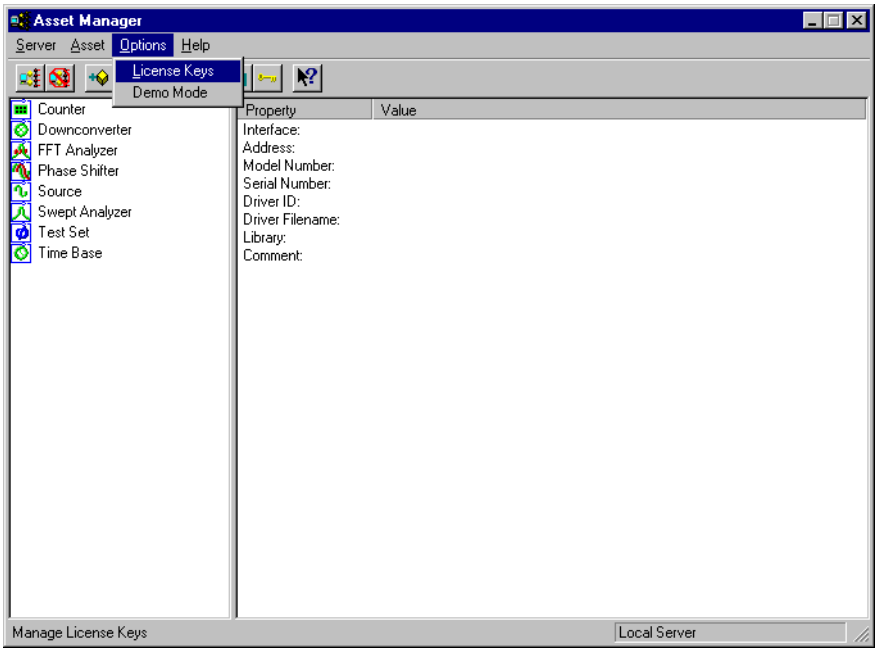


Figure 1-33 Navigate to License Keys

NOTE: The license key for your system is unique and may only be used with a specific Agilent 70420A Test Set serial number. The license key may be found both on your license-key document and in the file “license_key.txt” on the License_key floppy disk provided with your system.

---

4 Enter the license key for your Agilent 70420A Test Set and click the **Set** button. Use **Licence_key.txt** described in the next steps to facilitate entering your license key into the licensing dialog box.

a Insert the E5500 License Key disk in the computer.

b Using Notepad, load **License_key.txt** (Figure 1-34).

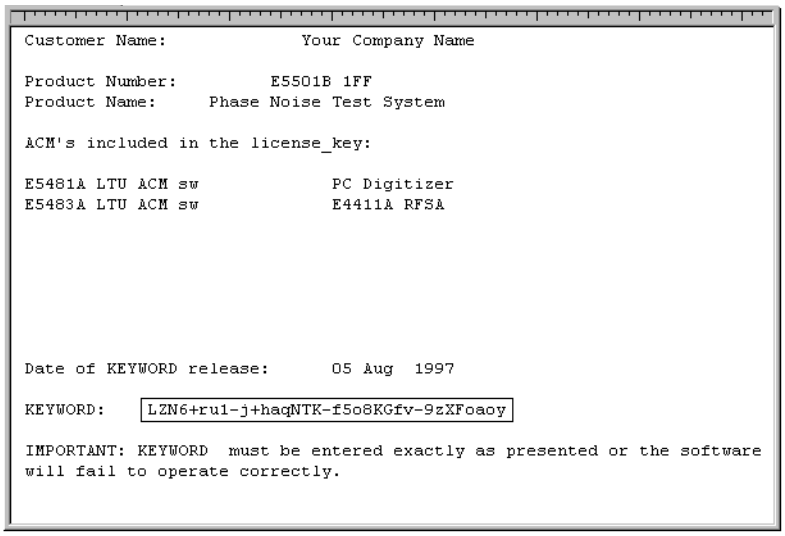


Figure 1-34 License_key.txt

c Highlight the keyword in the License_key.txt file and copy it to the dialog box as shown in Figure 1-35, then click the **Set** button.

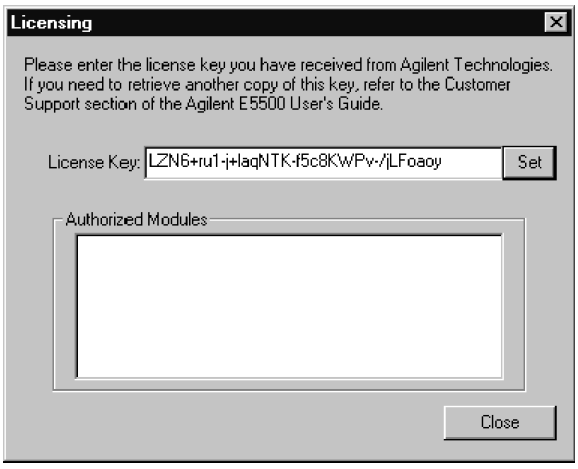


Figure 1-35 Copy Keyword into License Key Field

5 Start the measurement software ("Starting the Measurement Software" on page 1-35).

Starting the Measurement Software

1 Referring to Figure 1-36, navigate to the **E5500 User Interface**.

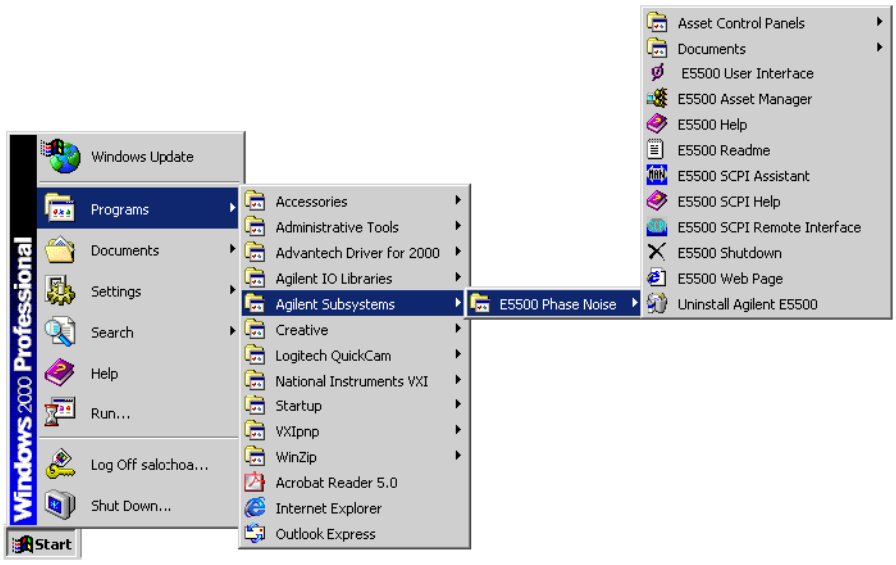


Figure 1-36 Navigate to E5500 User Interface

2 The main measurement subsystem window appears (Figure 1-37).

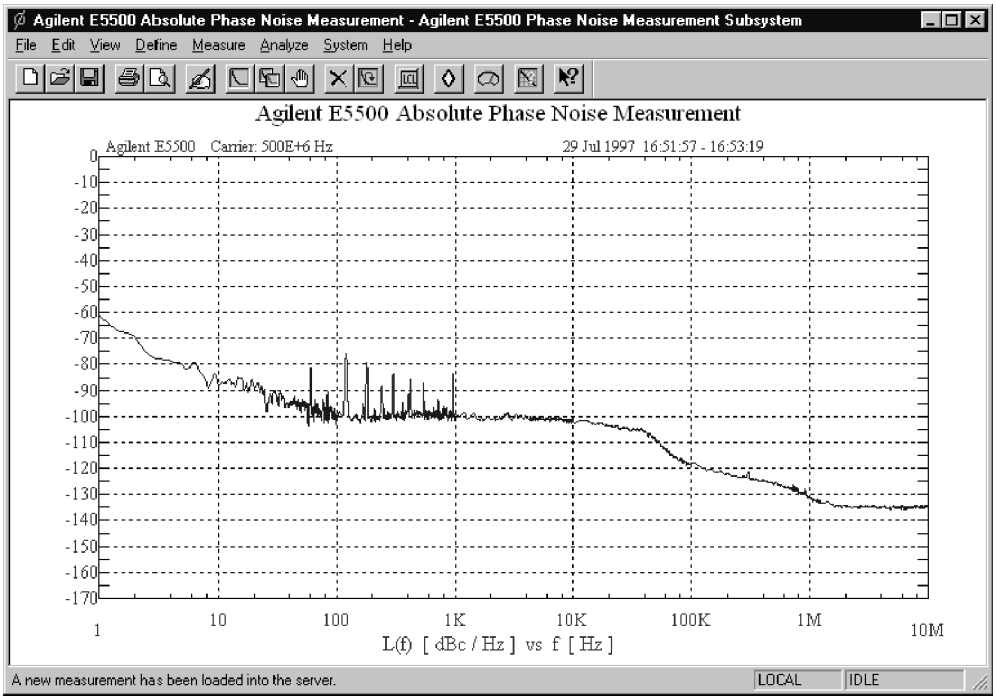


Figure 1-37 Main User Interface Screen

Using Server Hardware Connections to Specify Assets for the Confidence Test

1 From the **System** menu, choose **Server Hardware Connections**. See Figure 1-38.

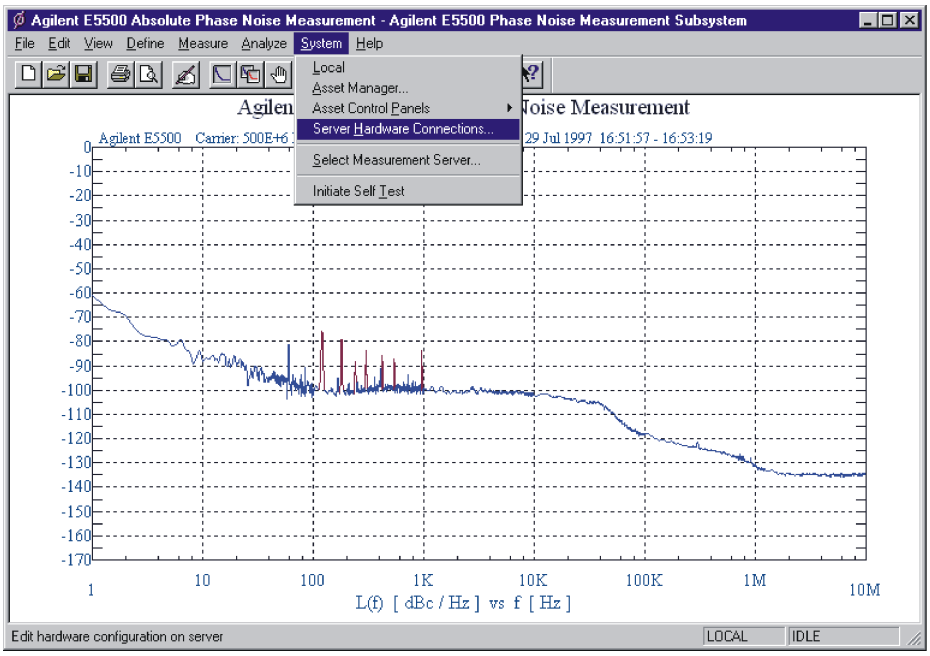


Figure 1-38 Navigate to Server Hardware Connections

2 In the Server Hardware Connections dialog (Figure 1-39):

a Select **Agilent 70420A** from the **Test Set** pull-down list.

b Click the **Check I/O** button. A green check-mark should appear after the I/O check has been performed by the software.

NOTE: If a red circle with a slash appears, return to the Asset Manager (click the **Asset Manager** button) and verify that the Agilent 70420A and PC Digitizer are configured correctly (check that the license key has been entered correctly). Also check your system hardware connections. Click the **Check I/O** button for a re-check.

c From the **FFT Analyzer** pull-down list, select **II PCI20428W-1**. Click the **Check I/O** button. A green check-mark should appear after the I/O check has been performed by the software.

d From the **Swept Analyzer** pull down list select **E4411A**. Click the **Check I/O** button. A green check mark should appear after the I/O is completed.

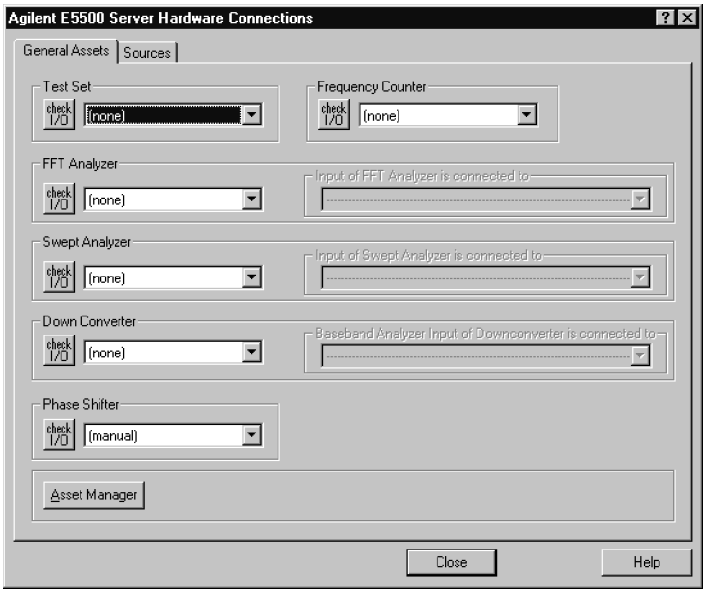


Figure 1-39 Select Test Set, FFT Analyzer, and Swept Analyzer

NOTE: Selecting the three instruments ties those assets to the confidence test performed in the next step.

3 Close the **Server Hardware Connections** box.

Running the Software Confidence Test

This measurement tests the Agilent 70420A Test Set's low-noise amplifier circuitry. The phase detectors are not tested. This measurement also confirm that the PC and test set are communicating with each other.

1 From the **File menu**, choose **Open**.

2. If necessary, choose the drive or directory where the file you want is stored.

3 In the **File Name** box, open **Confidence.pnm**. See Figure 1-40.

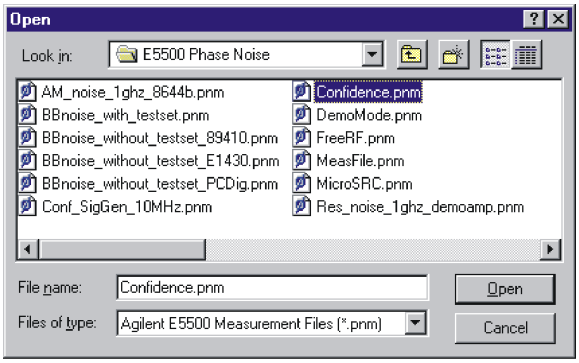


Figure 1-40 Opening the Parameters Definition File

The appropriate measurement definition parameters for this example have been pre-stored in this file. Table 1-4 lists the parameter data that has been entered for the Agilent 70420A Confidence Test example.

Table 1-5 Parameter Data for the Agilent 70420A Confidence Test Example

Step	Parameters	Data
1	**Type and Range Tab**	
	Measurement Type	• Baseband Noise (using a test set)
	• Start Frequency	• 10 Hz
	• Stop Frequency	• 100E + 6 Hz (determined by analyzer used)
	• Minimum Number of Averages	• 4
	FFT Quality	• Fast
	Swept Quality	• Fast
2	**Cal Tab**	
	Gain preceding noise input	0 dB

Table 1-5 Parameter Data for the Agilent 70420A Confidence Test Example

Step	Parameters	Data
3	**Block Diagram Tab**	
	Noise Source	Test Set Noise Input
4	**Test Set Tab**	
	Input Attenuation	• 0 dB
	LNA Low Pass Filter	• 20 MHz (Auto checked)
	• LNA Gain	• Auto Gain (Minimum Auto Gain - 14 dB)
	• DC Block	• Not checked
	• PLL Integrator Attenuation	• 0 dBm
	• Ignore out-of-lock conditions	• Not checked
	• Pulsed Carrier	• Not checked
5	**Graph Tab**	
	• Title	• E5500 Confidence Test
	• Graph Type	• Base band noise (dBV/Hz)
	• X Scale Minimum	• 10 Hz
	• X Scale Maximum	• 100 E + 6 Hz
	• Y Scale Minimum	• 0 dBc/Hz
	• Y Scale Maximum	• - 200 dBc/Hz
	• Normalize trace data to a:	• 1 Hz bandwidth
	• Scale trace data to a new carrier frequency of	• 1 times the current carrier frequency
	• Shift trace data by	• 0 dB
	• Trace Smoothing Amount	• 0
	• Power present at input of DUT	• 0 dBm

Beginning the Measurement

1 From the **Measure** menu, choose **New Measurement.** See Figure 1-41.

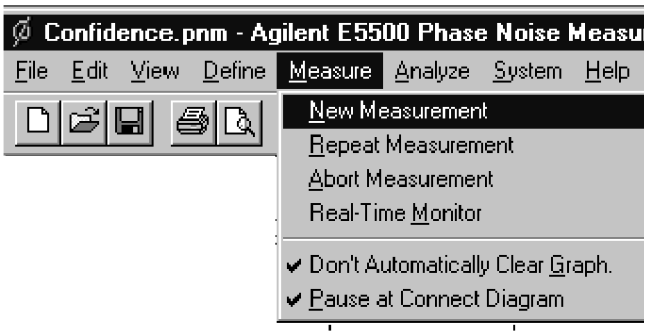


Figure 1-41 Selecting a New Measurement

2 When the **Do you want to perform a New Calibration and Measurement?** prompt appears, click **OK**.

3 When the **Connect Diagram** dialog box appears, connect the 50Ω termination provided with your system to the Agilent 70420A Test Set's Noise Input connector. (See Figure 1-42.)

NOTE: Although the Connect Diagram (Figure 1-42) appears next on your screen, this diagram does not apply to running the confidence test. Use the diagram merely to show where to connect the 50Ω termination to the Agilent 70420A Test Set.

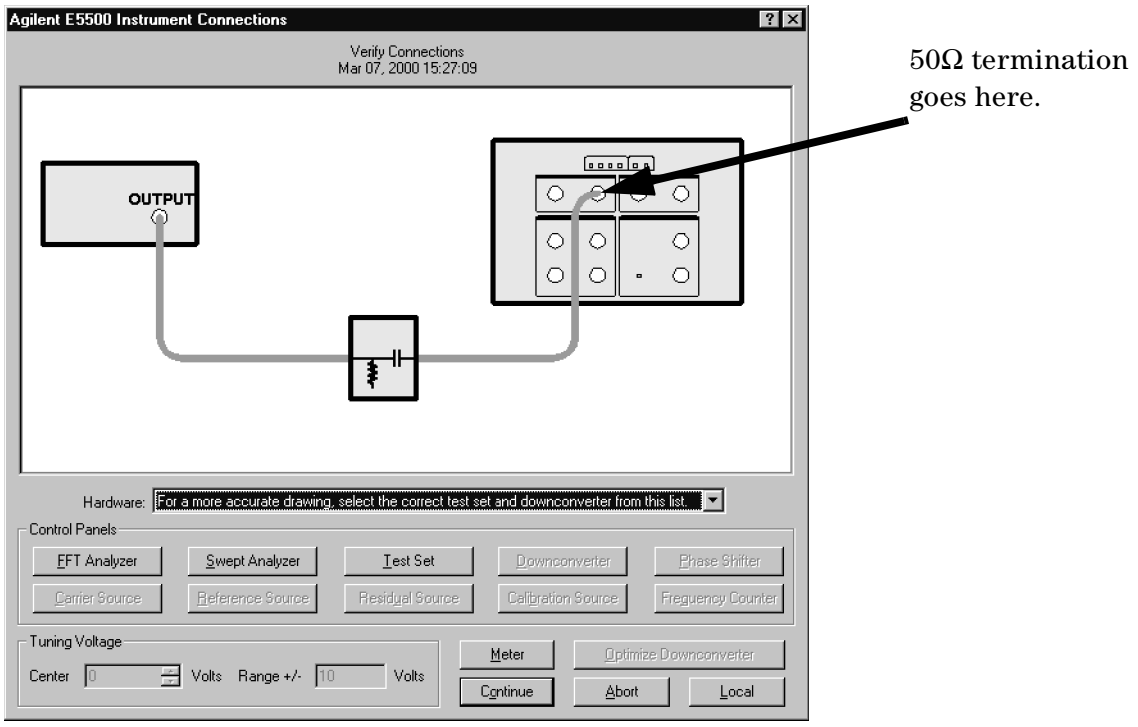


Figure 1-42 System Confidence Test Setup diagram

Making the Measurement

1 Press the **Continue** key. Because you selected New Measurement to begin this measurement, the System starts by running the routines required to calibrate the current measurement setup.

Figure 1-43 shows a typical baseband phase noise plot for an Agilent 70420A Phase Noise Test Set.

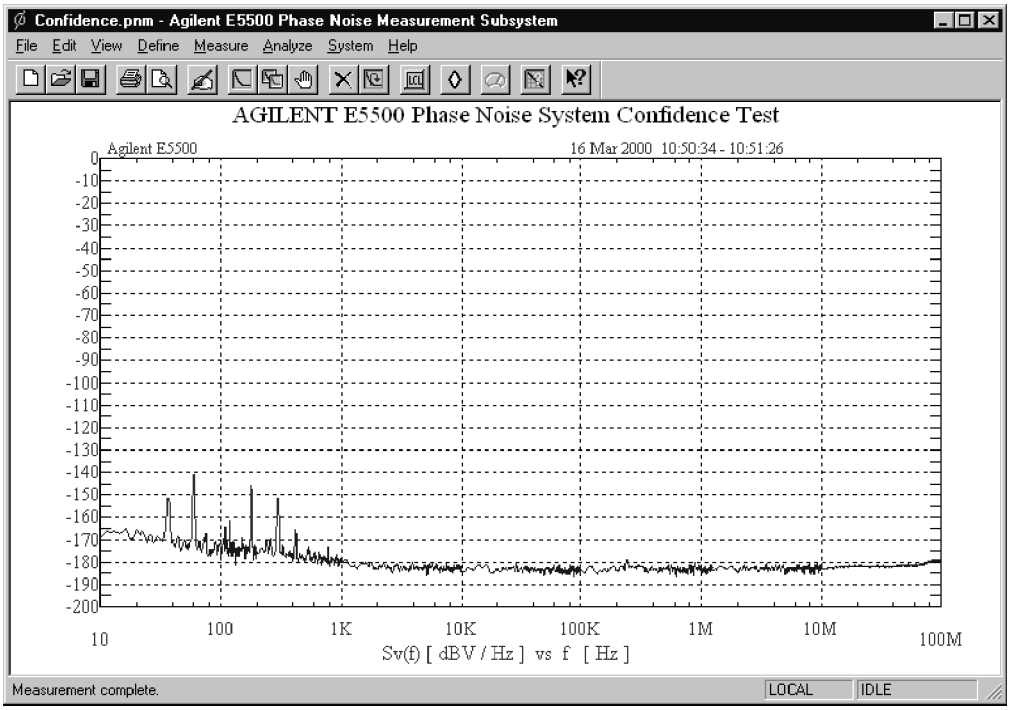


Figure 1-43 Typical Phase Noise Curve for a System Confidence Test

Congratulations

You have completed a phase noise measurement. You will find that this measurement of the Agilent 70420A Phase Noise Test Set's low noise amplifier circuitry provides a convenient way to verify that the System hardware and software are properly configured for making noise measurements.

2

Connect Diagrams

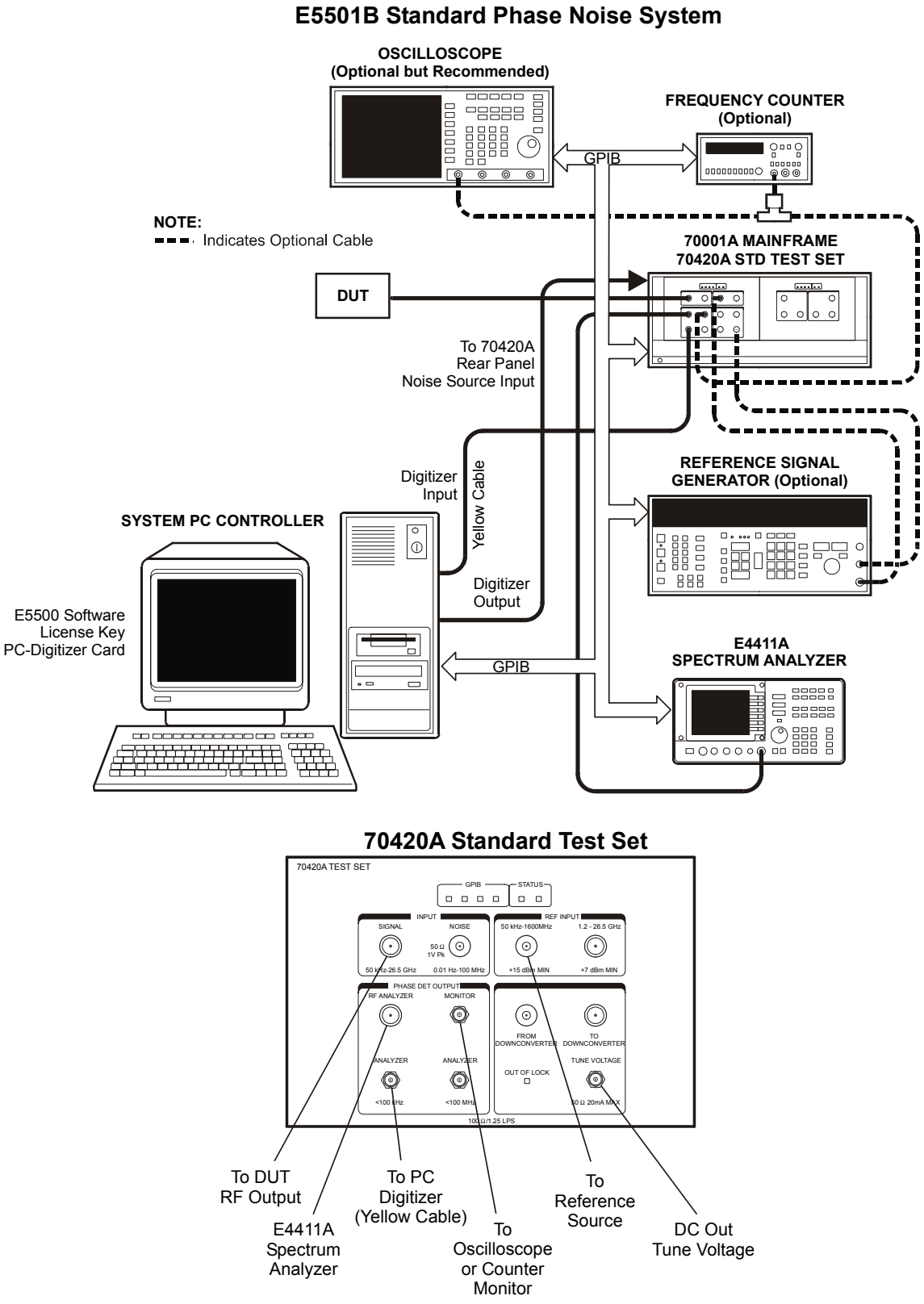


Figure 2-1 E5501B Standard Connect Diagram

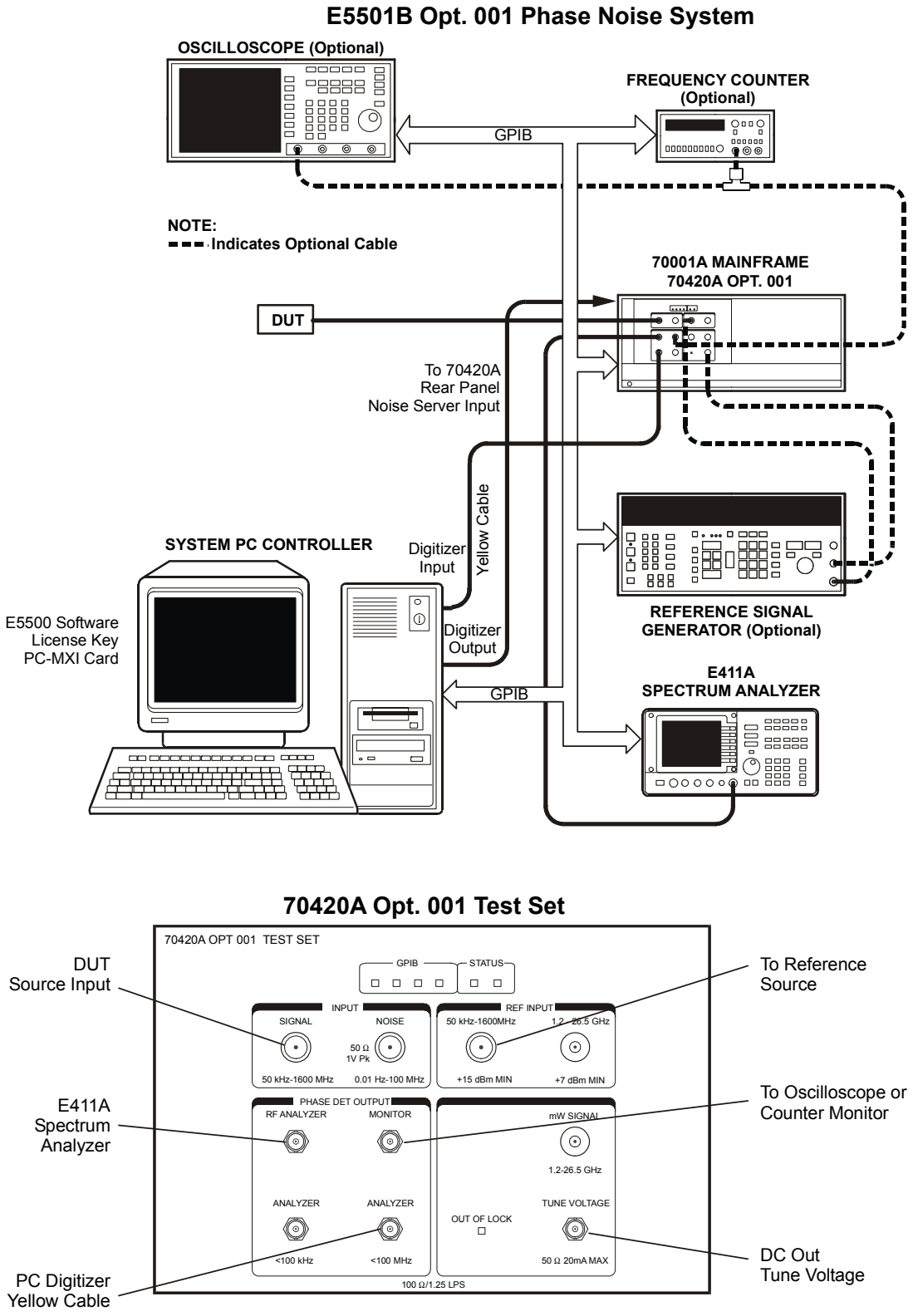


Figure 2-2 E5501B Opt. 001 Connect Diagram

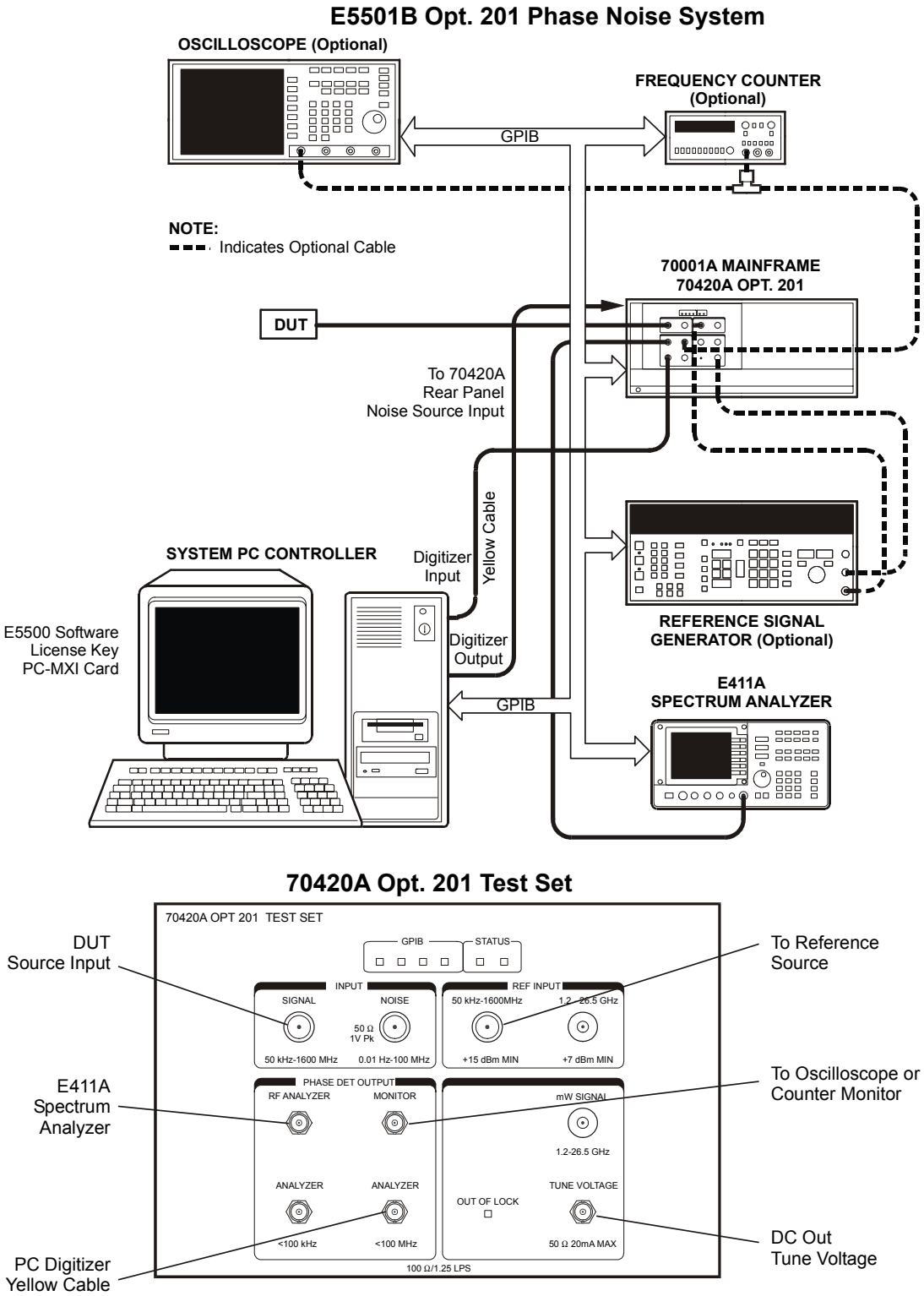


Figure 2-3 E5501B Opt. 201 Connect Diagram

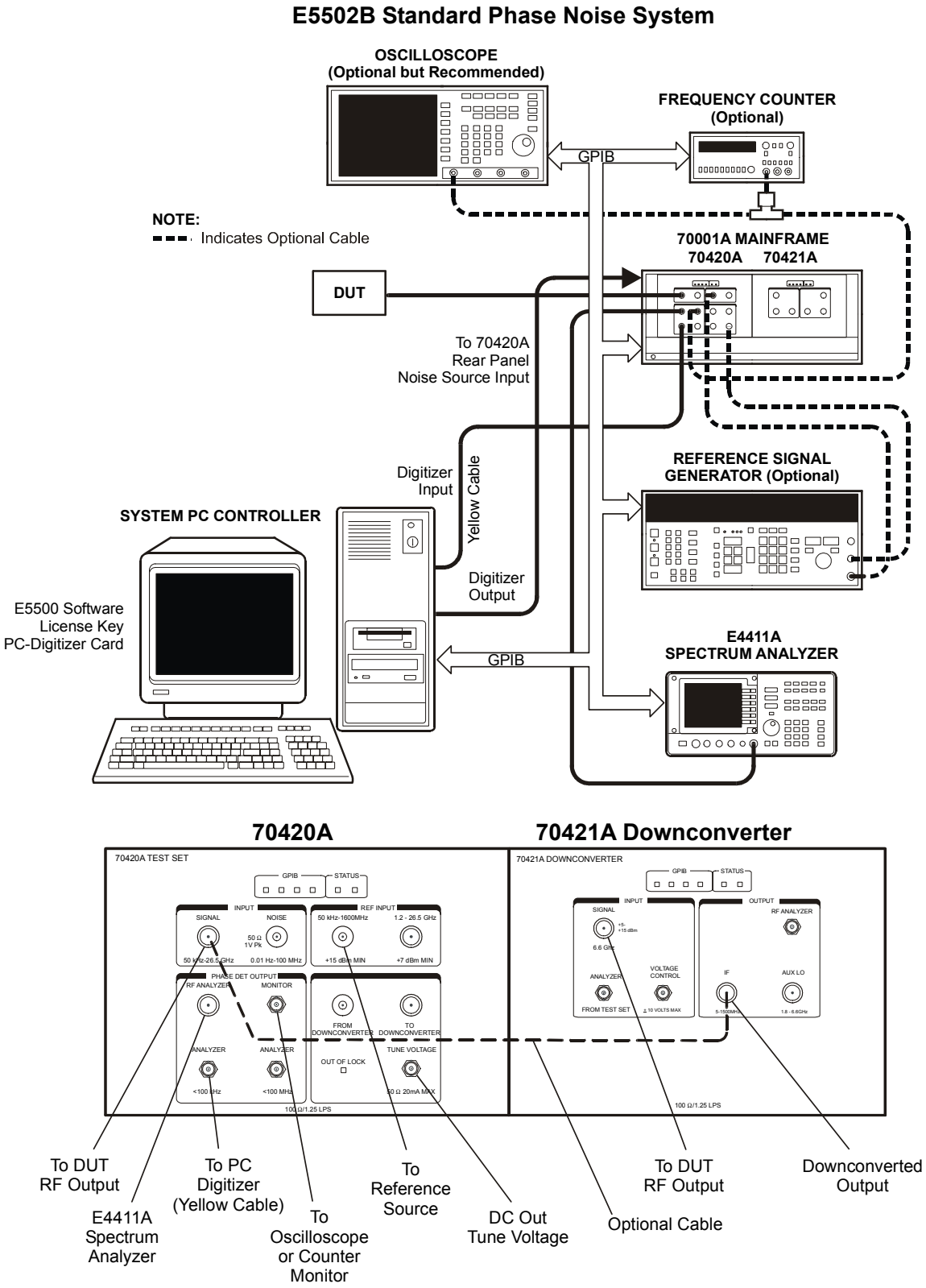


Figure 2-4 E5502B Standard Connect Diagram

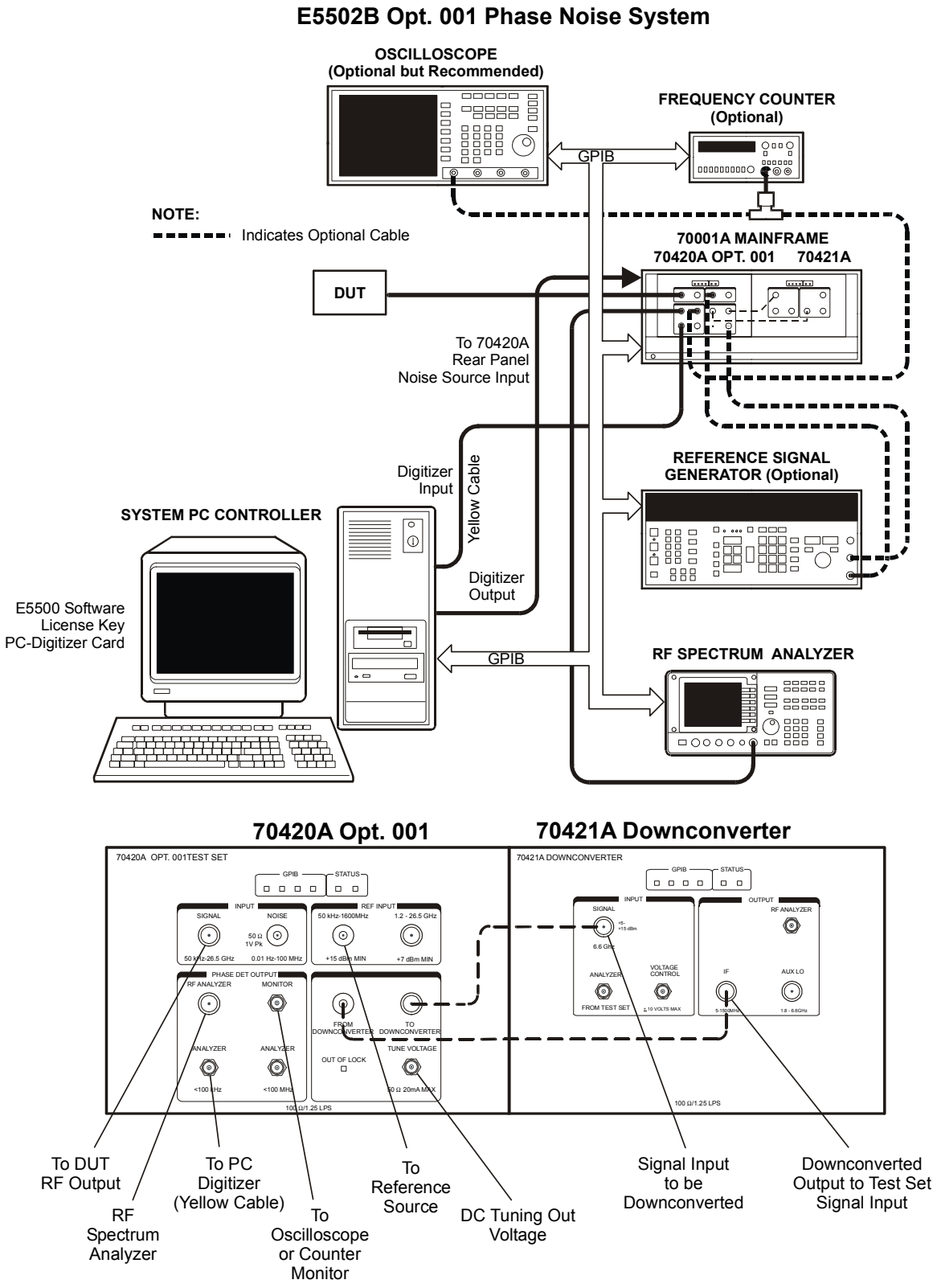


Figure 2-5 E5502B Opt. 001 Connect Diagram

E5502B Opt. 201 Phase Noise System

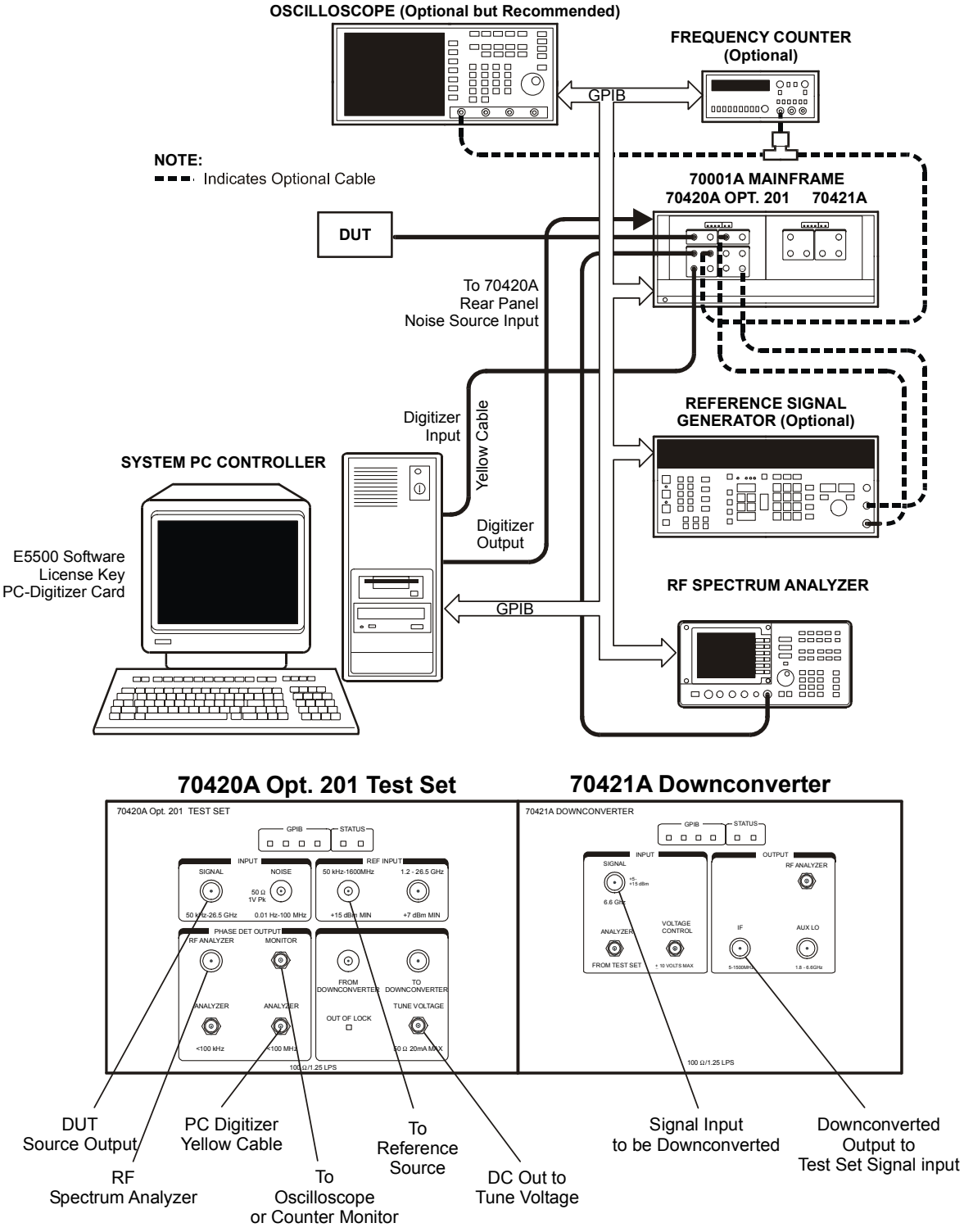


Figure 2-6 E5502B Opt. 201 Connect Diagram

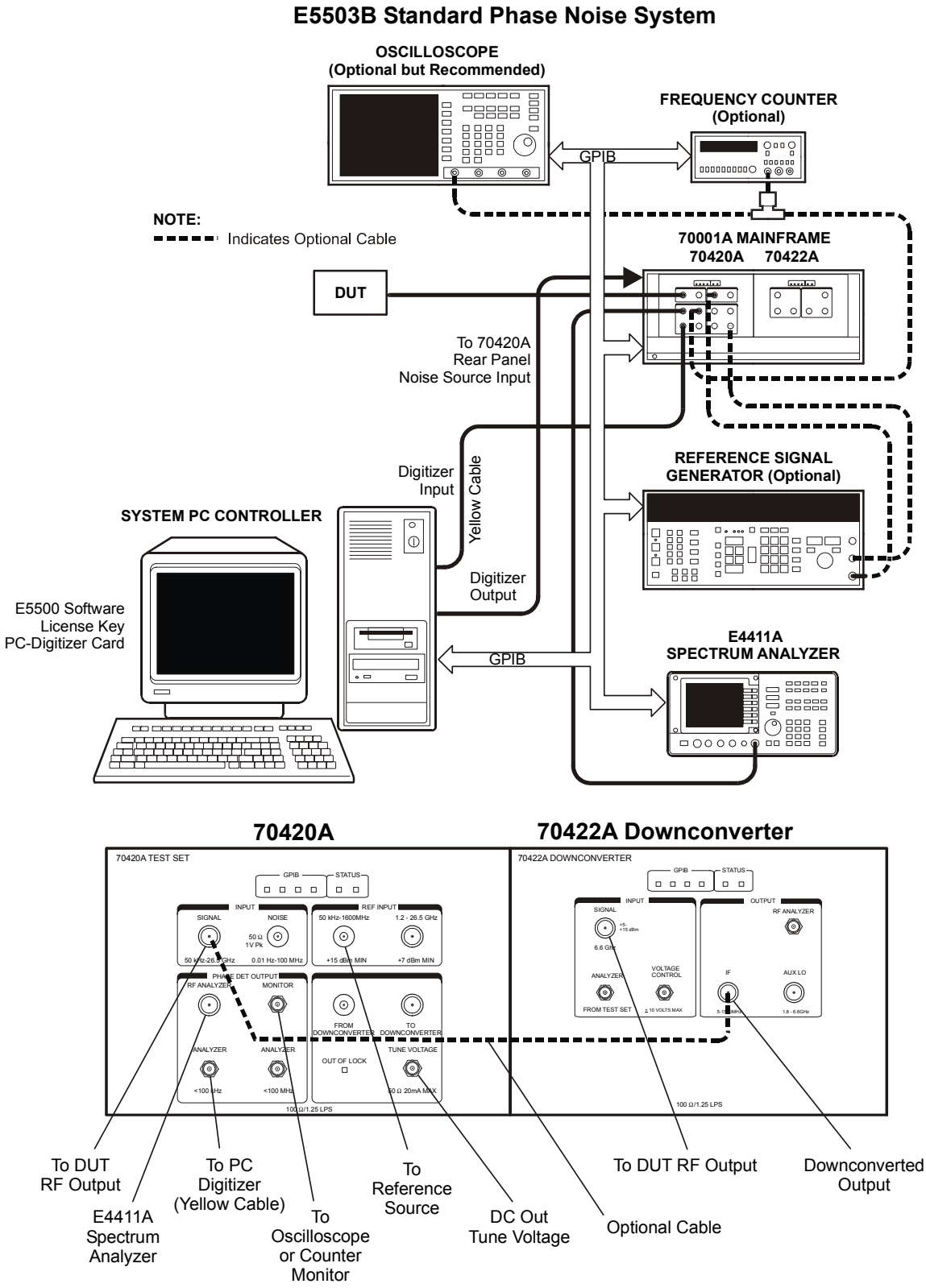


Figure 2-7 E5503B Standard Connect Diagram

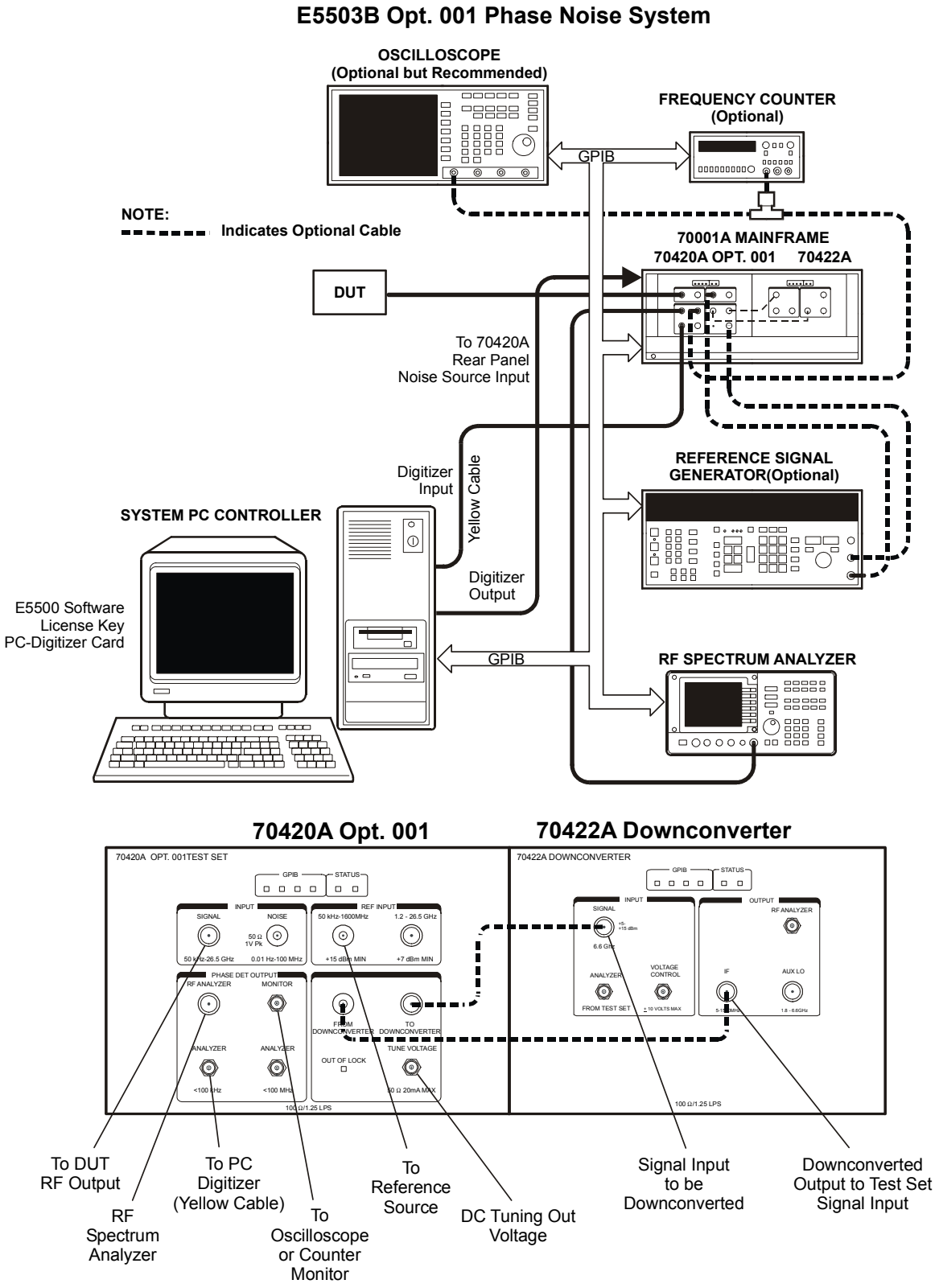


Figure 2-8 E5503B Opt. 001 Connect Diagram

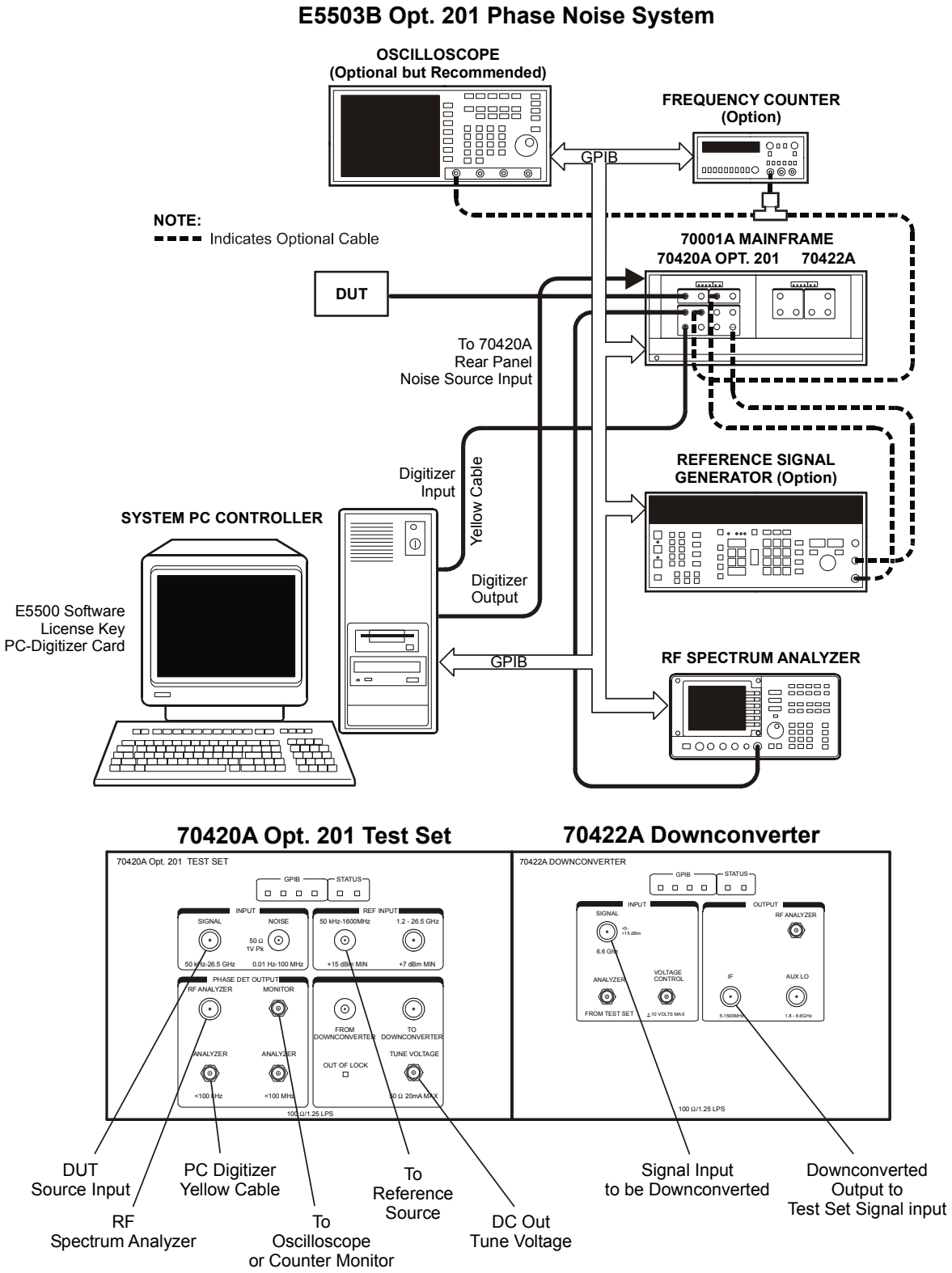


Figure 2-9 E5503B Opt. 201 Connect Diagram

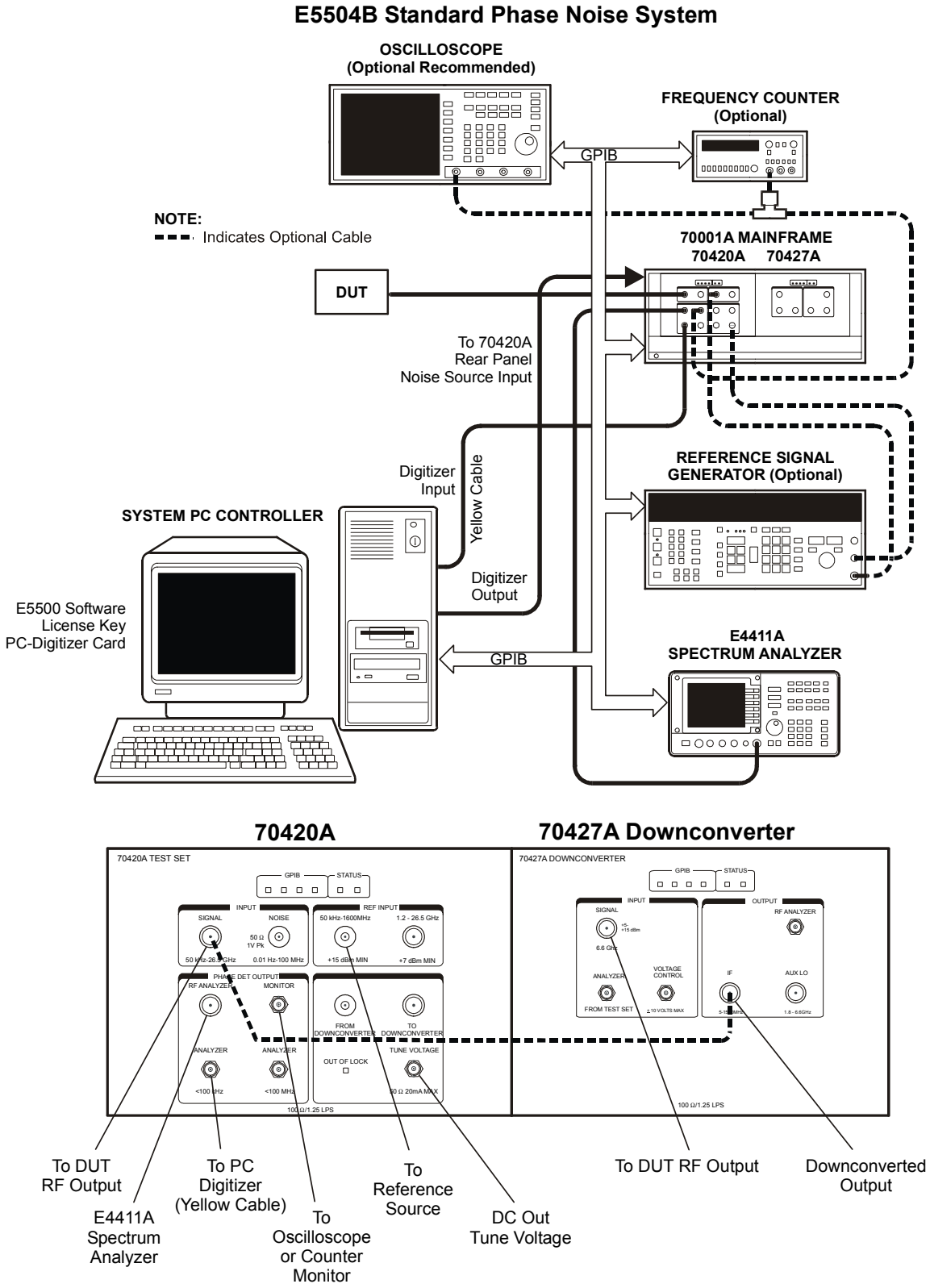


Figure 2-10 E5504B Standard Connect Diagram

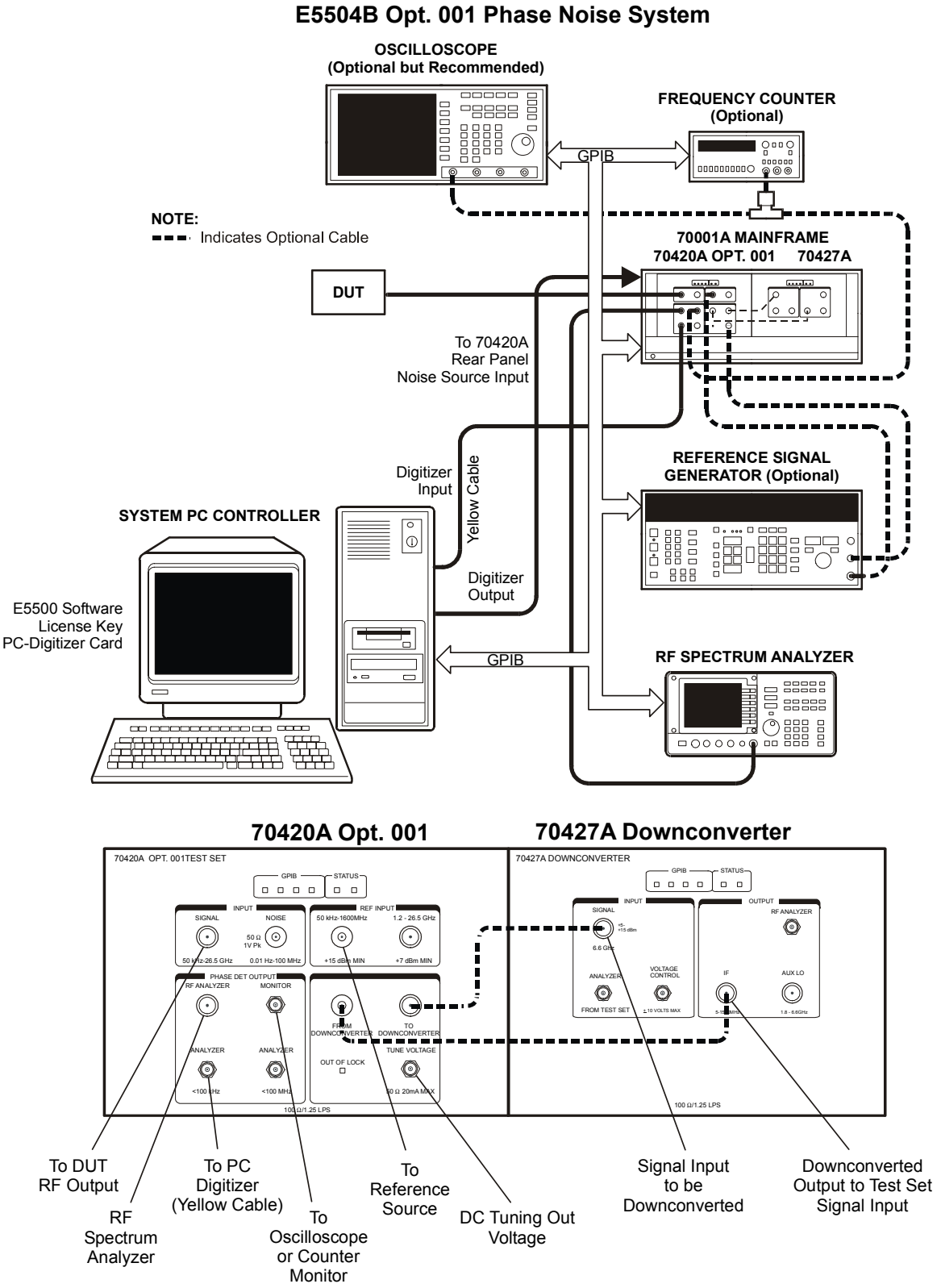


Figure 2-11 E5504B Opt. 001 Connect Diagram

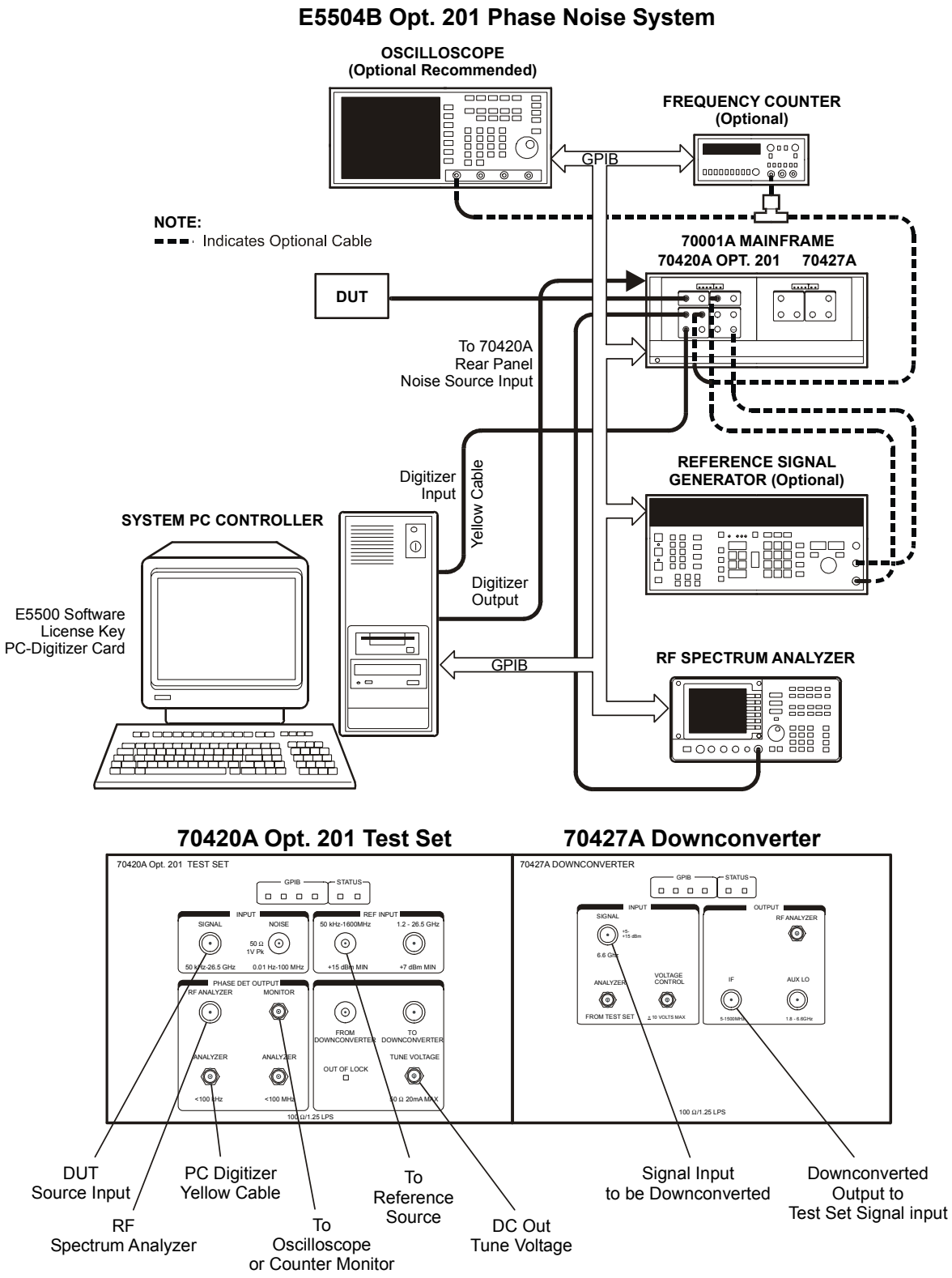


Figure 2-12 E5504B Opt. 201 Connect Diagram