Agilent E5023A Hard Disk Read/Write Test System

Service Manual

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Notices

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

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Component Test PGU

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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.

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January 2004	Fourth Edition (part number: E5023-90112)

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. In addition it violates safety standards of design, manufacture, and intended use of the instrument.

The Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

- Ground The Instrument

  To avoid electric shock hazard, the instrument chassis and cabinet must be connected to a safety earth ground by the supplied power cable with earth blade.

- DO NOT Operate In An Explosive Atmosphere

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

- Keep Away From Live Circuits

  Operating personnel 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 voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

- DO NOT Service Or Adjust 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 Instrument

  Because of the danger of introducing additional hazards, do not install substitute parts or perform unauthorized modifications to the instrument. Return the instrument to a Agilent Technologies Sales and Service Office for service and repair to ensure that safety features are maintained.

- 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 voltages, capable of causing death, are presenting this instrument. Use extreme caution when handling, testing, and adjusting this instrument.**

Safety Symbol

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.


Frame (or chassis) terminal. A connection to the frame (chassis) of the equipment which normally include all exposed metal structure.

WARNING **This warning sign denotes a hazard. It calls attention to a procedure, practice,**

condition or the like, which, 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, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

NOTE Note denotes important information. It calls attention to a procedure, practice, condition or the like, which is essential to highlight.

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 to the calibration facilities of other International Standards Organization members.

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Typeface Conventions

Bold	Boldface type is used when a term is defined. For example: **icons** are symbols.
Italic	Italic type is used for emphasis and for titles of manuals and other publications.
[Hardkey]	Indicates a hardkey labeled “Hardkey.”
Softkey	Indicates a softkey labeled “Softkey.”
[Hardkey] - **Softkey1** - **Softkey2**	Indicates keystrokes **[Hardkey]** - **Softkey1** - **Softkey2**.

Contents

Contents

1 Overview

Manual Overview

The Agilent E5023A has the following manuals:

Site Preparation and Installation Manual

This manual explains the necessary procedures for site preparation and installation of the system. Information on how to unpack the equipment, how to set the system, proper cable connections, air pressure and vacuum settings are all explained in this manual.

Operation Manual

Information such as product overview, measurement procedures, how to use the demo program, measurement definition, specifications and others. All important information related to the system's operation and measurement are explained in this manual.

Programming Manual

This manual contains the information to allow the user to create user's program. This manual also serves as a tutorial for the user.

Service Manual

This manual. Service Manual provides some trouble shooting techniques in case the system fails to operate. It explains how to analyze and fix the system in case of trouble.

The Installation Manual, Operation Manual and Programming Manual are all furnished with the system. The rest are not provided, you may order them from Agilent sales Office near you.

Also, the English Version of the Operating Manual and the Programming Guide have been installed in PDF form inside the PC. By selecting the desired manual from the start menu of Windows 2000, **Programs - [Agilent Hard Disk ReadWrite Test System**, the Acrobat Reader will automatically start up displaying the manual on the screen.

About this Manual

This manual provides information on troubleshooting and servicing the Agilent E5023A Hard Disk Read/Write Test System. Service information on spinstand is not included in this manual.

Chapter 1, “Overview,” on page 11

This chapter explains the manual structure, product overview and name of each part of the system.

Chapter 2, “Troubleshooting,” on page 23

This chapter describes over all troubleshooting flow.

Chapter 3, “Replaceable Parts,” on page 67

This chapter provides part numbers and illustrations of the replaceable assemblies and miscellaneous parts.

Chapter 4, “Assembly Replacement and Post-Repair Procedures,” on page 85

This chapter explains how to replace the faulty instrument.

Chapter 5, “Software Recovery,” on page 133

This chapter provides the information on how to install the system’s software using the furnished CD-ROMs.

Appendix A, “Manual Changes,” on page 155

This appendix contains the information required to adapt this manual to versions or configurations of the E5023A manufactured earlier than the current printing date of this manual.

Appendix B, “Measurement Paths,” on page 157

This appendix provides the Agilent E5023A measurement paths for every measurement parameters.

Appendix C, “Software Tools,” on page 161

This appendix describes how to use software tools with the Agilent E5023A.

Appendix D, “Error Messages,” on page 173

This appendix lists the error messages.

Name of Each Part

The name of each part of Agilent E5023A are listed below.

The name of each measuring instrument are listed in Figure 1-1. If rack option is not ordered, the rack will not be provided.

The name of each measuring instrument installed in the VXI mainframe are as follows.

Agilent E8491B	IEEE-1394 PC Link to VXI Module
Agilent E5035B	Spinstand Interface Module
Agilent E5036A	Filter Matrix Module
Agilent E5037C/D	Data Generator Module
Agilent E5038B	Parametric Measurement Module
Agilent E5039B/C	Bit Error Test Module (Option)
Agilent E5040A	Spectrum Measurement Module (Option)
Agilent E5041A	Dual Counter Module (Option)
Agilent E5043A/C	Head Amplifier Control Unit

Figure 1-1 Name of each Measuring Instrument

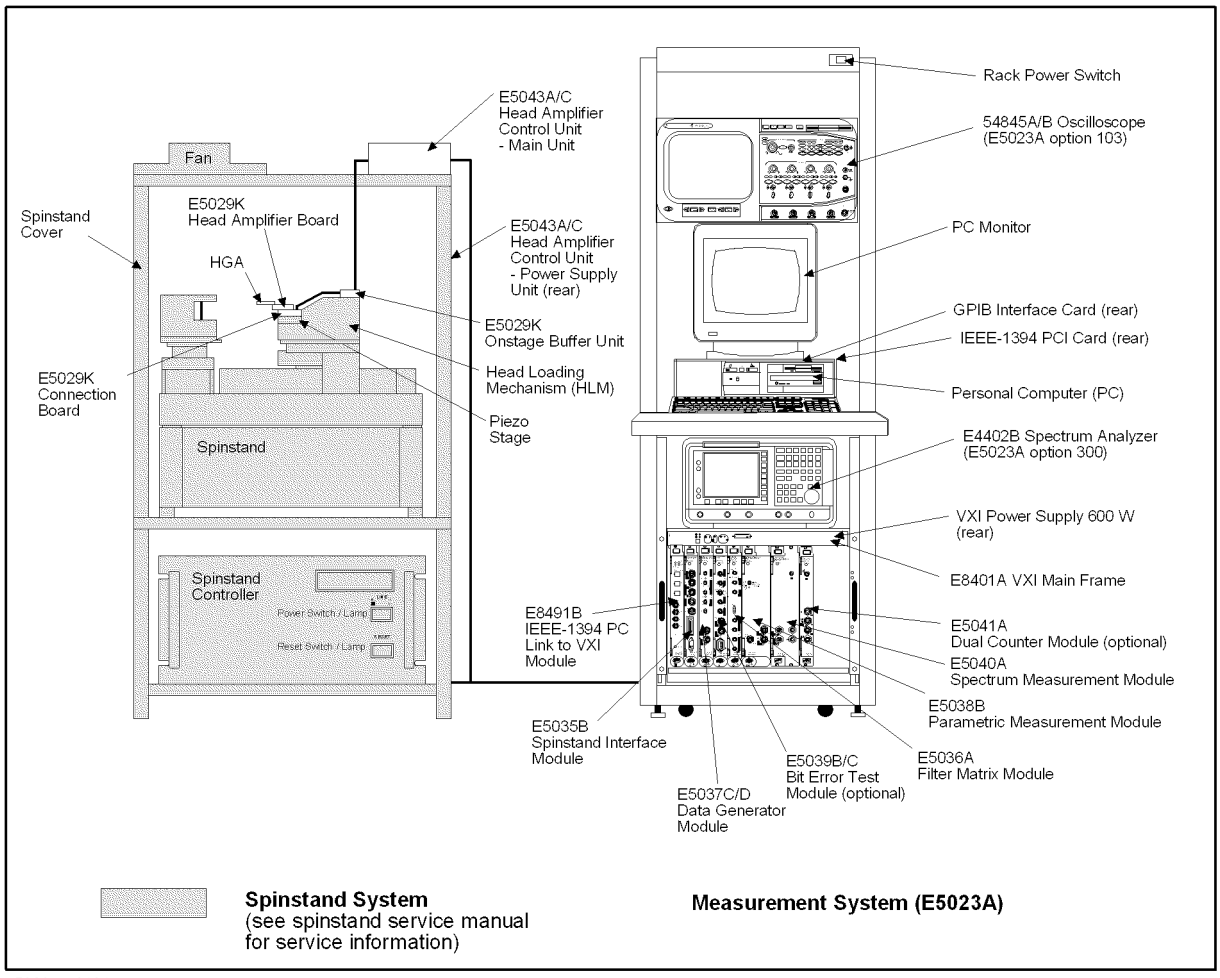

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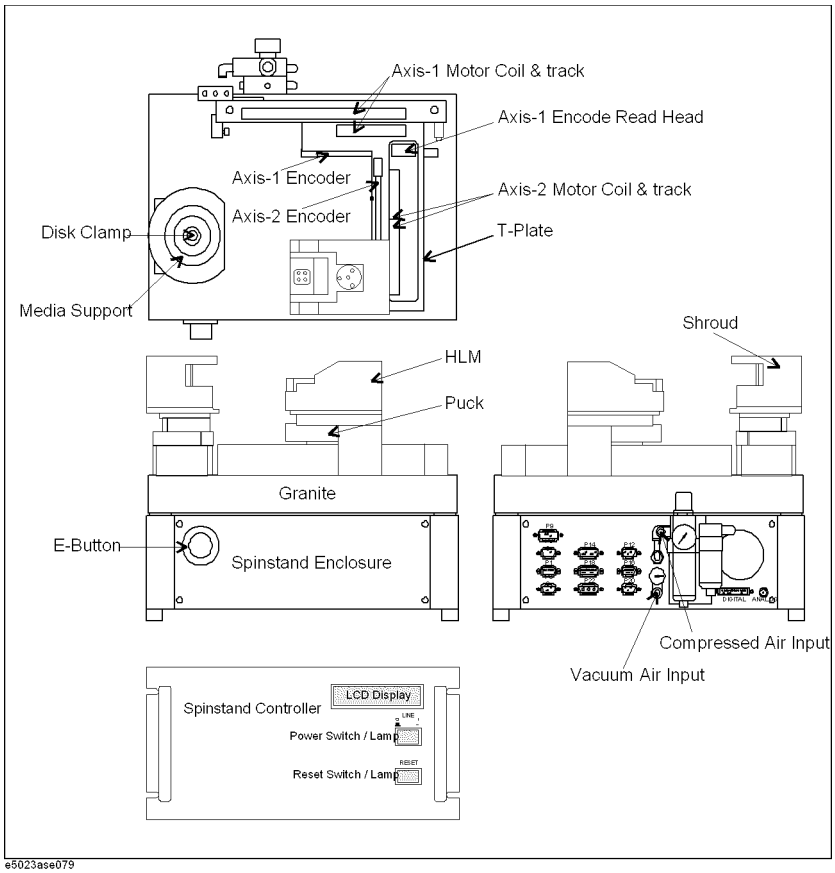
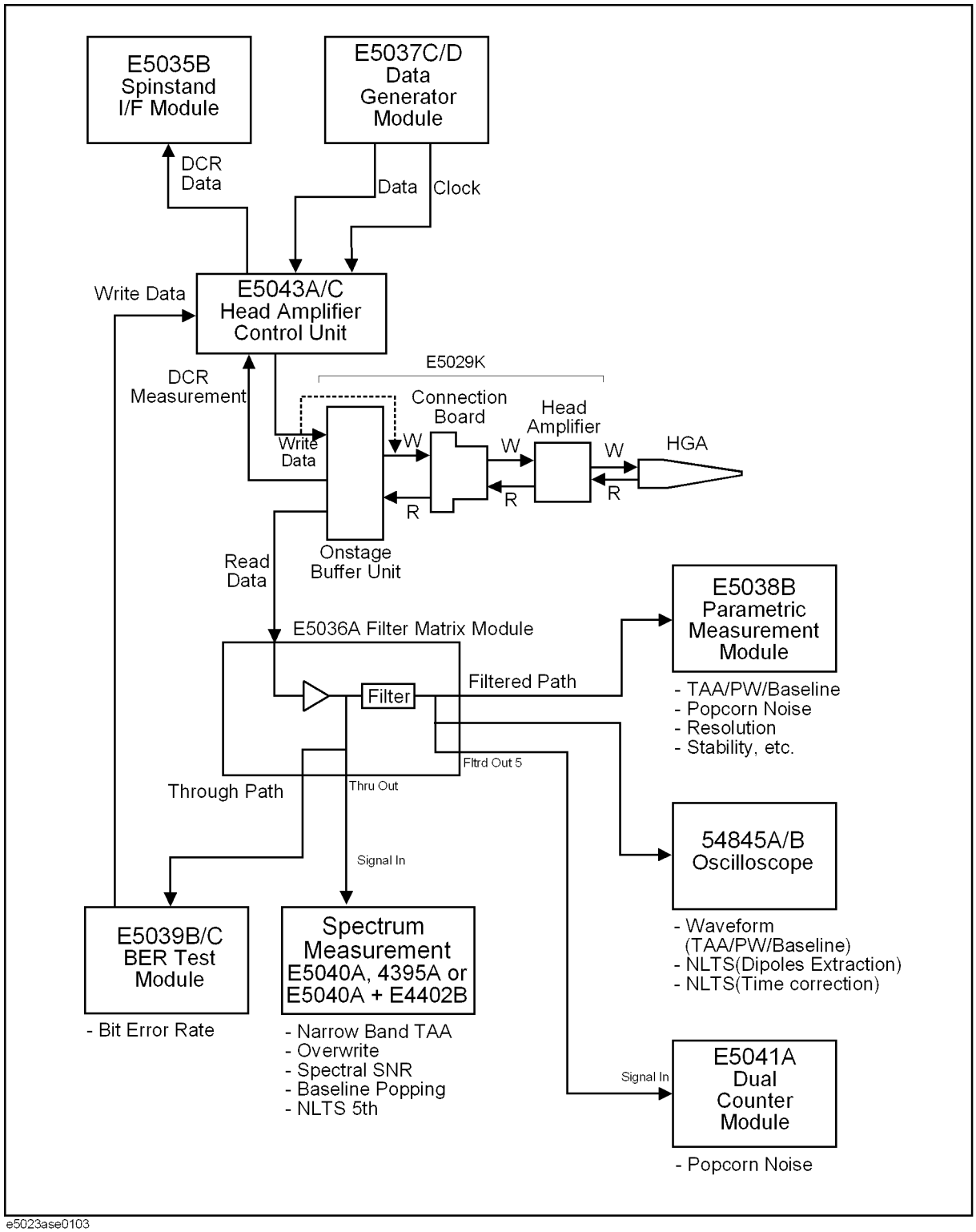
Figure 1-2 **Spinstand (E5013A) Overview**



System Overview

This section explains the structure of the system. The system block diagram is shown in Figure 1-3.

Figure 1-3 **System Block Diagram (Read/Write Signal Flow)**



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Measuring Instrument System

The measuring instrument system of the Agilent E5023A has three major parts.

- Signal Generating Part
  - Agilent E5037C/D Data Generator Module
  - Agilent E5039B/C Bit Error Rate Test Module
- Signal Distribution Part
  - Agilent E5043A/C Head Amplifier Control Unit
  - Agilent E5029K Onstage Buffer Unit
  - Agilent E5036A Filter Matrix Module
- Measuring Part
  - Agilent E5038B Parametric Measurement Module
  - Agilent E5039B/C Bit Error Test Module (Optional)
  - Agilent E5040A Spectrum Measurement Module
  - Agilent E5041A Dual Counter Module (Optional)
  - Agilent 54845A/B Infinium Oscilloscope (E5023A Option 103)
  - Agilent E4402B Spectrum Analayzer (E5023A Option 300)

Measurement Signal Flow

The signal produced by Agilent E5037C/D Data Generator Module is inputted to the head amplifier, with a specified amount of write current, data is written to the media.

When reading the data, as specified by the amount of read current, the read data is amplified by the head amplifier and inputted into the Filter Matrix Module.

The Agilent E5036A Filter Matrix Module then filters out the signal before sending it to each measuring instrument.The Filter Matrix Module is equipped with four filters. The user can set any of the four filters as desired.

The signal received by Agilent E5038B Parametric Measurement Module, Agilent 54845A/B Oscilloscope and Agilent E5041A Dual Counter Module will be filtered out from this module. The filtered signal received by the parametric module is calculated by this module whose results are displayed by the PC. However, for the Spectrum Measurement (Agilent E5040A or 4395A or E5040A+E4402B) and Agilent E5039B/C Bit Error Test Module, the signals received are non-filtered. The signal is simply pre-amplified as it passes through the filter matrix module.

Under normal measurement operation the data generator is used to produce the signal needed for measurement. The Agilent E5039B/C Bit Error Rate Test Module on the other hand, writes and reads its own signal. In other words, it produces its own signal and writes its own data. The written data passes through the filter matrix module to be filtered out before sending it to the bit error test module. A read channel IC in the bit error test module reads the written data and checks what fraction of the total bits of the written data are in error. Refer to the system block diagram as shown in Figure 1-3.

Control (PC) System

The commands for each measuring instrument and spinstand all come from the PC. The commands being sent by the PC to each module of the VXI mainframe passes through the IEEE-1394 interface.The triggers synchronizing with the index signal are generated from Agilent E5035B Spinstand Interface Module to all modules and instrument. The Agilent E5037C/D Data Generator Module of the VXI mainframe sends its write data as controlled by the Write Gate to the head amplifier from Agilent E5035B Spinstand Interface Module.

The same procedure applies for piezo, HLM and head amplifier. The command passes through the Agilent E5035B Spinstand Interface Module.

The box type measuring instrument (Oscilloscope) is controlled by the PC through GPIB cable. Also, the trigger to start measurement from Agilent E5035B Spinstand Interface Module are received to start measurement.

The stages of the spinstand and spindle as controlled by the spinstand controller, this is controlled by the PC through RS-232C.

NOTE If your E5023A has Windows® 95 operating system, you must turn off the power management mode to avoid performance (speed) deterioration. For Windows® 2000 operating system shipped with the latest version of the E5023A, you don't need to care the power management mode because Windows® 2000 does not have such mode.

Software

The PC of Agilent E5023A uses an English version of the Windows® 2000. Windows® 98, Windows® Me, Windows® NT, Windows® XP and other language version of Windows® 2000 are not supported by the system.

The following items have been installed at the factory before shipment.

- Agilent E5023A Measurement Library
- Agilent I / O Library
- Agilent VEE
- Agilent E5023A Test Environment (VEE-based graphical operating program)
- Sample Program (Visual Basic)
- Adobe Acrobat Reader

Agilent E5023A Measurement Library

The Agilent E5023A Measurement Library is a dynamic link library designed to facilitate measurement programming. This creates an environment that makes the Agilent E5023A into an integrated system rather than a rack-and-stack set of instruments, which allows the instruments to perform at a higher level as a system.

The configuration information for head amplifiers and HGA cassettes is stored in the directory "c:\Program Files\Agilent\e5022\config" as XML files (or "c:\Program Files\Agilent\e5022\bin" as DLL files).

Agilent I/O Library

Agilent I/O library is a general I/O library to control the instrument. This includes Agilent VISA library. It is not necessary to care about this library because the Agilent E5023A

measurement library controls this.

Agilent VEE

Agilent E5023A VEE is a powerful visual programming language, which allows you to control the instrument, make quick measurements and display the system settings. This software controls the system by calling the Agilent E5023A measurement library.

Agilent E5023A Test Environment (VEE-based graphical operating program)

The Test Environment is a user interface, it is constructed in Agilent VEE which allows the user to make quick measurements and display the system settings. It controls the system by calling the measurement library from the VEE. Since the internal structure of the Test Environment Program is open to public, one can use it as a reference for visual programming.

Agilent E5023A Sample Program (Visual Basic)

Agilent E5023A sample programs in Visual Basic are provided to help the user make his own program. As VEE is not suitable to explain how the program works due to its visual programming structure, the Visual Basic is used for an application of sample program although the Visual Basic is not installed at factory shipment. The sample program shows you the example procedure for measurement to understand the programming.

2 Troubleshooting

Start Here

The information in this chapter helps you identify the portion of the system that is at fault.

The troubleshooting strategy of this manual is based on a verification (rather than symptomatic). This chapter describes troubleshooting procedure step by step, and you can find next necessary action by following the troubleshooting steps sequentially.

By performing the procedures in this chapter, if something of the spinstand part is faulty, refer to the *spinstand service manual*.

Topics of this chapter are followings.

- Inspect the Power On Sequence
- Inspect Initialize Failure Troubleshooting
- System Verification

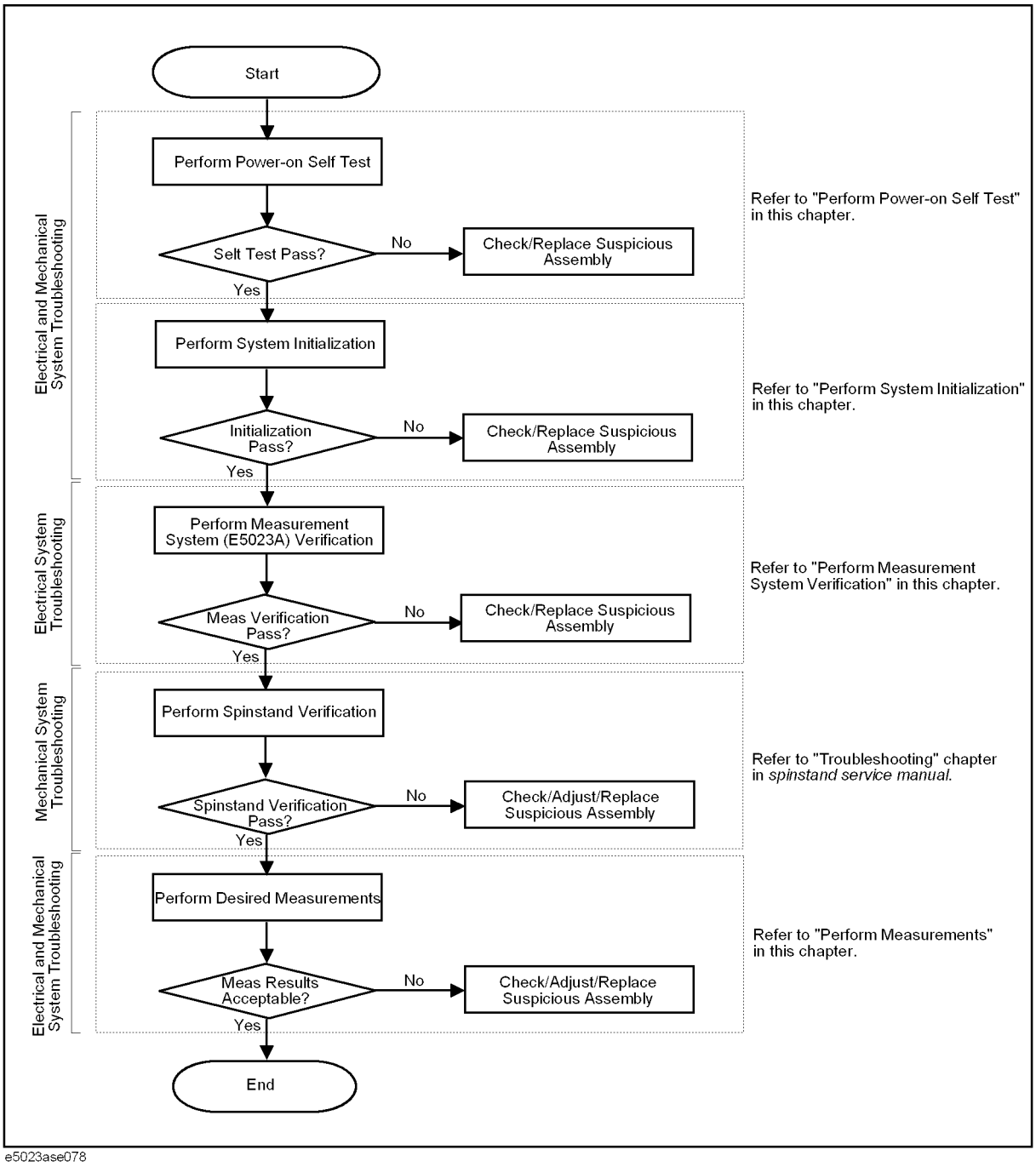
Figure 2-1 shows overall troubleshooting flow.

NOTE

Before you start troubleshooting, you must perform the followings:

1. Verify the media and the head are fine at all. Replacing them with properly working media and head is strongly recommended.
2. Disconnect all devices and peripherals from the system if you installed additional instruments or assemblies. Configure the system as it is properly installed.

Figure 2-1 Primary Trouble Isolation Flowchart



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Perform Power-on Self Test

The actions in the primary trouble isolation are done in the power-on sequence. Turn the system power on and inspect the status of the instruments (status LED on the front panel and error message in the LCD of the spinstand) as reference to the Table 2-1. If you find a symptom of the problems, it is necessary to isolate a defective instrument as reference to trouble isolation flow. After replacement of the instrument, turn the system power on and inspect it again.

When the inspection of the power on sequence pass, go to next trouble isolation steps.

Table 2-1 Inspect The Power On Sequence

Asserted Instrument	Symptom of the Problem	Action (check or replace instrument)
E8401A (VXI Main Frame)	“supply voltages” indicator flashing amber (normally green)	E8401A
	“supply temp” indicator flashing amber (normally green)	E8401A
	“fans” indicator flashing amber (normally green)	E8401A
	“SYSFAIL” indicator flashing amber (normally dark)	E8401A or VXI module
E8491B (IEEE-1394 PC Link to VXI)	“Failed” indicator lighting amber (normally dark)	E8491B
	“SYSFAIL” indicator lighting amber (normally dark)	E8491B or VXI module
E5035B (Spinstand Interface Module)	Status LED lighting red (normally green or amber)	E5035B
E5036A (Filter Matrix Module)	Status LED lighting red (normally green)	E5036A
E5037C/D (Data Generator Module)	Status LED lighting red (normally green or amber)	E5037C/D
E5038B (Parametric Measurement Module)	Status LED lighting red (normally green or amber)	E5038B
E5039B/C (Bit Error Test Module)	Status LED lighting red (normally green or amber)	E5039B/C
E5040A (Spectrum Measurement Module)	Status LED lighting red (normally green or amber)	E5040A

Table 2-1 Inspect The Power On Sequence

Asserted Instrument	Symptom of the Problem	Action (check or replace instrument)
54845A/B (Oscilloscope)	No Display (normally Display on)	54845A/B
E4402B (Spectrum Analyzer)	No Display (normally Display on)	E4402B
Spinstand	See *spinstand service manual*.	

Figure 2-2 VXI Main Frame and Instruments Front Panel

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Perform System Initialization

In this section, inspect initialization of the system.

Launch the pre-installed Agilent E5023A Measurement Software and confirm if the system can initialize itself properly in the initialize routine of the program. This achieves by calling initialize function at the beginning of the program.

Start the program and watch for the following events in this order.

1. Select **Start** - **Programs** - **Agilent Hard Disk ReadWrite Test System** - **Test Environment (RunTime Version)** from the task bar of Window 2000 to launch the program.
2. Agilent E5023A Measurement Software Main Menu will appear and start to initialize the system. Until initialization is completed, the menu is inactive.
3. The spinstand (E5013A) starts homing to initialize itself. In homing, the stage moves to an end of stage travel where the limit switch is turned on, then initialize the position. The stage is fixed by the servo motor after homing. The T-plate stage starts homing first, and the puck stage is next. (For the E5010C Spinstand, the HLM stage starts homing first, and the spindle stage is next.)
4. After the initialization, HGA Parameter Setup dialog box will appear. Click **Close**.
5. The **Configuration** and **Measure** buttons become active. It takes about 60 seconds for the program to initialize.

If the system initialization is not completed correctly, continue the trouble isolation to refer Table 2-2.

Table 2-2 Initialize Failure Troubleshooting

Symptom	Action
Error Message appears	Refer to Table 2-3.
Abnormal Motion of the Spinstand	Go to the *spinstand service manual* and continue trouble isolation.
Spinstand initialization does not start.	Go to the *spinstand service manual* and continue trouble isolation.
Spinstand initialization does not complete.	Go to the *spinstand service manual* and continue trouble isolation.

If the diagnostics detects a failed function during the system initialization, the following error message appears in the PC monitor. Then, reboot the E5023A once, and perform the self test again. If the same error message appears, check and to replace a defective cable or instrument by following to Table 3-2.

Table 2-3 List of System Initialization and Self Test Error for the VXI instruments

Error Message	Trouble Isolation Procedure	
"VXI0::5::INSTR:xxxxxxxx" hpe5022_ERROR_HARD_MISS: Hardware Not Detected	step 1	Check 36 pin I/O cable which is connected with E5035B Head Amp Control and Head Amp.
	step 2	Check four terminal cable which is connected with the E5035B Spinstand Control and HLM Control.
	step 3	Check the E5035B
hpe5022_ERROR_HARD_MISS: Hardware Not Detected	step 1	In case of only error message appears, but VXI instrument number (VISA name) does not appear, check four terminal cable which is connected with the E5035B Spinstand Control and Spinstand Piezo Control.
	step 2	Replace the E5035B
"VXI0::5::INSTR:xxxxxxxx" hpe5022_ERROR_MEMORY: Calibration Data or User Data Check Sum Failed	step 1	It is assumed that the calibration data in the Head Amp is lost. replace the Head Amp.
	step 2	Check 36 pin I/O cable which is connected with the E5035B Head Amp Control and Head Amp Control.
	step 3	Replace the E5035B.
"VXI0::x::INSTR:xxxxxxxx" VI_ERROR_RSRS_NFOUND:No matching resource found / no more matches. (where 'x' is 5,6,7,8 or 9)	step 1	Check the E5035B, E5036A, E5037C/D, E5038B or E5039B/C.
"VXI0::x::INSTR:xxxxxxxx" VI_ERROR_PRES_NFOUND:No matching resource found / no more matches (all VXI modules error appears)	step 1	Check IEEE-1394 cable which is connected with PC IEEE-1394 port and the E8491A/B IEEE1394 Port.
	step 2	Check the E8491A/B as shown in Figure 2-4.
	step 3	Check the E8401A (VXI Main Frame)
"VXI0::x::INSTR:xxxxxxxx" hpe5022_ERROR_REVISION: Sub DLLs and/or module firmware revision conflict. (where 'x' is 5,6,7,8 or 9)	step 1	E5023A system software (DLL) and module firmware conflict. update VXI module firmware which is included in the installer of E5023A system software.

Table 2-3 List of System Initialization and Self Test Error for the VXI instruments

Error Message	Trouble Isolation Procedure	
“VXI0::x::INSTR:xxxxxxxxx” hpe5022_ERROR_SELFTEST:Self test Failed on hpe5022 System (where ‘x’ is 5,6,7,8,or 9)	step1	VXI instruments self test error occurred. check and replace a defective VXI instrument.

NOTE The Agilent VISA Assistant assigns the several instruments to the VISA name as shown in Table 2-4. When the E5023A does not contain the E5039B/C, E5041A and/or Oscilloscope, the VISA name of them are not assigned.

Table 2-4 VISA Name

Instrument (Interface)	VISA Name
Spinstand (Serial Interface COM1)	ASRL1
E8491A/B (VXI / IEEE1394)	VXI0::0::INSTR
E5035B (VXI / IEEE1394)	VXI0::5::INSTR
E5036A (VXI / IEEE1394)	VXI0::6::INSTR
E5037C/D (VXI / IEEE1394)	VXI0::7::INSTR
E5038B (VXI / IEEE1394)	VXI0::8::INSTR
E5039B/C (VXI / IEEE1394)	VXI0::9::INSTR
E5040A (VXI / IEEE1394)	VXI0::10:INSTR
E5041A (VXI / IEEE1394)	VXI0::11:INSTR
Oscilloscope (GPIB)	GPIB0::7::INSTR
4395A (GPIB)	GPIB0::17::INSTR
E4402B (GPIB)	GPIB0::18::INSTR

Table 2-5 List of System Initialization and Self Test Error except for VXI instruments

Error Message	**Trouble Isolation Procedure**	
hpe5022_ERROR_NO_OPTION: Option not installed	step 1	If it appears just after system software installation, it is possible that the oscilloscope option codeword is incorrect. Re-install the E5023A system software with correct codeword.
"GPIB0::7::INSTR:xxxxxxxx" VI_ERROR_RSRS_NFOUND: No matching resources found / no more matches.	step 1	Check the GPIB cable which is connected with PC and Oscilloscope
	step 2	Check an operation of the Oscilloscope (Agilent 54820A or Agilent 54845A/B), and check GPIB address. Click on the mouse icon at the right upper side of display and click ‘Utilities’ > ‘Remote Interface..’ by using a mouse, then the Oscilloscope’s GPIB address appears on the display. If address is not 7, you must enter 7.
	step 3	Check the GPIB card within the PC

Table 2-5 List of System Initialization and Self Test Error except for VXI instruments

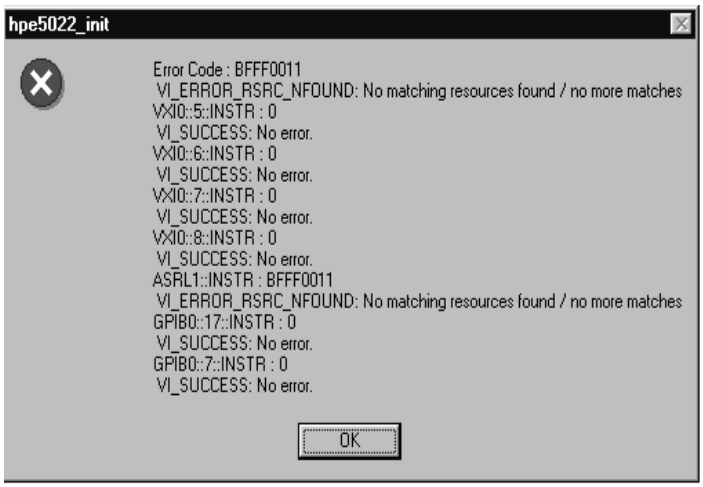
Error Message	Trouble Isolation Procedure	
“GPIB0::7::INSTR:xxxxxxx” hpe5022_ERROR_SELFTEST:Self test Failed on hpe5022 System	step 1	Oscilloscope self test error occurred. check and replace the Oscilloscope
"GPIB0::17::INSTR:xxxxxxxx” VI_ERROR_RSRS_NFOUND: No matching resources found / no more matches.	step 1	Check the GPIB cable which is connected with PC and 4395A or E4402B
	step 2	Check an operation of the 4395A or E4402B, and check GPIB address. Click on the mouse icon at the right upper side of display and click ‘Utilities’ > ‘Remote Interface..’ by using a mouse, then the 4395A/E4402B’s GPIB address appears on the display. If address is not 17/18, you must enter 17/18.
	step 3	Check the GPIB card within the PC
“ASRL1::INSTR:xxxxxxxx” VI_ERROR_IO: I/O error	step 1	Turn the Spinstand and PC on once, and perform the system initialization again. check or replace the Serial Cable (PC COM1 to the Spinstand).
	step 2	Inspect the LED on the RS-232 to RS-422 converter in the DMM after system initialization. Five LED lighting red or green is correct. If except case, check the RS-232 cable and RS-232 to RS-422 converter as shown in Figure 2-5.
	step 3	Check the Serial I/F in the PC
“ASRL1::INSTR:xxxxxxxx” Time out occurred	step 1	Check the serial I/F (COM 1) configuration as shown in Figure 2-6. (configuration of serial interface are baud rate: 19200, Parity: None, Flow Control: None, Stop Bits: 1, Data Size: 8 and SRQ Line: RI)
	step 2	If serial I/F is no problems, it assumes that Spinstand gives some problems.
“ASRL1::INSTR:xxxxxxxx” VI_ERROR_FAIL_ID_QUERY:Instrument Identification query failed.	step 1	Spinstand hardware and DLL files are mismatched. Re-install the DLL files to the PC.

Table 2-5 **List of System Initialization and Self Test Error except for VXI instruments**

Error Message	Trouble Isolation Procedure	
"ASRL1::INSTR:xxxxxxxx" VI_ERROR_RSRS_NFOUND:No matching resource found / no more matches	step 1	It assumes that a communication error occurs. Turn the all instruments, spinstand and PC on, and then perform the system initialization.
"ASRL1::INSTR:xxxxxxxx" hpe5022_ERROR_MEMORY:Calibration Data or User Data Check Sum Failed.	step 1	Calibration data or user data in the PMAC-PC is incorrect. Re-download the calibration data to PMAC from the PC.
"ASRL1::INSTR:xxxxxxxx" hpe5022_ERROR_INTERLOCK: Spinstand Interlocked.	step 1	Spinstand interlocked. Turn on the E5023A, and the perform test. If the same error message appears again, see "Troubleshooting" chapter of *spinstand service manual*.
"ASRL1::INSTR:xxxxxxxx" hpe5022_ERROR_MOTOR_FAULT:Spinstand Control Error	step 1	Turn the Spinstand and PC on, and then perform the system initialization. If the same error message appears again, see "Troubleshooting" chapter of *spinstand service manual*.
"ASRL1::INSTR:xxxxxxxx" hpe5022_ERROR_HARD_MISS: Hardware Not Detected	step 1	If the media is missing on the spindle, set it.
"ASRL1::INSTR:xxxxxxxxx" hpe5022_ERROR_SELFTEST:Self test Failed on the hpe5022 System	step 1	Turn the Spinstand and PC on, and then perform the system initialization. If the same error message appears again, see "Troubleshooting" chapter of *spinstand service manual*.

NOTE Figure 2-3 is sample of error message. If the error message return from the instrument, VISA name and error messages appears in the PC monitor. The head of the list is the E5023A error code regarding error message. In the case of the Figure 2-3, it is assumed that the spinstand gives some problems.

Figure 2-3 **Sample of Error Dialog Box**



NOTE When the E8401A VXI Main Frame or PC is turned on, the VXI Resource Manager executes automatically. If VXI Resource Manager fails, a warning message appears such as the Figure 2-4. See a detail of the error messages and make sure the VXI module's status using the Agilent I/O Libraries. If you find a defective module, replace it.

Figure 2-4 **Sample of the VXI Resource Manager Warning message**

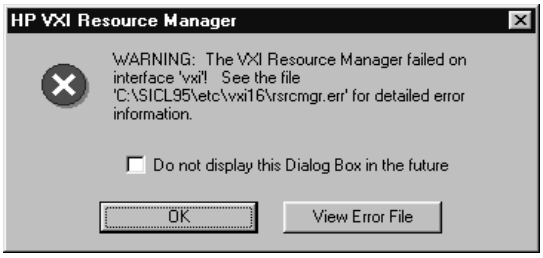
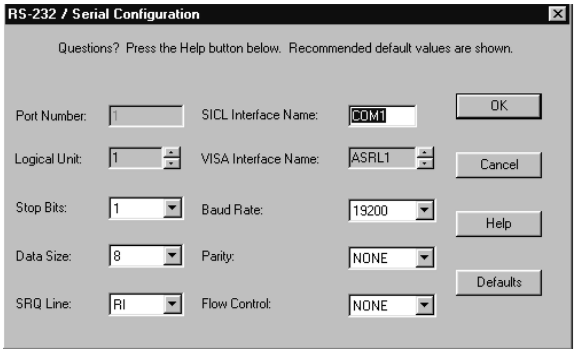


Figure 2-5 **LED on the RS-232C to RS-422 converter**

NOTE It is able to confirm the Serial Interface (COM1) settings using the I/O configuration.

Select **Start - Programs - Agilent I-O Libraries - I-O Config** from Windows® **Start** menu to launch the program. Double Click on the label of “COM1 ASRL1” in the configured interface. Then the ‘RS-232 / Serial Configuration’ menu will pop up as shown in Figure 2-6.

Figure 2-6 **RS-232 / Serial Configuration Menu**



Perform Measurement System Verification

The measurement system verification verifies the E5023A's basic measurement functions through the write and read signal measurements using the verification fixture. This verification does not verify the head amplifier.

Required Equipment

The following equipment is required to perform the write portion and read portion verification:

- P/N E5023-65600 Verification Kit (commercial HA-type)
  or P/N E5023-65601 Verification Kit (UHA-type)
- Oscilloscope (This oscilloscope is used to perform the write portion verification. E5023A option 103 oscilloscope can be used.)
- Verification Kit Setup Files (Those files are provided through the internal web site of Agilent Technologies' Component Test Division - Kobe. Contact your nearest service center to obtain those files.)

Table 2-6 and Table 2-7 show the contents of P/N E5023-65600 and P/N E5023-65601.

NOTE

These verification kits are designed as service tools for verifying the basic operations (connectivity, etc.) of the Agilent E5023A Hard Disk Read/Write Test System during its installation, trouble isolation, or repair work. Use for other purposes (such as a measurement performance evaluation) is not supported.

You must follow the procedure descried in this manual when you use these verification kits. Incorrect use is dangerous and may cause a system trouble or spinstand crash.

These verification kits should be used only by qualified personnel who took Agilent's official service training.

After completing the verification, the setup files you placed in the folders should be deleted.

You can order required verification parts individually or use required parts of your system temporarily (if they are not used during the verification).

Table 2-6 Contents of P/N E5023-65600 Verification Kit (commercial HA-type)

Agilent Model/Part Number	Description	Qty	Used for	
			Write Verification	Read Verification
P/N E5023-65520*1	Verification fixture for commercial head amplifier-type connection board (Figure 2-7)	1	√	√
P/N E5022-61612*2	SMA(m)-SMA(m) cable	2	√	√
P/N 1250-1700*3	SMA(f)-BNC(m) adapter	2	√	√
P/N 1810-0118*4	SMA(m) 50 Ω termination	1		√
8493A Option 010	SMA(f-m) 10 dB fixed attenuator	1		√

*1. *Although P/N E5023-65510 was discontinued and replaced with this new fixture, P/N E5023-65510 can still be used instead of P/N E5023-65520.*
*2. The cables P/N E5039-61606 and P/N E5039-61607 used in the system (No. 9 and 10 in Table 3-4 on page 76) can be removed and used instead of those cables.
*3. The adapter used in the system (No. 23 in Table 3-4 on page 76) can be used as one of the required adapters.
*4. The same parts are used for terminating the E5036A's output terminals. If you have an extra part, you can use it for the verification. See No. 32 in Table 4-12 on page 124.

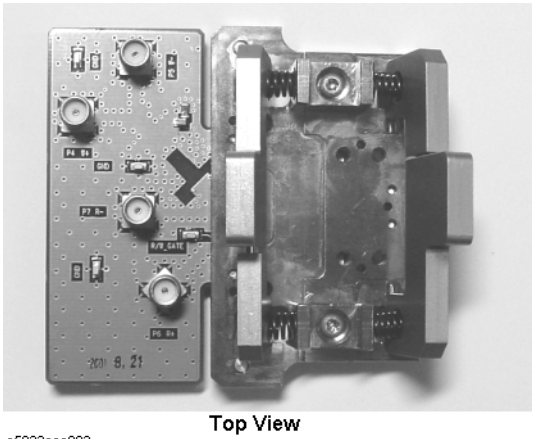
Table 2-7 Contents of P/N E5023-65601 Verification Kit (UHA-type)

Agilent Model/Part Number	Description	Qty	Used for	
			Write Verification	Read Verification
P/N E5023-65509	Verification fixture for commercial head amplifier-type connection board (Figure 2-8)	1	√	√
P/N E5022-61612*1	SMA(m)-SMA(m) cable	2	√	√
P/N 1250-1700*2	SMA(f)-BNC(m) adapter	2	√	√
P/N 1810-0118*3	SMA(m) 50 Ω termination	1		√
8493A Option 010	SMA(f-m) 10 dB fixed attenuator	1		√

*1. The cables P/N E5039-61606 and P/N E5039-61607 used in the system (No. 9 and 10 in Table 3-4 on page 76) can be removed and used instead of those cables.
*2. The adapter used in the system (No. 23 in Table 3-4 on page 76) can be used as one of the required adapters.
*3. The same parts are used for terminating the E5036A's output terminals. If you have an extra part, you can use it for the verification. See No. 32 in Table 4-12 on page 124.

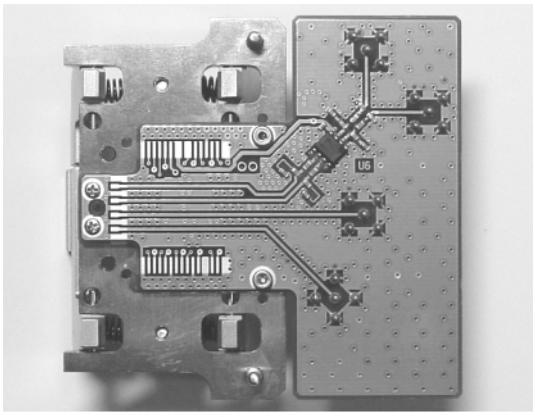
Figure 2-7 and Figure 2-8 show the top and bottom views of P/N E5023-65520 and P/N E5023-65509.

Figure 2-7 P/N E5023-65520 Verification fixture (commercial head amplifier type)



Top View

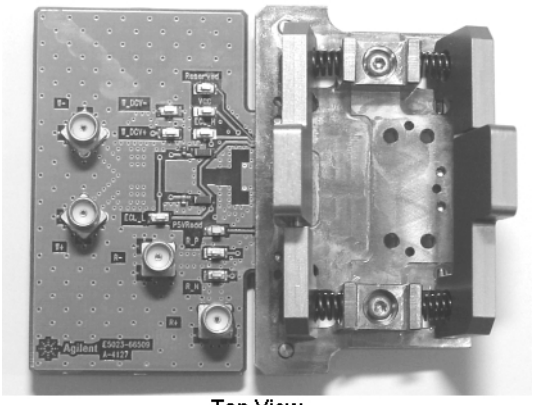
e5023ase083



Bottom View

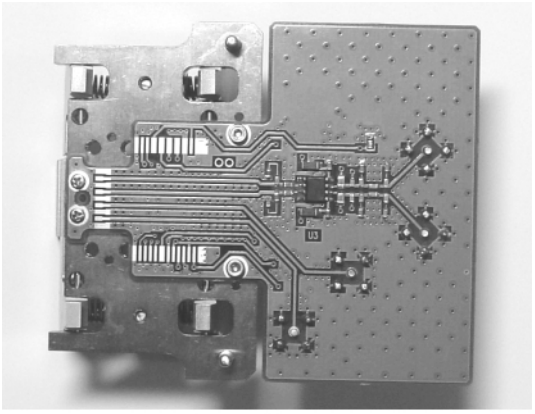
e5023ase087

Figure 2-8 P/N E5023-65509 Verification fixture (universal head amplifier type)



Top View

e5023ase082



Bottom View

e5023ase086

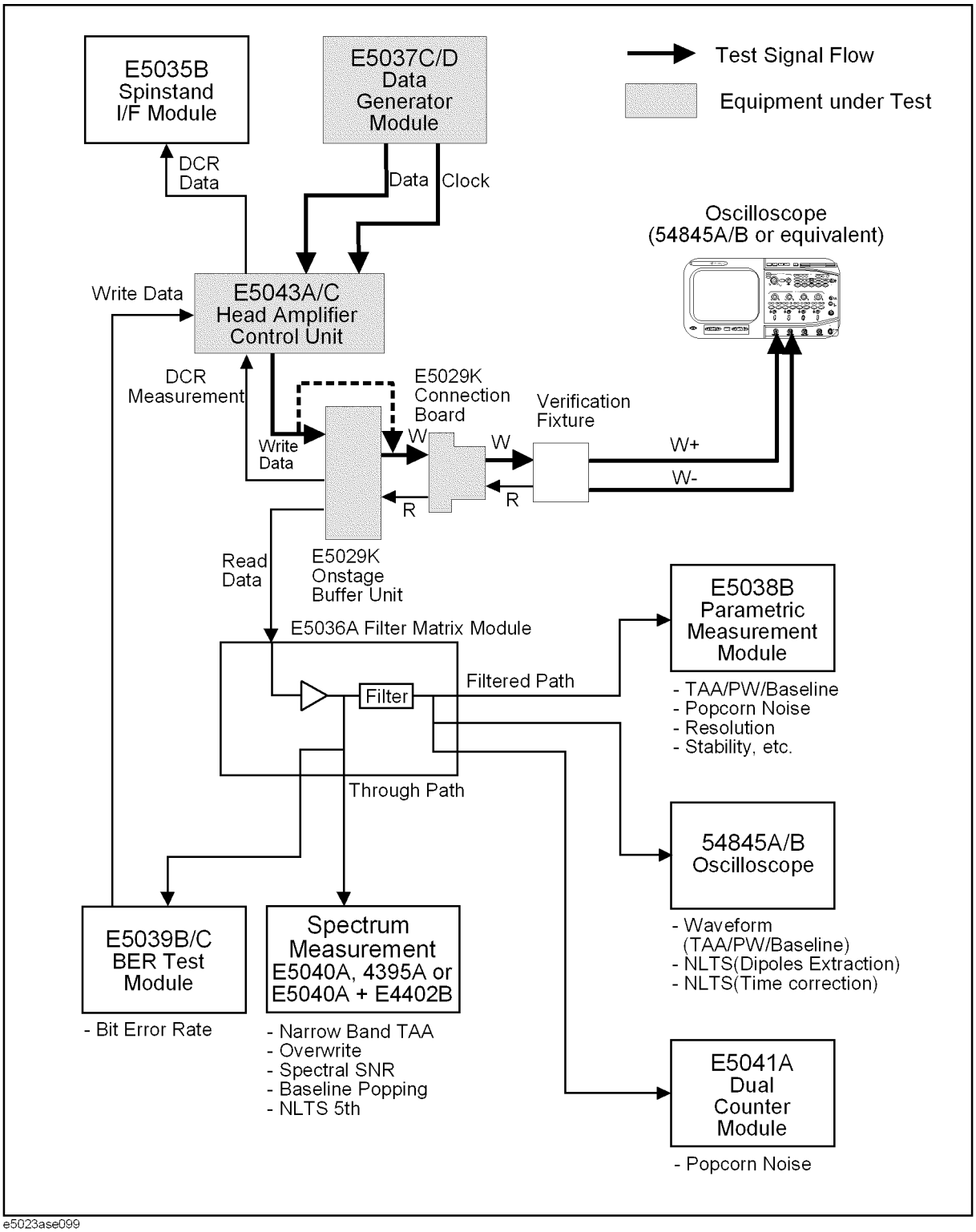
Write Portion Check

Description

The measurement system verification verifies if the write data generates. The write data is observed by the oscilloscope. The write data and clock signal are generated by the E5037C/D, then the signals are mixed by the E5043A/C. This checks the E5037C/D, E5043A/C, E5029K and the cable connection.

Figure 2-9 shows the test signal flow in the write portion check.

Figure 2-9 Write Portion Check Signal Flow



e5023ase099

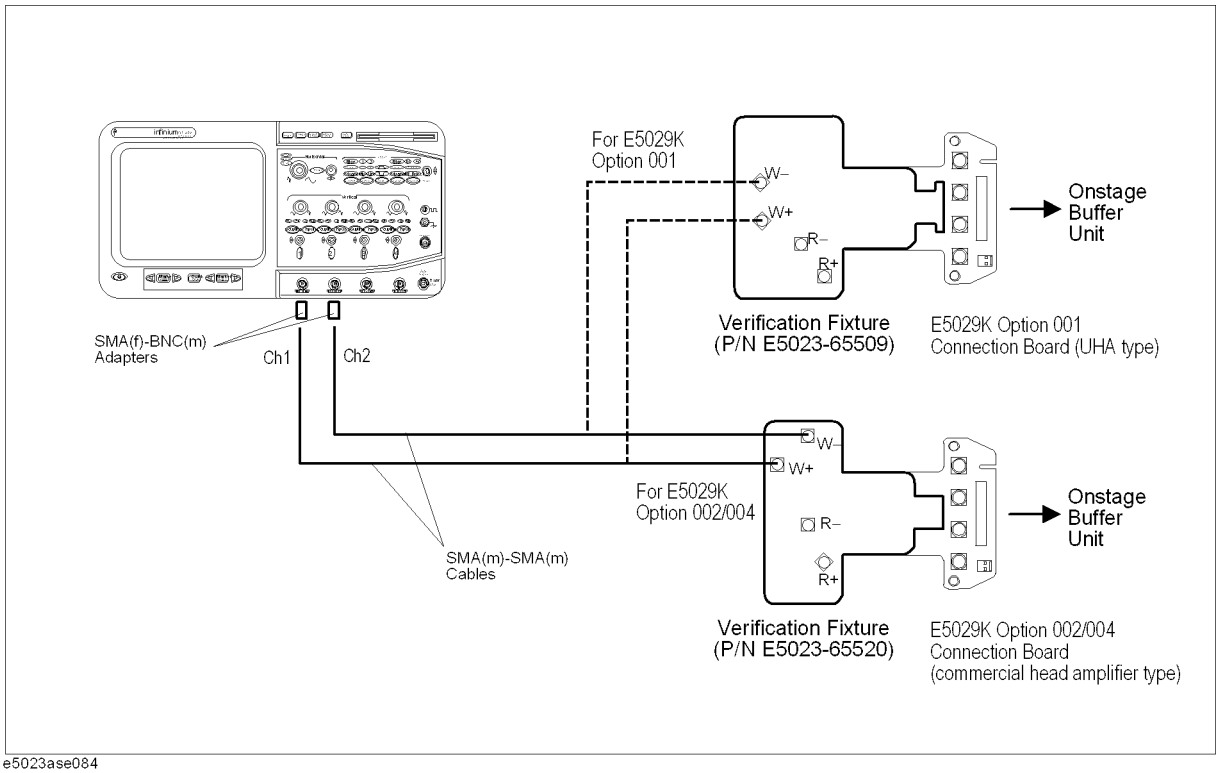
Step 1. Write Signal Test at Connection Board

1. Connect the cables between the ‘W+’ and ‘W-’ on the fixture board and the channels 1 and 2 on the oscilloscope.

NOTE *Do not attach or remove the verification fixture while the access lamp on the connection board is lit. Returning to the configuration menu will turn off the access lamp and allow you to attach or remove the fixture.*

These connections are shown in Figure 2-10.

Figure 2-10 Cable Connection of the Write Portion Check



e5023ase084

2. Place copies of the following *eight* verification kit setup files in the appropriate folders:

NOTE *Those files are provided through the internal web site of Agilent Technologies’ Component Test Division - Kobe. Contact your nearest service center to obtain those files.*

Be sure to place the files in the correct folders and not to destroy the other files in the e5022 folder. Incorrect file operations is dangerous and may cause a system trouble or

spinstand crash.

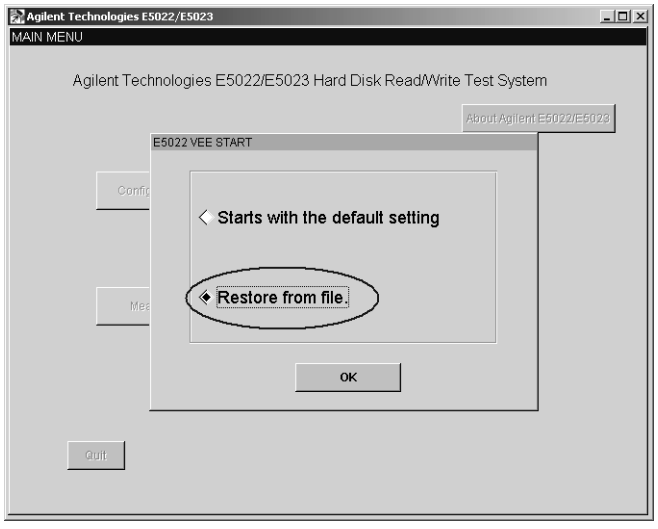
Table 2-8 Verification Kit Setup Files and Folders

Setup File Name	Folder
e5023-66510_bd.xml	[*system installation folder*] \config\headamp\
e5023-66510_cal.xml	
e5023-66510_ctrl.xml	
e5023-66510_ic.xml	
verification.cf0	[*system installation folder*] \vee\
verification.cf1	
verification4395a.cf0	
verification4395a.cf1	

NOTE [*system installation folder*] should be the folder you installed the system software. The default installation folder is "C:\Program Files\Agilent\E5022."

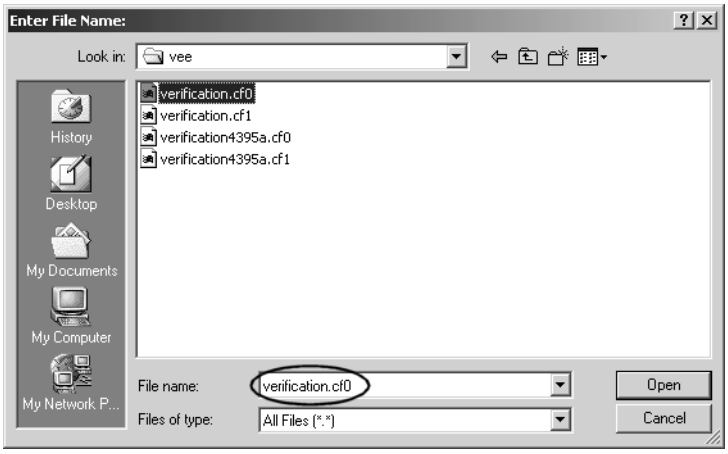
3. Select **Start** - **Programs** - **Agilent Hard Disk ReadWrite Test System** - **Test Environment (Run Time Version)** from the Windows® task bar to start the Test Environment VEE program.
4. Before the program starts to initialize, the 'E5022 VEE START' dialog box will appear, select the 'Restore from file.'

Figure 2-11 Selecting at the Start Menu



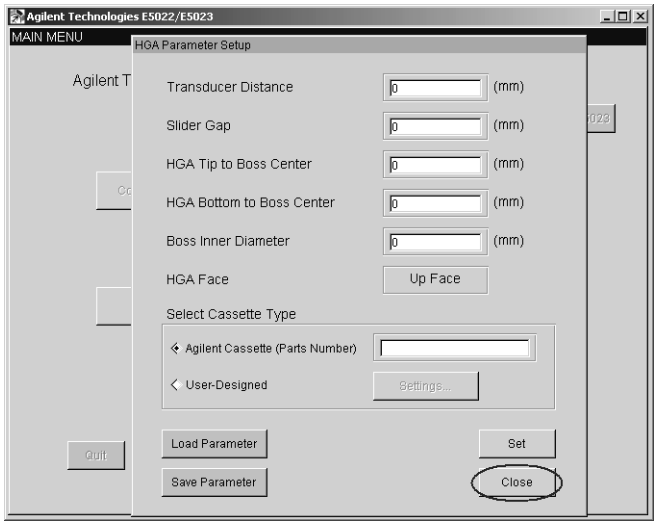
5. Select the file **verification.cf0** (if you use the E5040A as a spectrum analyzer in your system) or **verification4395a.cf0** (if you use the 4395A as a spectrum analyzer in the your system). This setting forces the system not to initialize the spinstand.

Figure 2-12 Selecting the Setup File (when you use the E5040A in the system)



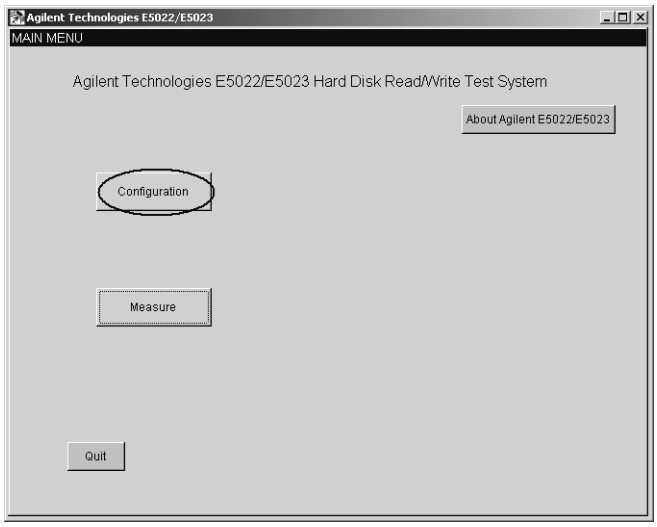
6. Initialization takes about 30 seconds for the program to initialize.
7. After initialization, the 'HGA Parameter Setup' menu will pop up. Click **Close**.

Figure 2-13 Closing the HGA Parameter Setup



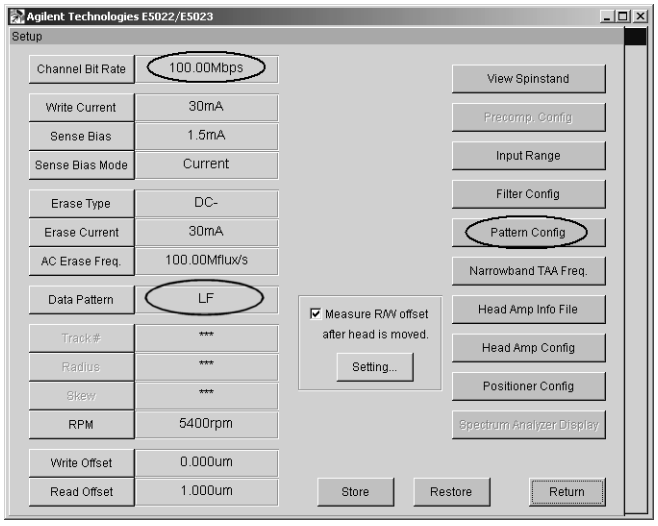
8. Click **Configuration**. Then click **Setup** to open the Setup menu.

Figure 2-14 Main Menu



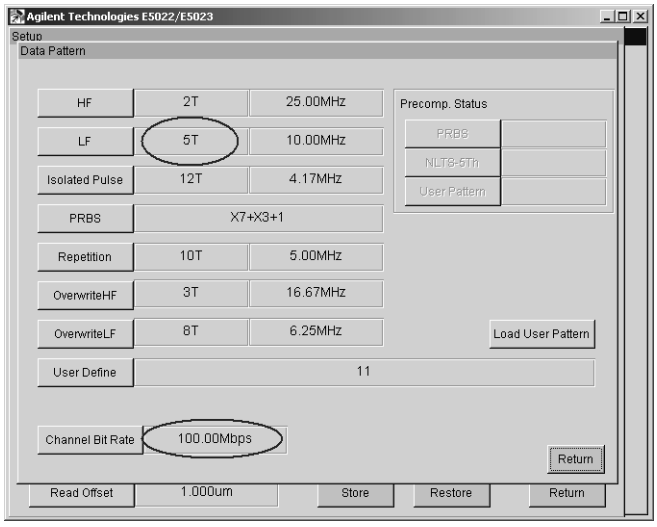
9. Set the channel bit rate to 100 Mbps and the data pattern to LF.

Figure 2-15 Setup Menu



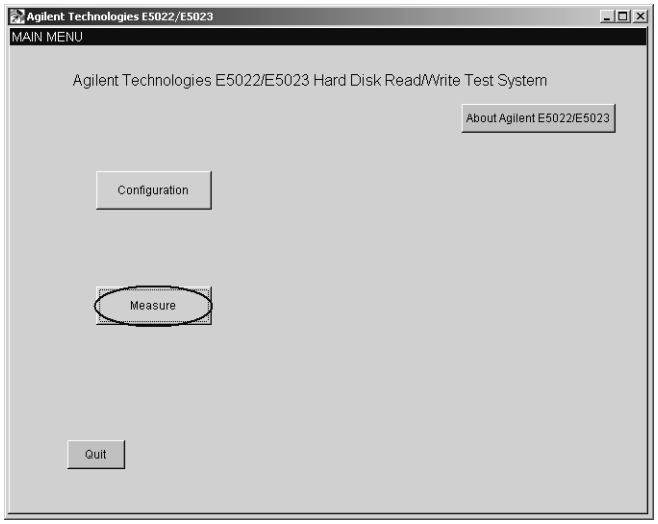
10. Click **Pattern Config** to open the Data Pattern Menu. Set the LF at 5T and confirm if the channel bit rate set at 100 Mbps.

Figure 2-16 Data Pattern Menu



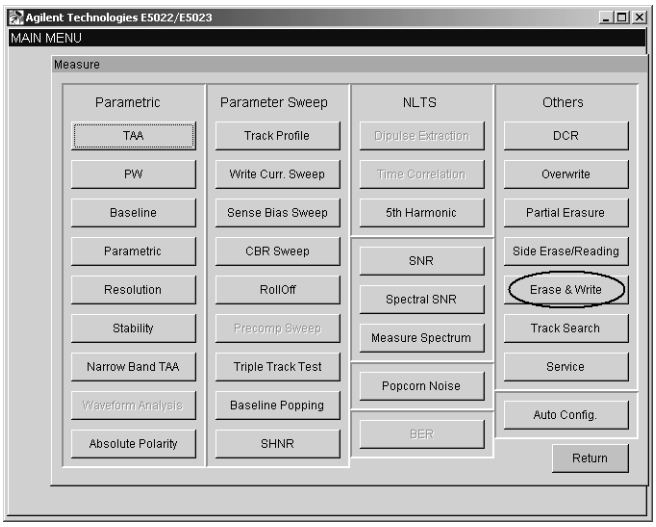
11. Click **Return** three times to return the Main Menu. Click **Measure**.

Figure 2-17 Main Menu



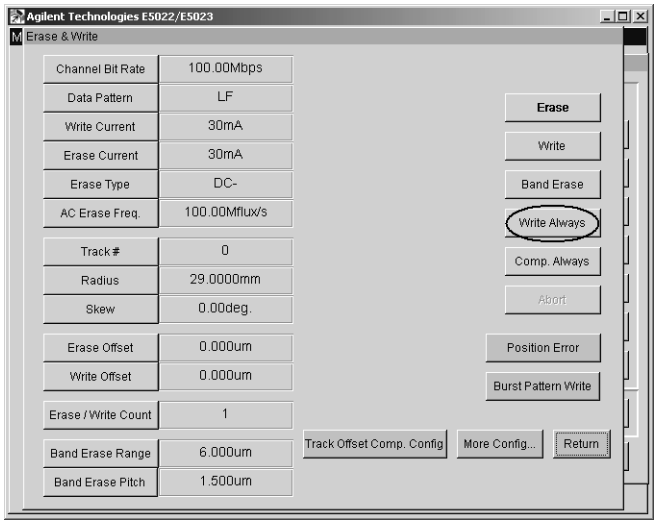
12. Click **Erase & Write** to open the Erase and Write Menu.

Figure 2-18 Main Menu



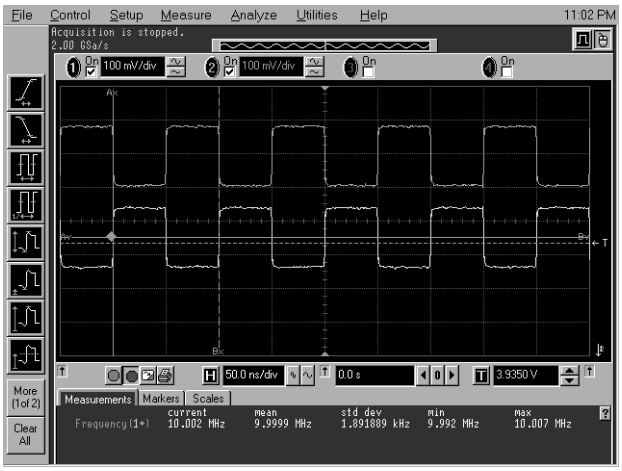
13. Click **Write Always** to generate a write data.

Figure 2-19 Erase & Write Menu



14. Observe the waveform on the oscilloscope.

Figure 2-20 Write Data



15. Read the waveform frequency. Confirm if the both mean frequencies (write+ and write–) are 10 MHz ± 100 Hz.
16. Click **Abort** to stop the data pattern.
17. Click **Return > Return > Config** to return to the configuration page and turn off the output signal.
18. If the waveform is not observed, check the cable connection. Especially, clean the E5029K connection board and the connection pads on it.

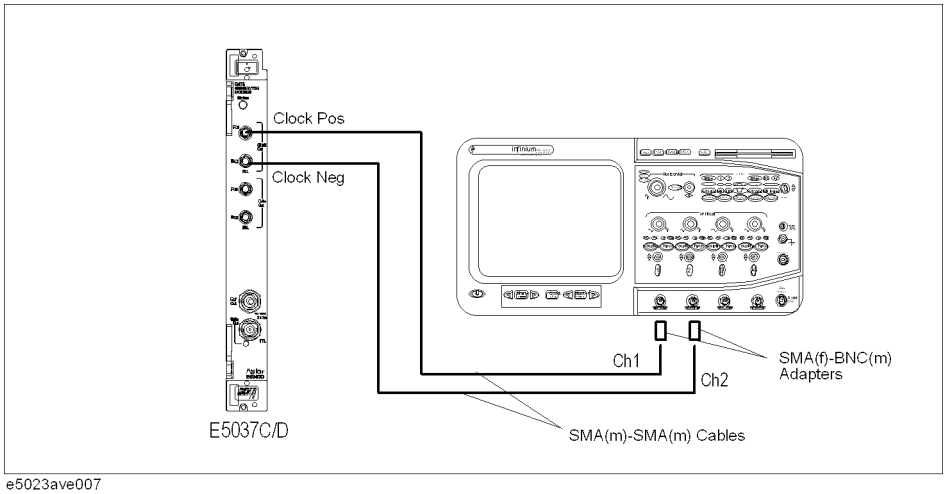
Step 2. Clock Signal Test at E5037C/D

If the cable connection is OK but the waveform is not observed properly in Step 1, check the signal on the E5037C/D in accordance to the following procedure.

1. Connect the cables between the ‘Clock Pos’ and ‘Clock Neg’ on the E5037C/D and the channels 1 and 2 on the oscilloscope.

   These connections are shown in Figure 2-21.

Figure 2-21 Cable Connection of the E5037C/D Clock Data Check

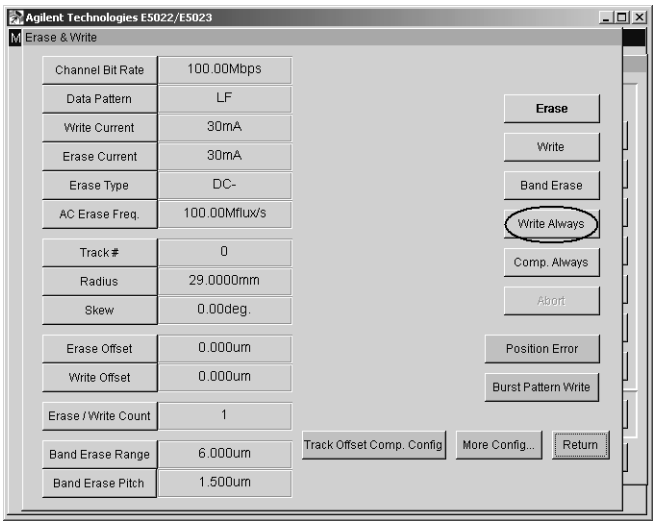


e5023ave007

NOTE Remain the verification fixture on the connection pad. Otherwise an error will occur during the measurement.

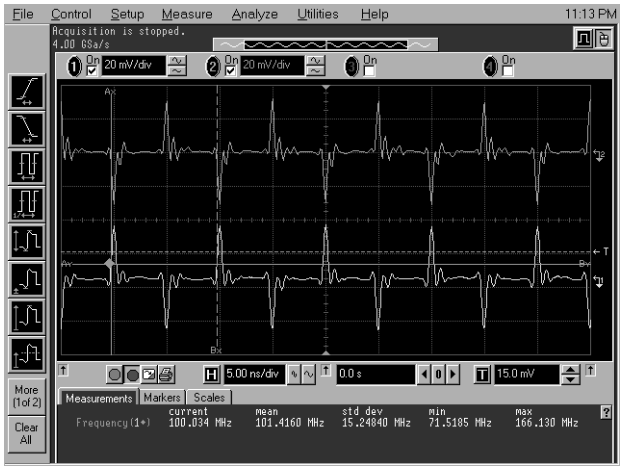
2. Click **Return > Measure > Erase & Write > Write Always** to generate a write data.

Figure 2-22 Erase & Write Menu



3. Observe the waveform on the oscilloscope.

Figure 2-23 Clock Data on E5037C/D



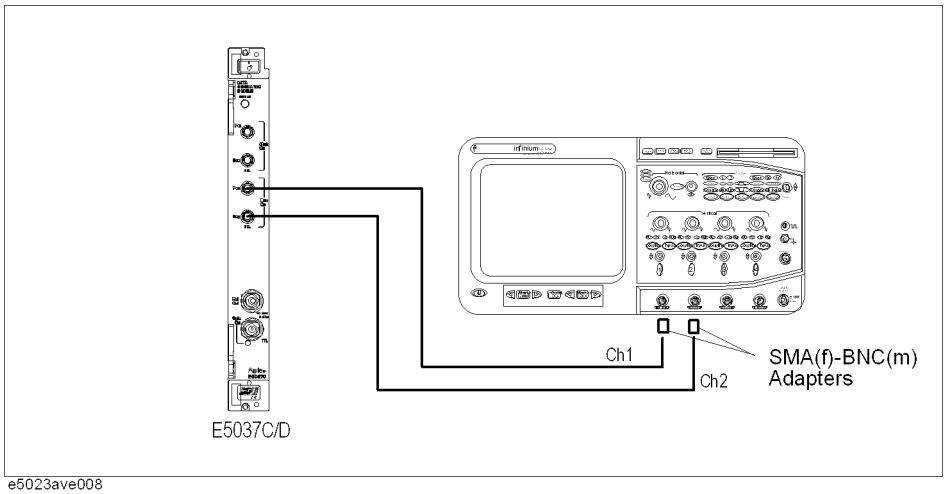
4. Read the waveform frequency. Confirm if the frequency is approximately 100 MHz.
5. Click **Abort > Return > Return > Config** to return to the configuration page and turn off the output signal.

Step 3. Data Signal Test at E5037C/D

1. Connect the cables between the ‘Data Pos’ and ‘Data Neg’ on the E5037C/D and the channels 1 and 2 on the oscilloscope.

   These connections are shown in Figure 2-24.

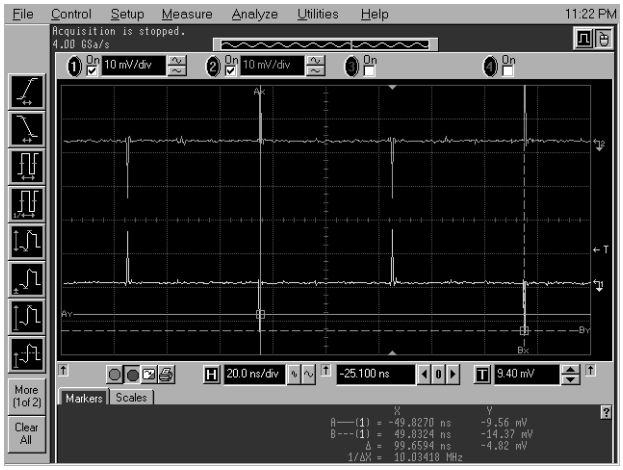
Figure 2-24 Cable Connection of the E5037C/D Data Check



e5023ave008

2. Click **Write Always** to generate a write data.
3. Observe the waveform on the oscilloscope.

Figure 2-25 Data on E5037C/D



4. Read the waveform frequency. Confirm if the both frequencies (data+ and data–) are approximately 10 MHz.
5. Click **Abort > Return > Return > Config** to return to the configuration page and turn off the output signal.
6. If the correct waveform can not be observed on the E5037C/D, replace the E5037C/D.

Otherwise, replace the E5043A/C.

Table 2-9 Faulty Assembly Isolation

Measurement Results			**Suspicious Assembly**
Write Signal Waveform Measured at Connection Board (Step 1)	**Clock Signal Waveform Measured at E5037C/D (Step 2)**	**Data Signal Waveform Measured at E5037C/D (Step 3)**	
Not Good	Good	Good	• E5029K Connection Board (replace) • E5029K Connection Pads (clean/ replace) • Cable Connection between Connection Board and E5037C/D (check/replace) • E5043A/C Head Amplifier Control Unit (replace)
Not Good	Not Good	Good	E5037C/D Data Generator Module (Replace)
Not Good	Good	Not Good	E5037C/D Data Generator Module (Replace)
Good	-	-	(None)

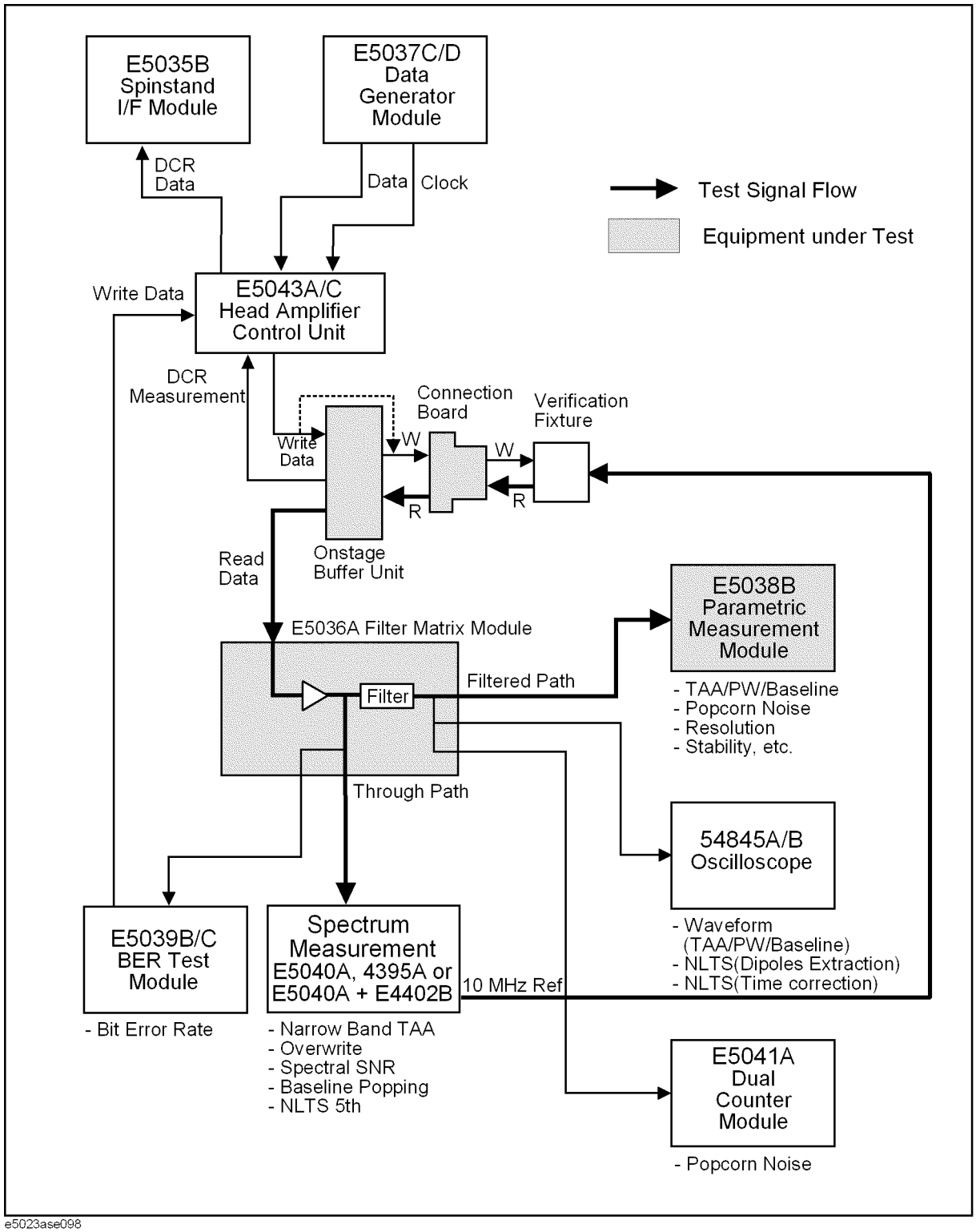
Read Portion Check

Description

This check verifies if the read potion of the system. The 10MHz reference signal from the E5040A is input into the fixture as a test signal. The signal is measured by the E5040A and the E5038B in order to confirm if the module works.

Figure 2-26 shows the test signal flow in the read portion check.

Figure 2-26 Read Portion Check Signal Flow



Step 1. TAA Measurement using E5040A Spectrum Measurement Module

1. Set the fixture board on the E5029K connection board.

NOTE *Do not attach or remove the verification fixture while the access lamp on the connection board is lit. Returning to the configuration menu will turn off the access lamp and allow you to attach or remove the fixture.*

2. Connect the terminator on the 'R–' on the fixture.

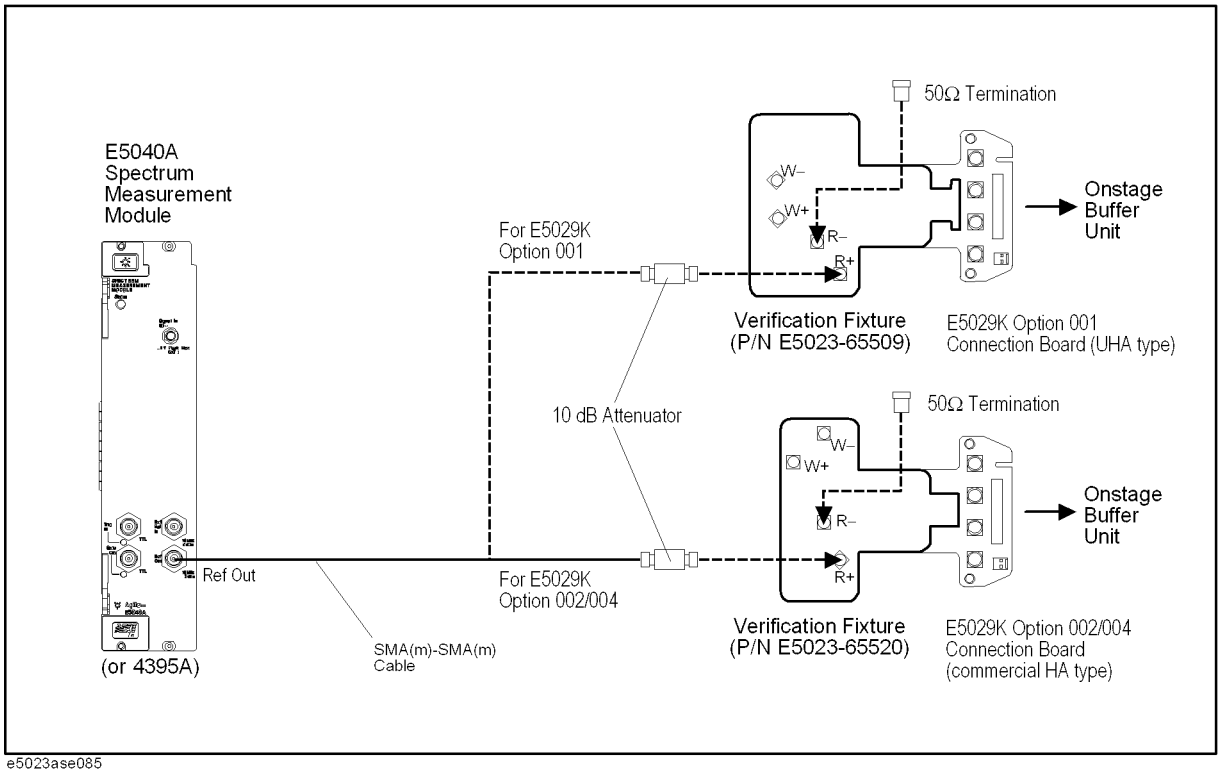
   Connect the 10 dB attenuator on the 'R+' on the fixture.

   Connect the cable between the 10 dB attenuator on the fixture board and the Ref Out on the E5040A.

   These connections are shown in Figure 2-27.

NOTE In case of installing the E4402B (opt. 300), connect the cable between the 10 dB attenuator on the fixture board and the 10 MHz REF OUT on the E4402B instead of the Ref Out on the E5040A.

Figure 2-27 Cable Connection of TAA Linearity Test

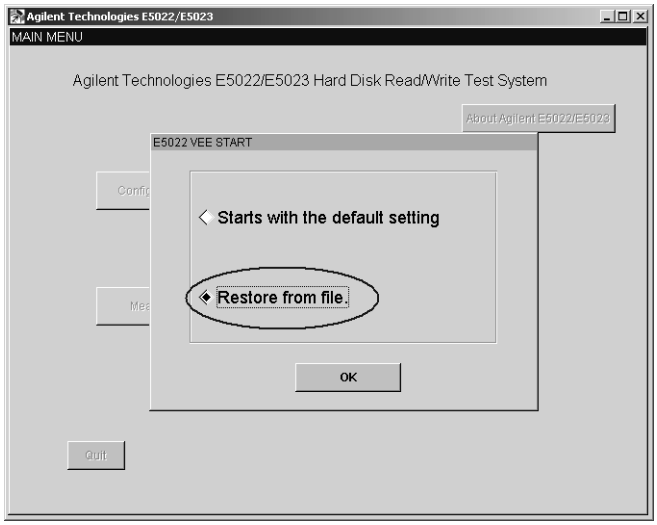


e5023ase085

3. Place copies of eight verification kit setup files in the appropriate folders (if it is not done). See Step 1-2 on page 40 for details.
4. Select **Start** - **Programs** - **Agilent Hard Disk ReadWrite Test System** - **Test Environment (Run Time Version)** from the task bar of Windows 95 or 2000 in order to start the VEE measurement program.

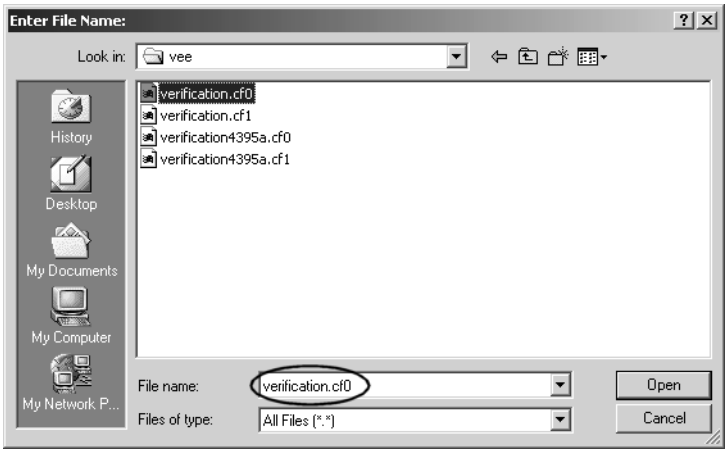
5. Before the program starts to initialize, the ‘E5022 VEE START’ will appear, select the ‘Restore from file’.

Figure 2-28 Selecting at the Start Menu



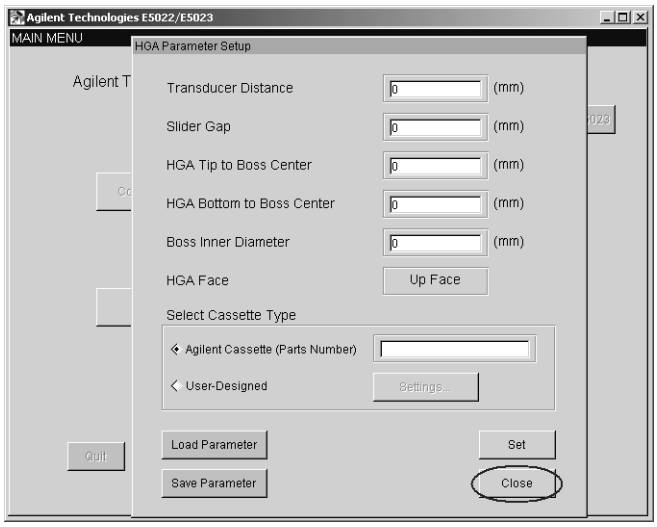
6. Select the file **verification.cf0** (if you use the E5040A as a spectrum analyzer in your system) or **verification4395a.cf0** (if you use the 4395A as a spectrum analyzer in the your system). This setting forces the system not to initialize the spinstand.

Figure 2-29 Selecting the Setup File (when you use the E5040A in the system)



7. Initialization takes about 30 seconds for the program to initialize.
8. After initialization, the ‘Cassette Parameter Setup’ menu will pop up. Click **Close**.

Figure 2-30 Closing the HGA Parameter Setup



9. Click **Configure** - **Setup** to open the Setup menu.

Figure 2-31 Main Menu

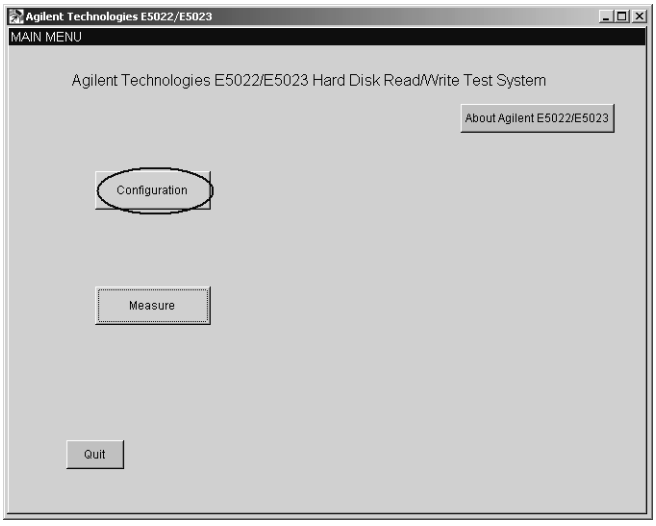
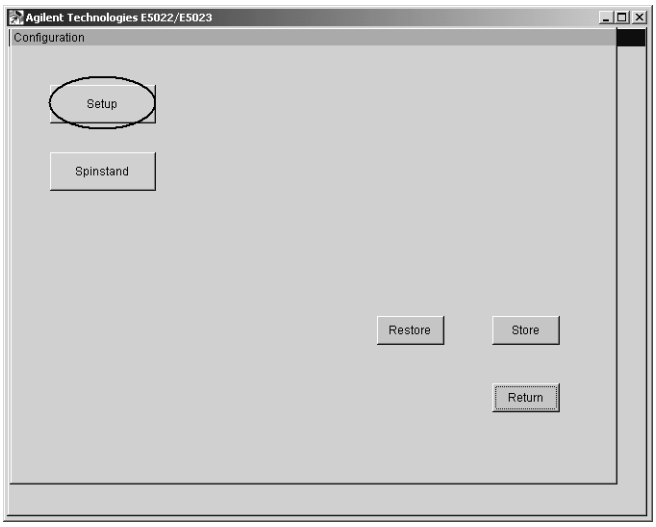
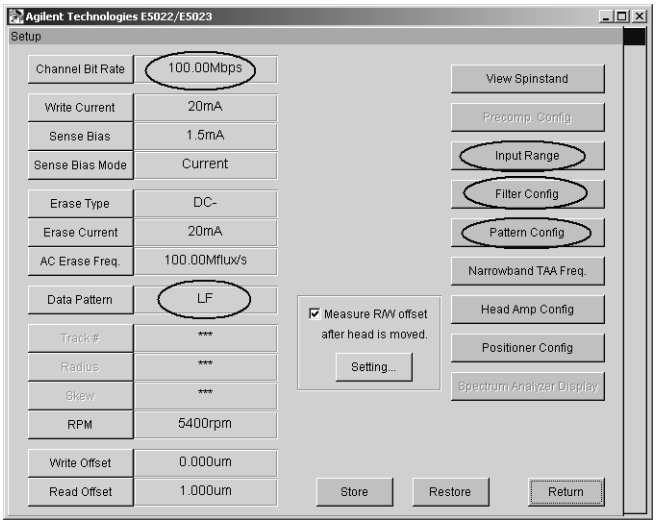


Figure 2-32 Configuration Menu



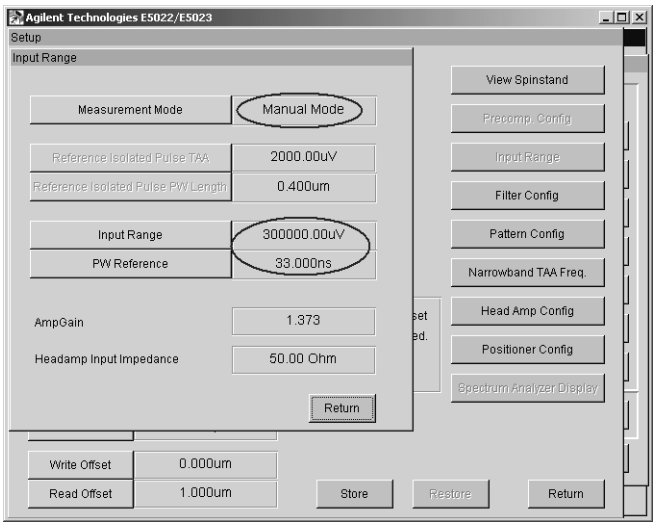
10. Set the channel bit rate at 100 Mbps and the data pattern at LF.

Figure 2-33 Setup Menu



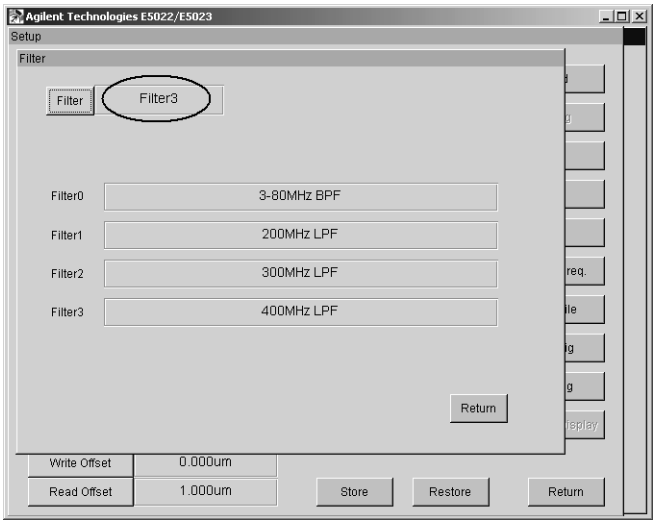
11. Click **Input Range** to open Input Range Menu. Set the Measurement Mode at Manual Mode, the input range at 300,000µ (300m) V, and the PW reference 33.000ns. Then click **Return** to return the setup menu.

Figure 2-34 Input Range Menu



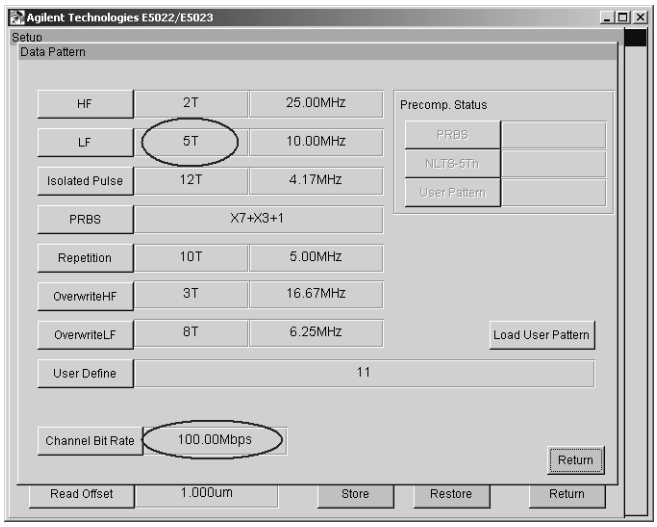
12. Click **Filter Config** to open the Filter Menu. Select the low pass filter of the highest cut-off frequency in the installed filters. Then click **Return**.

Figure 2-35 Filter Menu



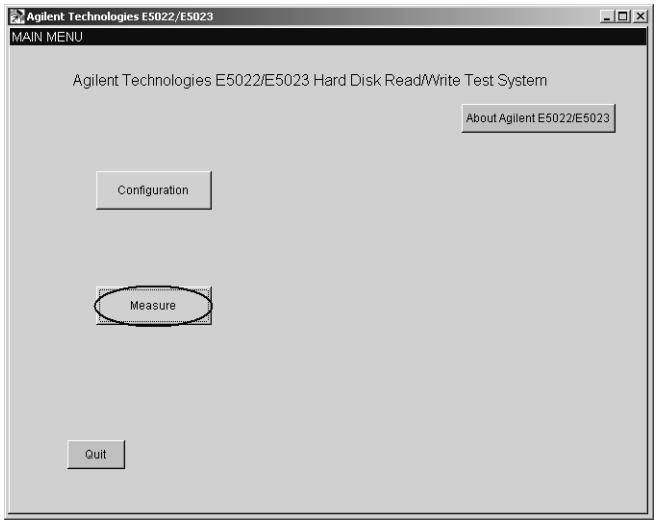
13. Click **Pattern Config** to open the Data Pattern Menu. Set the LF at 5T and confirm if the channel bit rate set at 100 Mbps.

Figure 2-36 Data Pattern Menu



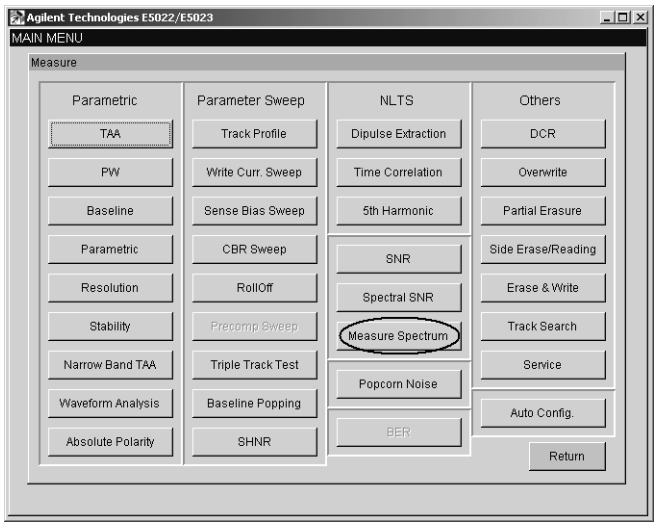
14. Click **Return** three times to return the Main Menu, then click **Measure**.

Figure 2-37 Main Menu



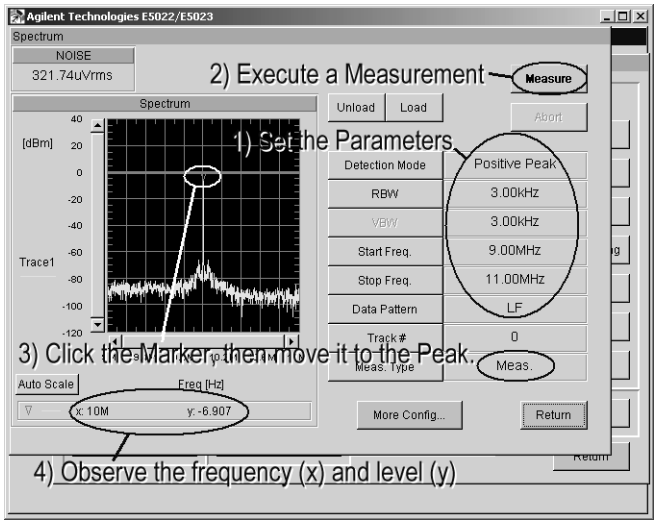
15. Click **Measure Spectrum** to open the Spectrum Menu.

Figure 2-38 Measure Menu



16. Set the parameters as shown in Figure 2-39.

Figure 2-39 Spectrum Measurement Menu



17. Click **Measure** to make a spectrum measurement. Although some error message may be displayed because the spinstand is not initialized, ignore it
18. Click the marker in the graph, then move it to the peak level.
19. Read its frequency (f) and level (x). Confirm if the frequency is 10 MHz ± 100 Hz and the level is from –10 to –5 dBm.
20. Calculate the TAA from the level according to the following equation.

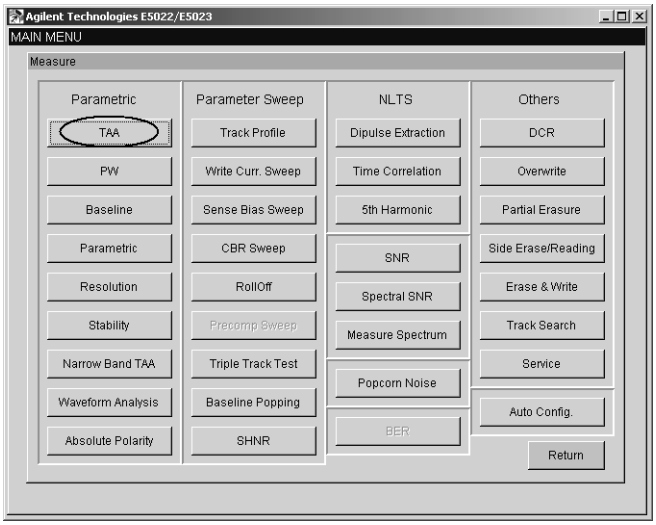
Equation 2-1 TAA Calculation Formula

$$TAA[V] = 2 \times 10^{\frac{x[dBm] \text{ Đ } 10}{20}}$$

Step 2. TAA Measurement using E5038B Parametric Measurement Module

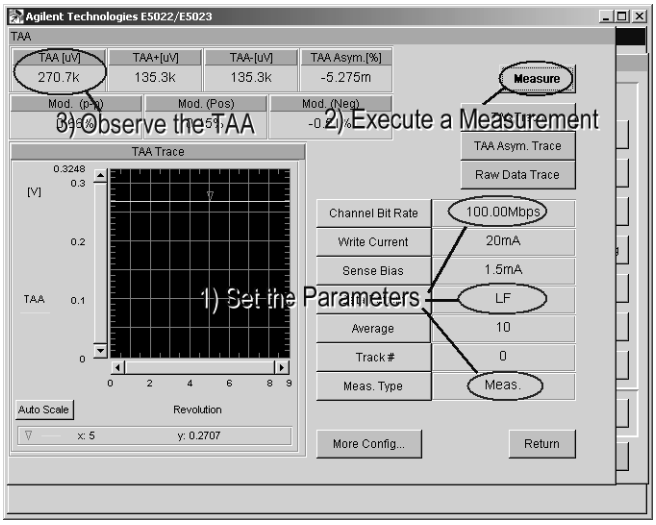
1. Click **Return** to return the Measure Menu.
2. Click **TAA** to open the TAA Menu.

Figure 2-40 Measure Menu



3. Set the parameters as shown in Figure 2-41.

Figure 2-41 TAA Menu



4. Click **Measure** to start a TAA measurement. Although some error message may be displayed because the spinstand is not initialized, ignore it

   Confirm the measured TAA is approximately same as the calculated TAA.

5. If the TAA measurement result is not good despite that the spectrum measurement result is good, replace E5038B or the filter portion of E5036A.

   If the spectrum measurement result is not good despite that the TAA measurement result is good, replace E5040A.

NOTE In case of installing the E4402B (opt. 300), if the spectrum measurement result is not good, use the Ref Out on the E5040A and check the E5040A with "Step 1. TAA Measurement using E5040A Spectrum Measurement Module" on page 51 and "Step 2. TAA Measurement using E5038B Parametric Measurement Module" on page 58. If the E5040A's measurement result is good, a failure in the E4402B is suspected.

If the both result is not good, replace E5029K Onstage Buffer Board.

Table 2-10 Faulty Assembly Isolation

Measurement Results		**Suspicious Assembly**
Level, Frequency and TAA Value Obtained by Spectrum Measurement	**TAA Value Obtained by TAA Measurement Function**	
Not Good	Good	E5040A Spectrum Measurement Module, 4395A Spectrum Analyzer or E4402B Spectrum Analyzer (replace)
Good	Not Good	• E5038B Parametric Measurement Module (replace) • E5036A Filter Matrix Module (replace)
Not Good	Not Good	• E5029K Onstage Buffer Board (replace) • E5036A Filter Matrix Module (replace)
Good	Good	(None)

Perform Measurements

This section helps you to isolate a problem in the system through actual device measurements. In brief, the Hard Disk Read/Write Test System consists of a data generation instruments, measuring instruments and the spinstand mechanical part as shown in Figure 2-42 and Figure 2-43 (Agilent E5023A does not include the spinstand). These figures are useful to isolate a defective assembly in the system. For example, TAA, PW and Baseline measured data which are measured at the E5038B are wrong in spite of the other data such as Narrow Band TAA is good, it is assumed that the E5038B gives problem. Especially, in case of the measurement instrument such as the E5038B, E5040A and Oscilloscope gives problem, it is easy to isolate a defective instrument. However, if one of the E5037C/D, E5035B, Head Amp and Spinstand gives problem, it is difficult to specify the defective instrument. In this case, to replace the instrument except for the Spinstand in sequence is the best method. And, when you encounter the measurement data does not return or 'Timeout occurred' error message appears, it is assumed that the trigger line stops causes this problem. In this case, to check the trigger line on the E5035B and Spinstand, or to inspect the status LED on the VXI instrument is the best method. Refer to Appendix B, "Measurement Paths," on page 157 which describes the matrix with measurement paths and measurement parameters. If you have any problems as shown in Table 2-11, "Trouble Isolation Hints," on page 63, it is possible to roughly isolate a defective instrument.

Figure 2-42 Agilent E5023A Write/Read Data Flow

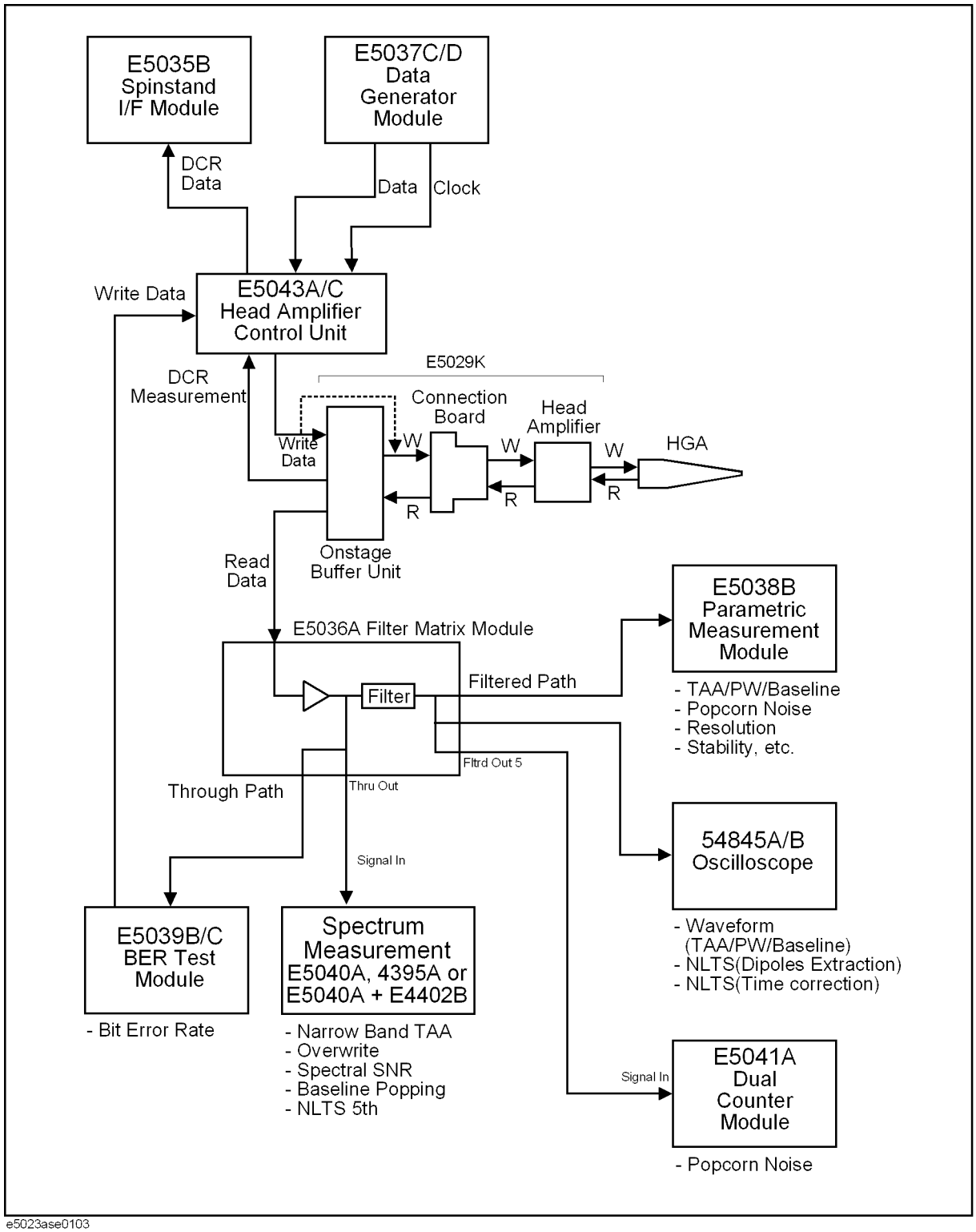


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Figure 2-43 **Agilent E5023A Control/Trigger/Gate Line**

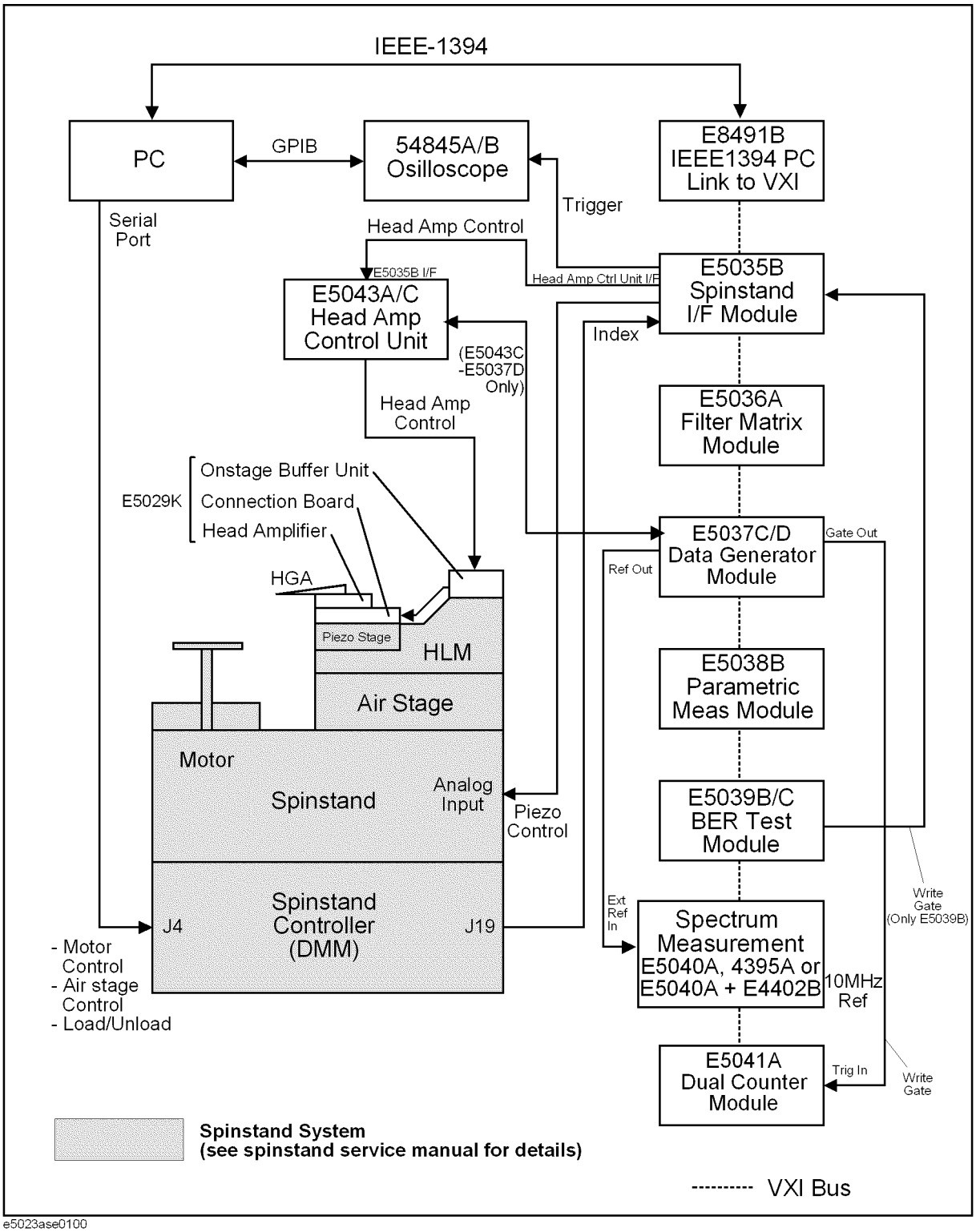

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Table 2-11 Trouble Isolation Hints

Measurement Item	Symptoms of Problem	To Guess the Cause of Problem
Auto Configuration	"Auto Configuration Error" occurs or TAA measurement data and/or PW measurement data is unacceptable.	If a parameter of write and sense current data is unsuitable, it is assumed that the head amplifier, E5035B or E5038B has some problem.
Read/Write Offset Measurement	"No Peak" error message occurs during the measurement or track profile data is unacceptable.	It is assumed that the instrument except for the Oscilloscope, E5039B/C, and E5038B gives problem. Firstly, check and replace the E5037C/D, Head Amp, E5035B and E5040A in sequence. Still, if you can not isolate a defective instrument, refer to "Troubleshooting" chapter of *spinstand service manual*.
Parametric Measurement with E5038B Parametric Measurement Module	TAA is unacceptable in spite of the PW and Baseline measurement data are acceptable.	Check the SMA - SMA cable connecting 'Fltrd Out 3' connector on the E5036A and 'Signal In' connector on the E5038B. If cable connection is good, replace the E5038B. (The E5038B consists of three separated measurement part as TAA measurement part, PW measurement part and Baseline measurement part.)
	PW is unacceptable in spite of the TAA and Baseline are acceptable.	
	Baseline is unacceptable in spite of the TAA and PW are acceptable.	
	Parametric measurement data is unacceptable in spite of the Narrow band TAA measurement data measured by the E5040A is acceptable.	
Narrow Band TAA Measurement	Narrow Band TAA is unacceptable which is measured by the E5040A, but TAA is acceptable which is measured by the E5038B.	Check the SMA - SMA cable connecting 'Thru Out 1' on the E5036A and 'Signal In' on the E5040A. In addition, check the SMA-BNC cable connecting 'Ref Out' connector on the E5037C/D and 'Ext Ref In' connector on the E5040A. If the cable connections are good, replace the E5040A.

Table 2-11 Trouble Isolation Hints

Spectral SNR, Measure Spectrum with E5040A	Noise Level is high	Verify the noise level at the 'Signal In' connector on the E5040A. If it is out of limit, replace the E5040A. If it is acceptable, specify the noise source in the E5023A system.
Waveform Analysis and NLTS Dipulse Extraction / Time Correlation Measurement	Measurement data is unacceptable	Check the SMA - BNC cable which is connected with 'Fltrd Out 4' connector on the E5036A and 'Ch1' connector on the Oscilloscope. If cable connection is good, perform the self test. If the self test fails, replace the Oscilloscope.
Measurement with 54845A/B Oscilloscope	Error message "Timeout occurred" appears on the PC monitor.	Check the BNC - BNC cable which is connected with 'TRG OUT 1' connector on the E5035B and 'Ch2(3)' connector on the Oscilloscope. If cable connection is good, verify the trigger level at the TRG OUT 1. If it is wrong, replace the E5035B.
Write or Read Head DCR Measurement	Measurement data is unacceptable	Check the MDR-MDR cable connecting the 'Head Amp Ctrl Unit I/F' connector on the E5035B and 'E5035B I/F' connector on the E5043A/C. If cable connection is good, replace the E5035B, E5043A/C and head amplifier in sequence.
	One of the Head DCR is acceptable, but another Head DCR is unacceptable.	It is assumed that connection with the connection board (E5029K) and HGA cassette is poor.
Track Profile	No Peak	Same as R/W offset
NLTS 5th Measurement	Measurement data is unacceptable.	If the measurement data with precompensation is wrong in spite of the it without precompensation is acceptable, it is assumed that the precompensation part within the E5037C/D gives any problems. Replace the E5037C/D.
Bit Error Rate Measurement	measurement data is unacceptable.	If Bit Error Rate measurement data is wrong, replace the E5039B/C.

Table 2-11 Trouble Isolation Hints

Popcorn Noise Measurement with E5041A	Measurement data is unacceptable	If popcorn noise data measured by the E5041A is wrong, replace the E5041A. If the E5041A replacement does not solve the problem, check unwanted noise source generated within the measurement system and remove it.
All measurement Items	Measurement data is not returned	If the status LED on the VXI module lighting is amber, replace the module. If all status LED on the VXI modules lighting is green, verify the index signal from the 'J19' connector on the spinstand controller (DMM). If the index signal is incorrect, refer to "Troubleshooting" chapter of *spinstand service manual*. If measurement data still does not return, replace the E5035B and E8491B in sequence.

3 Replaceable Parts

Introduction

In this chapter, the replaceable parts used for on-site repair are listed. How to order the parts is also described.

This chapter lists the replaceable parts for followings.

- Replaceable VXI modules and equipment
- Cables and connectors

In this chapter, replaceable parts for the following instruments are not described, since these instruments are repaired at service center.

E8401A	VXI mainframe (except for 0950-3276 or E8401-69276 Power Supply)
54845A/B	Infinium Oscilloscope (E5023A Option 103)
E4402B	Spectrum Analyzer (E5023A Option 300)

NOTE For spinstand related parts, see spinstand service manual.

Ordering Information

To order a part listed in the replaceable parts table, quote the Agilent part number (with a check digit), indicate the quantity required, and address the order to the nearest Agilent office. The check digit will ensure accurate and timely processing of the order.

To order a part not listed in the replaceable parts table, include the instrument model number, the description and function of the part, and the quantity of parts required. Address the order to the nearest Agilent office.

Direct Mail Order System

Within the USA, Agilent can supply parts through a direct mail order system. Advantages of using this system are:

1. Direct ordering and shipment from the Agilent Parts Center.
2. No maximum or minimum on any mail order (there is a minimum order amount for parts ordered through a local Agilent office when the orders require billing and invoicing).
3. Prepaid transportation (there is a small handling charge for each order).
4. No invoices.

To provide these advantages, a check or money order must accompany each order.

Mail order forms and specific ordering information are available through your local Agilent office, addresses and phone numbers are located at the back of this manual.

Replaceable Parts List

Replaceable parts tables list the following information for each part.

1. Agilent part number.
2. Part number check digit (CD).
3. Part quantity as shown in the corresponding figure. There may or may not be more of the same part located elsewhere in the instrument.
4. Part description, using abbreviations.
5. A manufacturer of the part, if available directly.
6. The manufacturer's part number, if available directly.

Replaceable Parts

Replaceable VXI Modules and Equipment

Figure 3-1 Replaceable VXI Modules and Equipment

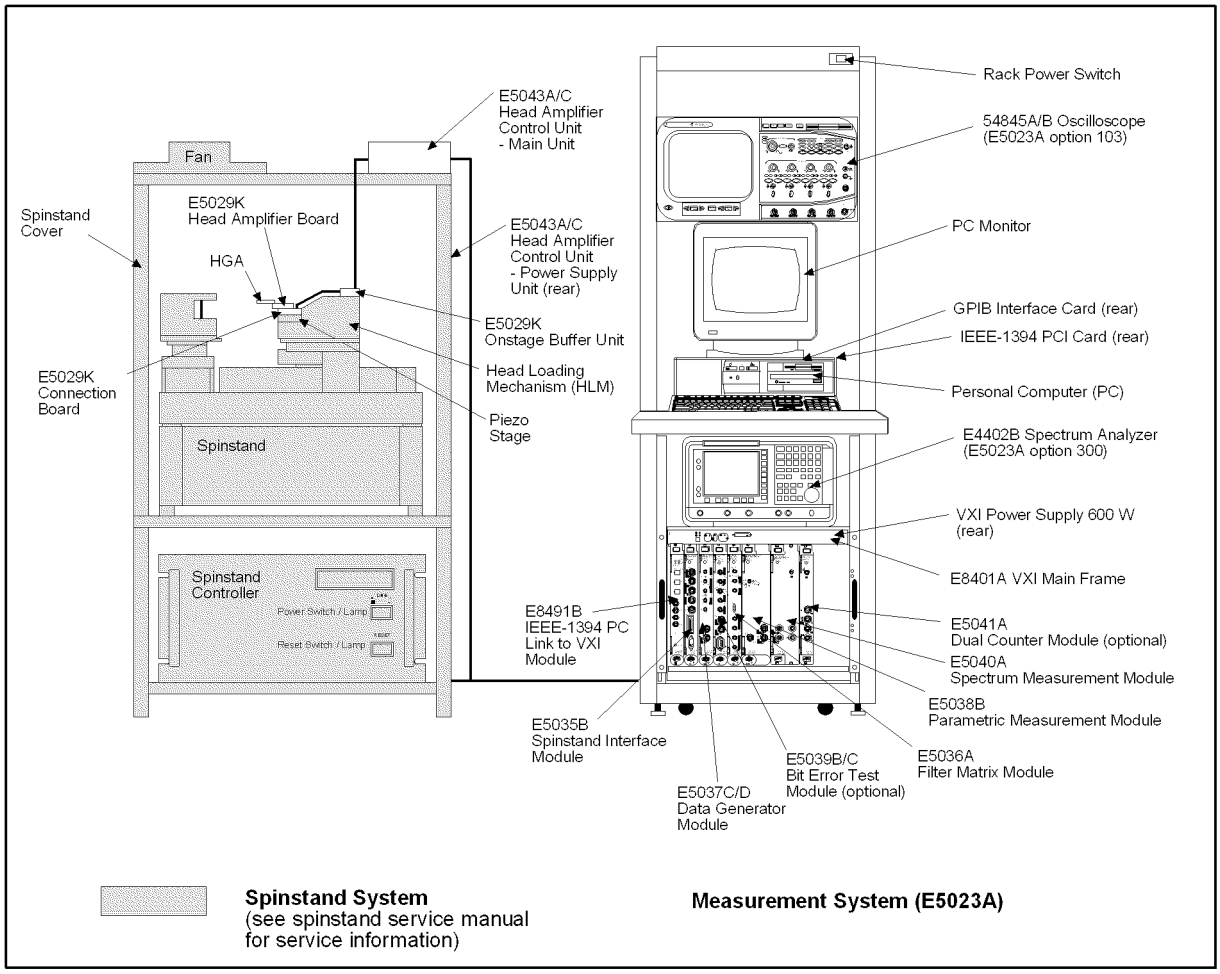

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Table 3-1 VXI Modules

	Part Number	CD	Qty.	Description
1	E8491-66202		1	E8491B IEEE-1394 PC Link to VXI Module
2	E5035-65102		1	E5035B Spinstand Interface Module
	E5035-69102*1		1	E5035B Spinstand Interface Module (exchange)

Table 3-1 VXI Modules

	Part Number	CD	Qty.	Description
3	E5037-65004		1	E5037C 1.5 Gbps Data Generator Module
	E5037-69004*1		1	E5037C 1.5 Gbps Data Generator Module (exchange)
	E5037-65005		1	E5037D 2.6 Gbps Data Generator Module
	E5037-69005*1		1	E5037D 2.6 Gbps Data Generator Module (exchange)
4	E5039-65011		1	E5039B Bit Error Test Module
	E5039-69011*1		1	E5039B Bit Error Test Module (exchange)
	E5039-65021		1	E5039C Bit Error Test Module
	E5039-69021*1		1	E5039C Bit Error Test Module (exchange)
5	E5036-65001		1	E5036A Filter Matrix Module
	E5036-69001*1		1	E5036A Filter Matrix Module (exchange)
6	E5038-65002		1	E5038B Parametric Measurement Module
	E5038-69002*1		1	E5038B Parametric Measurement Module (exchange)
7	E5040-65001		1	E5040A Spectrum Analyzer Module
	E5040-69001*1		1	E5040A Spectrum Analyzer Module (exchange)
8	E5041-65001		1	E5041A Dual Counter Module
	E5041-69001*1		1	E5041A Dual Counter Module (exchange)

*1. Rebuilt-Exchange assembly. Defective parts must be returned for credit. Parts required for spare stock must be ordered by the new model number.

Table 3-2 Other Equipment

	Part Number	CD	Qty.	Description
9	0950-3276		1	VXI Power Supply 600W
	E8401-69276*1		1	VXI Power Supply 600W (exchange)
10	E5022-61011		1	Dell Personal Computer
11	E5022-61009		1	17 inch CRT Monitor
	E5022-61010		1	15 inch LCD Monitor
12	82350B		1	GPIB Interface Card
13	E8491-66503		1	IEEE 1394 PCI Card

Table 3-2 Other Equipment

	Part Number	CD	Qty.	Description
14	E5043-65001		1	E5043A/C Head Amplifier Control Unit - Power Supply Unit
	E5013-01205*2		1	Angle for E5043A/C Power Supply Unit used with E5013A
15	E5043-65002		1	E5043A Head Amplifier Control Unit - Main Unit
	E5043-69002*1		1	E5043A Head Amplifier Control Unit - Main Unit (exchange)
	E5013-01201*3		1	Angle-1 for E5043A/B/C Main Unit used with E5013A
	E5013-01202*3		1	Angle-2 for E5043A/B/C Main Unit used with E5013A
	E5043-65004		1	E5043C Head Amplifier Control Unit - Main Unit
	E5043-69004*1		1	E5043C Head Amplifier Control Unit - Main Unit (exchange)
	3050-0893		4	Washer for E5043C Main Unit used with E5010C
16	E5023-65513		1	E5029K Opt. 004 Onstage Buffer Board
	E5023-66514		1	E5029K Opt. 004 Connection Board
	E5023-66506		1	E5029K Opt. 002 Onstage Buffer Board
	E5023-66507		1	E5029K Opt. 002 Connection Board

*1. Rebuilt-Exchange assembly. Defective parts must be returned for credit. Parts required for spare stock must be ordered by the new model number.
*2. For the E5010C spinstand, P/N E5012-04425 should be used.
*3. For the E5010C spinstand, P/N E5043-01203 (2 pieces for an E5043A Main Unit) should be used.

Table 3-3 Filter Boards for the E5036A Filter Matrix Module

	Part Number	CD	Qty.	Description
1	E5036-66531	5	1	0.5 - 2.0 MHz Band Pass Filter Board
2	E5036-66532	6	1	3.0 - 80.0 MHz Band Pass Filter Board
3	E5036-66571	3	1	100 MHz Low Pass Filter Board
4	E5036-66572	4	1	200 MHz Low Pass Filter Board
5	E5036-66573	5	1	300 MHz Low Pass Filter Board
6	E5036-66574	6	1	400 MHz Low Pass Filter Board
7	E5036-66575	7	1	75 MHz Low Pass Filter Board
8	E5036-66576	8	1	150 MHz Low Pass Filter Board
9	E5036-66577	9	1	250 MHz Low Pass Filter Board

Table 3-3 Filter Boards for the E5036A Filter Matrix Module

	Part Number	CD	Qty.	Description
10	E5036-66578	0	1	15 MHz Low Pass Filter Board
11	E5036-66579	1	1	30 MHz Low Pass Filter Board
12	E5036-66598	4	1	Blank Filter Board (for user design)
13	E5036-66599	5	1	50 ohm Thru Filter Board

Cables and Connectors of E5023A Option 415 (1.5 Gbps)(without opt. 300)

Refer to the “Cable Connection” on page 106 for more details.

Figure 3-2 Cable Connection of E5023A Option 415 (1.5 Gbps) (without opt. 300)

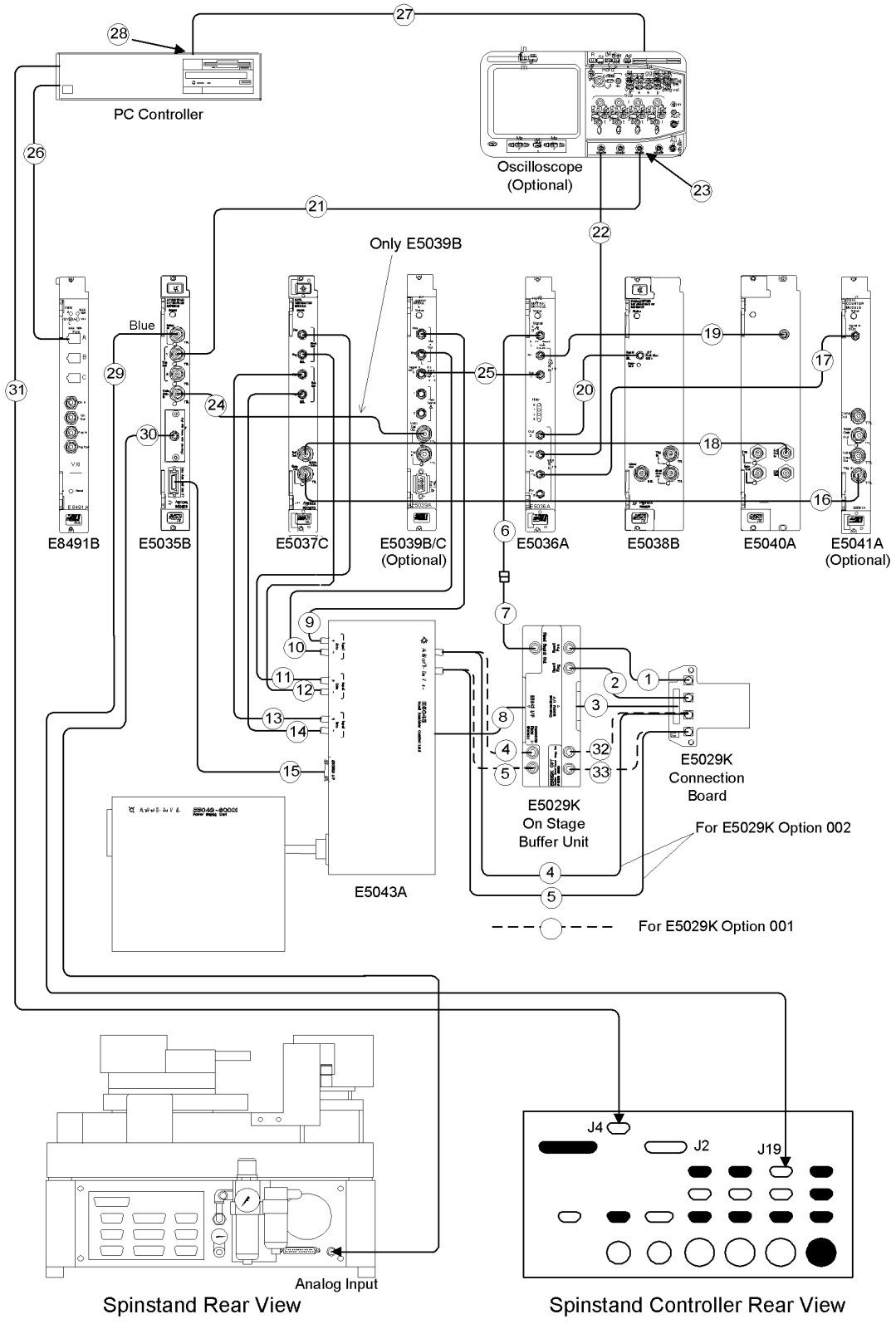

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Table 3-4 Cable Connection of E5023A Option 415 (1.5 Gbps) (without opt. 300)

No.	Description	Connection		Part Number
1	SMA(m)-SMA(m) Cable	E5029K Connection Board “R+”	E5029K Onstage Buffer Unit “R+”	E5029-61601
2	SMA(m)-SMA(m) Cable	E5029K Connection Board “R–”	E5029K Onstage Buffer Unit “R–”	E5029-61602
3	FFC Cable	E5029K Connection Board “Connection Board I/F”	E5029K Connection Board “Cable”	E5029-61608
4	SMA(m)-SMA(m) Cable	E5043A “OUT D+”	E5029K Connection Board (Onstage Buffer Unit[*1]) “W+”	E5043-61641
5	SMA(m)-SMA(m) Cable	E5043A “OUT D–”	E5029K Connection Board (Onstage Buffer Unit[*1]) “W–”	E5043-61642
6	SMA(m)-SMA(m) Cable	E5036A “Sig In”	Inter Connector Plate “Junction Read Sig”	E5023-61607
7	SMA(m)-SMA(m) Cable	Inter Connector Plate “Junction Read Sig”	E5029K “Read Sig Out”	E5023-61608
8	50P Halfpitch Flat Cable	E5029K Onstage Buffer Unit	E5043A Head Amplifier Control Unit (Main Unit)	E5043-61613
9	SMA(m)-SMA(m) Cable	E5039B/C “Data Out Pos”	E5043A “Input 2 Data+”	E5039-61606
10	SMA(m)-SMA(m) Cable	E5039B/C “Data Out Neg”	E5043A “Input 2 Data–”	E5039-61607
11	SMA(m)-SMA(m) Cable	E5037C “Clk Out Pos”	E5043A “Input Clock+”	E5023-61601
12	SMA(m)-SMA(m) Cable	E5037C “Clk Out Neg”	E5043A “Input Clock–”	E5023-61602
13	SMA(m)-SMA(m) Cable	E5037C “Data Out Pos”	E5043A “Input 1 Data+”	E5023-61603
14	SMA(m)-SMA(m) Cable	E5037C “Data Out Neg”	E5043A “Input 1 Data–”	E5023-61604
15	MDR-MDR Cable	E5035B “Head Amp Ctrl Unit I/F”	E5043A “E5035B I/F”	E5023-61605
16	BNC(m)-BNC(m) Cable	E5037C “Gate Out”	E5041A “Trig In”	E5041-61602
17	SMA(m)-SMA(m) Cable	E5036A “Filtrd Out 5”	E5041A “Signal In 50 Ω”	E5041-61603
18	BNC(m)-BNC(m) Cable	E5037C “Ref Out”	E5040A “Ext Ref In”	E5023-61606
19	SMA(m)-SMA(m) Cable	E5036A “Thru Out 1”	E5040A “Signal In”	E5023-61611
20	SMA(m)-SMA(m) Cable	E5036A “Filtrd Out”	E5038B “Signal In”	E5023-61610
21	BNC(m)-BNC(m) Cable	E5035B “Trig Out 1”	Oscilloscope Ch3	E5023-61613
22	SMA(m)-SMA(m) Cable	E5036A “Filtrd Out”	Oscilloscope Ch1	E5023-61612
23	SMA(f)-BNC(m) Adapter	-	-	1250-1700
24	BNC(m)-BNC(m) Cable[*2]	E5035B “WG IN”	E5039B “WG OUT”	E5039-61609
25	SMA(m)-SMA(m) Cable	E5039B/C “Signal In”	E5036A “Thru Out 2”	E5039-61608

Table 3-4 Cable Connection of E5023A Option 415 (1.5 Gbps) (without opt. 300)

No.	Description	Connection		Part Number
26	IEEE-1394 Cable	IEEE-1394 Port on PCI Board	E8491B “Port A”	8192-8688
27	GPIB Cable, 2m	GPIB Port on PCI Board	54845A/B GPIB Port	10833B
28	GPIB Adapter Extender*3	-	-	10834A
29	BNC(m)-DSUB(f) Cable	E5035B “Index In”	Spinstand Controller “J19”	E5023-61609
30	SMA(m)-BNC(m) Cable	E5035B “Piezo Ctrl”	Spinstand “Analog Input”	E5013-61601
31	Serial Cable	PC COM1 Port	Spinstand Serial Port	E5022-61628
32*1	SMA(m)-SMA(m) Cable	E5029K Connection Board “W+”	E5029K Onstage Buffer Unit “W+”	E5029-61604
33*1	SMA(m)-SMA(m) Cable	E5029K Connection Board “W–”	E5029K Onstage Buffer Unit “W–”	E5029-61605

*1. For E5029K Option 001.
*2. For E5039B.
*3. It is not needed if the GPIB cable can be connected to the PC without this extender.

Cables and Connectors of E5023A Option 426 (2.6 Gbps) (without opt. 300)

Refer to the “Cable Connection” on page 106 for more details.

Figure 3-3 Cable Connection of E5023A Option 426 (2.6 Gbps) (without opt. 300)

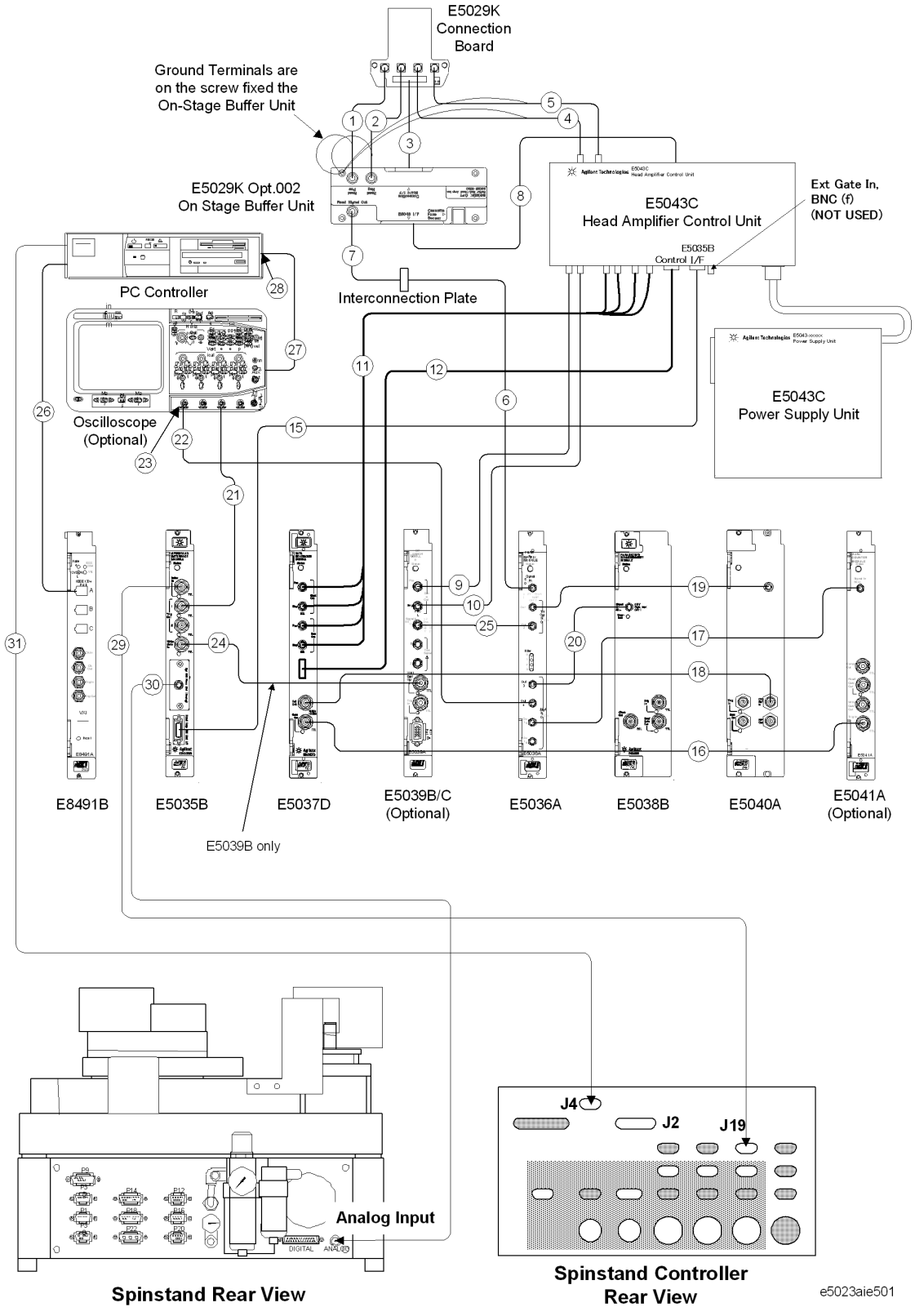


Table 3-5 Cable Connection of E5023A Opt. 426 (2.6 Gbps) (without opt. 300)

No.	Description	Connection		Part No.
1	SMA(m)-SMA(m) Cable	E5029K Connection Board “R+”	E5029K Onstage Buffer Unit “R+”	E5029-61601
2	SMA(m)-SMA(m) Cable	E5029K Connection Board “R-”	E5029K Onstage Buffer Unit “R-”	E5029-61602
3	Flat Cable	E5029K Connection Board “Connection Board I/F”	E5029K Connection Board “Cable ”	E5029-61608
4	SMA(m)-SMA(m) Cable	E5043C “OUT D+”	E5029K “W+”	E5043-61611
5	SMA(m)-SMA(m) Cable	E5043C “OUT D-”	E5029K “W-”	E5043-61612
6	SMA(m)-SMA(m) Cable	E5036A “Sig In”	“Junction Read Sig”	E5023-61607
7	SMA(m)-SMA(m) Cable	“Junction Read Sig”	E5029K “Read Sig Out”	E5023-61608
8	50P Halfpitch	-	-	E5043-61613
9	SMA(m)-SMA(m) Cable	E5039B/C “Data Out Pos”	E5043C “Input2 Data+”	E5039-61606
10	SMA(m)-SMA(m) Cable	E5039B/C “Data Out Neg”	E5043C “Input2 Data-”	E5039-61607
11	SMA(m) - SMA(m) Cable	E5037D “Clk Out Pos”	E5043C “Input Clock+”	E5037-61621 *1
		E5037D “Clk Out Neg”	E5043C “Input Clock-”	
		E5037D “Data Out Pos”	E5043C “Input1 Data+”	
		E5037D “Data Out Neg”	E5043C “Input1 Data-”	
12	MDR-MDR Cable	E5037D “Ctrl”	E5043C “Control”	E5043-61622
15	MDR-MDR Cable	E5035 “Head Amp Ctrl”	E5043C “E5035B I/F”	E5023-61605
16	BNC(m)-BNC(m) Cable	E5037D “Gate Out”	E5041A “Trig In”	E5041-61602
17	SMA(m)-SMA(m) Cable	E5036A “Fltrd Out 5”	E5041A “Signal In 50Ω”	E5041-61603
18	BNC(m)-BNC(m) Cable	E5037D “Ref Out”	E5040A “Ext Ref In”	E5023-61606
19	SMA(m)-SMA(m) Cable	E5036A “Thru Out”	Spectrum Ana In	E5023-61611
20	SMA(m)-SMA(m) Cable	E5036A “Filtr’d Out”	E5038B “Signal In”	E5023-61610
21	SMA(m)-SMA(m) Cable	E5035B “Trig Out 1”	Oscillo	E5023-61613
22	BNC(m)-BNC(m) Cable	E5036A “Filtr’d Out”	Oscillo Ch1	E5023-61612
23	SMA(f)-BNC(m) Adapter	-	-	1250-1700
24	BNC(m)-BNC(m) Cable	E5035B “WG IN”	E5039B/C “WG OUT”	E5039-61609
25	SMA(m)-SMA(m) Cable	E5039B/C “Signal In”	E5036A “Thru Out 2”	E5039-61608
26	IEEE-1394 Cable	IEEE-1394 Port on PCI Board	E8491B “Port A”	8192-8688
27	GPIB Cable, 2m	GPIB Port on PCI Board	54845A/B GPIB port	10833B
28	GPIB Adapter Extender	-	-	10834A

Table 3-5 Cable Connection of E5023A Opt. 426 (2.6 Gbps) (without opt. 300)

No.	Description	Connection		Part No.
29	BNC(m)-BNC(m) Cable	E5035B “Index In”	Spinstand Index	E5023-61609
30	SMA(m)-SMB(m) Cable	E5035B “Piezo Ctrl”	PZT Ctrl Analog	E5035-61601
31	Serial Cable	PC COM1 Port	Spinstand Serial Port	E5022-61628

*1. E5037-61621 has to be used as the default 4 cables set, because these length are used in the system calibration data.

Cables and Connectors of E5023A Option 300

Figure 3-4 Cable Connection of E5023A Option 300

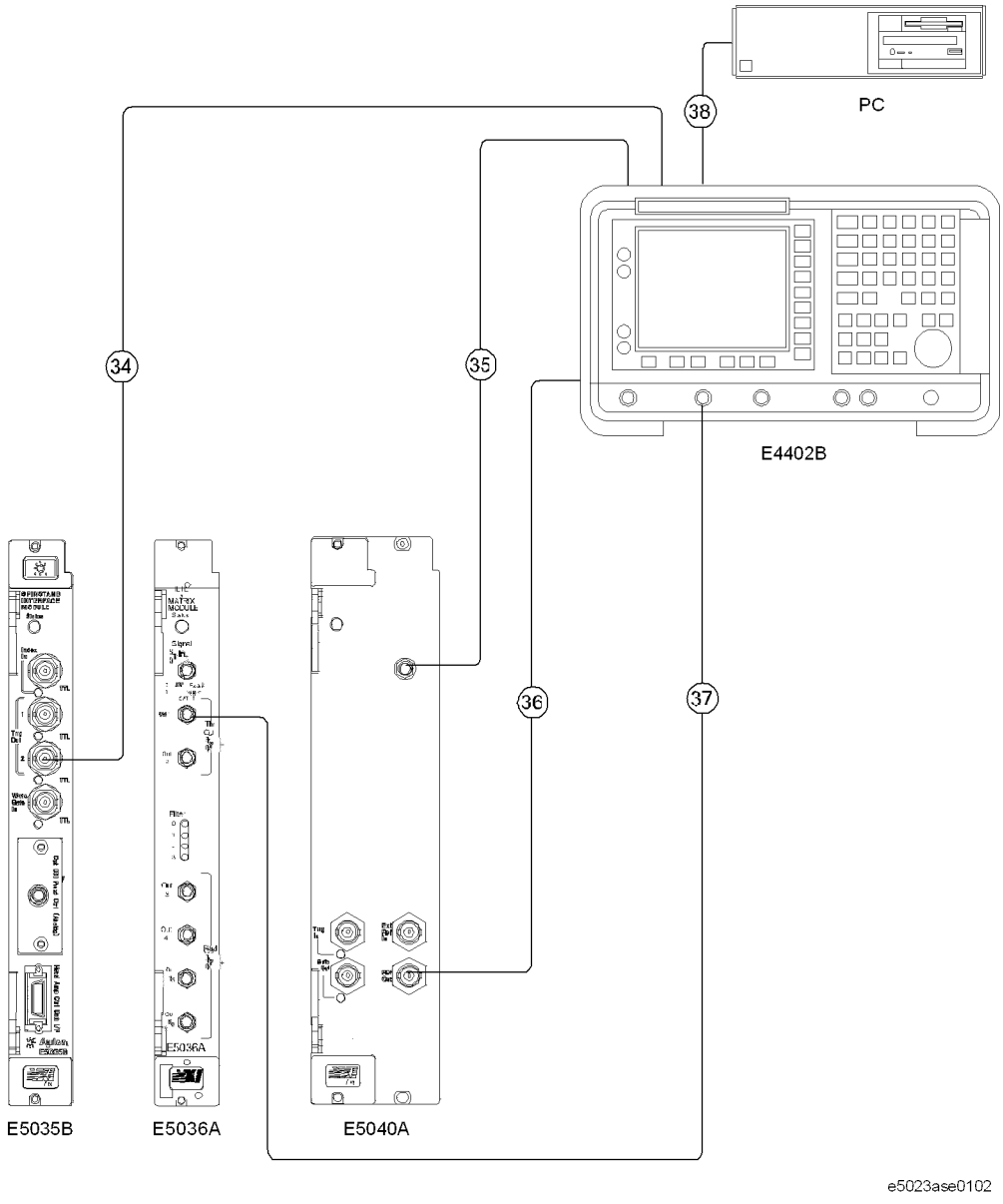


Table 3-6 Cable Connection (Option 300)

No.	Description	Connection		Part Number
34	BNC(m)-BNC(m) Cable, 2.3 m	E5035B “Trig Out 2”	E4402B “Gate Trig / Ext. Trig In”	E5023-61615
35	BNC(m)-SMA(m) Cable, 2.3 m	E5040A “Signal In”	E4402B “Aux IF Out”	E5023-61618

Table 3-6 Cable Connection (Option 300)

No.	Description	Connection		Part Number
36	BNC(m)-BNC(m) Cable, 2.3 m	E5040A“Ref. Out”	E4402B “10 MHz Ref in”	E5023-61616
37	SMA(m)-SMA(m) Cable, 0.6 m	E5036A “Thru Out 1”	E4402B “Input”	E5023-61617
38	GPIB Cable, 2 m	GPIB Port on PCI Board	E4402B “GPIB”	10833B

4 Assembly Replacement and Post-Repair Procedures

Introduction

In this chapter, information required for replacement of the instruments in the Agilent E5023A test system is provided. Refer to this chapter when replacing or updating the instruments. Topics in this chapter are as follows.

- Name of each part
- Replacement of VXI mainframe (Agilent E8401A)
- Replacement of IEEE 1394 PC Link to VXI module (Agilent E8491B)
- Replacement of other modules (Agilent E5035B/37C/37D/38B/40A/41A)
- Replacement of other modules (Agilent E5036A)
- Replacement of other modules (Agilent E5039B)
- Replacement of other modules (Agilent E5039C)
- Replacement of Oscilloscope (Agilent 54845A/B) or Spectrum Analyzer (Agilent E4402B)
- Cable Connection

Replacement of VXI Main Frame (Agilent E8401A)

This part describes how to replace the Agilent E8401A VXI main frame.

Tools Required

- Pozidriv screwdriver
- Torque Limiting Driver - 8 mm Opening 1.1 N·m (11 kgf·cm)

Removal

To uninstall the VXI main frame from the system, follow below steps.

Step 1. Shut down the whole system and disconnect the power cable from the VXI main frame.

Step 2. Disconnect all cables from VXI modules.

Step 3. Uninstall all VXI modules from VXI main frame. To uninstall VXI modules, remove two screws at top and bottom of the module's front panel, then pull levers of the modules to pull them out.

Step 4. Remove the VXI main frame from the system.

Replacement

To install the VXI main frame into the system, follow below steps.

Step 1. Install the VXI main frame into the system rack.

Step 2. Insert the modules into the VXI main frame. Then, make sure the modules are inserted deep enough, and fix the modules by tightening the screws on the front panel.

Step 3. Connect all cables to the modules. Refer to "Cable Connection" section in this chapter.

Step 4. Select "Full" from the Funs menu on the front panel of the VXI main frame.

Operation Check

Refer to the "Perform Power-on Self Test" on page 26 to verify the system operation.

Replacement of E8491B (IEEE 1394 PC Link to VXI Module)

This part describes how to replace the Agilent E8401A IEEE 1394 PC-Link-to-VXI module.

Tools Required

- Pozidriv screwdriver

Removal

To uninstall the E8491B module from the VXI mainframe, follow below steps.

Step 1. Shut whole system down.

Step 2. Remove all cables connected to the module.

Step 3. Pull the module out from the VXI mainframe. To pull it out, loosen the screws fixing the module to the VXI mainframe and pull the lever of the module.

Replacement

To install the E8491B module into the VXI mainframe, follow below steps.

Step 1. Write the faulty module's serial number on the new module using a fine point permanent marker.

Step 2. Insert the module into the VXI mainframe. Then, make sure the module is inserted deep enough, and fix the module by tightening the screws on the front panel.

Step 3. Connect the cables to the module. Refer to "Cable Connection" section in this chapter.

Post Replacement Procedures

Following steps are required after replacement of the Agilent E8491B module. If you don't follow these, the Agilent E8491B module is not configured correctly.

Step 1. Turn on the PC and log in.

Step 2. Select **Start - Programs - Agilent I_O Libraries - I_O Config**, or click the right mouse button on the Agilent logo in the task bar and select **Run I_O Config**. Refer to "Usage of I/O Config" on page 168 in Appendix C, "Software Tools," for details.

Step 3. Remove "vxi" item in the Configured Interface in the I/O Config window.

Step 4. Select the "E8491" in the Available Interface Types and select the "Configure" button to enter it. Other settings may use default settings.

Operation Check

Refer to the "Perform Power-on Self Test" on page 26 to verify the system operation.

Replacement of E5035B/37C/37D/38B/40A/41A Modules

This part describes how to replace the E5035B/37C/37D/38B/40A/41A modules.

Tools Required

- Pozidriv screwdriver
- Torque Limiting Driver - 8 mm Opening 1.1 N·m (11 kgf·cm)

Removal

To uninstall the module from the VXI mainframe, follow below steps.

Step 1. Shut whole system down.

Step 2. Remove all cables connected to the module.

Step 3. Pull the module out from the VXI mainframe. To pull it out, loosen the screws fixing the module to the VXI mainframe and pull the lever of the module.

Replacement

To install the module into the VXI mainframe, follow below steps.

Step 1. Write the faulty module's serial number on the new module's blank serial number tag using a fine point permanent marker

Step 2. Write the faulty module's serial number on the new module's Certificate of Calibration.

Step 3. Insert the module into the VXI mainframe. Then, make sure the module is inserted deep enough, and fix the module by tightening the screws on the front panel.

Step 4. Connect the cables to the module. Refer to "Cable Connection" section in this chapter.

Post Replacement Procedures

Following steps to update the module firmware are required after replacement of the modules. If you don't follow these, "revision conflict error" will be occurred when you launch the system software.

Step 1. Turn on and log in the PC.

Step 2. Launch Command Prompt (**Start - Programs - Accessories - Command Prompt**) from **Start** menu of the Windows 95 or Windows 2000.

Step 3. At the prompt: **C:\>**, type **cd Program Files\Agilent\E5022\Util** and press **[Enter]** key to change the current directory.

Step 4. Type the command shown below. This command will download the firmware to the module. It takes a few minutes.

Module	Command (number designates module's logical address)
E5035B	`update 5 ..\dsp` **[Enter]**
E5037C/D	`update 7 ..\dsp` **[Enter]**
E5038B	`update 8 ..\dsp` **[Enter]**
E5040A	`update 10 ..\dsp` **[Enter]**
E5041A	`update 11 ..\dsp` **[Enter]**

Step 5. Type **exit** and press **[Enter]** key to close the Command Prompt application.

Operation Check

Refer to the "Perform System Initialization" on page 28 to verify the system operation.

Replacement of E5036A Module

This part describes how to replace the E5036A module.

Tools Required

- Pozidriv screwdriver
- Torque Limiting Driver - 8 mm Opening 1.1 N·m (11kgf·cm)

Removal

To uninstall the module from the VXI mainframe, follow below steps.

Step 1. Shut whole system down.

Step 2. Remove all cables connected to the module.

Step 3. Pull the module out from the VXI mainframe. To pull it out, loosen the screws fixing the module to the VXI mainframe and pull the lever of the module.

Step 4. Open the faulty module and uninstall the filter matrix boards. Refer to Figure 4-1 for details.

1. Unscrew 13 screws from the side panel.
2. Remove the side panel.
3. Remove the filter matrix boards.

NOTE Record order of these boards before removing. You should attach them on the new module in order of the faulty module.

Replacement

To install the module into the VXI mainframe, follow below steps.

Step 1. Open the new module and install the filter matrix boards at proper position.

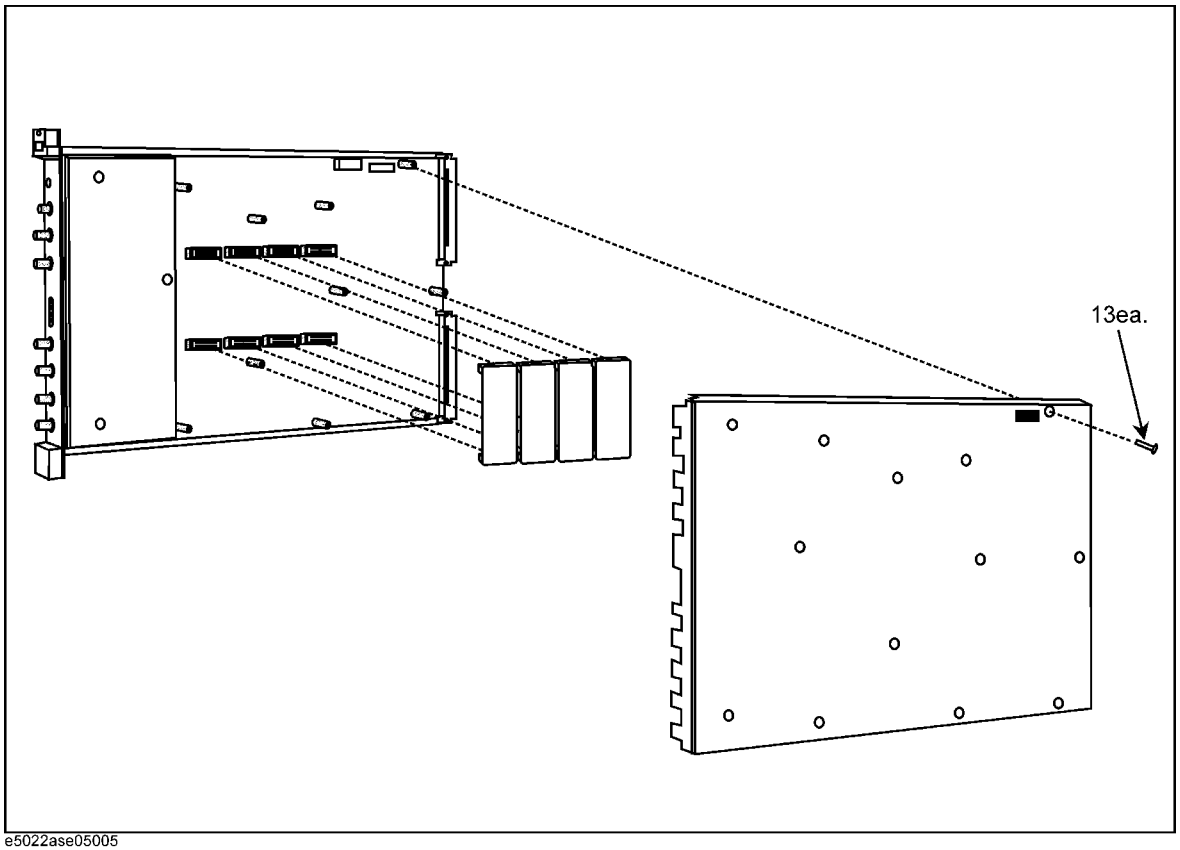
Step 2. Place the side panel and screw 13 screws.

Step 3. Write the faulty module's serial number on the new module's blank serial number tag using a fine point permanent marker

Step 4. Insert the module into the VXI mainframe. Then, make sure the module is inserted deep enough, and fix the module by tightening the screws on the front panel.

Step 5. Connect the cables to the module. Refer to "Cable Connection" section in this chapter.

Figure 4-1 E5036A Diagram



e5022ase05005

Operation Check

Refer to the “Perform System Initialization” on page 28 to verify the system operation.

Replacement of E5039B Module

This part describes how to replace the E5039B module.

Tools Required

- Pozidriv screwdriver
- Torque Limiting Driver - 8 mm Opening 1.1 N·m (11 kgf·cm)
- T10 TORX driver
- T8 TORX driver
- Socket Wrench 5/8 (Long Pattern)[*1]
- Open End or Box Wrench 5/16
- Hex Nut Driver 3/16 or 5mm

[*1] Approximately 20mm depth is required.

Removal

To uninstall the module from the VXI mainframe, follow below steps.

Step 1. Shut whole system down.

Step 2. Remove all cables connected to the module.

Step 3. Pull the module out from the VXI mainframe. To pull it out, loosen the screws fixing the module to the VXI mainframe and pull the lever of the module.

Step 4. Open the faulty module and uninstall the channel IC board as following steps. Refer to Figure 4-2 for details.

1. Unscrew 2 screws (No. 7) from the handle so that handles (No. 5 and No. 6) are removed.
2. Unscrew 2 nuts (No. 12) and washers (No. 10) from the BNC connectors.
3. Unscrew 5 nuts (No. 13) and washers (No. 14) from the SMA connectors.
4. Remove the front panel (No. 4).
5. Unscrew 2 jack screws (No. 11) located on both sides of the Test Port.
6. Unscrew 12 torx screws (No. 8 in Figure 4-2) on the right side panel.
7. Remove the right side panel (No. 3).
8. Remove 5 spacers (No. 15) from the SMA connectors of the channel IC board.
9. Unscrew 3 torx screws (No. 9) fasten on the channel IC board.
10. Remove the channel IC board (No. 2).

Replacement

To install the module into the VXI mainframe, follow below steps.

Step 1. Open the new module and install the channel IC board as following steps.

1. Install new channel IC board (No. 2)
2. Screw 3 trox screws (No. 9)
3. Replace 5 spacers (No. 15) on the SMA connectors of the channel IC board.
4. Replace the right side panel (No. 3).
5. Screw 2 jack screws.
6. Replace the front panel (No. 4).
7. Replace the handles (No. 5 and No. 6) and screw 2 screws (No. 7) to fasten the front panel.
8. Replace 2 washers (No. 10) and screw 2 nuts (No. 12) for the BNC connectors.
9. Replace 5 washers (No. 14) and screw 5 nuts (No. 13) for the SMA connectors.
10. Screw 12 torx screws (No. 8) on the right side panel.

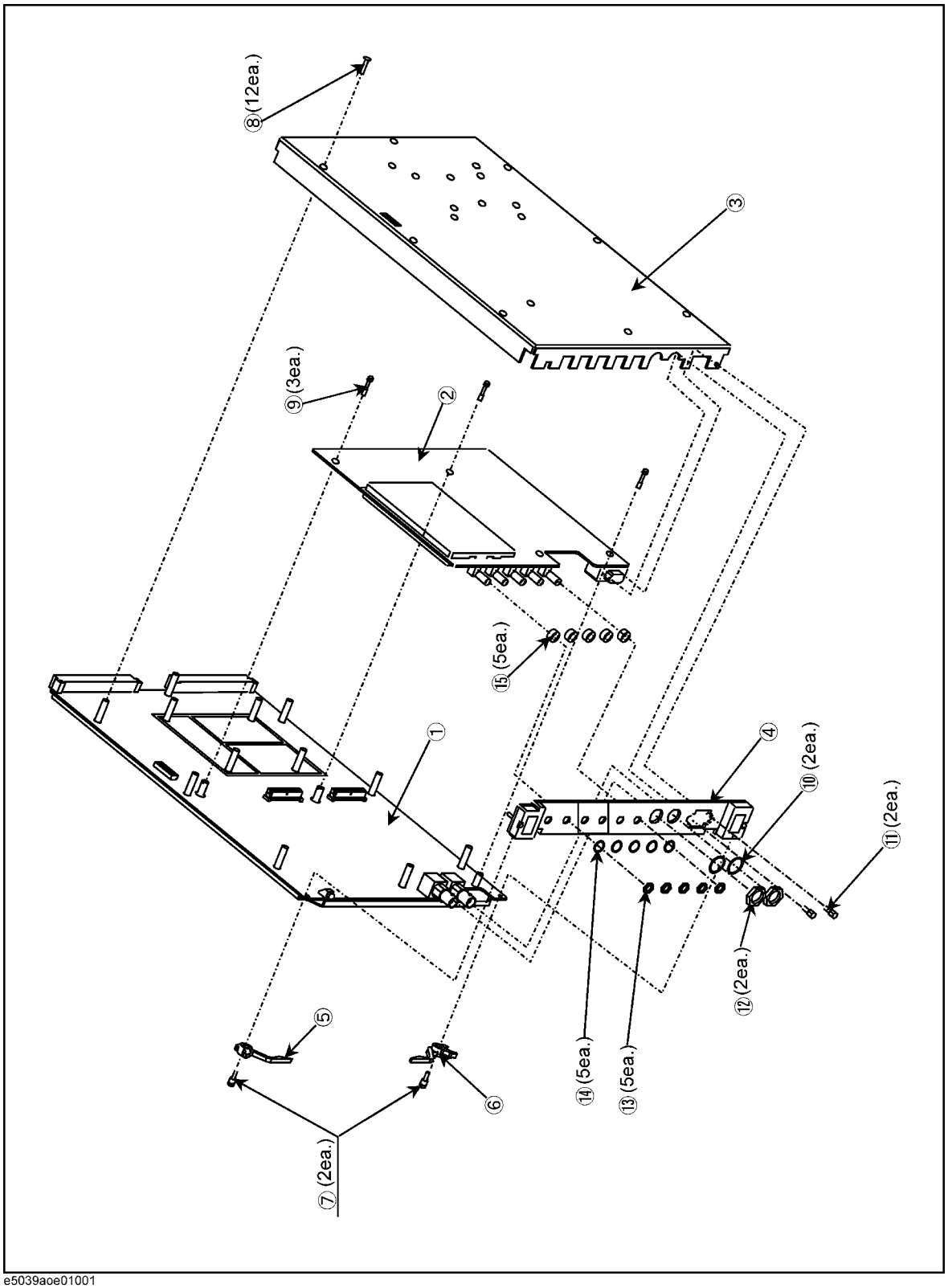
Step 2. Write the faulty module's serial number on the new module's blank serial number tag using a fine point permanent marker

Step 3. Write the faulty module's serial number on the new module's Certificate of Calibration.

Step 4. Insert the module into the VXI mainframe. Then, make sure the module is inserted deep enough, and fix the module by tightening the screws on the front panel.

Step 5. Connect the cables to the module. Refer to "Cable Connection" section in this chapter.

Figure 4-2 E5039B Diagram



Post Replacement Procedures

Following steps to update the module firmware are required after replacement of the modules. If you don't follow these, "revision conflict error" will be occurred when you launch the system software.

Step 1. Turn on and log in the PC.

Step 2. Launch MS-DOS Prompt (**Start - Programs - MS-DOS Prompt**) from **Start** menu of the Windows 95 or 2000, and change the directory to `c:\Program Files\Agilent\E5022\Util.`

Step 3. Type the command shown below. This command will download the firmware to the module. It takes about a few minute.

Module	**Command (*command_module logical address*)**
E5039B	*update39 9* **[Enter]**

Step 4. Close MS-DOS Prompt.

Operation Check

Refer to the "Perform System Initialization" on page 28 to verify the system operation.

Replacement of E5039C Module

This part describes how to replace the E5039C module.

Tools Required

- Pozidriv screwdriver
- T10 TORX driver*1
- Wrench*1

Removal

To uninstall the module from the VXI mainframe, follow below steps.

Step 1. Shut whole system down.

Step 2. Remove all cables connected to the module.

Step 3. Pull the module out from the VXI mainframe. To pull it out, loosen the screws fixing the module to the VXI mainframe and pull the lever of the module.

Step 4. Open the faulty module and uninstall the channel IC board as following steps. Refer to Figure 4-3 for details.

NOTE The channel IC board is owned by customer. Return it to the customer after uninstalling it from the E5039C module.

1. Remove 10 torx screws (No. 1 in Figure 4-3) fasten on the right side panel.
2. Remove a torx screw (No. 7) fasten on the right side panel.
3. Remove the right side panel (No. 8).
4. Remove 3 nuts (No. 3) and washers (No. 4) that secure the SMA connectors to the front panel.
5. Remove 2 nuts (No. 5) and washers (No. 6) that secure the SMB connectors to the front panel.
6. Remove 4 torx screws (No. 2) fasten on the channel IC board.
7. Remove the channel IC board (No. 9).
8. Install the right side panel.
9. Tighten 10 torx screws (No. 1) fasten on the right side panel.

Replacement

To install the new module into the VXI mainframe, follow below steps.

*1. included in the E5039C

Step 1. Open the new module and install the channel IC board as following steps.

1. Remove 10 torx screws (No. 1 in Figure 4-3) fasten on the right side panel.
2. Remove the right side panel (No. 8).
3. Install the channel IC board (No. 9).
4. Tighten 4 torx screws (No. 2) fasten on the channel IC board.
5. Tighten 3 nuts (No. 3) and washers (No. 4) that secure the SMA connectors to the front panel.
6. Tighter 2 nuts (No. 5) and washers (No. 6) that secure the SMB connectors to the front panel.
7. Install the right side panel.
8. Tighten 10 torx screws (No. 1) fasten on the right side panel.
9. Tighten a torx screw (No. 7) fasten on the right side panel.

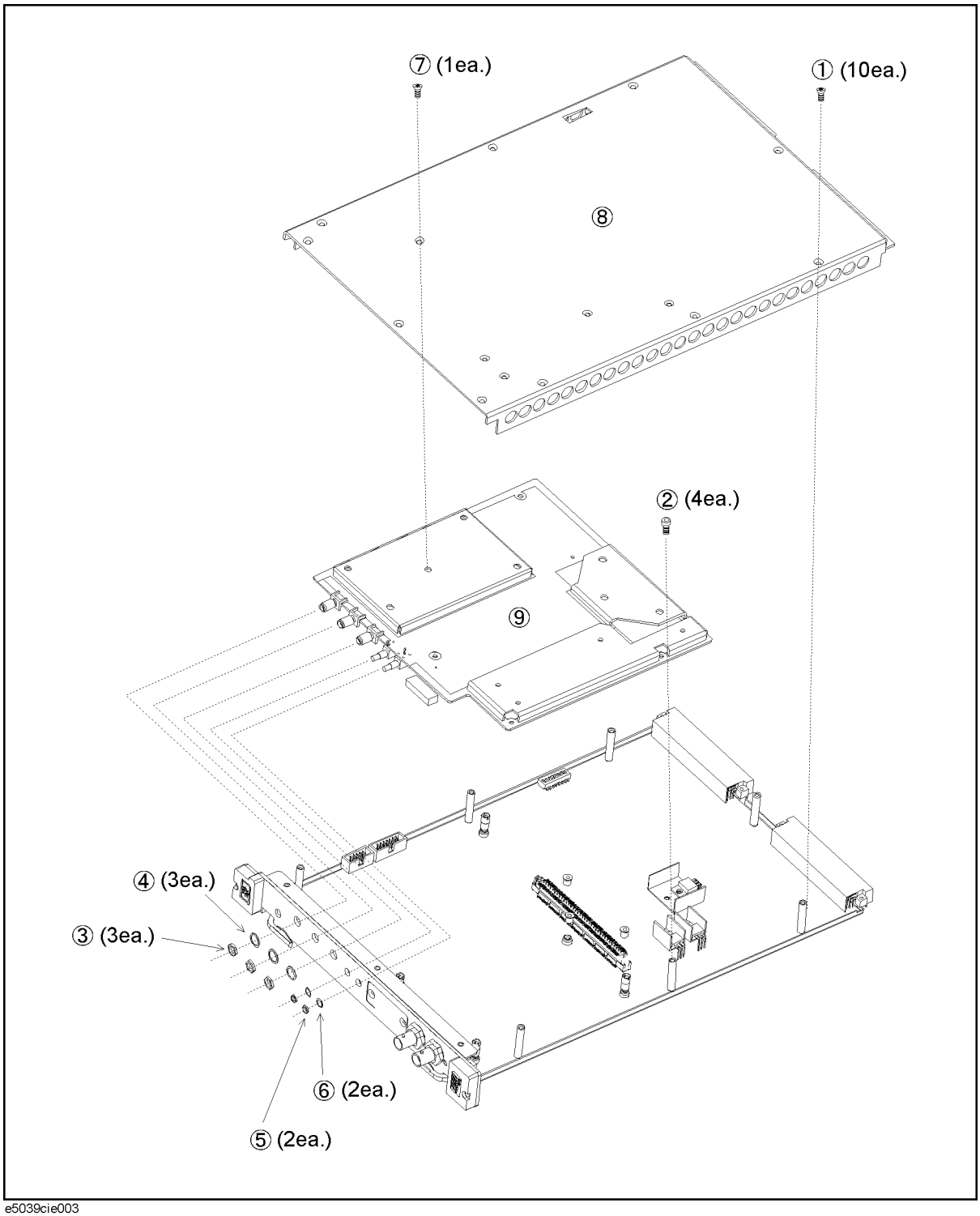
Step 2. Write the faulty module's serial number on the new module's blank serial number tag using a fine point permanent marker

Step 3. Write the faulty module's serial number on the new module's Certificate of Calibration.

Step 4. Insert the module into the VXI mainframe. Then, make sure the module is inserted deep enough, and fix the module by tightening the screws on the front panel.

Step 5. Connect the cables to the module. Refer to "Cable Connection" section in this chapter.

Figure 4-3 E5039C Diagram



e5039cie003

Post Replacement Procedures

Following steps to update the module firmware are required after replacement of the modules. If you don't follow these, "revision conflict error" will be occurred when you launch the system software.

Step 1. Turn on and log in the PC.

Step 2. Launch MS-DOS Prompt (**Start - Programs - MS-DOS Prompt**) from **Start** menu of the Windows 95 or 2000, and change the directory to `c:\Program Files\Agilent\E5022\Util.`

Step 3. Type the command shown below. This command will download the firmware to the module. It takes about a few minute.

Module	**Command (*command_module logical address*)**
E5039C	*update39 9* **[Enter]**

Step 4. Close MS-DOS Prompt.

Operation Check

Refer to the "Perform System Initialization" on page 28 to verify the system operation.

Replacement of Oscilloscope (Agilent 54845A/B) or Spectrum Analyzer (Agilent E4402B)

This part describes how to replace the optional oscilloscope/spectrum analyzer.

Removal

To uninstall the oscilloscope/spectrum analyzer from the system, follow below steps.

Step 1. Shut whole system down.

Step 2. Remove all the cables connected to the oscilloscope/spectrum analyzer.

Step 3. Remove the oscilloscope/spectrum analyzer from the system.

Installation

To install the oscilloscope/spectrum analyzer into the system, follow below steps.

Step 1. Install the oscilloscope/spectrum analyzer into the system.

Step 2. Connect the cables to the oscilloscope/spectrum analyzer. Refer to “Cable Connection” in this chapter.

Operation Check

Refer to the “Perform System Initialization” on page 28 to verify the system operation.

Replacement of Onstage Buffer Unit and Connection Board

Overview

Head amplifier is a module that enlarges signals from the hard disk head. Head amplifier differs depending on what IC is used in the hard disk that the head is going to be installed. This section describes a method to replace a head amplifier.

Tools

- T10 TORX driver

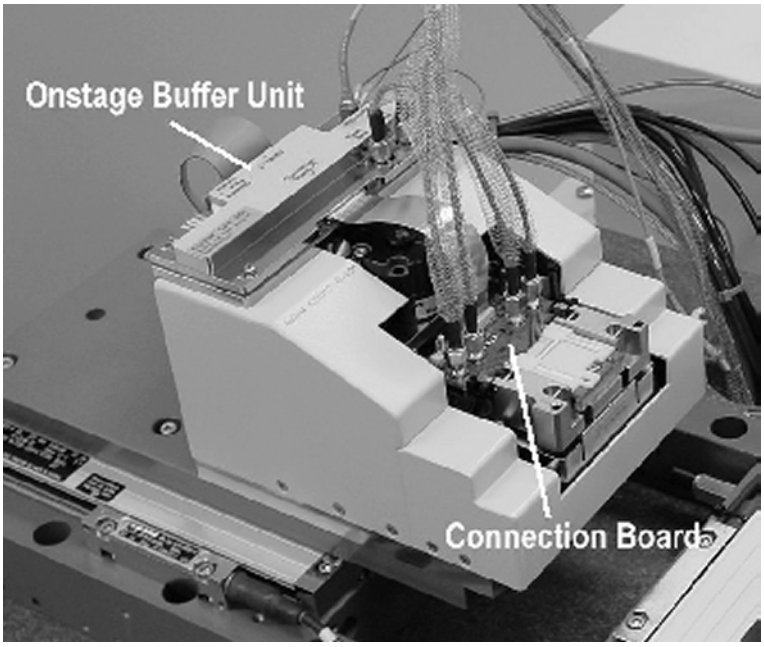
Removal of Head Amplifier

Step 1. Shut whole system down.

Step 2. Disconnect cables from the head amplifier.

Step 3. Using TORX driver (T10), remove screws fixing the head amplifier. See Figure 4-4 for locations of screws.

Figure 4-4 Onstage Buffer Unit and Connection Board



Attachment of Head Amplifier

Step 1. Attach a head amplifier to the HLM with TORX driver (T10) lightly. Pay attention that all guide pins of the head amplifier are properly inserted into the HLM.

Step 2. Attach an HGA casette to the HLM and see that all pogo pins of the head casette has good

contact to the electrode pattern on the head amplifier. If contact is bad, make a fine adjustment on the positioning of the head amplifier after attachment.

Step 3. Fasten screws and fix the head amplifier to the HLM tightly.

Inspecting the Pads Condition

The life time is approximately 100,000 contacts. However, improper operation might damage the wire on the pad. This causes the short circuit between the terminals on the connection board.

Four sets of this are furnished with the system as spares. When you need them more, order PN E5029-65001. It consists of 20 long pads and 10 short pads.

Performance Verification

Follow steps below and check that the head amplifier is properly attached.

Step 1. Start the system up and prepare for head measurement.

Step 2. Attach a head, that is know to be working properly, to a casette and measure DCR. If the result of the measurement is correct, the head amplifier is properly attached. If the result is clearly wrong (for example the result is clearly big or 0), the head amplifier is not properly attached. That means, pogo pins on the casette and electrode on the amplifier has bad contact. In this case, return to the section “Attachment of Head Amplifier” and check contact.

PC (System Controller) Replacement

Tools Required

- Pozidriv screwdriver

Removal

Step 1. Remove all cables (GPIB cable, IEEE-1394 cable, and serial cable) from the PC.

Step 2. Remove GPIB card from the PC.

Step 3. Remove IEEE-1394 card from the PC.

Replacement

Step 1. Install the Agilent E5023A software including Agilent I/O Library into the PC. See Chapter 5, “Software Recovery,” on page 133 for the installation procedure.

NOTE *You must install Agilent I/O Library into the PC before installing the GPIB and IEEE-1394 cards.*

Step 2. Install the GPIB card which was used for the old PC into a PCI slot of the new PC.

Step 3. Install the IEEE-1394 card which was used for the old PC into a PCI slot of the new PC.

NOTE Generally, you can install a PCI card into any slot in the PC. However, the card position might cause the problem in case of combination of GP-IB and IEEE-1394 cards.

From the rear view, the IEEE-1394 card must be installed in the most upper (or left) slot and the GP-IB card must be installed in the second slot from the top (or left).

There is a cable on the IEEE-1394 PCI card to supply power from the connector on the FDD or the CD-ROM drives. The cable has 4-pin-female connector on one side and has a 4-pin-female and another 4-small-pin-female connectors on the other side in order to split the power. The 4-small-pin-female is connect with IEEE-1394 card. When you replace the IEEE-1394 card, you have to remove the cable from the defective PC, too. Then install them into a new PC.

Step 4. Connect GPIB cable, IEEE-1394 cable, and serial cable to the PC. See “PC (System Controller) Replacement” on page 104 for how to connect those cables.

GPIB Card and/or IEEE-1394 Card Replacement

Tools Required

- Pozidriv screwdriver

Removal

Step 1. Remove all cables (GPIB cable, IEEE-1394 cable, and serial cable) from the PC.

Step 2. Remove GPIB card and/or IEEE-1394 card from the PC.

Replacement

Step 1. Install a GPIB card and/or an IEEE-1394 card into slot(s) of the PC.

NOTE

Before physically installing GPIB card or IEEE-1394 card, you must complete the Agilent I/O Library installation into the PC.

Generally, you can install a PCI card into any slot in the PC. However, the card position might cause the problem in case of combination of GP-IB and IEEE-1394 cards.

From the rear view, the IEEE-1394 card must be installed in the most upper (or left) slot and the GP-IB card must be installed in the second slot from the top (or left).

There is a cable on the IEEE-1394 PCI card to supply power from the connector on the FDD or the CD-ROM drives. The cable has 4-pin-female connector on one side and has a 4-pin-female and another 4-small-pin-female connectors on the other side in order to split the power. The 4-small-pin-female is connect with IEEE-1394 card. When you replace the IEEE-1394 card, you have to remove the cable from the defective PC, too. Then install them into a new PC.

Step 2. Connect GPIB cable, IEEE 1394 cable, and serial cable to the PC. See “PC (System Controller) Replacement” on page 104 for how to connect those cables.

Cable Connection

Cable Connection of E5023A Option 415 (1.5 Gbps) (without opt. 300)

Figure 4-5 shows the overall connection diagram including optional oscilloscope and the E5039B/C bit error test module. The E5041A dual counter module is not included in this figure.

Figure 4-5 Overall Connection Diagram of E5023A Option 415 (1.5 Gbps) (without opt. 300)

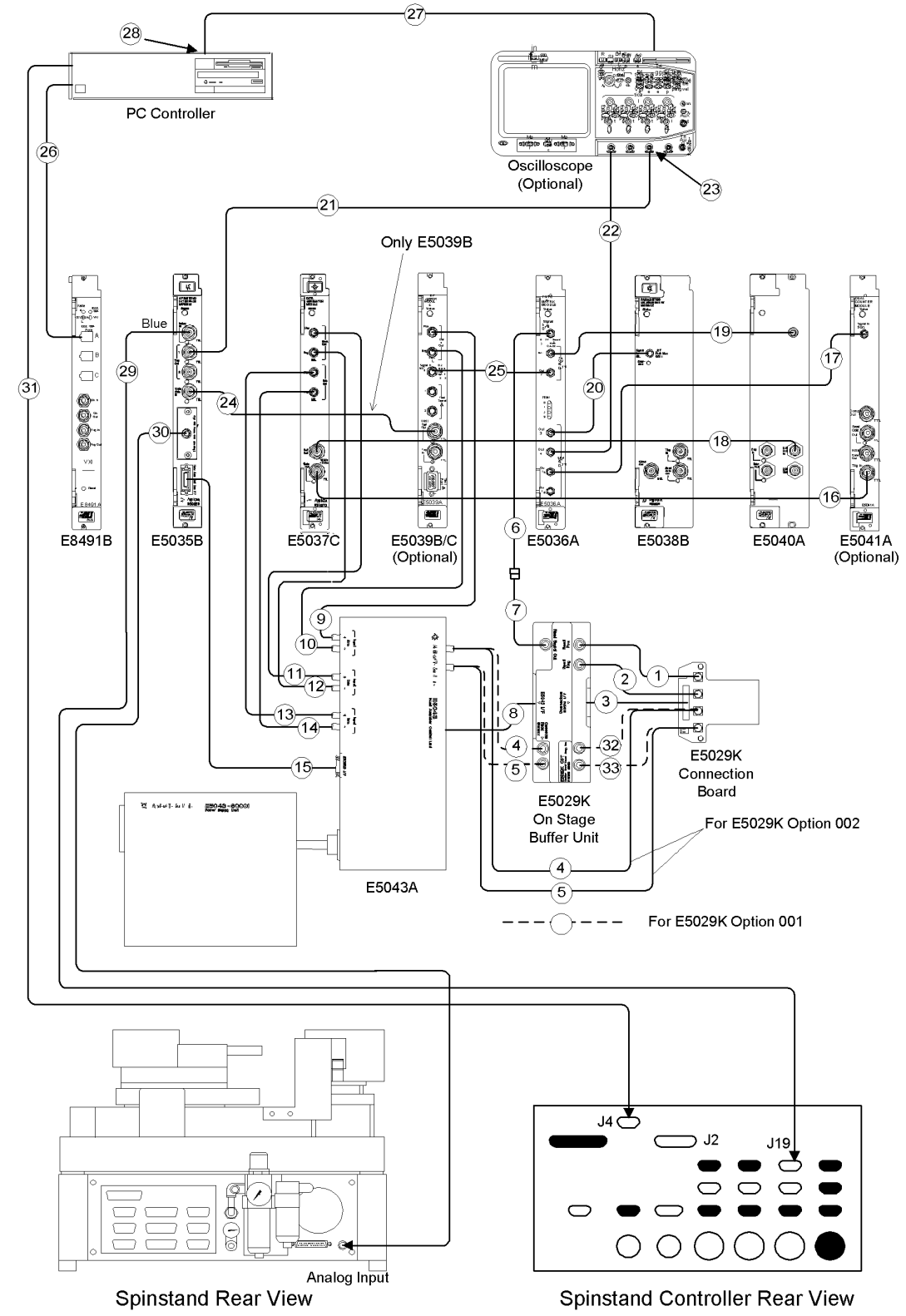
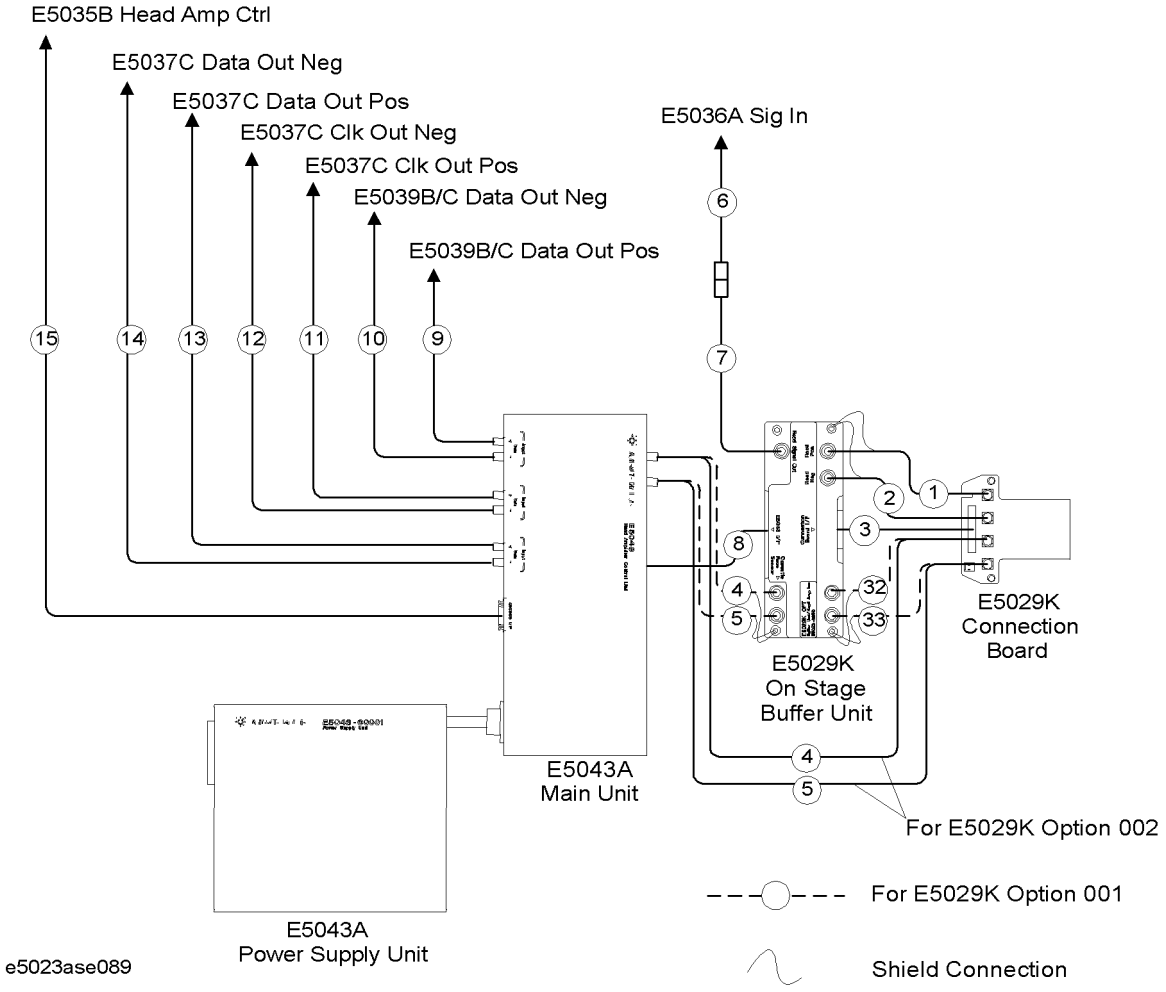


Figure 4-6 shows the cable connection of the head amplifier and the HLM.

Figure 4-6 **Cable Connection for E5023A-415 (1.5 Gbps) (Connection Board, Onstage Buffer Unit, E5043A)**



NOTE The locations of connectors on the head amplifier may differ from the figure above depending on the amplifier that you use. Check the connector names printed on the head amplifier when connecting the cables.

Table 4-1 **Cable Connection (Head Amplifier, HLM) (E5023A-415, 1.5 Gbps)**

No.	Description	Connection		Part Number
1	SMA(m)-SMA(m) Cable	E5029K Connection Board “R+”	E5029K Onstage Buffer Unit “R+”	E5029-61601
2	SMA(m)-SMA(m) Cable	E5029K Connection Board “R–”	E5029K Onstage Buffer Unit “R–”	E5029-61602

Table 4-1 Cable Connection (Head Amplifier, HLM) (E5023A-415, 1.5 Gbps)

No.	Description	Connection		Part Number
3	FFC Cable	E5029K Connection Board “Connection Board I/F”	E5029K Connection Board “Cable”	E5029-61603
4	SMA(m)-SMA(m) Cable	E5043A “OUT D+”	E5029K “W+”	E5043-61641*1
5	SMA(m)-SMA(m) Cable	E5043A “OUT D–”	E5029K “W–”	E5043-61642*1
6	SMA(m)-SMA(m) Cable	E5036A “Sig In”	Cable “7”	E5023-61607
7	SMA(m)-SMA(m) Cable	Cable “6”	E5029K “Read Sig Out”	E5023-61608
8	50P Halfpitch Flat Cable	E5029K Onstage Buffer Unit	E5043A Head Amplifier Control Unit (Main Unit)	E5043-61613
9	SMA(m)-SMA(m) Cable	E5039B/C “Data Out Pos”	E5043A “Input 2 Data+”	E5039-61606
10	SMA(m)-SMA(m) Cable	E5039B/C “Data Out Neg”	E5043A “Input 2 Data–”	E5039-61607
11	SMA(m)-SMA(m) Cable	E5037C “Clk Out Pos”	E5043A “Input Clock+”	E5023-61601
12	SMA(m)-SMA(m) Cable	E5037C “Clk Out Neg”	E5043A “Input Clock–”	E5023-61602
13	SMA(m)-SMA(m) Cable	E5037C “Data Out Pos”	E5043A “Input 1 Data+”	E5023-61603
14	SMA(m)-SMA(m) Cable	E5037C “Data Out Neg”	E5043A “Input 1 Data–”	E5023-61604
15	MDR-MDR Cable	E5035B “Head Amp Ctrl”	E5043A “Head Amp Ctrl”	E5023-61605
32	SMA(m)-SMA(m) Cable	E5029K Connection Board “W+”	E5029K Onstage Buffer Unit “W+”	E5029-61604
33	SMA(m)-SMA(m) Cable	E5029K Connection Board “W–”	E5029K Onstage Buffer Unit “W–”	E5029-61605

*1. E5043-61611 and E5043-61612 were replaced with these E5043-61641 and E5043-61642 respectively in December 2002.

Cable Connection of E5023A Option 426 (2.6 Gbps)(without opt. 300)

Figure 4-7 shows the overall connection diagram including optional oscilloscope and the E5039B/C bit error test module. The E5041A dual counter module is not included in this figure.

Figure 4-7 Cable Connection of E5023A Option 426 (2.6 Gbps) (without opt. 300)

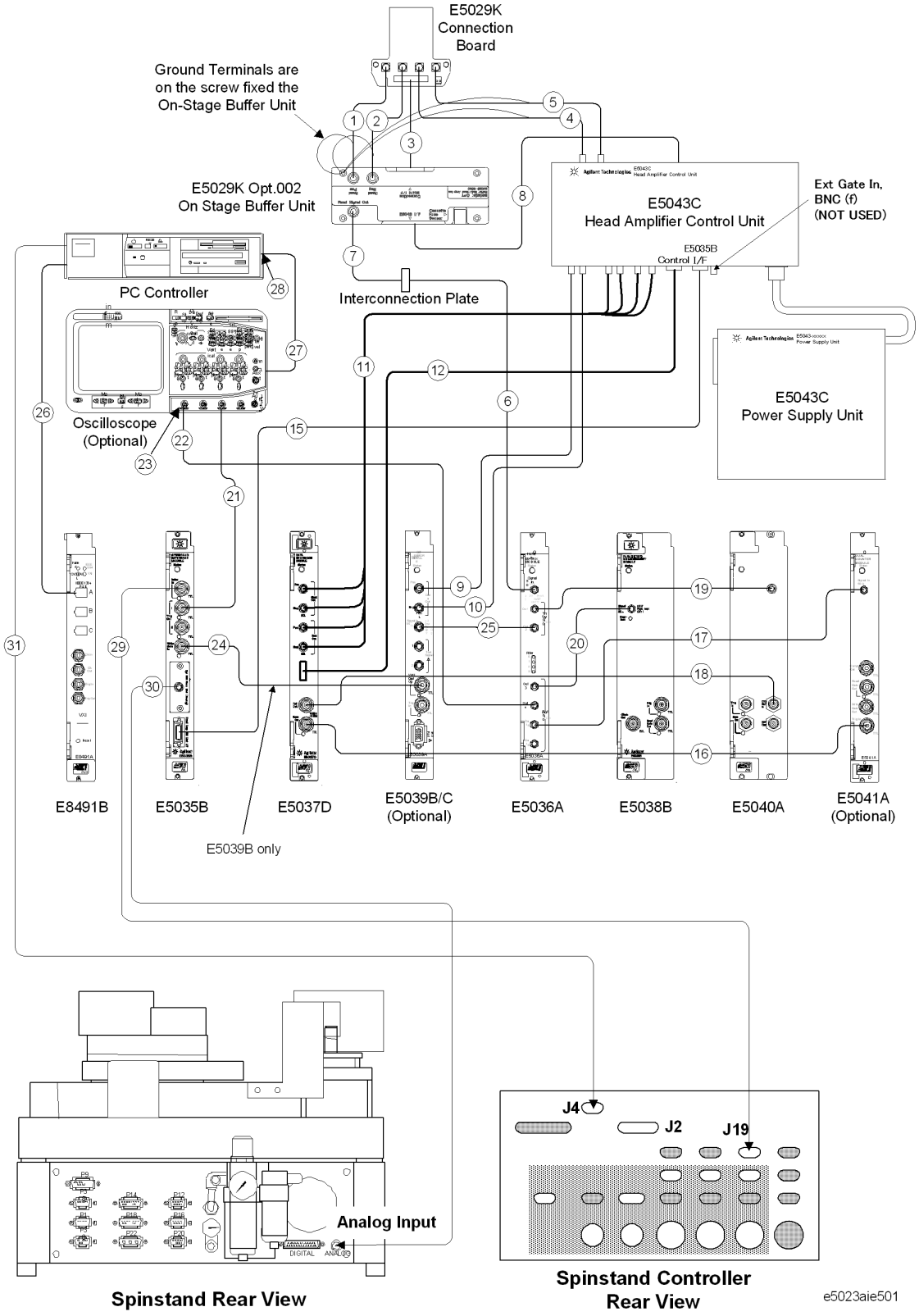
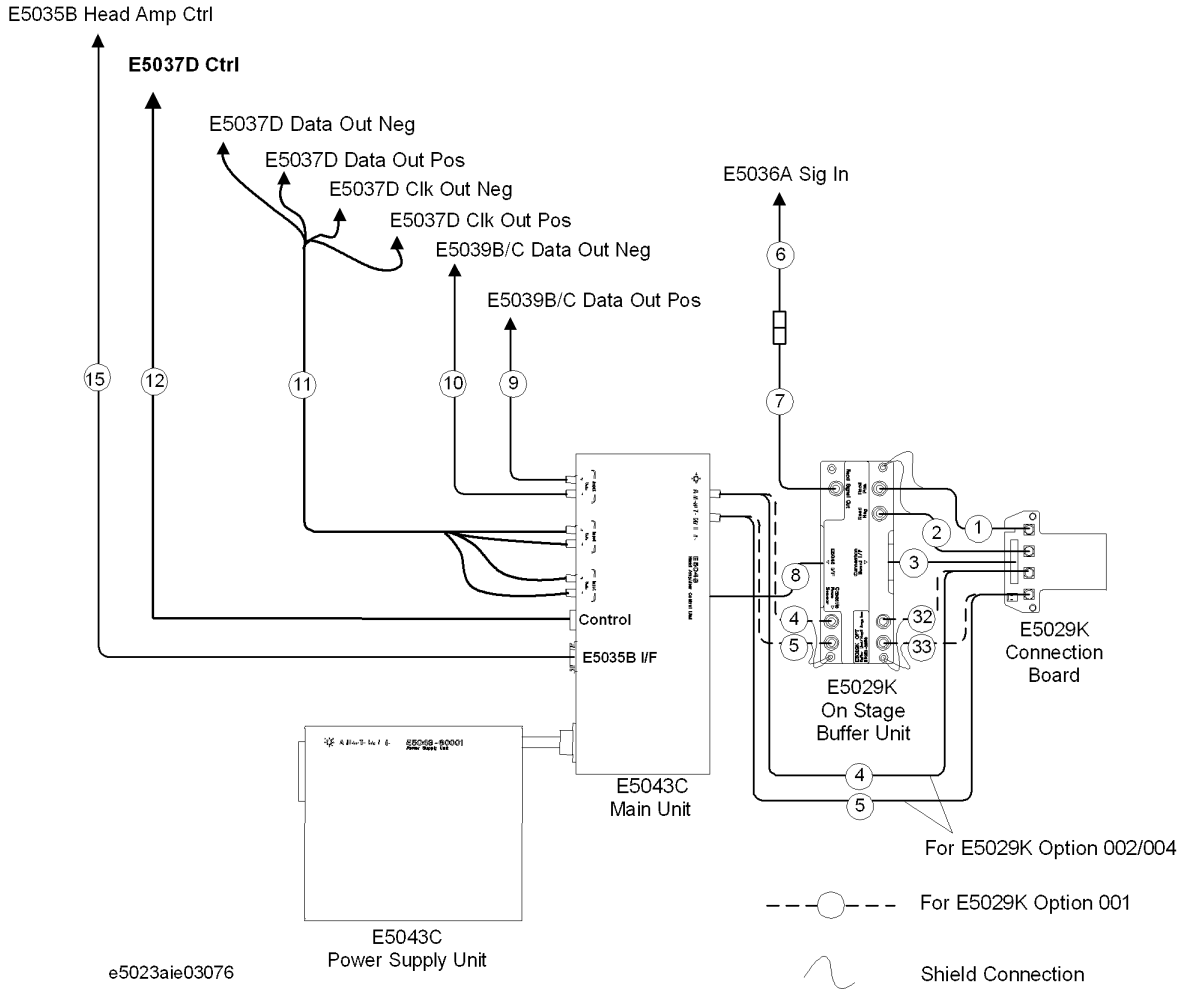


Figure 4-8 shows the cable connection of the head amplifier and the HLM.

Figure 4-8 Cable Connection for E5023A-426 (2.6 Gbps) (Connection Board, Onstage Buffer Unit, E5043C)



NOTE The locations of connectors on the head amplifier may differ from the figure above depending on the amplifier that you use. Check the connector names printed on the head amplifier when connecting the cables.

Table 4-2 Cable Connection of E5023A Opt. 426 (2.6 Gbps) (VXI Modules)

No.	Description	Connection		Part No.
1	SMA(m)-SMA(m) Cable	E5029K Connection Board “R+”	E5029K Onstage Buffer Unit “R+”	E5029-61601
2	SMA(m)-SMA(m) Cable	E5029K Connection Board “R-”	E5029K Onstage Buffer Unit “R-”	E5029-61602
3	Flat Cable	E5029K Connection Board “Connection Board I/F”	E5029K Connection Board “Cable ”	E5029-61608

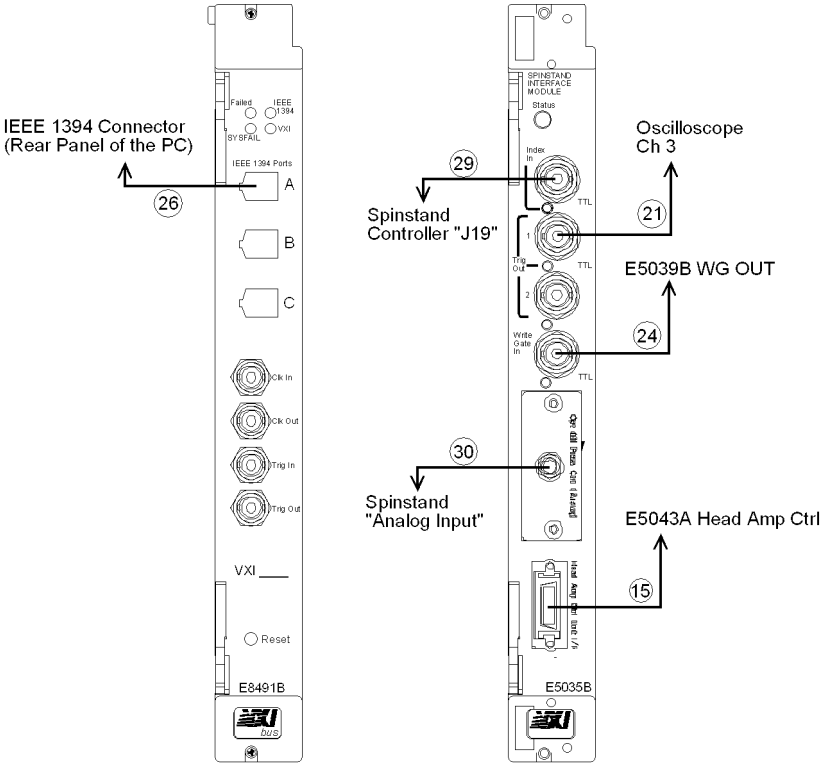
Table 4-2 Cable Connection of E5023A Opt. 426 (2.6 Gbps) (VXI Modules)

No.	Description	Connection		Part No.
4	SMA(m)-SMA(m) Cable	E5043C “OUT D+”	E5029K “W+”	E5043-61641 *1
5	SMA(m)-SMA(m) Cable	E5043C “OUT D-”	E5029K “W-”	E5043-61642 *1
6	SMA(m)-SMA(m) Cable	E5036A “Sig In”	“Junction Read Sig”	E5023-61607
7	SMA(m)-SMA(m) Cable	“Junction Read Sig”	E5029K “Read Sig Out”	E5023-61608
8	50P Halfpitch	-	-	E5043-61613
9	SMA(m)-SMA(m) Cable	E5039B “Data Out Pos”	E5043C “Input2 Data+”	E5039-61606
10	SMA(m)-SMA(m) Cable	E5039B “Data Out Neg”	E5043C “Input2 Data-”	E5039-61607
11	SMA(m) - SMA(m) Cable	E5037D “Clk Out Pos”	E5043C “Input Clock+”	E5037-61621
		E5037D “Clk Out Neg”	E5043C “Input Clock-”	
		E5037D “Data Out Pos”	E5043C “Input1 Data+”	
		E5037D “Data Out Neg”	E5043C “Input1 Data-”	
12	MDR-MDR Cable	E5037D “Ctrl”	E5043C “Control”	E5043-61622
15	MDR-MDR Cable	E5035B “Head Amp Ctrl”	E5043C “E5035B I/F”	E5023-61605
16	BNC(m)-BNC(m) Cable	E5037D “Gate Out”	E5041A “Trig In”	E5041-61602
17	SMA(m)-SMA(m) Cable	E5036A “Fltrd Out 5”	E5041A “Signal In 50Ω”	E5041-61603
18	BNC(m)-BNC(m) Cable	E5037D “Ref Out”	E5040A “Ext Ref In”	E5023-61606
19	SMA(m)-SMA(m) Cable	E5036A “Thru Out”	Spectrum Ana In	E5023-61611
20	SMA(m)-SMA(m) Cable	E5036A “Filtr’d Out”	E5038B “Signal In”	E5023-61610
21	SMA(m)-SMA(m) Cable	E5035B “Trig Out 1”	Oscillo	E5023-61613
22	BNC(m)-BNC(m) Cable	E5036A “Filtr’d Out”	Oscillo Ch1	E5023-61612
23	SMA(f)-BNC(m) Adapter	-	-	1250-1700
24	BNC(m)-BNC(m) Cable	E5035B “WG IN”	E5039B “WG OUT”	E5039-61609
25	SMA(m)-SMA(m) Cable	E5039B “Signal In”	E5036A “Thru Out 2”	E5039-61608
26	IEEE-1394 Cable	IEEE-1394 Port on PCI Board	E8491B “Port A”	8192-8688
27	GPIB Cable, 2m	GPIB Port on PCI Board	54845A/B GPIB port	10833B
28	GPIB Adapter Extender	-	-	10834A
29	BNC(m)-BNC(m) Cable	E5035B “Index In”	Spinstand Index	E5023-61609
30	SMA(m)-SMB(m) Cable	E5035B “Piezo Ctrl”	PZT Ctrl Analog	E5035-61601
31	Serial Cable	PC COM1 Port	Spinstand Serial Port	E5022-61628

*1. E5043-61611 and E5043-61612 were replaced with these E5043-61641 and E5043-61642 respectively in December 2002.

Connecting the VXI Modules

Figure 4-9 E8491B/E5035B Cable Connection



e5023ase002

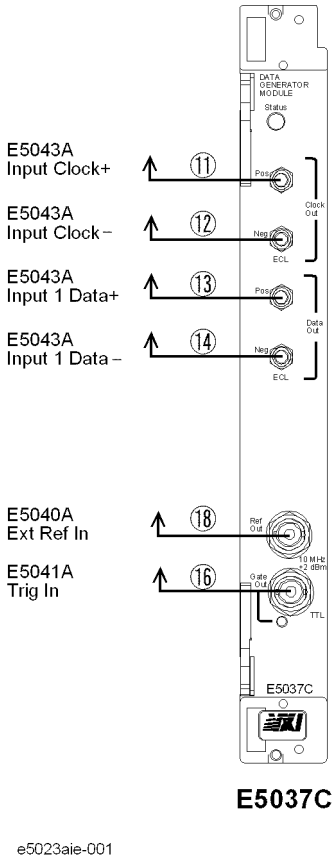
*1 Already connected inside of the spinstand to the piezo control unit and the piezo power supply.

Table 4-3 E8491B/E5035B Cable Connection

No.	Description	Connection		Part Number
15	MDR-MDR Cable	E5035B “Head Amp Ctrl”	E5043A/C “Head Amp Ctrl”	E5023-61605
21	BNC(m)-BNC(m) Cable	E5035B “Trig Out 1”	Oscilloscope Ch3	E5023-61613
24	BNC(m)-BNC(m) Cable	E5035B “WG IN”	E5039B “WG OUT”	E5039-61609
26	IEEE-1394 Cable	IEEE-1394 Port on PCI Board	E8491B “Port A”	8192-8688
29	BNC(m)-DSUB(f) Cable	E5035B “Index In”	Spinstand Controller “J19”	E5023-61609
30	SMA(m)-BNC(m) Cable	E5035B “Piezo Ctrl”	Spinstand “Analog Input”	E5013-61601

NOTE Any IEEE-1394 port can be used on both E8491B and PC.

Figure 4-10 E5037C Cable Connection (for E5023A-415, 1.5 Gbps)



e5023aie-001

Table 4-4 E5037C Cable Connection (for E5023A-415, 1.5 Gbps)

No.	Description	Connection		Part Number
11	SMA(m)-SMA(m) Cable	E5037C “Clk Out Pos”	E5043A “Input Clock+”	E5023-61601
12	SMA(m)-SMA(m) Cable	E5037C “Clk Out Neg”	E5043A “Input Clock–”	E5023-61602
13	SMA(m)-SMA(m) Cable	E5037C “Data Out Pos”	E5043A “Input 1 Data+”	E5023-61603
14	SMA(m)-SMA(m) Cable	E5037C “Data Out Neg”	E5043A “Input 1 Data–”	E5023-61604
16	BNC(m)-BNC(m) Cable	E5037C “Gate Out”	E5041A “Trig In”	E5041-61602
18	BNC(m)-BNC(m) Cable	E5037C “Ref Out”	E5040A “Ext Ref In”	E5023-61606

Figure 4-11 E5037D Cable Connection (for E5023A-426, 2.6 Gbps)

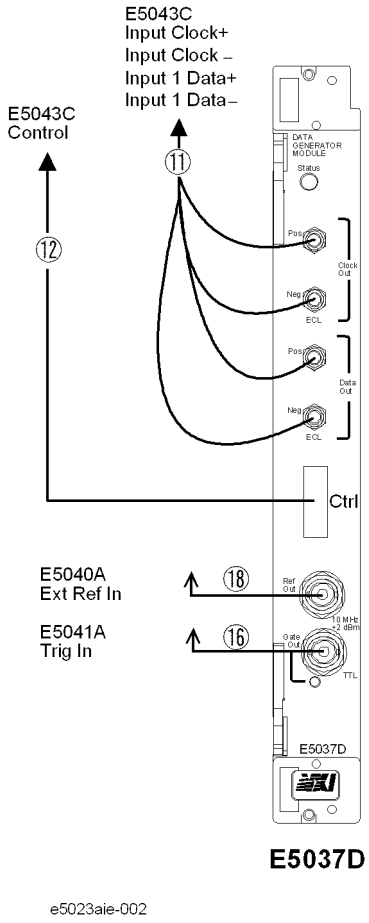


Table 4-5 E5037D Cable Connection (for E5023A-426, 2.6 Gbps)

No.	Description	Connection		Part No.
11	SMA(m) - SMA(m) Cable	E5037D “Clk Out Pos”	E5043C “Input Clock+”	E5037-61621
		E5037D “Clk Out Neg”	E5043C “Input Clock-”	
		E5037D “Data Out Pos”	E5043C “Input1 Data+”	
		E5037D “Data Out Neg”	E5043C “Input1 Data-”	
12	MDR-MDR Cable	E5037D “Ctrl”	E5043C “Control”	E5043-61622
16	BNC(m)-BNC(m) Cable	E5037D “Gate Out”	E5041A “Trig In”	E5041-61602
18	BNC(m)-BNC(m) Cable	E5037D “Ref Out”	E5040A “Ext Ref In”	E5023-61606

Figure 4-12 Cable Connection (E5036A/E5038B)

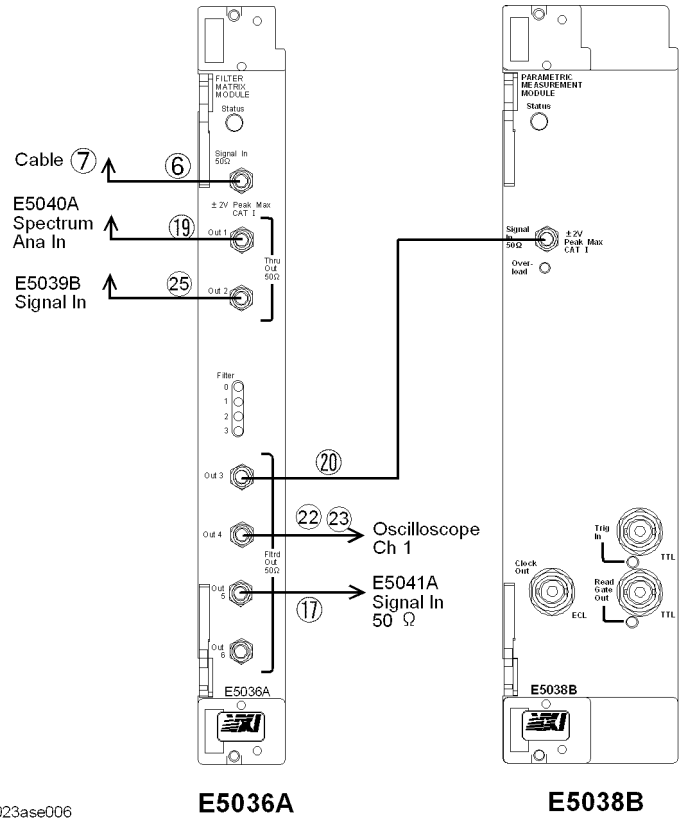


Table 4-6 E5036A/E5038B Cable Connection

No.	Description	Connection		Part Number
6	SMA(m)-SMA(m) Cable	E5036A “Sig In”	Cable “7”	E5023-61607
17	SMA(m)-SMA(m) Cable	E5036A “Filtrd Out 5”	E5041A “Signal In 50 Ω”	E5041-61603
19	SMA(m)-SMA(m) Cable	E5036A “Thru Out”	E5040A “Spectrum Ana In”	E5023-61611
20	SMA(m)-SMA(m) Cable	E5036A “Filtrd Out”	E5038B “Signal In”	E5023-61610
22	SMA(m)-SMA(m) Cable	E5036A “Filtrd Out”	Oscilloscope Ch1	E5023-61612
23	SMA(f)-BNC(m) Adapter	-	-	1250-1700
25	SMA(m)-SMA(m) Cable	E5039B/C “Signal In”	E5036A “Thru Out 2”	E5039-61608

Connecting the E5039B Bit Error Test Module (Optional)

NOTE This procedure is needed only if the system is configured with the Agilent E5039B Bit Error Test Module.

Figure 4-13 Cable Connection of the Agilent E5039B (Option)

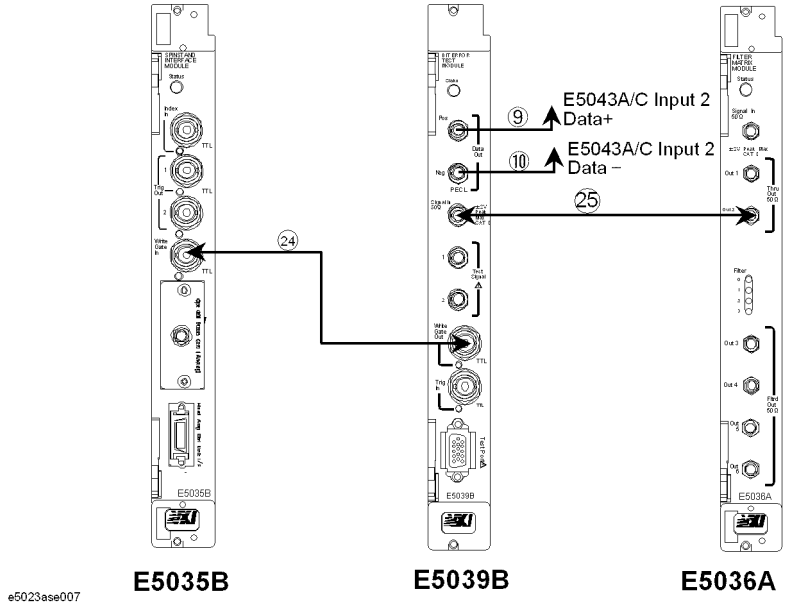


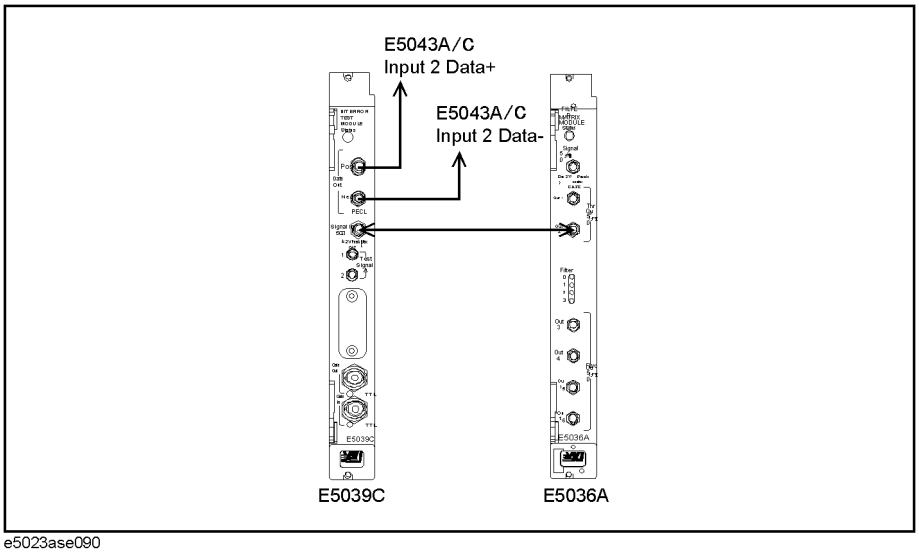
Table 4-7 Cable Connection (E5039B)

No.	Description	Connection		Part Number
9	SMA(m)-SMA(m) Cable	E5039B “Data Out Pos”	E5043A/C “Input 2 Data+”	E5039-61606
10	SMA(m)-SMA(m) Cable	E5039B “Data Out Neg”	E5043A/C “Input 2 Data–”	E5039-61607
24	BNC(m)-BNC(m) Cable	E5035B “WG IN”	E5039B “WG OUT”	E5039-61609
25	SMA(m)-SMA(m) Cable	E5039B “Signal In”	E5036A “Thru Out 2”	E5039-61608

Connecting the E5039C Bit Error Test Module (Optional)

NOTE This procedure is needed only if the system is configured with the Agilent E5039C Bit Error Test Module.

Figure 4-14 Cable Connection of the Agilent E5039C (Option)



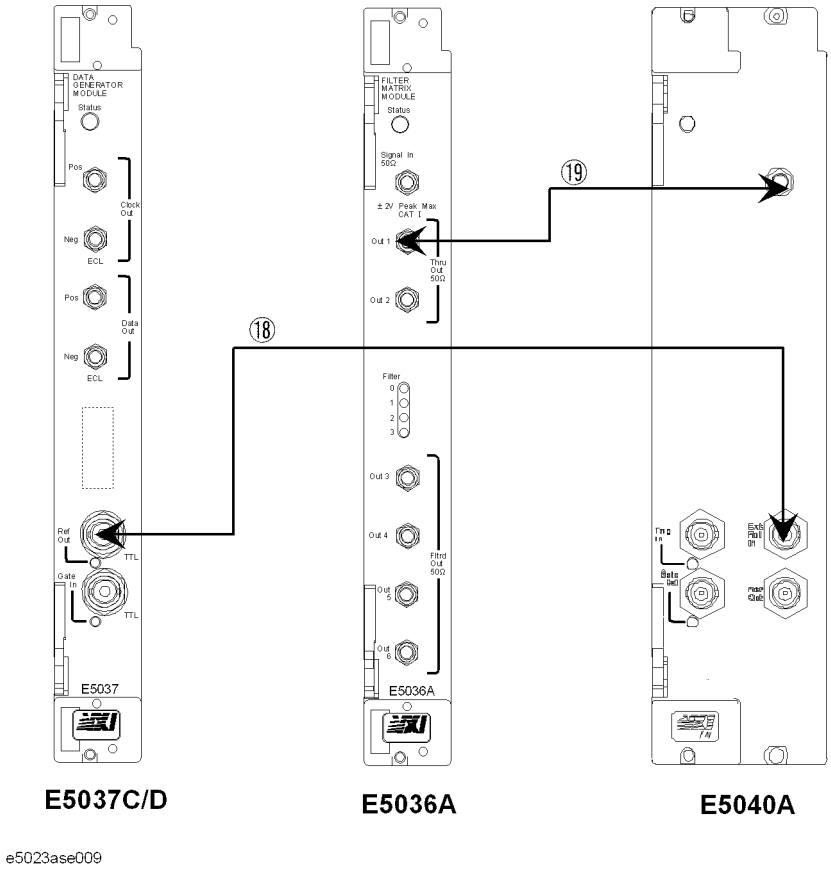
e5023ase090

Table 4-8 Cable Connection (E5039C)

No.	Description	Connection		Part Number
9	SMA(m)-SMA(m) Cable	E5039C “Data Out Pos”	E5043A/C “Input 2 Data+”	E5039-61606
10	SMA(m)-SMA(m) Cable	E5039C “Data Out Neg”	E5043A/C “Input 2 Data–”	E5039-61607
25	SMA(m)-SMA(m) Cable	E5039C “Signal In”	E5036A “Thru Out 2”	E5039-61608

Connecting the E5040A Spectrum Analyzer Module

Figure 4-15 **Cable Connection (Spectrum Analyzer Module)**



e5023ase009

Table 4-9 **Cable Connection (E5040A)**

No.	Description	Connection		Part Number
18	BNC(m)-BNC(m) Cable	E5037C/D “Ref Out”	E5040A “Ext Ref In”	E5023-61606
19	SMA(m)-SMA(m) Cable	E5036A “Thru Out”	E5040A “Spectrum Ana In”	E5023-61611

Connecting the E5041A Dual Counter Module (Optional)

NOTE This procedure is needed only if the system is configured with the Agilent E5041A Dual Counter Module.

Figure 4-16 Cable Connection of the Agilent E5041A (Option)

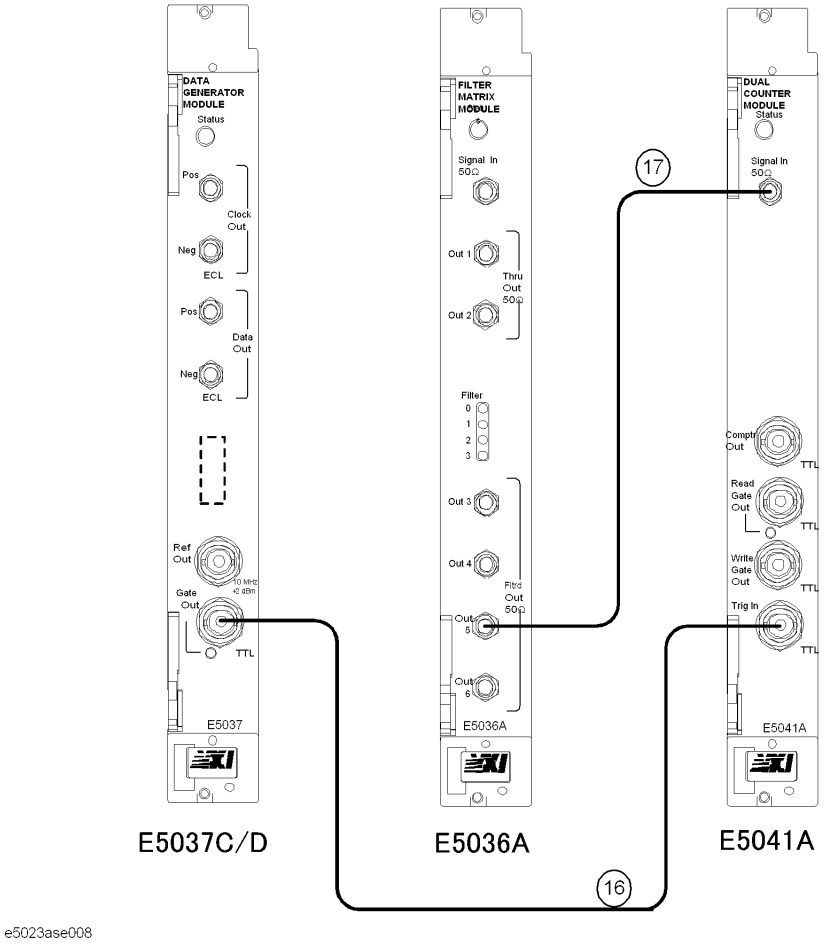
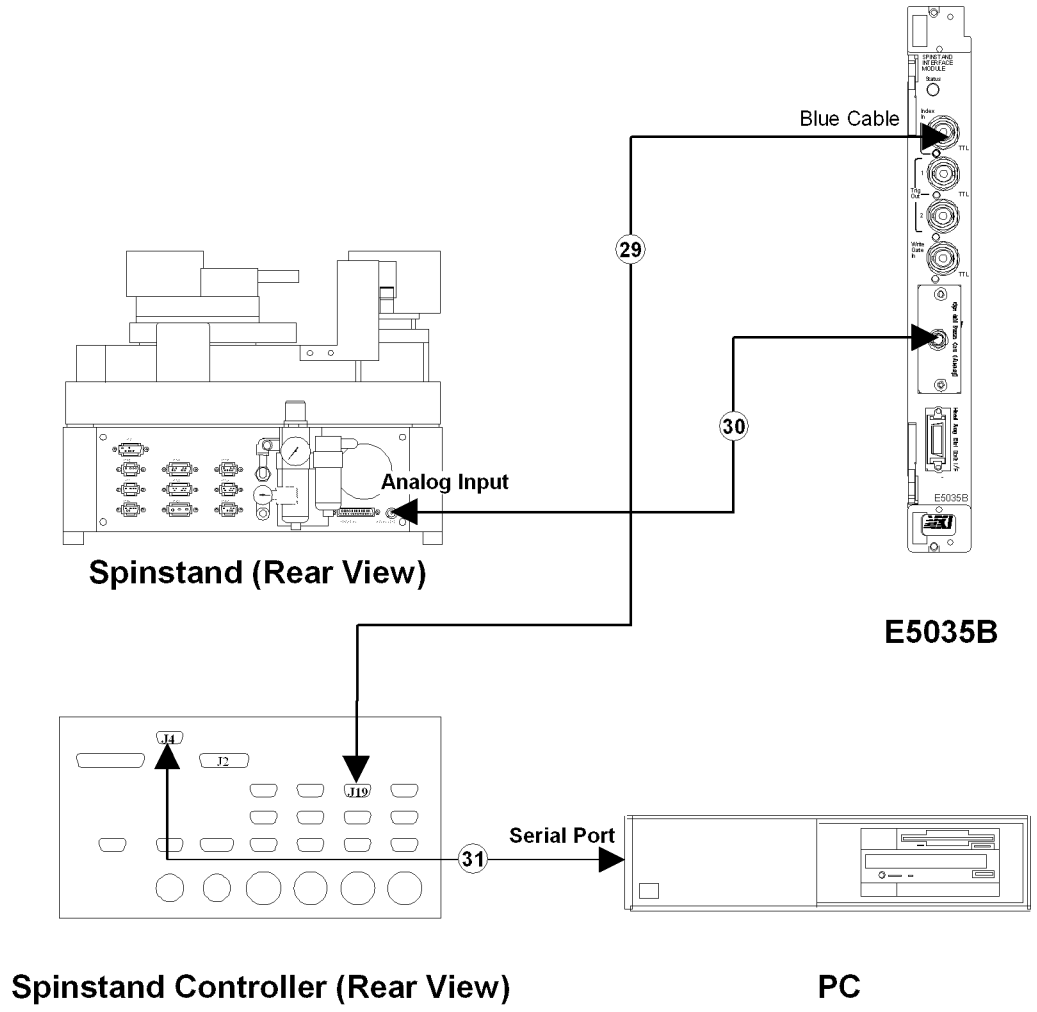


Table 4-10 Cable Connection (E5041A)

No.	Description	Connection		Part Number
16	BNC(m)-BNC(m) Cable	E5037C/D “Gate Out”	E5041A “Trig In”	E5041-61602
17	SMA(m)-SMA(m) Cable	E5036A “Filtrd Out 5”	E5041A “Signal In 50 Ω”	E5041-61603

Connecting Spinstand and PC

Figure 4-17 **Cable Connection (Spinstand)**



e5023ase010

Figure 4-18 Cable Connection (PC) (without option 300)

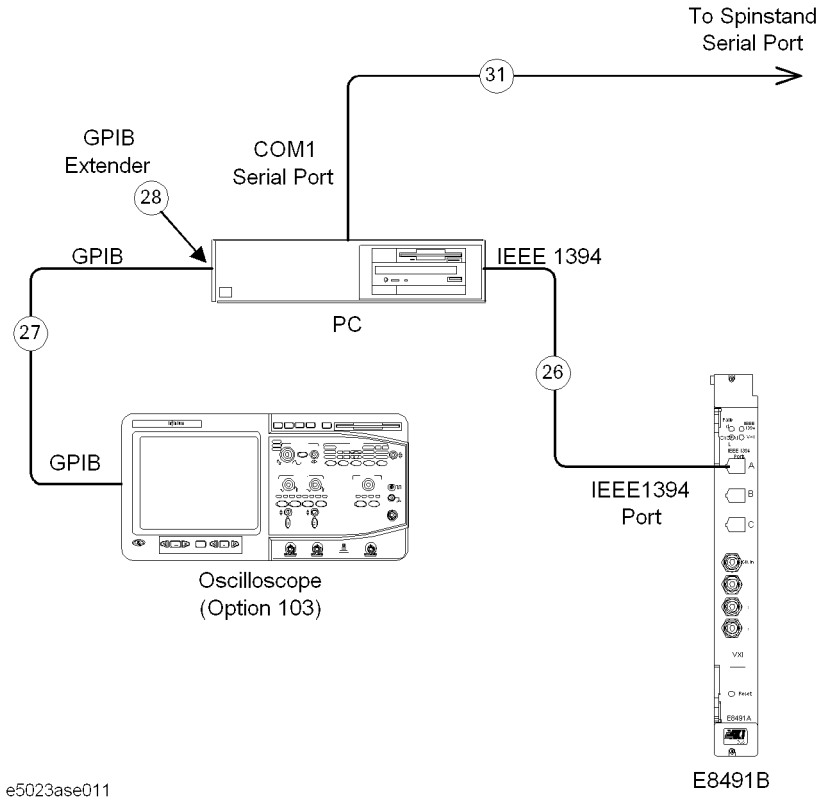
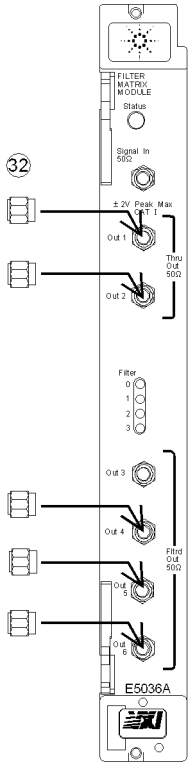


Table 4-11 Cable Connection (Serial Cable)

No.	Description	Connection		Part Number
26	IEEE-1394 Cable	IEEE-1394 Port on PCI Board	E8491B “Port A”	8192-8688
27	GPIB Cable, 2m	GPIB Port on PCI Board	54845A/B GPIB Port	10833B
28	GPIB Adapter Extender	-	-	10834A
29	BNC(m)-DSUB(f) Cable	E5035B “Index In”	Spinstand Controller “J19”	E5023-61609
30	SMA(m)-BNC(m) Cable	E5035B “Piezo Ctrl”	Spinstand “Analog Input”	E5013-61601
31	Serial Cable	PC COM1 Port	Spinstand Serial Port	E5022-61628

Terminating unused connectors

Figure 4-19 Terminator Connection



e5023ase012

Table 4-12 Terminator Connection

No.	Description	Connection		Part Number
32	50 Ω Terminator	-	-	1810-0118

Connecting the Oscilloscope (Option)

Connect the oscilloscope as follows.

Connecting Option 103

Connect the cables for option 103 (8 GSa/s Oscilloscope) as shown in Figure 4-20 and Table 4-13.

Figure 4-20 Cable Connection (Option 103)

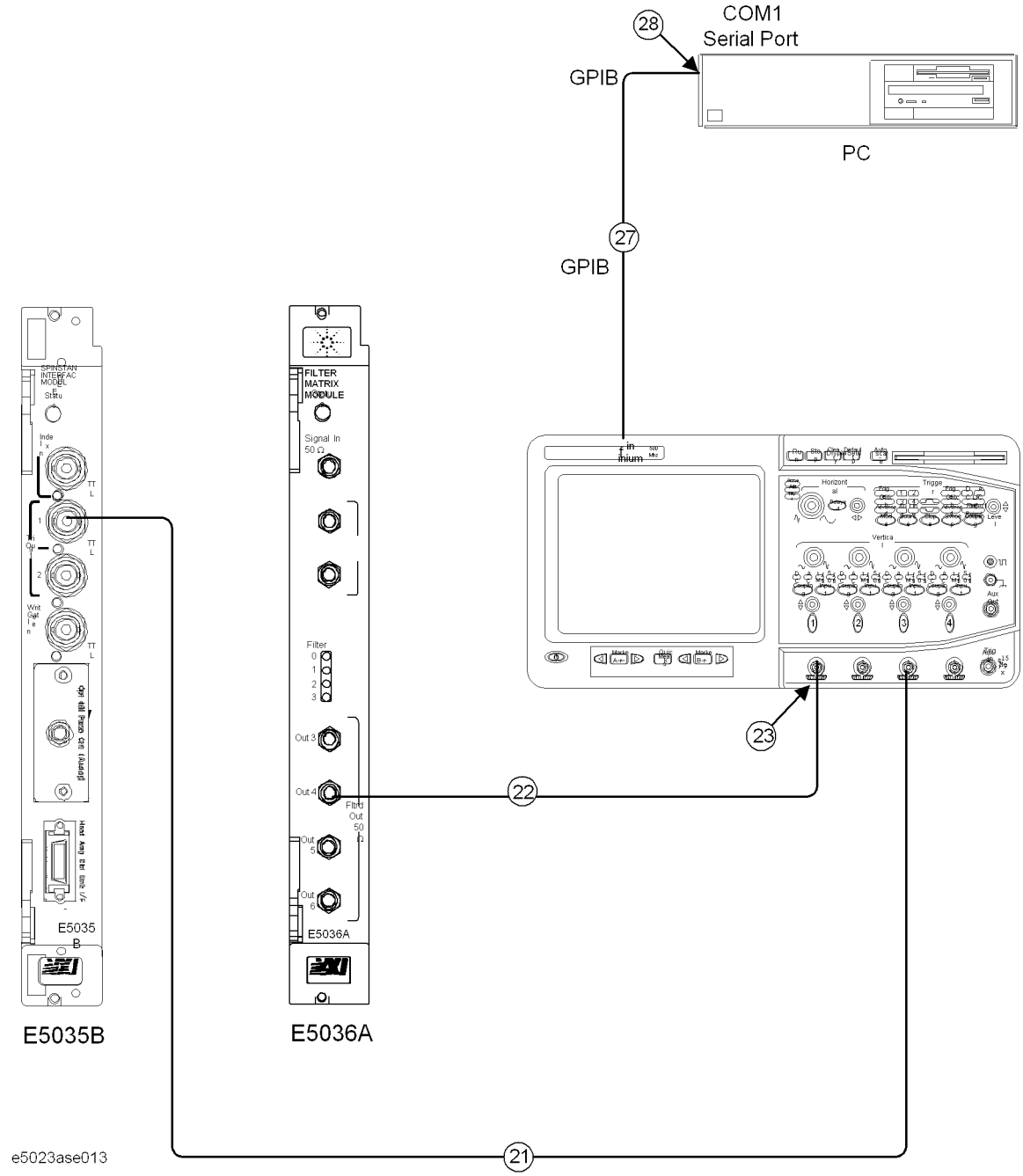


Table 4-13 Cable Connection (Option 103)

No.	Description	Connection		Part Number
21	BNC(m)-BNC(m) Cable	E5035B “Trig Out 1”	54845A/B (Oscilloscope) Ch3	E5023-61613
22	SMA(m)-SMA(m) Cable	E5036A “Filtrd Out 4”	54845A/B (Oscilloscope) Ch1	E5023-61612

Table 4-13 Cable Connection (Option 103)

No.	Description	Connection		Part Number
23	SMA(f)-BNC(m) Adapter	-	-	1250-1700
27	GPIB Cable, 2m	GPIB Port on PCI Board	54845A/B GPIB Port	10833B
28	GPIB Adapter Extender*1	-	-	10834A

*1. The GPIB Extender is used if the GPIB connector is difficult to connect to the PC when the PC's rear panel is sunk.

NOTE Store the terminators you removed from the Agilent E5035B to mount the oscilloscope in a safe place for future use.

Connecting the GPIB

Step 1. Connect a GP-IB extender adapter to the GPIB connector of the PC.

Step 2. Connect the PC and the oscilloscope with a GPIB cable.

Connecting the 3 GHz Spectrum Analyzer (Option)

Connect the 3 GHz Spectrum Analyzer as follows.

Connecting Option 300

Connect the cables for option 300 (3 GHz Spectrum Measurement Capability) as shown in Figure 4-21 and Table 4-14.

Figure 4-21 Cable Connection (Option 300)

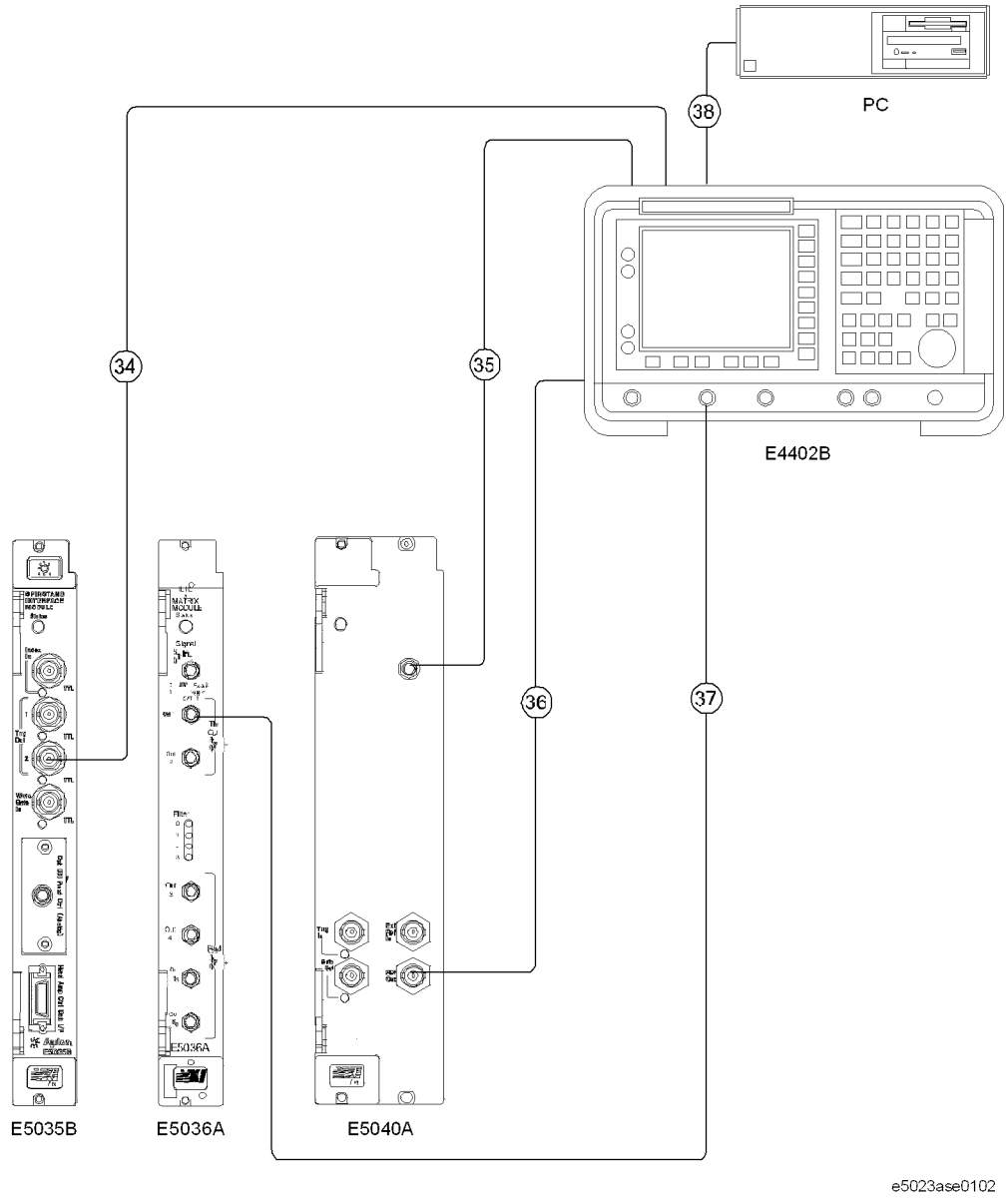


Table 4-14 Cable Connection (Option 300)

No.	Description	Connection		Part Number
34	BNC(m)-BNC(m) Cable, 2.3 m	E5035B “Trig Out 2”	E4402B “Gate Trig / Ext. Trig In”	E5023-61615
35	BNC(m)-SMA(m) Cable, 2.3 m	E5040A “Signal In”	E4402B “Aux IF Out”	E5023-61618
36	BNC(m)-BNC(m) Cable, 2.3 m	E5040A“Ref. Out”	E4402B “10 MHz Ref in”	E5023-61616
37	SMA(m)-SMA(m) Cable, 0.6 m	E5036A “Thru Out 1”	E4402B “Input”	E5023-61617

Table 4-14 Cable Connection (Option 300)

No.	Description	Connection		Part Number
38	GPIB Cable, 2 m	GPIB Port on PCI Board	E4402B “GPIB”	10833B

Connecting the GPIB

Step 1. Connect a GP-IB extender adapter to the GPIB connector of the PC.

Step 2. Connect the PC and the E4402B with a GPIB cable.

How to Check the Operation After Replacement

After replacement of the instrument, it is necessary to perform the software updating, re-configuration and re-adjustment as shown in Table 3-11. And, perform the System Check function or user application program again to verify the E5023A operation.

Table 4-15 **Requirements after replacement of instruments (---: not required)**

exchange instruments	**s/w update**	**re-config.**
PC	x*1	x*2
GPIB I/F card in the PC	x*3	x*2
IEEE 1394 I/F card in the PC	x*3	x*2
E8401A (VXI Main Frame)	---	---
E8491B (IEEE 1394 PC Link to VXI)	x*3	x*2
E5035B (Spinstand Interface Module)	x*4	---
E5036A (Filter Matrix Module)	---	---
E5037C/D (Data Generator Module)	x*4	---
E5038B (Parametric Measurement Module)	x*4	---
E5039B/C (Bit Error Test Module)	x*4	---
E5041A (Dual Counter Module)	---	---
E5040A (Spectrum Analyzer Module)	x*4	---
54845A/B (Oscilloscope)	---	---
E4402B (Spectrum Analyzer)	---	---
Head Amplifier	x*5	---
HGA Cassette	x*5	x*6
Spinstand	Go to troubleshooting chapter in spinstand service manual*7	

*1. All software (Agilent I/O library, Agilent VEE, E5022/E5023 system software, Acrobat Reader).
*2. The I/O card must be re-configured using the Agilent I/O config.
*3. It is necessary to update the Agilent I/O library depending on the situation, for example exchanged the interface card if it is different from the present one.
*4. If system DLLs and module firmware revision conflict, it is necessary to update a instrument firmware or to install the E5023A system software again.
*5. If ahead amplifier board or cassette is changed, the update of the configuration files is required.

*6. If exchanged head cassette is not same as existed one, it is necessary to re-enter the cassette parameter.
*7. After replacing an assembly of spinstand system, you may additionally need to perform re-adjustment. See spinstand service manual for details.

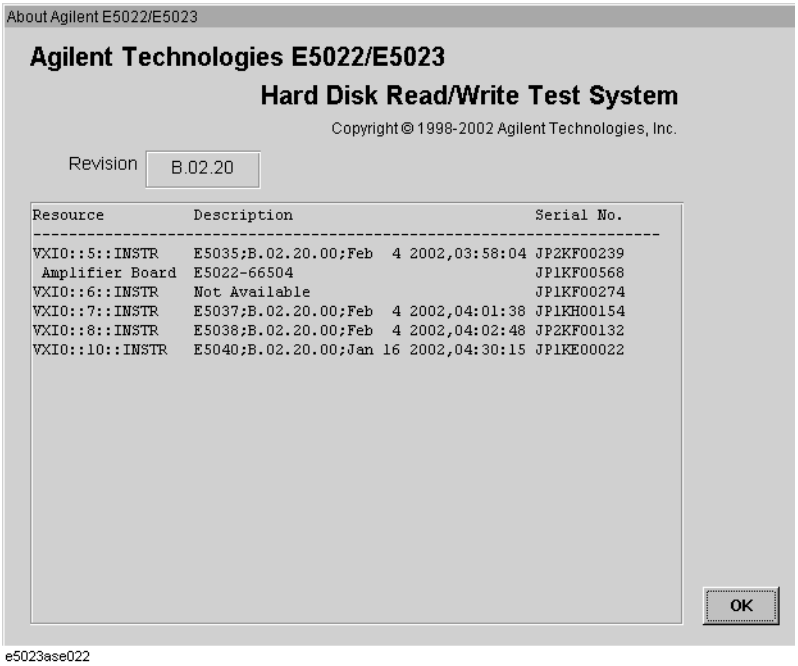
It is able to confirm the E5023A system configuration, such as instrument serial number, software revisions and driver revisions.

Software Revision and Hardware Information

The revision of the E5023A system software, the serial number of modules and instrument are displayed using the E5023A VEE measurement program. It explains how to display the software revisions and hardware information using it

1. Select **Start - Programs - Agilent Hard Disk ReadWrite Test System - Test Environment (Run Time Version)** from **Start** menu of Windows 2000 to launch the program.
2. Before the program starts to initialize, the 'VEE Start' will appear. Then select 'Starts with the default setting'. Initialization takes about 60 seconds.
3. After initialization, the 'cassette Parameter Setup' menu will pop up. Click the **Close** button.
4. Click the **About Agilent E5022/E5023** button to display the current software versions and hardware informations as shown in Figure 4-22.

Figure 4-22 **About Agilent E5022/E5023A Display**



e5023ase022

NOTE Since the E5036A (VXI0::6::INSTR) has no internal DSP chip, there is no firmware to be update. For the spinstand (ASRL1::INSTR), module revision and serial number are not returned.

5 Software Recovery

This chapter provides the information on how to install the required software for the PC of the E5023A. When the PC breaks down and is replaced with a new one, you will have to install the E5023A software into the PC.

Installing Software

The E5023A system requires some software to be installed into the PC. The following sections provide the important information when you install the following software into the PC.

- Agilent I/O Library
- Agilent VEE
- Acrobat Reader®
- Agilent E5023A System Software.

NOTE The Agilent E5023A system supports Windows® 95 or Windows® 2000 operating system. Windows® 98/ME/NT are not supported.

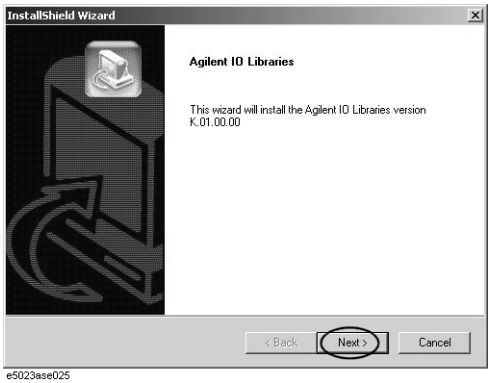
Installing Agilent I/O Library

Agilent I/O library is a general I/O library that controls the instrument. This includes the Agilent VISA / SICL library. The E5023A system software requires this software to control VXI module, instruments such as an oscilloscope, and spinstand through IEEE-1394, GPIB and RS-232C.

Installation Procedure

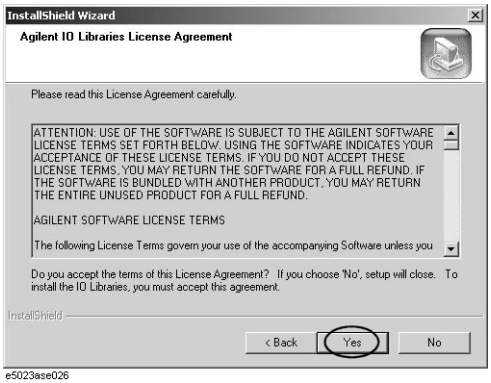
Follow the instruction on the screen to install the I/O Library, basically. There are two dialogs to require a operator's selection. The selection you have to choose is shown below.

1. Insert the I/O Library CD into the CD-ROM drive of the PC. Agilent I/O Library installation program will start automatically. If the installation does not start, run setup.exe from the CD to start the installation process.
2. Click **Next** to continue.



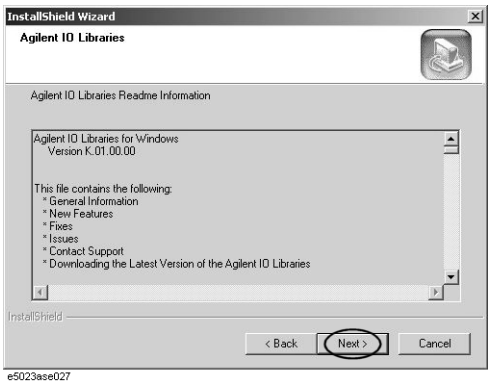
e5023ase025

3. Click **Yes** if you accept the terms of the license agreement.



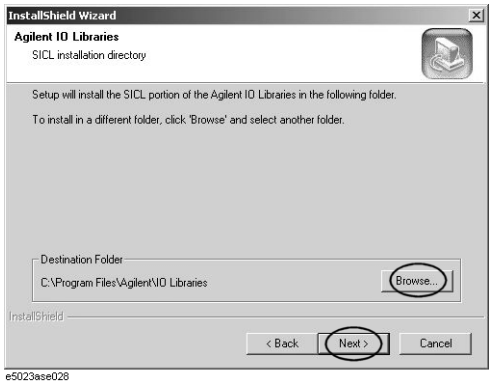
e5023ase026

4. Read the readme information and click **Next >**.



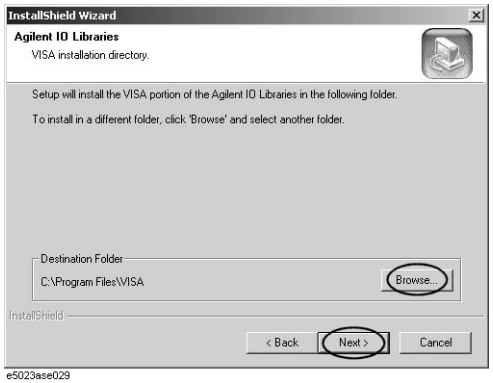
e5023ase027

5. If required, change the SICL installation holder using **Browse...**. Then click **Next >**.



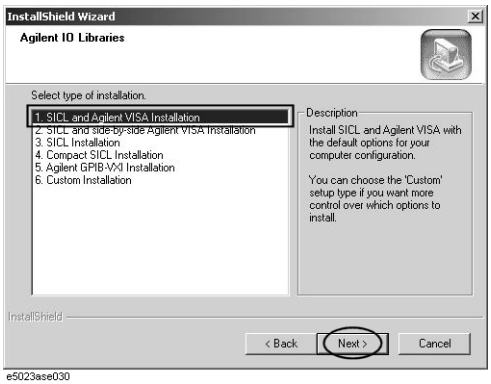
e5023ase028

6. If required, change the VISA installation holder using **Browse...**. Then click **Next >**.



e5023ase029

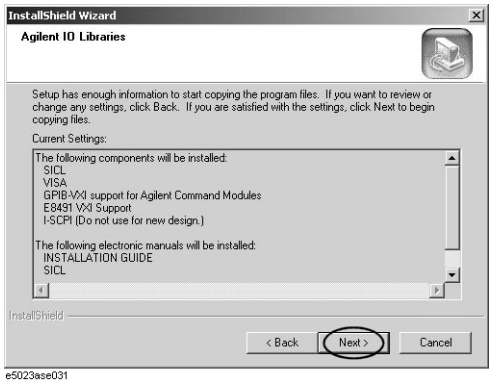
7. Select **1. SICL and Agilent VISA Installation** and click **Next >**.



e5023ase030

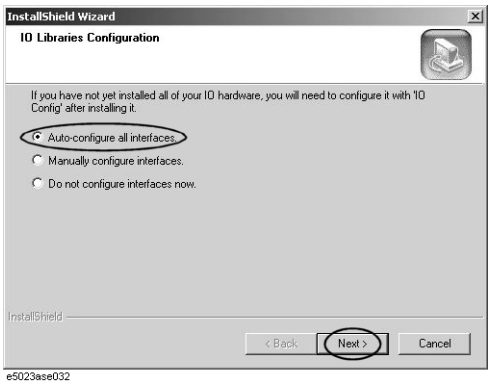
NOTE If you are asked if you want to install Agilent E8491 IEEE 1394 to VXI support, you must click **Yes**.

8. Click **Next >** to start copying the program files.



e5023ase031

9. Select **Auto-configure all interfaces** and click **Next >**.



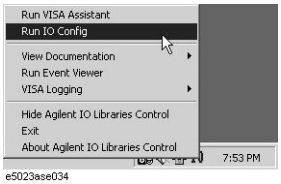
e5023ase032

10. Click **Finish** to finish the installation.

e5023ase033

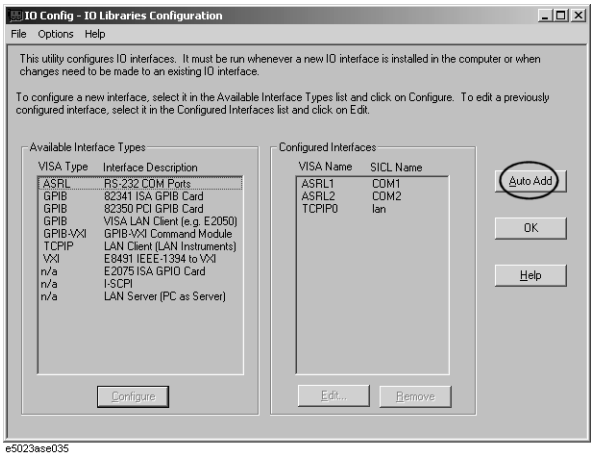
Configuring I/O Library

1. Connect the E8491B with the IEEE-1394 card in the PC slot.
2. Turn on the PC and the VXI mainframe.
3. Execute the I/O Config by clicking the right mouse button on the IO logo in the windows task bar (right bottom in the PC screen) and selecting **Run IO Config**.



e5023ase034

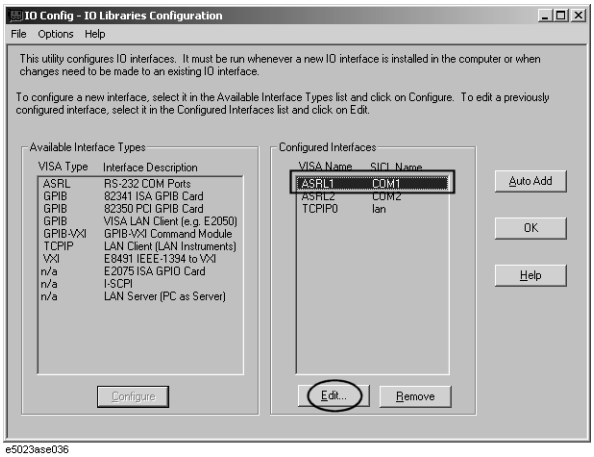
4. Click **Auto Add**.



e5023ase035

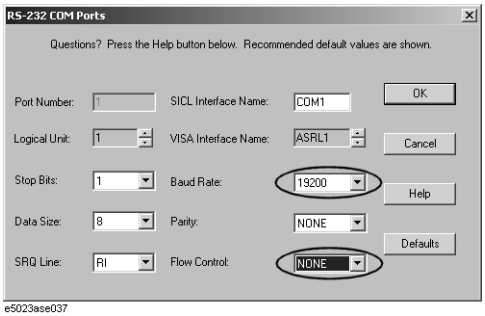
5. Confirm if the COM1, hpib7 and VXI is displayed as the SICL Name in the Configured Interfaces box.

6. Select **COM1 ASRL1** in the Configured Interfaces, then click **Edit**.



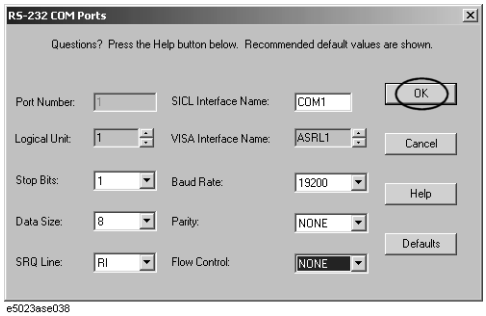
e5023ase036

7. Set the parameters as shown below.
   - Baud Rate: 19200
   - Flow Control: None



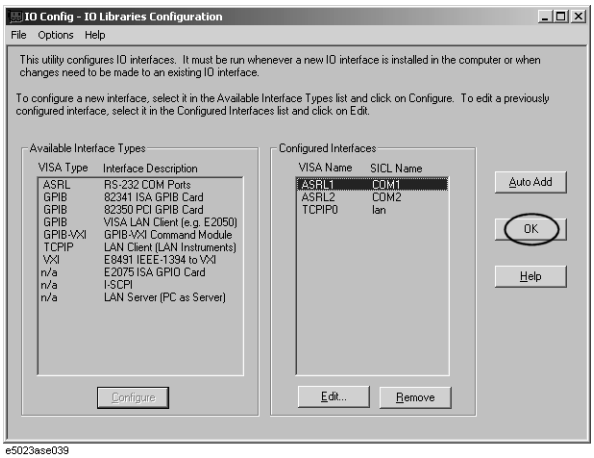
e5023ase037

8. Click **OK**.



e5023ase038

9. Click **OK**.

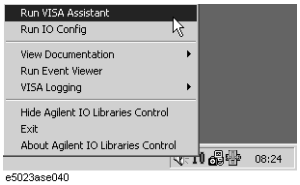


e5023ase039

10. Reboot the PC.

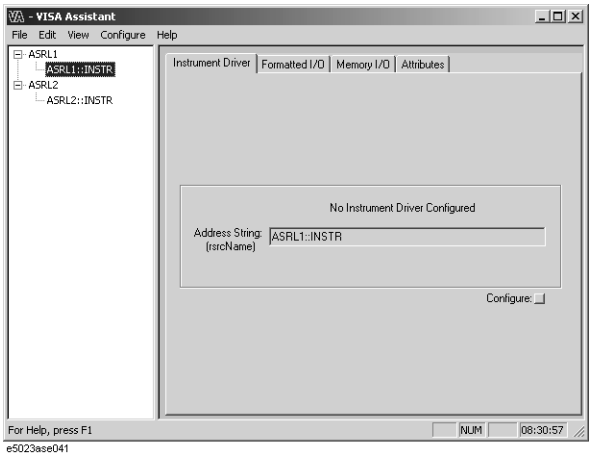
Checking Connection

1. Turn on the PC and the VXI mainframe.
2. Execute the VISA assistant by clicking the right mouse button on the IO logo in the task bard (right bottom in the PC screen) and select **Run VISA Assistant**.



e5023ase040

3. Confirm if the ASRL1, VXI0, GPIB0 are displayed on the left side of the screen.



e5023ase041

NOTE The following property might not be displayed when module is not installed in the VXI. mainframe

- VXI0:5:INSTR (E5035B)

- VXI0:6:INSTR (E5036A)
- VXI0:7:INSTR (E5037C/D)
- VXI0:8:INSTR (E5038B)
- VXI0:9:INSTR (E5039B/C)
- VXI0:10:INSTR (E5040A)
- VXI0:11:INSTR (E5041A)

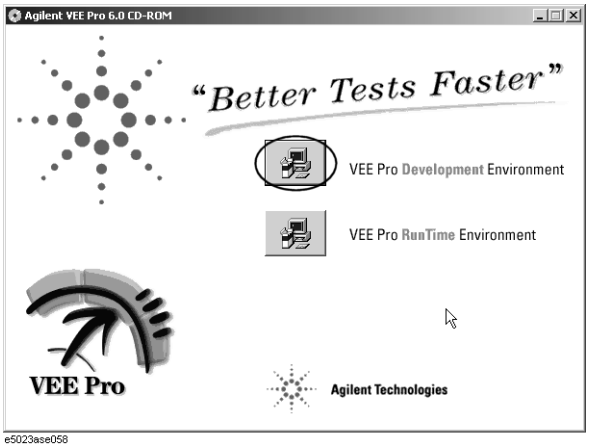
4. Confirm if the GPIB control properly works if the 54845A Oscilloscope is connected.
   a. Select **GPIB0::7::INSTR** in the left side of the screen.
   b. Select **Formatted I/O** tab.
   c. Check IEEE 488.2.
   d. Click ***RST**.
   e. Click ***IDN?** to confirm if the serial number data of 54845A is returned.
5. Confirm if the GPIB control properly works if the 4395A Spectrum Analyzer is connected.
   a. Select **GPIB0::17::INSTR** in the left side of the screen.
   b. Select **Formatted I/O** tab.
   c. Check IEEE 488.2.
   d. Click ***RST**.
   e. Click ***IDN?** to confirm if the serial number data of 4395A is returned.
6. Confirm if the GPIB control properly works if the E4402B Spectrum Analyzer is connected.
   a. Select **GPIB0::18::INSTR** in the left side of the screen.
   b. Select **Formatted I/O** tab.
   c. Check IEEE 488.2.
   d. Click ***RST**.
   e. Click ***IDN?** to confirm if the serial number data of E4402B is returned.

Installing Agilent VEE

Agilent E5023A VEE (Visual Engineering Environment) is a graphical programming language designed to solve engineering problems and create test systems. The Agilent VEE has two basic parts, namely; the development environment that allows you to use all features of the VEE and the run-time environment that allows you to run the VEE program created from the development environment. Follow the instruction of the installer program and select the development environment in the installer sequence.

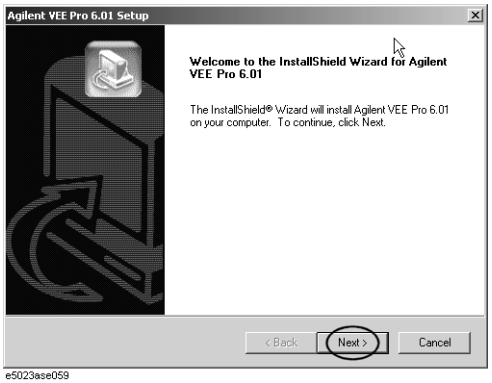
VEE Development Environment Installation Procedure

1. Insert the Agilent VEE program CD into the CD-ROM drive of the PC. Agilent VEE installation program will start automatically.
2. Click **VEE Pro Development Environment** icon to start installing the VEE Pro Development Environment.



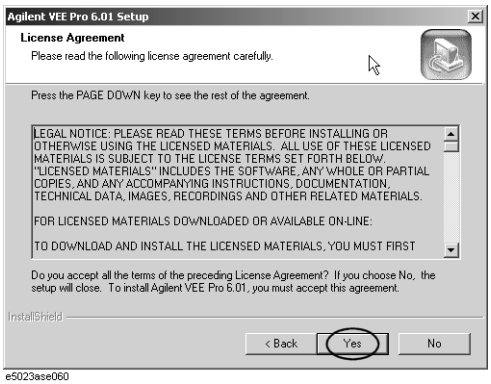
e5023ase058

3. Click **Next >**.



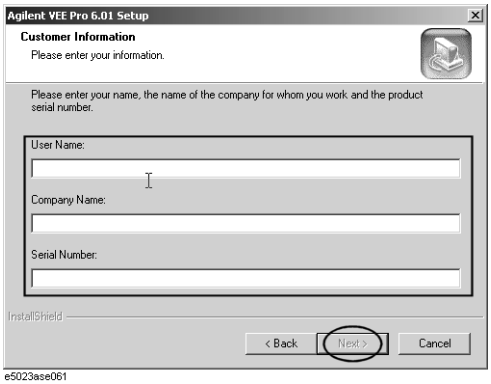
e5023ase059

4. Click **Yes** if you accept the terms of the license agreement.



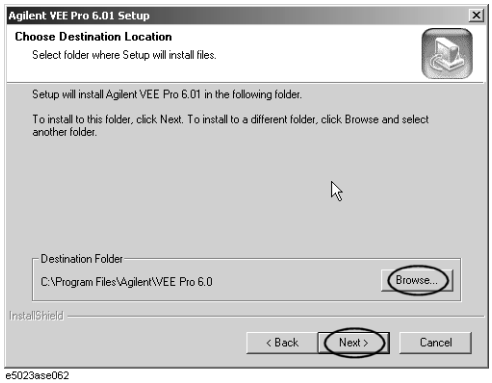
e5023ase060

5. Enter your name, company name, and serial number of the software and click **Next >**.



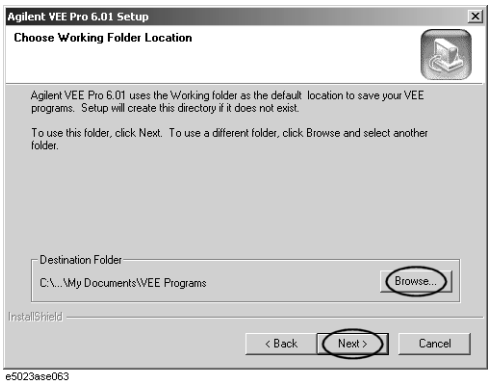
e5023ase061

6. Click **Next >**.



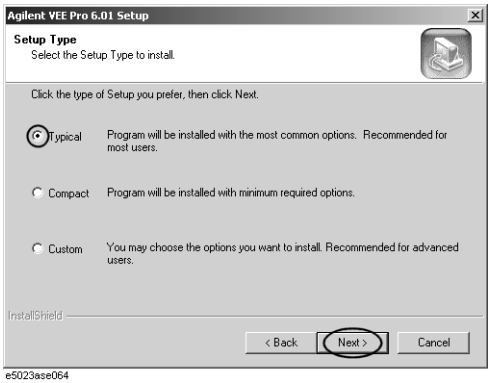
e5023ase062

7. Click **Next >**.



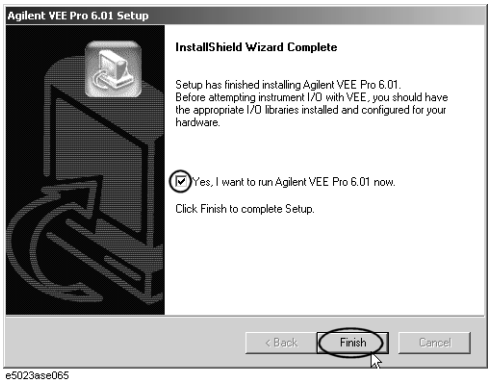
e5023ase063

8. Select **Typical** and click **Next >**.



e5023ase064

9. If you want to run the Agilent VEE now, select **Yes, I want to run Agilent VEE**. Click **Finish** to complete the installation.

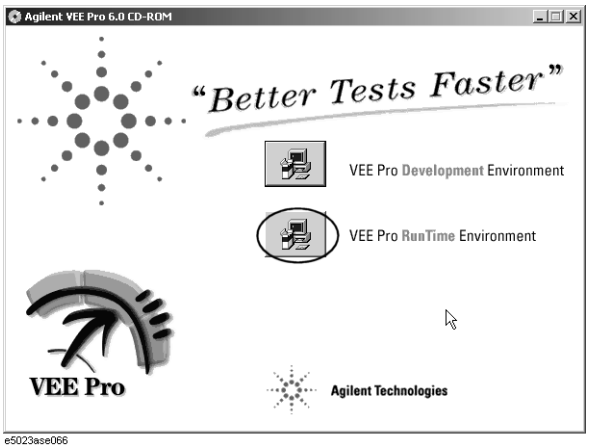


e5023ase065

VEE RunTime Environment Installation Procedure

1. Insert the Agilent VEE program CD into the CD-ROM drive of the PC. Agilent VEE installation program will start automatically.
2. Click **VEE Pro RunTime Environment** icon to start installing the VEE Pro RunTime

Environment.

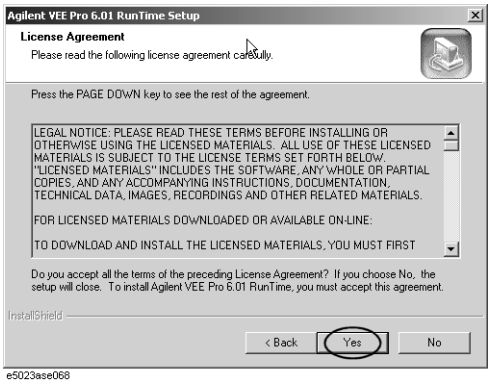


e5023ase066

3. Click **Next >**.

e5023ase067

4. Click **Yes** if you accept the terms of the license agreement.

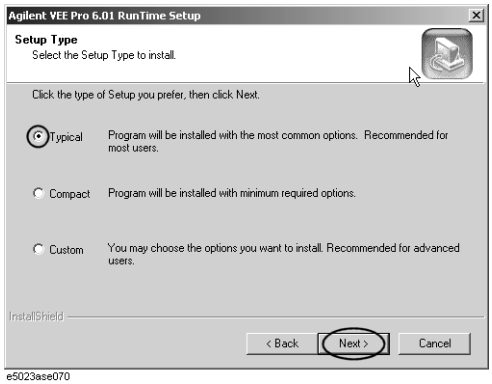


e5023ase068

5. Click **Next >**.

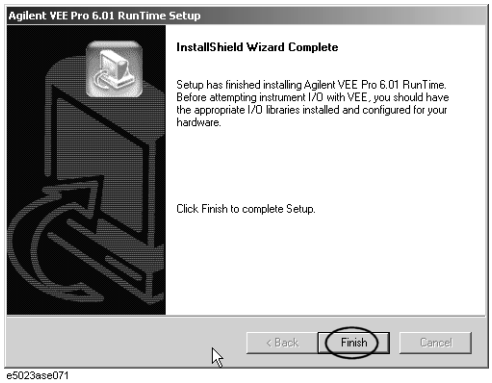
e5023ase069

6. Select **Typical** and click **Next >**.



e5023ase070

7. Click **Finish** to complete the installation.



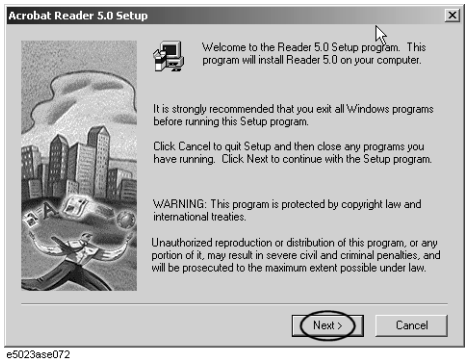
e5023ase071

Installing Acrobat Reader

Acrobat Reader allows you to read the operation/programming manuals in pdf format. It is provided in the E5023A system software CD-ROM or the website of Adobe Company (http:\\www.adobe.com\). Follow the instruction of the installer program.

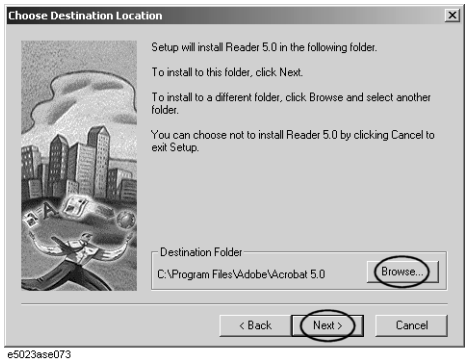
Installation Procedure

1. Click **Next >**.



e5023ase072

2. Click **Next >**.



e5023ase073

3. Click **OK**.

e5023ase074

4. Click **Accept** if you accept the terms of the license agreement.

e5023ase075

Installing E5023A System Software

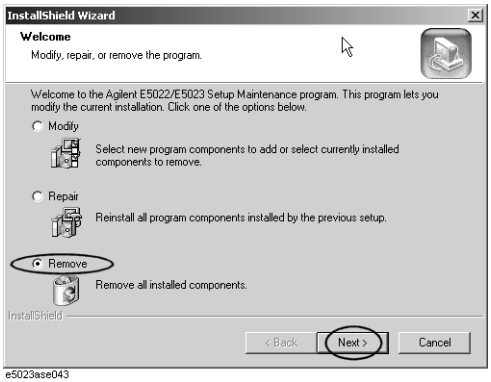
The E5023A system software allows you to control the E5023A. Executing the system software installs the E5023A function library, VEE measurement software, manuals in PDF format. It is provided in the E5022/E5023 system software CD-ROM or the website of Agilent E5023A customer support (http://dst.tm.agilent.com/).

Installation Procedure

1. Insert the Agilent E5022/E5023 Software CD into the CD-ROM drive of the PC, or download the E5022/E5023 System Software (inst_e5022.exe) from the Agilent E5022/E5023 customer support web site (http://dst.tm.agilent.com/) and make a copy of the file in the PC.
2. Select and double-click the system software: **inst_e5022.exe**.
3. Click **Next >** to continue the installation.

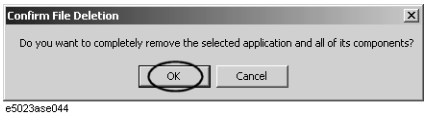
e5023ase042

4. If an E5022/E5023 system software exists in your PC and the following dialog box appears, select **Remove** and click **Next >** to remove it before installing a new software. Otherwise proceed to Step 11 on page 151.



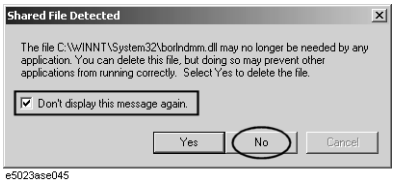
e5023ase043

5. Click **OK** to start removing the existing system software.



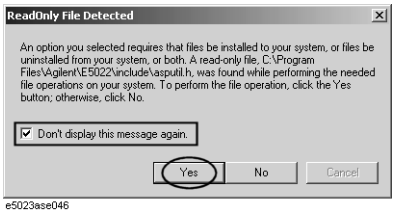
e5023ase044

6. If **Shared File Detected** dialog box appears, select **Don't display this message again** and click **No**.



e5023ase045

7. If **ReadOnly File Detected** dialog box appears, select **Don't display this message again** and click **Yes**.



e5023ase046

8. Click **Finish** to end the system software removal.

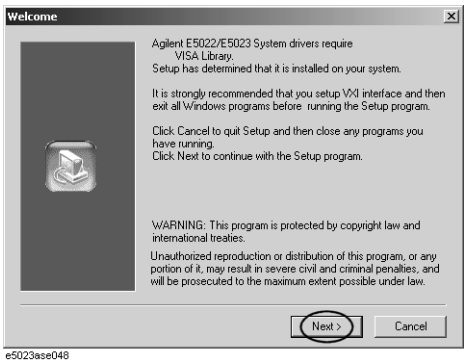
e5023ase047

9. Select and double-click the system software: **inst_e5022.exe** again.

10. Click **Next >** to continue the installation.

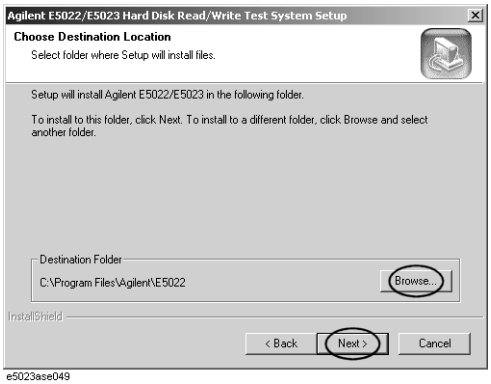
e5023ase042

11. Read the information and click **Next >**.



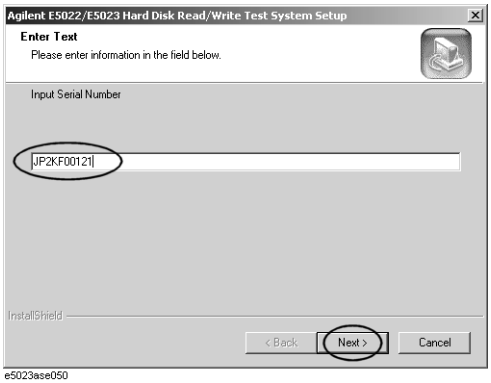
e5023ase048

12. If needed, change the system installation holder using **Browse...**. Then click **Next >**.



e5023ase049

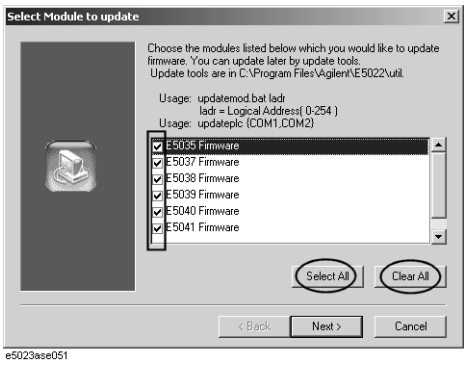
13. Enter the system's serial number and click **Next >**.



e5023ase050

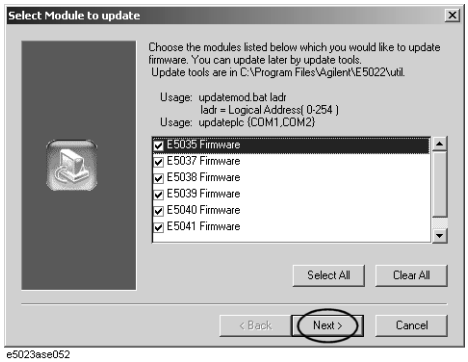
14. If firmware update is needed, select the desired firmware of VXI modules. You can use **Select All** or **Clear All** to select all items or clear all selections at a time.

NOTE *Do not select a firmware check box if its hardware is not installed into the system.*



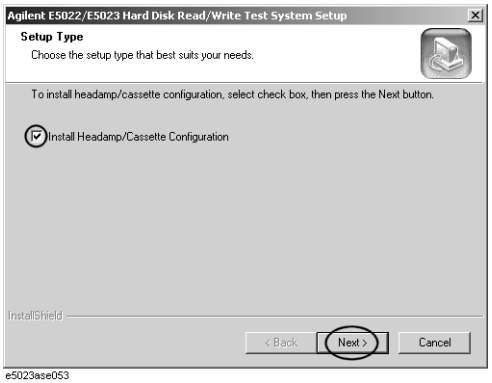
e5023ase051

15. Click **Next >** to start firmware update.



e5023ase052

16. If the head amplifier/cassette configuration software should be installed, select **Install Headamp/Cassette Configuration** and click **Next >**.



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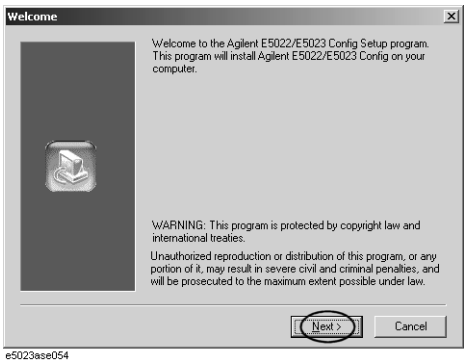
17. Click **Next >** to start installing the Head Amplifier/Cassette Configuration Software.



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18. If **ReadOnly File Detected** dialog box appears, select **Don't display this message again** and click **Yes**.

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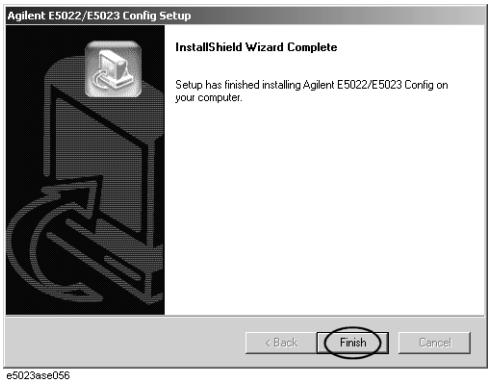
19. Click **Finish**.



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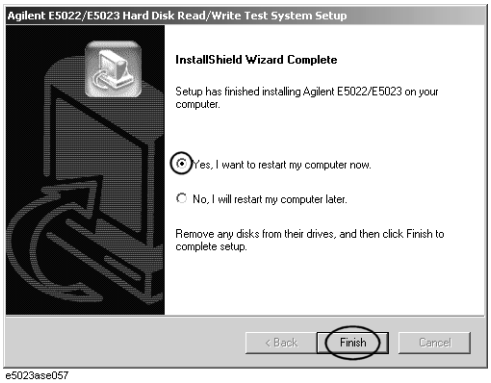
20. Select **Yes, I want to restart my computer now**, remove the CD-ROM from the PC, and click **Finish** to restart the computer.



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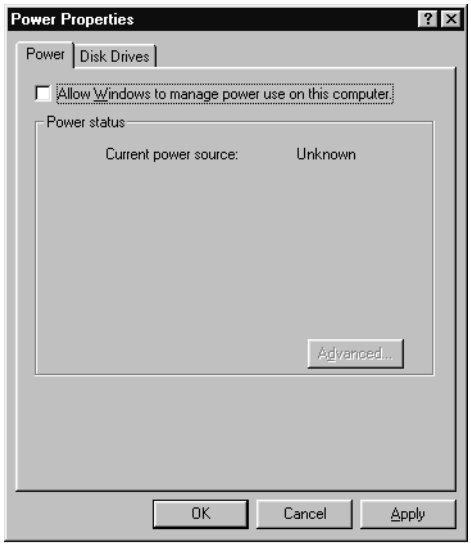
PC Power Management

If your E5023A has Windows® 95 operating system, you must turn off the power management mode to avoid performance (measurement speed) deterioration. For Windows® 2000 operating system shipped with the latest version of the E5023A, you don’t need to care the power management mode because Windows® 2000 does not have such mode.

Use the ‘Power Icon’ in the Control Panel to change this setting.

Figure 5-1 **Power Management (Windows® 95 Operating System)**



A Manual Changes

This appendix contains the information required to adapt this manual to versions or configurations of the E5023A manufactured earlier than the current printing date of this manual. The information in this manual applies directly to E5023A units having the serial number printed on the title page of this manual.

Manual Changes

To adapt this manual to your E5023A, 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

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 Serial Number Plate Example

B Measurement Paths

In this Appendix, major measurement parameters versus signal paths are described. The matrix is useful to isolate faulty part or module if measurement parameter value has some problem.

Measurement Paths by Measurement Parameters

Table B-1 E5035B Measurement Paths by Typical Measurement Parameters

Module	**E5035B Spinstand Interface Module**							
Function	**Trigger Output**		**Write Current Control**	**Sense Current Control**	**DCR Measurement**	**Write Gate Control**	**Head Amp Control**	**Piezo Stage Control**
Port	**Trig Out 1 (to Osc)**	**VXI bus (to 37/38/39/40)**	**Head Amp Ctrl Unit I/F (to 43)**	**Head Amp Ctrl Unit I/F (to 43)**	**Head Amp Ctrl Unit I/F (from 43)**	**Write Gate In (from 39), Head Amp Ctrl Unit I/F (to 43)**	**Head Amp Ctrl Unit I/F (to 43)**	**Piezo Ctrl (to spinstand)**
TAA		P	P	P			P	P
PW		P	P	P			P	P
Baseline		P	P	P			P	P
NLTS 5th		P	P	P			P	P
Narrow Band TAA		P	P	P			P	P
Triple Track Profile (TAA)		P	P	P			P	P
Over Write		P	P	P			P	P
DCR (Read)				P	M		P	P
DCR (Write)					M		P	
Popcorn Noise		P	P				P	
TAA w/ Oscilloscope	P	P	P	P			P	P
Bit Error Rate		P	P	P		P	P	P

Table B-2 E5036A/E5037C/E5037D Measurement Paths by Typical Measurement Parameters

Module	**E5036A Filter Matrix Mod.**		**E5037C/D (Data Generator Module**					
Function	**Through Connection**	**Filtering**	**Trigger Acceptance**	**Write Gate Signal Output**	**Clock Signal Output**	**Write Data Signal Output**	**Reference Signal Output**	**Precompen**
Port	**Signal In (from OBU), Thru Out (to 39/40)**	**Signal In (from OBU), Fltrd Out 3/4/5 (to 38/Osc/41)**	**VXI bus (from 35)**	**Gate Out (to 41)**	**Clock Out Pos/Neg (to 43)**	**Data Out Pos/Neg (to 43)**	**Ref Out (to 40)**	**-**
TAA		P	P		P	P		
PW		P	P		P	P		
Baseline		P	P		P	P		
NLTS 5th	P		P		P	P	P	P
Narrow Band TAA	P		P		P	P	P	
Triple Track Profile (TAA)		P	P		P	P		
Over Write	P		P		P	P	P	
DCR (Read)								
DCR (Write)								
Popcorn Noise		P	P	P	P	P		
TAA w/ Oscilloscope		P	P		P	P		
Bit Error Rate	P		P					

Table B-3 E5038B/E5040A Measurement Paths by Typical Measurement Parameters

Module	**E5038B Parametric Measurement Module**				**E5040A Spectrum Measurement Module**		
Function	**Trigger Acceptance**	**TAA Measurement**	**PW Measurement**	**Baseline Measurement**	**Trigger Acceptance**	**External Reference Signal Acceptance**	**Spectrum Measurement**
Port	**VXI bus (from 35)**	**Signal In (from 36)**	**Signal In (from 36)**	**Signal In (from 36)**	**VXI bus (from 35)**	**Ext Ref In (from 37)**	**Signal In (from 36)**
TAA	P	M					
PW	P		M				
Baseline	P			M			
NLTS 5th					P	P	M
Narrow Band TAA					P	P	M
Triple Track Profile (TAA)	P	M					
Over Write					P	P	M
DCR (Read)							
DCR (Write)							
Popcorn Noise	P			M			
TAA w/ Oscilloscope							
Bit Error Rate							
Spectral SNR					P	P	M

Table B-4 Oscilloscope/E5039B/39C Measurement Paths by Typical Measurement Parameters

Module	**Oscilloscope (Optional)**		**E5039B/C Bit Error Rate Test Module (Optional)**				**E5041A Dual Counter Module (Optional)**	
Function	**Trigger Acceptance**	**Waveform Measurement**	**Trigger Acceptance**	**Write Gate Control (only E5039B)**	**Write Data Output**	**Bit Error Rate Measurement**	**Trigger Acceptance**	**Popcorn Noise Measurement**
Port	**Channel 3 (from 35)**	**Channel 1 (from 36)**	**VXI bus (from 35)**	**Write Gate Out (to 35)**	**Data Out Pos/Neg (to 43)**	**Signal In (from 36)**	**Trig In (from 37)**	**Signal In (from 36)**
TAA								
PW								
Baseline								
NLTS 5th								
Narrow Band TAA								
Triple Track Profile (TAA)								
Over Write								
DCR (Read)								
DCR (Write)								
Popcorn Noise							P	M
TAA w/ Oscilloscope	P	M						
Bit Error Rate			P	P	P	M		

Table B-5 E4402B Measurement Paths by Typical Measurement Parameters

Module	**E4402B Spectrum Analyzer (Optional)**			
Function	**Trigger Acceptance**	**External Reference Signal Acceptance**	**IF Signal Output**	**Spectrum Measurement**
Port	**EXT TRIG IN (from 35)**	**10 MHz REF IN (from 40)**	**AUX IF OUT (to 40)**	**INPUT (from 36)**
TAA				
PW				
Baseline				
NLTS 5th	P	P	P	P
Narrow Band TAA	P	P	P	P
Triple Track Profile (TAA)				
Over Write	P	P	P	P
DCR (Read)				
DCR (Write)				
Popcorn Noise				
TAA w/ Oscilloscope				
Bit Error Rate				
Spectral SNR	P	P	P	M

NOTE The following abbreviations are used in Table B-1 through Table B-5:

P: Signal passes at this function block.

M: Measurement is done at this function block.

35: E5035B Spinstand Interface Module

36: E5036A Filter Matrix Module

37: E5037C/D Data Generator Module

38: E5038B Parametric Measurement Module

39: E5039B/C Bit Error Test Module

40: E5040A Spectrum Measurement Module

41: E5041A Dual Counter Module

Osc: 54845A/B Oscilloscope

OBU: Onstage Buffer Unit

C Software Tools

This appendix describes how to use software tools installed in the Agilent E5023A.

Introduction

This appendix describes how to use software tools installed in the Agilent E5023A. These tools are used to troubleshoot and configure the setting after module replacement. The items shown below are explained in the following sections.

- Spinstand Tool Usage
- Agilent I/O Config Usage
- Agilent VISA Assistant Usage

Spinstand Tool Usage

Purpose of Tools

The spinstand tools allows you to control the each stage, spindle and HLM one by one to help adjustment, repair and isolation. This tool has following function.

- Spinstand Data Backup/Restore

  Backup or restore the spinstand data. This data includes important and unique values for each spinstand. So, you should back up the data before every adjustment/repair for the spinstand.

- Spinstand Diagnosis

  Operates spinstand motion to test their function.

  — X-Y Stages

    - Lock/Unlock

      Lock means to pull the stage by vacuum air, land and fix it

      Unlock means to float the stage.

    - Free float

      Free float means to release servo motor actuate a stage, so that you can move the stage by hand.

    - Homing

      Homing means to initialize the stage. In homing, the stage is moved to an end of stage travel where limit switch is turned on, then initialize the position. The stage is fixed by servo motor after homing.

  — Spindle

    - Clamp/Unclamp

      Clamp means to fix the media on the spindle. Unclamp means to release it.

    - Rotate

      Rotates the spindle. Before rotation, media is clamped automatically.

  — HLM

    - Head Load/Unload

      Actuate HLM to load or Unload a head.

Additional Function for Trained Personnel

For trained personnel, additional functions of the spinstand tool are available. See the spinstand service manual for details.

Procedure to use the Spinstand Tool

The procedure for the spinstand tool is as follows.

Step 1. Connect the spinstand and the PC with serial cable.

Step 2. Turn on the spinstand and the PC.

Step 3. Select **Start - Programs - Agilent Hard Disk ReadWrite Test System - Spinstand Tool** to execute the spinstand tool

NOTE It is strongly recommended to reboot the PC before launching spinstand tool to free serial port from other applications. Also, shutdown any application that use serial port. Such application may lock serial port and cause conflict with the spinstand tool.

Figure C-1 Opening window of the Spinstand Tool

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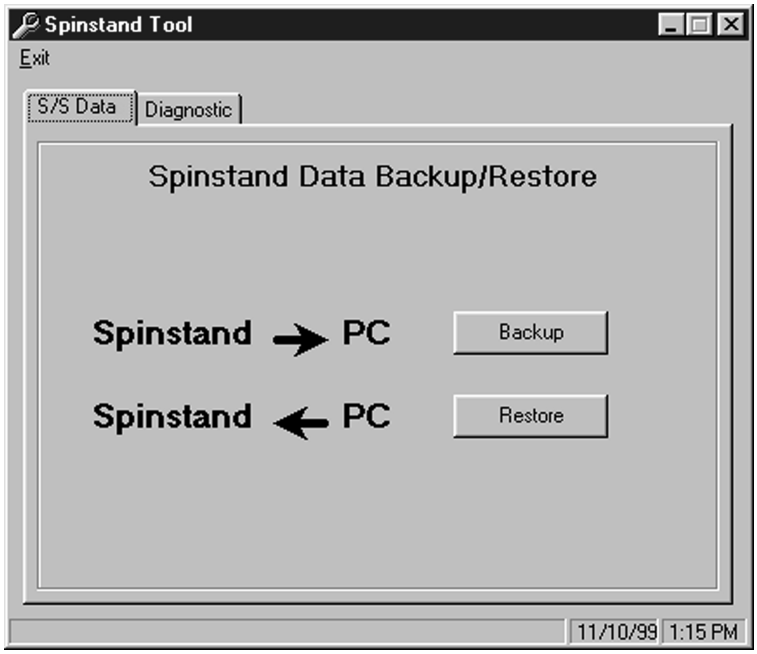
Spinstand Data Backup/Restore menu

To activate Spinstand Data Backup/Restore menu, click on **S/S Data** tab of the spinstand tool.

This menu backup the spinstand data to the PC or restore to the spinstand. This data includes the alignment data of the stages, piezo calibration data and other spinstand unique information.

NOTE It is recommended to take a backup before proceeding to repair or diagnostics because there can be loss of data during these process.

Figure C-2 **Spinstand Data Backup/Restore menu**



Backup Backup all spinstand data to the PC. To back up the data, click this button and select the destination of the data.

Restore Restore the backuped data to the spinstand. To restore the data, click this button and select the file you want to restore.

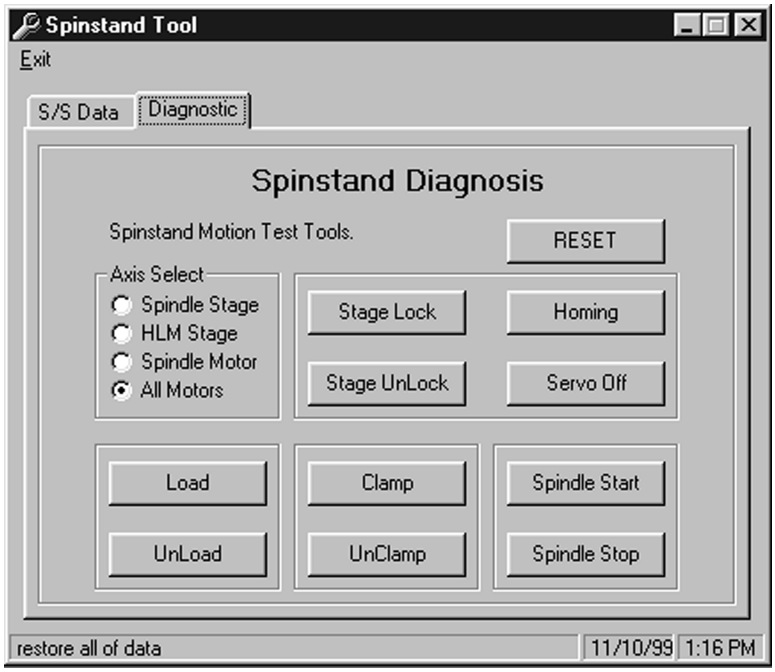
NOTE While backing up and restoring the data, the Spinstand Data Backup/Restore menu may be corrupted. This is caused that the screen is not refreshed properly during data is transferred between the PC and the spinstand. If screen corruption occurs, data transfer is certainly transferred and you don't have to reboot the PC.

Spinstand Diagnosis menu

To activate Spinstand Diagnosis menu, click on **Diagnostic** tab of the spinstand tool.

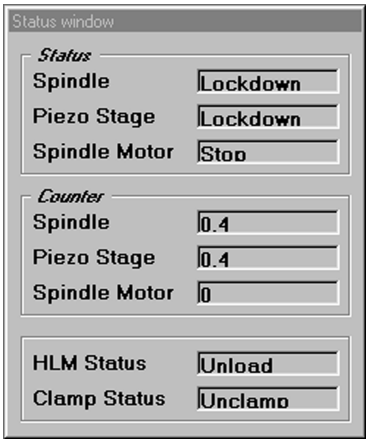
This menu controls each part of the spinstand to diagnosis the spinstand. Status window shows each part status and data.

Figure C-3 **Spinstand Diagnosis menu**



Reset	Reset the spinstand.
Axis Select	Select an Axis from Spindle Stage, HLM Stage, Spindle Motor or All Motors.
Stage Lock	Lockdown the selected stage.
Stage Unlock	Unlock the selected stage.
Homing	Initialize the selected stage position and fix home position of each stage.
Servo Off	Off the servo control of each stage.
Load **UnLoad**	Load or unload the head to actuate the HLM.
Clamp **UnClamp**	Fix or release the media on the spindle.
Spindle Start **Spindle Stop**	Start or stop the spindle rotation. Before rotation, the media will be clamped automatically.

Figure C-4 **Spinstand Diagnosis menu Status window**



Usage of I/O Config

Purpose of I/O Config

I/O Config is to detect the interface devices and configure them. The I/O config is set at proper setting at factory shipment. However, somehow it might be change. In case of communication trouble, confirming I/O configure is required.

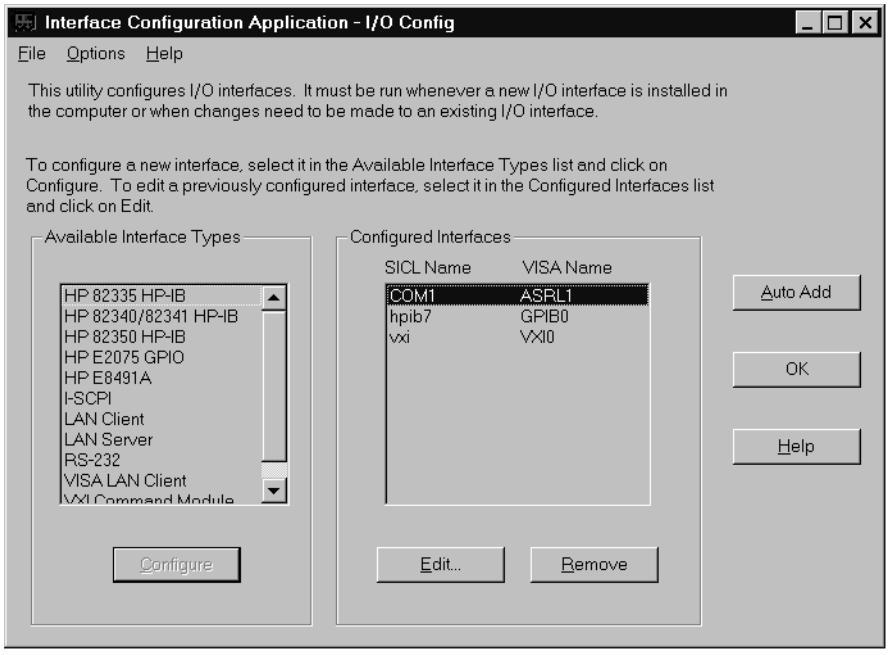
Procedure of I/O Config

The procedure for I/O Config is as follows.

Step 1. Select **Start - Programs - Agilent I_O Libraries - I_O Config**, or click the right mouse button on the HP logo in the task bar and select **Run I_O Config**.

Step 2. Confirm if the “ASRL1”, “GPIB0” and “VXI0” as VISA name is listed in the Configured Interfaces as shown in Figure C-5 on page 168

Figure C-5 I/O Config Menu



Step 3. If not correct, follows as below.

- If no “VXI0”, select “Agilent E8491” in the Available Interface Types and click on “Configure” button.
- If no “ASRL1”, select “RS232” in the Available Interface Types and click on “Configure” button.
- If no “hpib7”, select “Agilent 82350 GPIB” in the Available Interface Types and click on “Configure” button.

VISA Assistant Usage

Purpose of VISA Assistant

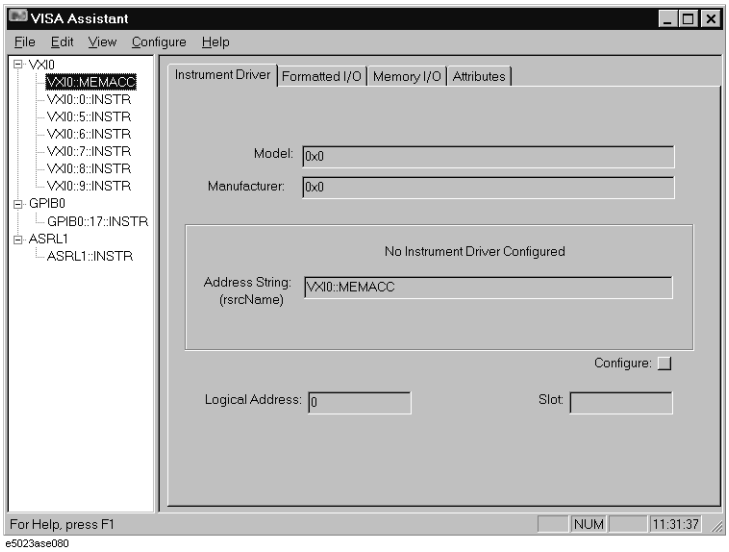
VISA Assistant is designed to help you communicate with instruments. VISA Assistant can automatically detect and assign Instrument Drivers to Instruments. In case of communication trouble, it allows you to confirm if the communication is correct.

Procedure

Step 1. Select **Start - Programs - Agilent I_O Libraries - VISA Assistant**, or click the right mouse button on the Agilent logo in the task bar and select **Run VISA Assistant** to execute VISA Assistant.

Step 2. Confirm if "VXI::0::INSTR", ”VXI::5::INSTR", "VXI::6::INSTR" ,"VXI::7::INSTR", "VXI::8::INSTR", "GPIB0::xx::INSTR"*1, "ASRL1::INSTR" is displayed on the left side of the screen. If not displayed, proceed the step 5.

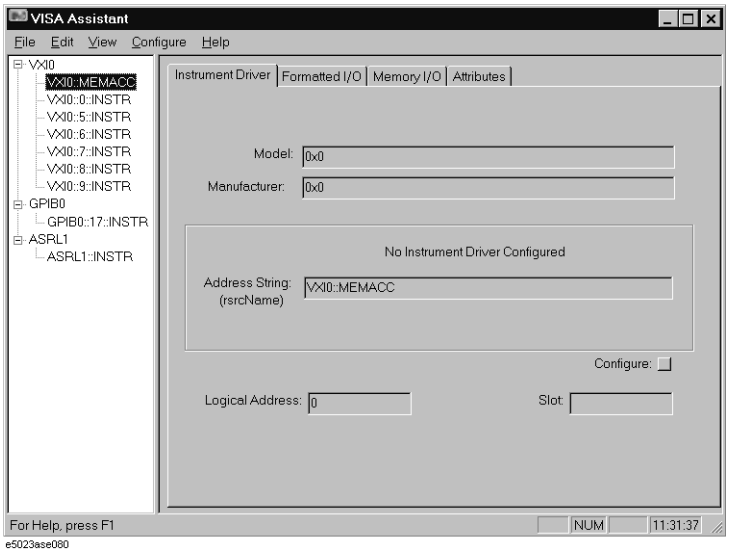
Figure C-6 **VISA Assistant Menu**



Step 3. Click "VXI::0::INSTR" on the left side of the screen. Confirm if the "VXI::0::INSTR" is displayed on the middle of the right side of screen.

*1. GPIB Address, 7 - Oscilloscope, 17 - 4395A, 18 - E4402B

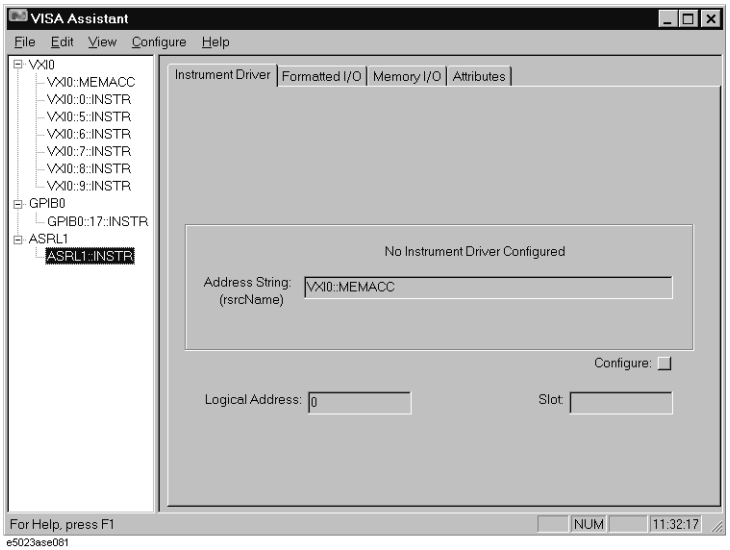
Figure C-7 **VISA Assistant Menu**



Step 4. Confirm as same manner for "VXI::0::INSTR","VXI::5::INSTR", "VXI::6::INSTR", "VXI::7::INSTR", "VXI::8::INSTR", "GPIB0::xx::INSTR", "ASRL1::INSTR".

If the connection has problem, they are different between the selection of right side screen and the displayed in the middle of the left side screen. See the Figure C-8 on page 170.

Figure C-8 **Connection Problem Example**



Step 5. If the connection has problem, follows the instruction below.

1. When "VXI::0::INSTR", "VXI::5::INSTR", "VXI::6::INSTR", "VXI::7::INSTR", "VXI::8::INSTR" has problem, turn off the VXI mainframe. When "GPIB0::xx::INSTR" has problem, turn off and on the spectrum analyzer. When "ASRL1::INSTR" has problem, turn off and on the spinstand.

2. Click the right mouse button on the HP logo in the task bar and select **Exit** button to

quit the resource manager.

3. Select **Start - Programs - StartUP - Agilent I_O Libs Control** from Start menu of Windows 95 to execute the resource manager again.
4. Click the right mouse button on the HP logo in the task bar and select **Refresh Resource Manager** to refresh the status of the instruments.

Step 6. Confirm if the connection makes correct according to the step 1 to 3.

Step 7. If the problem is not solved, it is suspected the hardware failure or connection failure.

D Error Messages

This appendix lists the error messages.

Error Messages on PC Monitor Display

Table shows the error messages that could appear on the PC monitor display when you use a demo program or other programs created by the user.

Error Messages on PC Monitor Display

Error Code	Description
hpe5022_ERROR_AUTO_CONFIG_FAILED	The auto configuration has failed. Check if the parameter and head is correct.
hpe5022_ERROR_AUTO_RANGE_FAIL	The auto range has failed. Check if the parameter and head is correct.
hpe5022_ERROR_CAL_DATA_CORRUPT	Calibration data stored in the system or head amplifier board was corrupt. Need to perform the calibration again.
hpe5022_ERROR_CAL_FAILED	Calibration is failed. Check the configuration and cabling, then re-try the calibration.
hpe5022_ERROR_CLOSE	Unable to close some components (instruments and the spinstand).
hpe5022_ERROR_CONFLICT_PREC_PATTERN	The precompensation pattern has conflict.
hpe5022_ERROR_D50_NOT_FOUND	Can’t find the D50 parameter point. Check the result of the roll off measurement.
hpe5022_ERROR_DATA_CORRUPT	The measurement data is corrupt. Check if your measurement sequence is correct.
hpe5022_ERROR_EXCESS_TRACK_DATA	The data overflows a track at one revolution. Change the setting of the user data rate, rpm, track number, track format or sector format.

Error Messages on PC Monitor Display

Error Code	Description
hpe5022_ERROR_FILE_ACCESS	Data log file in the auto alignment operation can not be created.
hpe5022_ERROR_FUNCTION_NOT_LOADED	Unable to load the DLL file. Perform the E5023A installation software or check if the file is installed in the PC. The location of DLL file is described in Chapter 2 of the programming manual.
hpe5022_ERROR_HARD	Detected a hardware error in the system.
hpe5022_ERROR_HARD_HAMP	Detected a hardware in the head amplifier board.
hpe5022_ERROR_HARD_MISS	The media or HGA cassette is missing or the selected hardware is not installed. Check if they are placed properly.
hpe5022_ERROR_INACCURATE_BER	Too many Bit Error Rate happens and measurement result is not correct. Need to optimize the measurement.
hpe5022_ERROR_INTERNAL	Unexpected internal error occurred.
hpe5022_ERROR_INTERLOCK	The spinstand is out of air or vacuum or emergency switch has been turned on. Check if air or vacuum is supplied to the spinstand or reset the emergency switch.
hpe5022_ERROR_INV_BAS_HNDL	Detected the invalid base segment handle parameter in UDS. Check your program.
hpe5022_ERROR_INV_BAS_ID	Detected the invalid base segment ID parameter in UDS. Check your program.

Error Messages on PC Monitor Display

Error Code	Description
hpe5022_ERROR_INV_DATA_SIZE	In the user defined data pattern, the length of specified data pattern is shorter than the specified user data bit length.
hpe5022_ERROR_INV_DATA_TYPE	The specified data pattern for the user define data pattern includes an invalid character. (either binary nor hexadecimal)
hpe5022_ERROR_INV_DRIVE_CONDITION	The spinstand drive is in improper condition When this message is displayed while the drive is on, turn off the drive. If this is displayed while the drive is off, turn on the drive.
hpe5022_ERROR_INV_GATE_TIME	Gate setting is invalid in the BER measurement. Check your program.
hpe5022_ERROR_INV_ID	The handle ID is invalid. Check if the handle ID in your program is correct.
hpe5022_ERROR_INV_PARAMETER	The parameter is out of range.
hpe5022_ERROR_INV_POSITION	The specified head position is in the inhibit area. Check the HP part number of cassette, the inhibit area, the HGA dimension, the data area and the specified track number.
hpe5022_ERROR_INV_REGISTRY_DATE	Detected the invalid registry data.
hpe5022_ERROR_INV_SEG_HNDL	Detected the invalid segment handle parameter in UDS. Check your program.
hpe5022_ERROR_INV_SEG_ID	Detected the invalid segment ID parameter in UDS. Check your program.

Error Messages on PC Monitor Display

Error Code	Description
hpe5022_ERROR_INV_SEQ	Sequence is invalid. Check your program.
hpe5022_ERROR_INV_SEQ_HNDL	Detected the invalid sequence handle parameter in UDS. Check your program.
hpe5022_ERROR_INV_SETUP	Detected an error in operation. There must be some illegal set-up in the parameters. Check your program.
hpe5022_ERROR_INV_TRIG_PORT	Invalid trigger port is selected as the parameter ‘trigPort’.
hpe5022_ERROR_MEM_ALLOC	Can't allocate enough memory. Reboot your PC.
hpe5022_ERROR_MEMORY	Check sum error occurred in the calibration data or user data.
hpe5022_ERROR_MICRO_TRACK_FAILED	Failed to create a micro track. The measured TAA level did not reach the specified level. Check the parameters for micro track measurement.
hpe5022_ERROR_MOTOR_FAULT	An error is detected in the motor or servo of the spinstand. Check the spinstand and restart the system.
hpe5022_ERROR_NO_OPTION	An option is not installed to perform the required measurement and function.
hpe5022_ERROR_NOT_INIT	System is not initialized. Check if the required modules and options are installed.
hpe5022_ERROR_NDEF_HGA	The cassette parameters and type are undefined. Specify the cassette parameter.

Error Messages on PC Monitor Display

Error Code	Description
hpe5022_ERROR_NSUP_CHAN_IC	The DLL for the installed channel IC is not installed. Install the E5039B/C option software.
hpe5022_ERROR_NSUP_CONF	Detected software configuration errors. Check your program.
hpe5022_ERROR_NSUP_FUNC	Detected a mismatch between measurement functions, firmware and hardware. Check the revisions of those.
hpe5022_ERROR_NSUP_HAMP	The installed head amplifier is not supported. Check if the DLL file named head amplifier's part number is in the directory of "c:\Program Files\Agilent\E5022\bin\". If there is no the DLL file, update the E5023A software or contact Agilent Technologies for DLL file.
hpe5022_ERROR_NSUP_HGA_CASSETTE	The specified HGA cassette type is not supported. Check the specified Agilent Parts number. If it is correct, check if the DLL file named Agilent cassette's part number is in the directory of "c:\Program Files\Agilent\E5022\bin\". If there is no the DLL file, update the E5023A software or contact Agilent Technologies for DLL file.
hpe5022_ERROR_NSUP_PREC	Write Pre-compensation function is not supported on the current system configuration. (Pre-compensation is supported only with E5037A.)

Error Messages on PC Monitor Display

Error Code	Description
hpe5022_ERROR_NSUP_SENS_CURR_POL	The head does not support the reverse polarity on a stability measurement. Set the polarity at normal.
hpe5022_ERROR_OPEN	Unable to open some components in initialization. (instruments and the spinstand).
hpe5022_ERROR_OPT_FAIL	The optimization is failed.
hpe5022_ERROR_OVERFLOW	An overflow is detected in the parametric module. Perform the auto configuration (input range) or Check if the setting parameter is correct.
hpe5022_ERROR_PARAMETER_SET_FAILED	The acquisition parameters are invalid for an oscilloscope. Reduce the value of the over sampling rate, the wave averaging factor or the channel bit rate.
hpe5022_ERROR_PEAK_NOT_FOUND	The peak can’t be found in the track profile result. Check if the track profile is performed properly.
hpe5022_ERROR_PES_DATA	Effective position error signal data can not be measured.
hpe5022_ERROR_PLL_UNLOCK	The PLL is unlocked. Check if the parameter setting is correct.
hpe5022_ERROR_QUEUE_OVERFLOW	Error queue overflows.
hpe5022_ERROR_RESAMP_FAILED	The waveform resampling has failed.
hpe5022_ERROR_REVISION	The revision between system software and module firmware in not same. Reinstall E5023A software.

Error Messages on PC Monitor Display

Error Code	Description
hpe5022_ERROR_RESET	Unable to reset on some components (instruments and the spinstand).
hpe5022_ERROR_SERCH_TRACK_FAILED	Detected an error and failed the operation in searching the track.
hpe5022_ERROR_SEG_COMPLETE	Segment is already completed in UDS. Check your program.
hpe5022_ERROR_SEG_IN_EDIT	Segment is not completed in UDS. Check your program.
hpe5022_ERROR_SELFTEST	Unable to perform selftest on some components (instruments and the spinstand)
hpe5022_ERROR_SEQ_COMPLETE	Sequence is already completed in UDS. Check your program.
hpe5022_ERROR_SEQ_IN_EDIT	Sequence is not completed in UDS. Check your program
hpe5022_ERROR_SEQ_NOT_SETUP	Sequence is not set-up in UDS. Check your program.
hpe5022_ERROR_SHROUD_OPEN	The shroud cover is open. Close the shroud cover when the drive is on.
hpe5022_ERROR_SPINSTAND_SPECIFIC	Detected the spinstand specific errors.
hpe5022_ERROR_STAGE_INHIBIT_POS	The target position of a head is set in the inhibit area on the media.
hpe5022_ERROR_THRESHOLD_NOT_FOUND	The threshold level is not found for PW measurement or OTC calculation.
hpe5022_ERROR_THERMAL_ASPERITY	Thermal Asperity Detected. Check the head and media. This error occurs when the overflow is detected but the average of measurement is under the limit.

Error Messages on PC Monitor Display

Error Code	Description
hpe5022_ERROR_TOO_MANY_RETRY	Spinstand stage is not positioned within a certain range after retry. Call Agilent Service office.
hpe5022_ERROR_TRACK_OFFSET_COMP_FAILED	Track offset compensation is failed. Check if the all measurement conditions are correct.
hpe5022_ERROR_UNAVAILABLE_PINNO	Unavailable pin number is assigned for the S/S TTL I/O. Check the available pin number.
hpe5022_ERROR_UNDERFLOW	An underflow is detected in the parametric module. Perform the auto configuration (input range) or check if the setting parameter is correct.

Error Messages at Auto Disk Alignment

Table D-1 shows the error messages that could appear when Auto Disk Alignment is performed.

Table D-1 Error Message at Auto Disk Alignment

Error Message	Description
Can't converge the track position	The start position could be wrong or the X-Y positioning might be inaccurate. Retry auto disk alignment. When it fail again, contact Agilent Technologies.