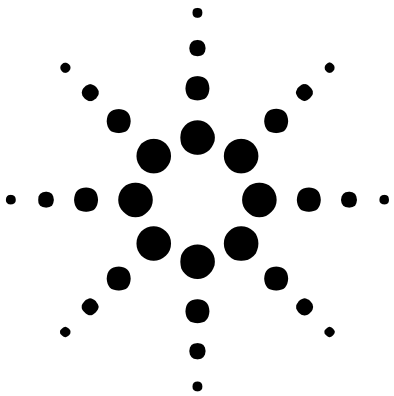
Agilent Technologies
Innovating the HP Way

Performance Verification Test Tool
for
81200 Platform



User Guide

Revision 1.0

1 Introduction

1.1 Tasks of PVT

The PVT is a software tool to conduct the Performance Verification Test (PVT) for the 81200 platform, that currently comprises the systems 81210 (previously 81200) and 81250. The systems are VXI-based and consist of clock and carrier modules, plug-in front-ends, and mainframes. The PVT tool needs to verify product functionality and specifications.

1.2 Requirements of PVT

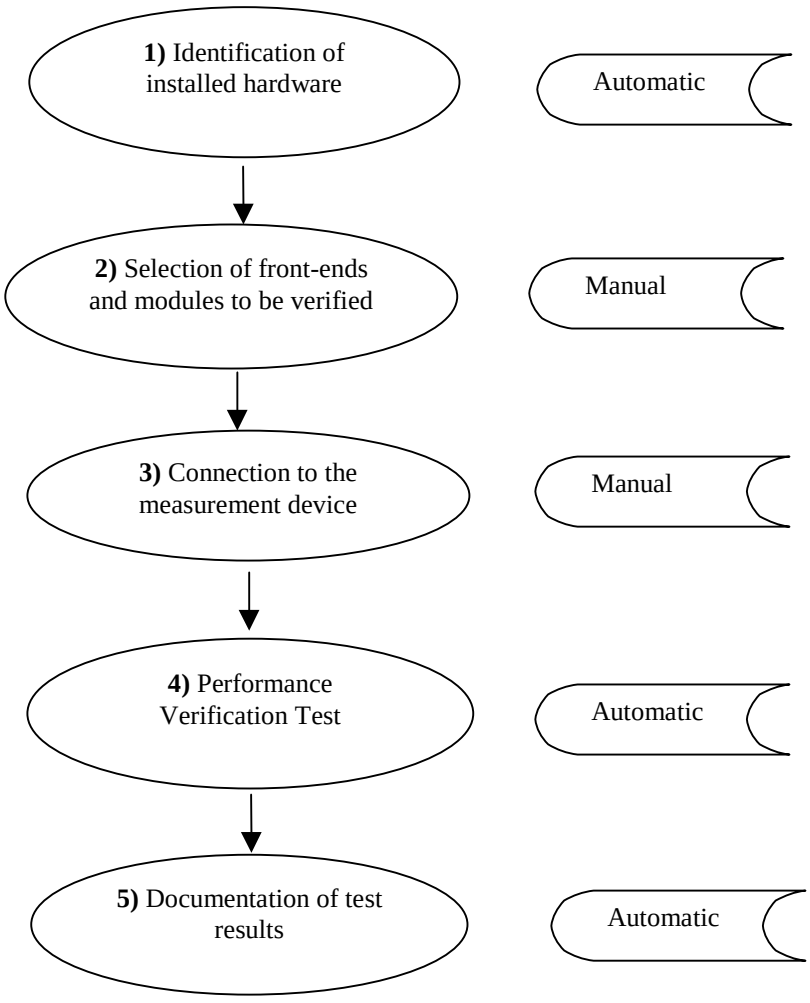
The PVT software tool will be used by service engineers at a customer-site or in local service centers of Agilent Technologies for fast support, e.g. repair or calibration.

The aim of the PVT tool is to provide field service a semi-automatic program procedure to verify multiple Data channels.

The PVT Tool is built upon the TEST EXEC SL. It is possible to set up an individual schedule of available test cycles

1.3 Software Structure

1.3.1 Simplified overview of program functionality



1.3.1.1 Identification of installed hardware

The registration of the installed hardware will be displayed in a single overview on the Graphical User Interface (GUI). There, all modules installed are described with any front-ends they might contain and the front-ends addresses. Module and front-end slots not used are also displayed.

1.3.1.2 Selection of front-ends and modules

The user of the PVT tool can select every front-end in the module that he wants to be tested. All possible performance verification test routines for the specific front-end/module is displayed and can be selected individually.

1.3.1.3 Connection to the measurement device

After selecting the front-end and the verification test to be conducted, the user needs to connect the front-end to the measuring device manually. The PVT provide information about the required connections.

1.3.1.4 Performance Verification Test

The PVT Software Tool conducts the complete Performance Verification Test in steps, e.g. by testing all front-end/carrier-module tests sequentially. In order to conduct the PVT steps, the Software Tool automatically will set all parameters for a selected front-end/module combinations.

After running each Performance Verification Test step, the user can repeat the step once more or proceed to the next step.

All settings for the measurement device, e.g. Oscilloscope, Counter or Digital Voltmeter, will be set automatically.

1.3.1.5 Documentation of test results

User-selectable, all results can be displayed or printed out after each single Performance Verification Test step, or after finishing the complete Performance Verification Test. The Performance Verification Test results need to comprise the results measured and the specification values, also “Pass” or “Fail” needs to be indicated for each parameter.

2 PVT Software Tool Scope and Technical Requirements

2.1 Scope

The following tests for Modules and Generator and Analyzer front-ends can be performed:

Clock Modules:
1. System Clock
2. Clock Jitter

Generator front-ends:
1. Generator Delay
2. Generator Width
3. Generator Level
4. Generator Transition time
5. Generator Overshoot

Analyzer front-ends:
1. Receiver Threshold

2.2 Devices-under-Test

Three systems have to be characterized:
81200 “Basic”
81210 “Basic” (successor of 81200)
81250 “ParBert” (CPL Apr 1 2000)

Each system supports a choice of different front-ends and modules:

81200 - System

Modules:
E4831A Clock and Data Generator Module
E4841A Module for Data Generator and Analyzer front-end
E4805A Clock Module

Generator front-ends:
E4842A 330MHz (Differential Output)
E4843A 660MHz (Differential Output)
E4846A 200Mbit/s; Dual Output
E4838A 660MHz (Differential Output)

Analyzer front-ends:
E4844A 660MSa/s (Single Input)
E4845A 330MSa/s (Dual Input)
E4847A 330MSa/s (Dual Input, High Impedance)
E4837A 660MSa/s

81210 – System

Modules
E4805B Central Clock Modul
E4831A Clock and Data Generator Module
E4832A Module for Data Generator and Analyzer front-end (660MHz)
E4841A Module for Data Generator and Analyzer front-end (660MHz
E4861A Module for Data Generator and Analyzer front-end (2,6GB/s)

Generator front-ends:
E4838A 660MHz (Differential Output)
E4843A 660MHz
E4846A 200Mbit/s; Dual Output
E4862A 2,6GSa/s
E4864A 1,3GSa/s

Analyzer front-ends:
E4835A 660MSa/s
E4863A 2,6GSa/s
E4865A 1,3GSa/s
E4847A 330MSa/s (Dual Input, High Impedance)
E4837A 660MSa/s
E4844A 660MSa/s (Single Input)
E4845A 330MSa/s (Dual Input)

81250 – System

Modules
E4805B Central Clock Modul
E4832A Module for Data Generator and Analyzer front-end (660MHz)
E4861A Module for Data Generator and Analyzer front-end (2,6GB/s)

Generator front-ends:
E4838A 660MHz (Differential Output)
E4843A 660MHz
E4862A 2,6GSa/s
E4864A 1,3GSa/s

Analyzer front-ends:
E4835A 660MSa/s
E4863A 2,6GSa/s
E4865A 1,3GSa/s

2.3 Measurement Equipment

Recommended Devices.
- Oscilloscope with bandwidth >20GHz (e.g.: Agilent 54120, and 86100 series)
- Counter with range up to 1GHz (e.g. Agilent 53132A)
- Digital Volt Meter with a dc voltage range up to 10 V (e.g.: Agilent 34401A)

Recommended Accessories:
- Attenuator 20db
  (Agilent 8493A, Opt.020)
- 4 SMA Cables á 50 Ohm **90cm length**
  (Agilent 8120-4948)
- Power Splitter 50Ohm
  (Agilent 11667B)
- 50 Ohm Feedthrough Termination, 10 W, 0.1 %
- Torque Wrench
  (Agilent 8710-1582)

2.4 Compatibilities

The Performance Verification Test Tool can test multiple numbers of one Module type with different Front-end combinations within a test cycle.

Every Module type needs to be tested individually:
E4841A, E4832A and E4861A.

We recommend to test clock group wise. This requires to test all Modules related to a common Clock Module to test in the same test cycle.
This will give the customer the best performance verification results, because all settings and specifications are depend on Clock Module, Data Module and Front-end.

To conduct a Performance Verification Test for a single Front-end or Data Module requires all HW Clock Module, Data Module to set up a proper system to run a complete test cycle.

3 How do I set up the PVT Tool

1) You need to load the Test Exec SL and the PVT SW under different directories.
   Filename for the Test EXEC SL:
   C:\Test EXEC SL
   Filename for the PVT User SW:
   C:\PVT

2) Create an Start Icon for starting the Test EXEC SL. You will find the start icon under:
   C:\Test Exec SL\bin\tstexcsl.exe
   In the shortcut properties please adjust following path in START IN:
   C:\PVT\bin\

3) If necessary, you need to adjust the tstexcsl.ini with following paths:
   Developer=C:\PVT\Bin\opui.dll
   Operator=$ROOT$\bin\opui.dll
   [Action Definition Paths]
   Path00= C:\PVT \TestExec\Actions
   [Dynamic Link Library Paths]
   Path00= C:\PVT \Project Files\Bin
   [Symbol Table Paths]
   Path00= C:\PVT \TestExec\Symbols
   [Topology Layer Paths]
   Path00= C:\PVT\TestExec\Topology

4) By double clicking on the Test EXEC SL Button a small window will pop up
   Please do enter User name: WILD, no Password is necessary,
   and choose in the next window "Developer".

   The Use Userinterface will pop up next as you will see in the next chapter.

4 Deskew Procedure

Before running the Performance Verification Procedure the user must do a deskewing of each channel.
Therefor it is necessary to have a known delay of the used cable.
Please do following the Deskew Procedure in the User Manuel of the 812xx Software.

5 Structure of the user Interface

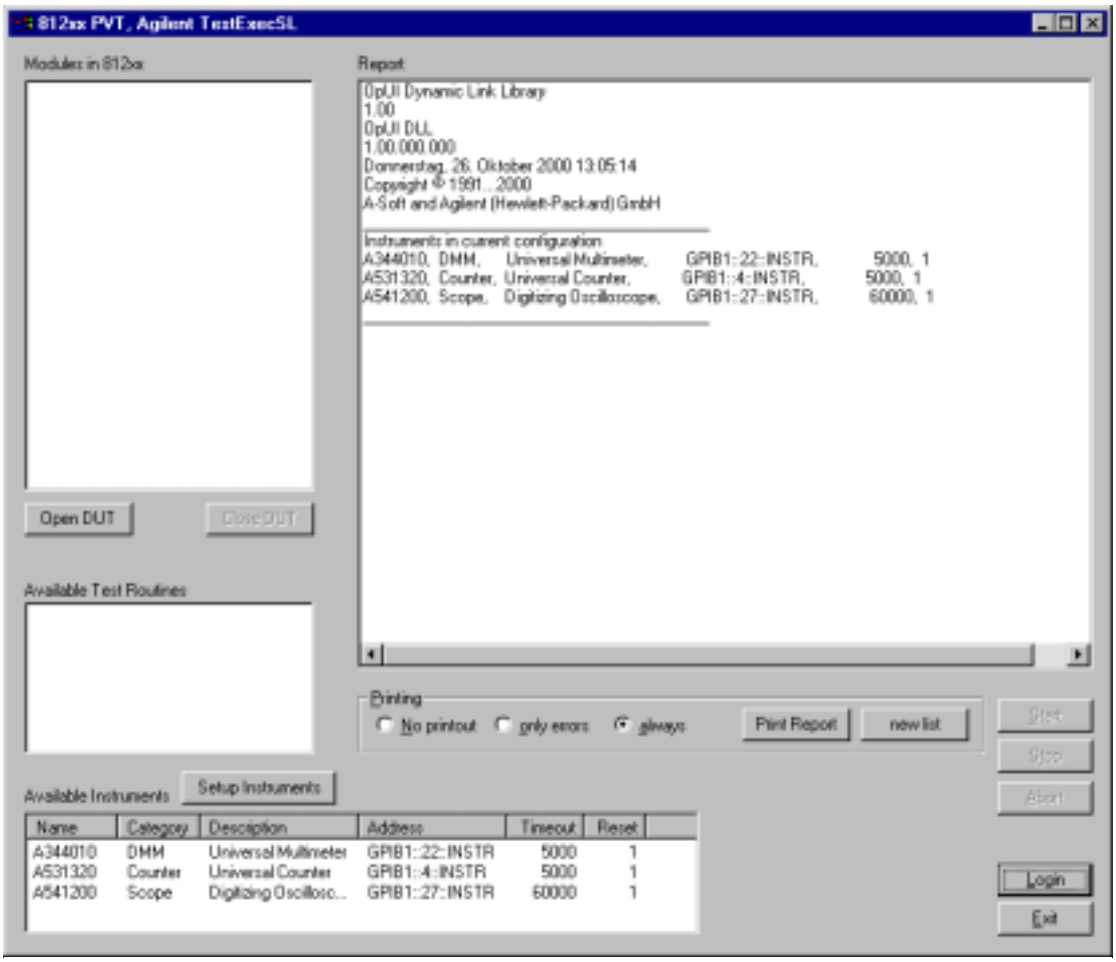


Figure 1User Interface of PVT

Figure 1 shows the User Interface of the PVT, there are four windows:

-Modules in 812xx

In the window "Modules in 812xx" there will be all detected front-ends displayed there you can select the front-end you want to test.

-Report

The report window will display all necessary information about the test report. The test report must be reviewed and the results of every verification procedure must be transferred into the report file of the attached document.

-Available test Routines

By selecting a front-end all available test routines for this front-end will be displayed and can be started separate. A test routine can multiple times running.

-Available Instruments

In this window, the user need to setup his measurement devices.

5.1 Step I

By pressing the "open DUT" button the user has got three choices:

81200, this does include front-ends within the E4841A module
81210, this test is currently the same as under 81250
81250, this test covers all front-ends which belongs to the modules E4832A and E4861A.

It is required that all module types are running separately and cannot mixed within one Hardware configuration.

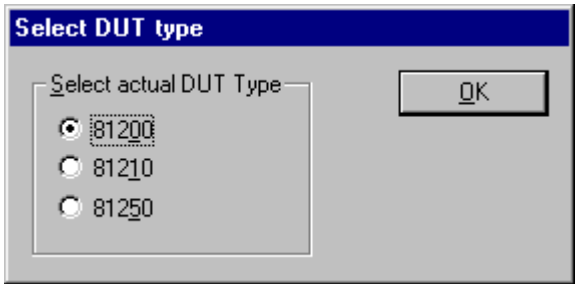


Figure 2: Select DUT Type

5.2 Step II

The next step after selecting the DUT type the Report window will show all modules, front-ends and clockboards installed in the current hardware configuration.

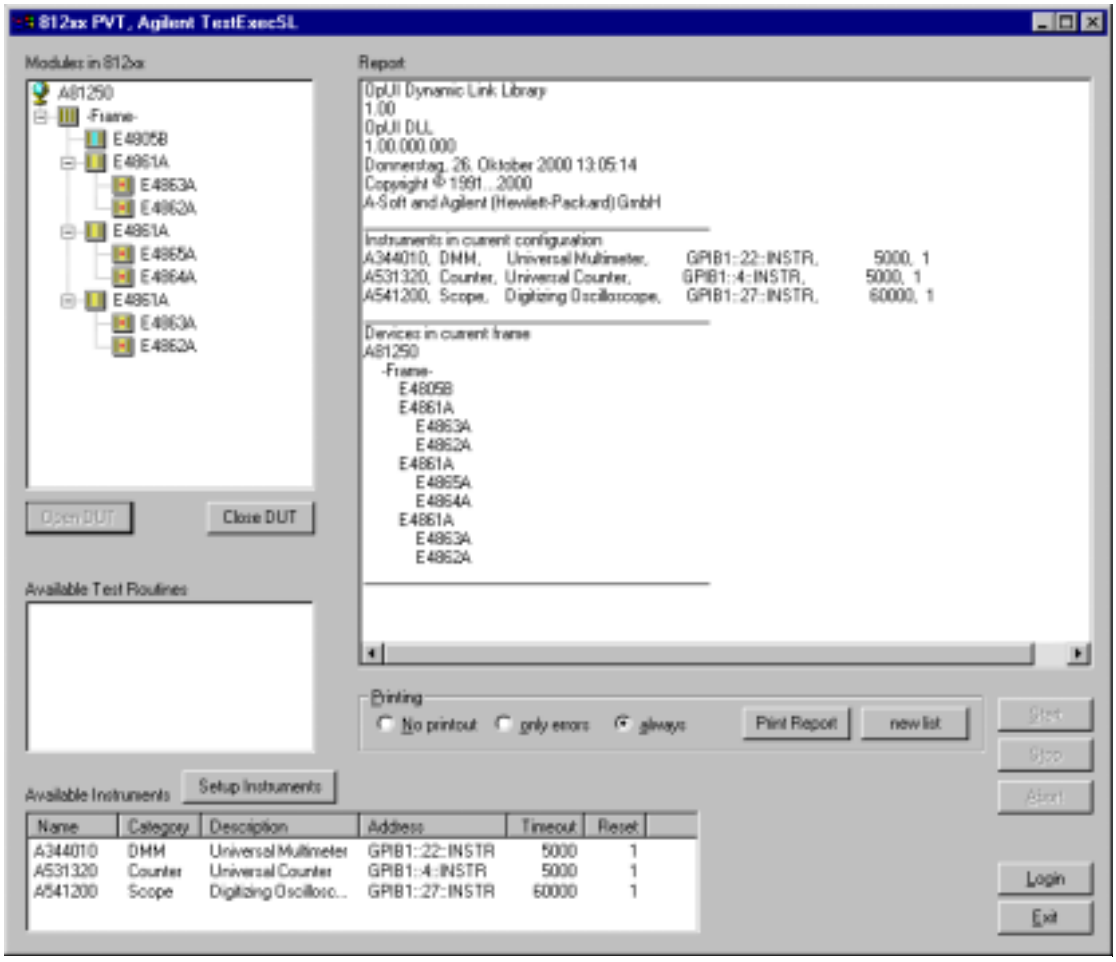


Figure 3: User Interface with hardware configuration

5.3 Step III

When selecting the front-end that needs to be tested, the window " Available Test Routines" will show all available test routines.

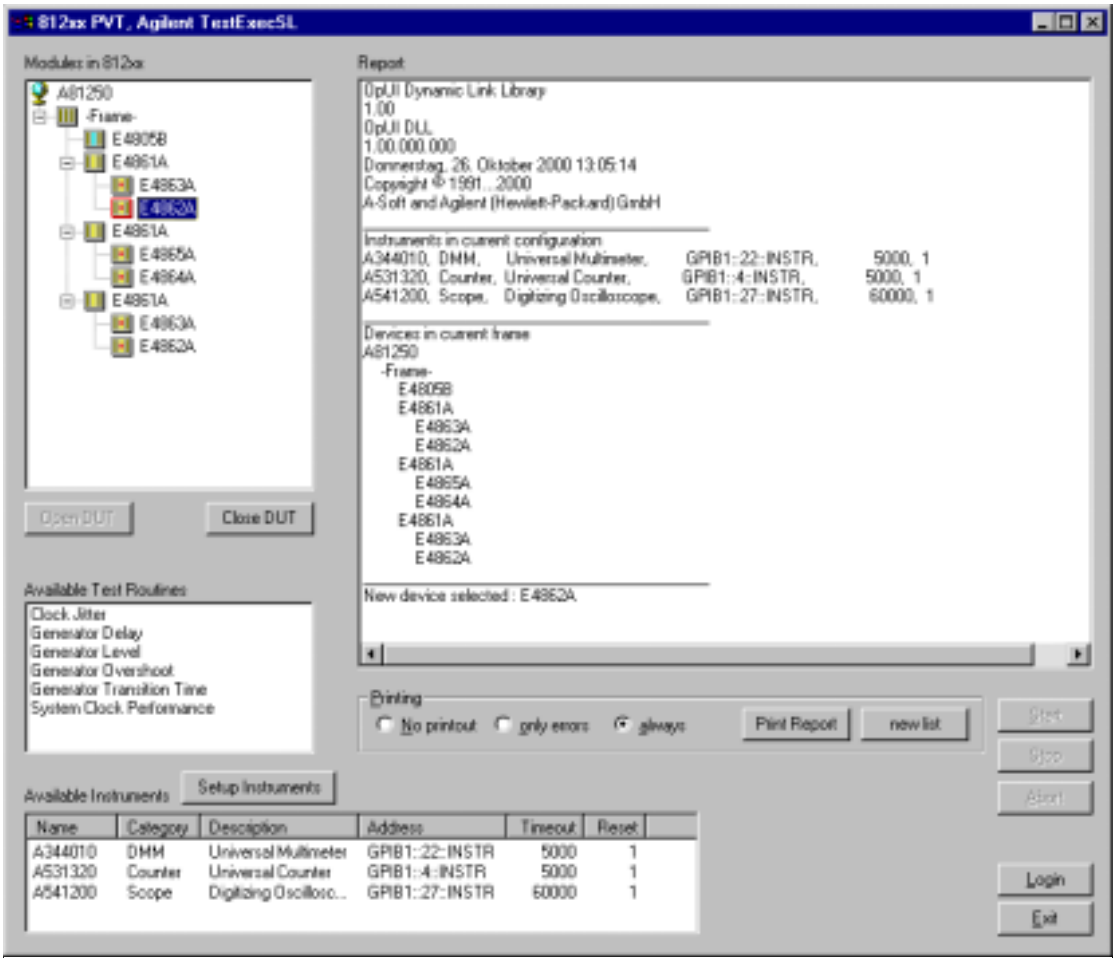


Figure 4 User Interface with available Test Routines

5.4 Step IV

To select the test routine, the user needs to select the test routine. In the report window the name of the selected test routine will be display.

Second, you need to run the test routine by pressing the start button.

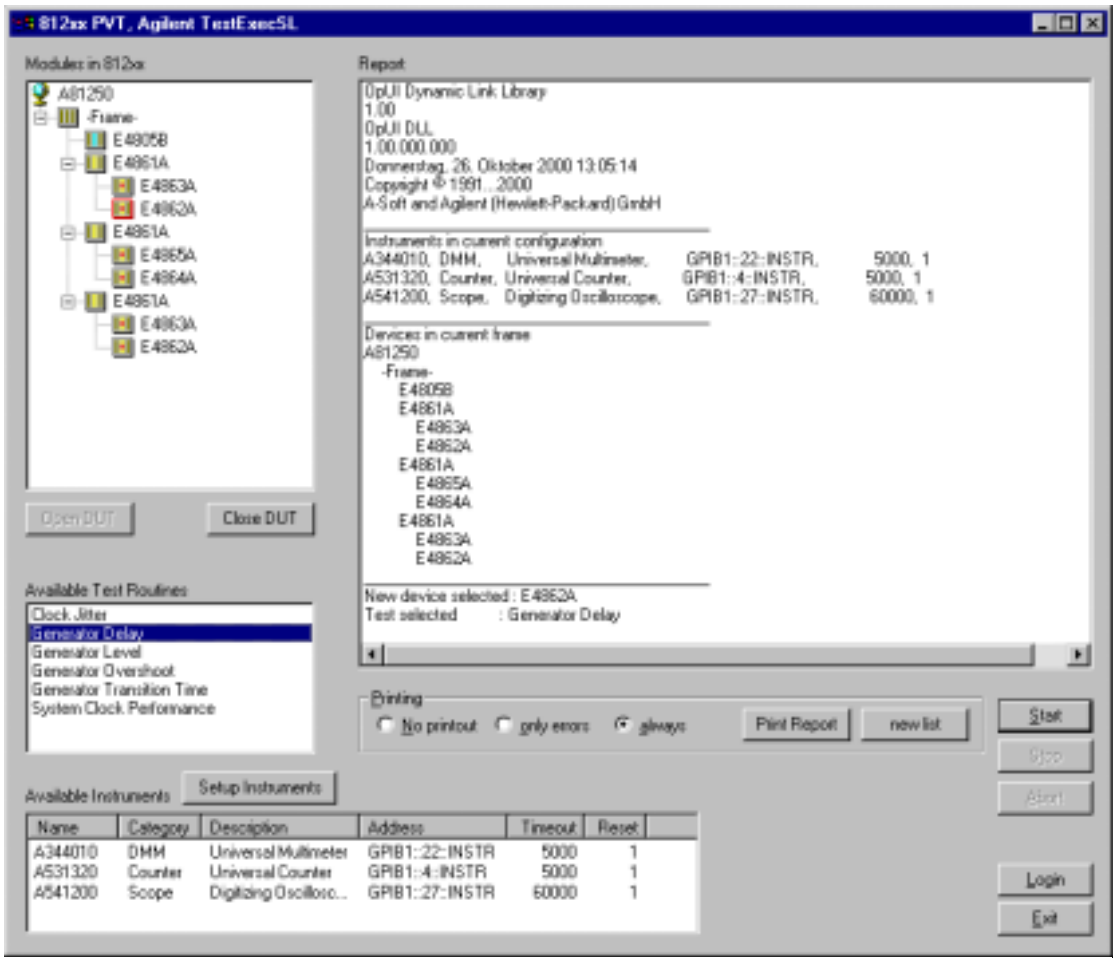


Figure 5 Selected Test Routine

Before the test routine will start, the user will be noticed to make all necessary connections. Please be aware, to use 20db Attenuators for scope input and scope trigger input.

Figure 6 Information about connection

5.5 Step V

After a test routine has finished, the result will be displayed in the report window.
The report window will also decide, whether the verification test was pass or fail.
BUT, you need to adapt the results into the PVT procedure and decide about the test result.
This is necessary, because there are many tests who cover a functionality or a typically specification.
A typically specification is whether pass nor fail, it must be decided by the user. A general answer what is fail or pass is, if the result is +/-20% of the typical specified value the test result can be seen as fail.

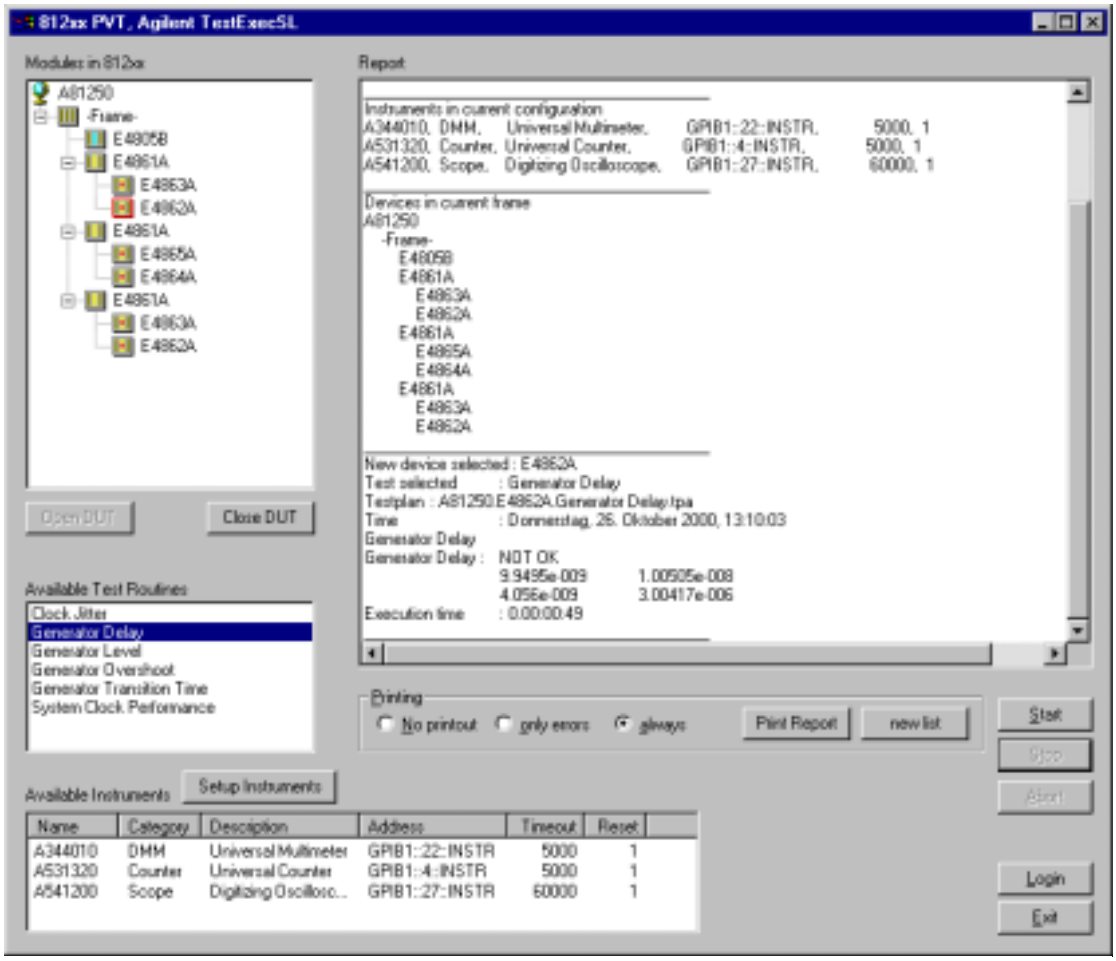


Figure 7 Displayed results after performance test

5.6 Step VI

The user has got the choice of printing the report to the current default printer.
The user can select between test results who cover " only errors" or "always" which will printout all results.
With the button "new List" a new report list will be generated and all previous test results in the report window are deleted.

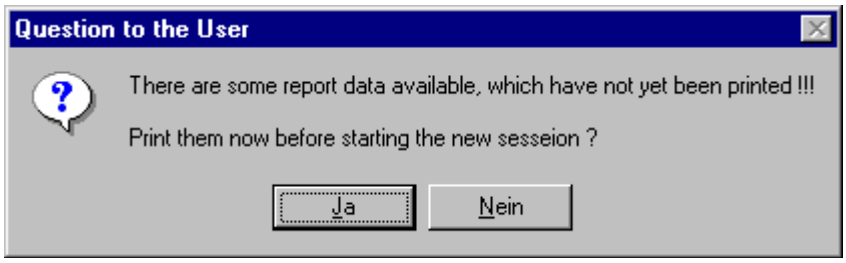


Figure 8 Print out of data report

6 PVT configuration

With "Setup Instruments" the user will be able to adapt the connected instruments via GPIB.

1. Mark the checkbox
2. Double click the device
3. Figure 11 will pop up

After adjusting the properties of the device, please press Setup new list and the new devices will be setup.

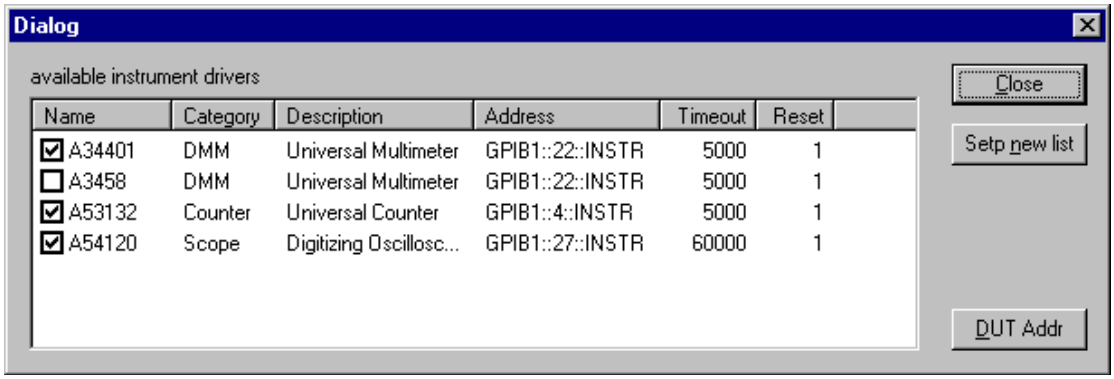


Figure 9 Available instrument driver

There are two possibilities for setting up the test environment and control the embedded PC:
A) Controlled via LAN from an external PC:
the User Softwareof the 812xxand the LAN Server must run on the embedded PC
the Test EXEC SL must run on the external PC
Please set up at Run I/O config at the WIN NT environment GPIB1

B) Working from the embedded PC:
the User Software and the Test EXEC SL must run on the embedded PC
Please set up at RUN I/O config at the WIN NT environment GPIB0

The GPIB1 or GPIB0 must also be adapted in this window.

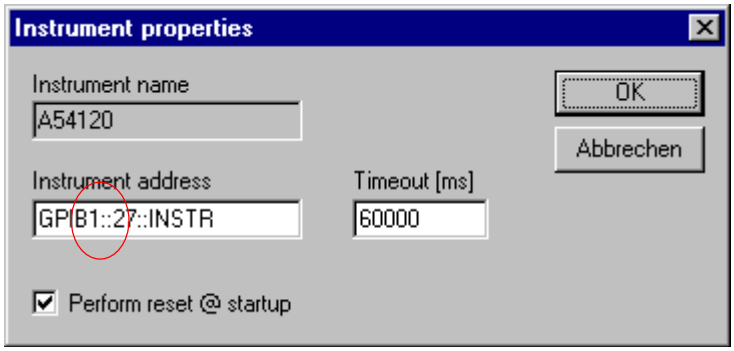


Figure 10 Instrument Properties

At the Setup Instrument window you need to modify the DUT address.
This is the computer name where the User Software 812xx is running
e.g.: BVSTP031

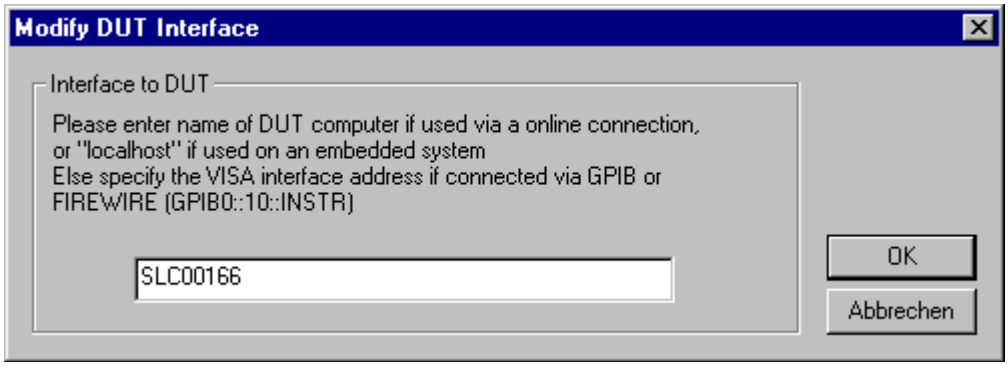


Figure 11 Modify Computer name

7 Report of the PVT tool

OpUI Dynamic Link Library
1.00
812xx OpUI DLL
1.03.000.000
Thursday, November 23, 2000 02:44:14 PM
Copyright © 1991...2000
A-Soft and Agilent Technologies GmbH
no additional specs
Main user interface

Instruments in current configuration
A344010, DMM, Universal Multimeter, GPIB1::22::INSTR, 5000, 1
A531320, Counter, Universal Counter, GPIB1::4::INSTR, 5000, 1
A541200, Scope, Digitizing Oscilloscope, GPIB1::7::INSTR, 5000, 1

Devices in current frame
A81200
-Frame-
E4805A
E4841A
-empty-
E4837A
E4843A
E4838A

Test selected : Clock Jitter
Testplan : A81200.E4838A.Clock Jitter.tpa
Time : Friday, November 24, 2000, 7:21:58 AM
Clock Jitter
Clock Jitter : Pass
1e-011 Specification: value must be <10ps typ
4.48333e-012 Measured value
Execution time : 0.00:01:37

Test selected : Generator Delay
Testplan : A81200.E4838A.Generator Delay.tpa
Time : Friday, November 24, 2000, 7:24:40 AM
Generator Delay
Generator Delay : Pass
9.9495e-009 1.00505e-008 Specifications: minimum - maximum value
9.99e-009 3.01002e-006 Measured value, functionality of 3000ns test
Execution time : 0.00:00:24

Test selected : Generator Overshoot
Testplan : A81200.E4838A.Generator Overshoot.tpa
Time : Friday, November 24, 2000, 7:25:09 AM
Generator Overshoot
Generator Overshoot : Pass
0.056 0.0375 Specification: value must be <56mV; measured value
Execution time : 0.00:00:12

Test selected : Generator Transition Time
Testplan : A81200.E4838A.Generator Transition Time.tpa
Time : Friday, November 24, 2000, 7:25:25 AM
Generator Transition Time
Generator Transition Time : Pass
5.5e-010 3.474e-010 Specification value; measured value
3.75e-010 6.25e-010 5.058e-010 Specification minimum - maximum value; measured value
4.65e-009 5.35e-009 4.9048e-009 Specification minimum - maximum value; measured value
Execution time : 0.00:00:37

Test selected : Generator Width
Testplan : A81200.E4838A.Generator Width.tpa
Time : Friday, November 24, 2000, 7:26:10 AM
Generator Width
Generator Width : Pass
4.975e-008 5.025e-008 5.00826e-008 Specification minimum - maximum value; measured value
9.79e-009 1.021e-008 9.9954e-009 Specification minimum - maximum value; measured value
Execution time : 0.00:00:29

Test selected : Generator Level
Testplan : A81200.E4838A.Generator Level.tpa
Time : Friday, November 24, 2000, 7:27:32 AM
Generator Level
Generator Level : Pass
-0.871 -0.929 -0.8895 Specification minimum - maximum value; measured value
4.248 4.552 4.3865 Specification minimum - maximum value; measured value
Execution time : 0.00:00:08

New device selected : E4838A
Test selected : System Clock Performance
Testplan : A81200.E4838A.System Clock Performance.tpa
Time : Friday, November 24, 2000, 7:51:32 AM
System Clock Performance
System Clock Performance : Pass
999.95 1000.05 1000.02 Specification minimum - maximum value; measured value
6.59967e+008 6.60033e+008 6.59998e+008 Specification minimum - maximum value; measured value
Execution time : 0.00:00:06

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8 Documentation

Agilent 81200 System: Performance Test Record **Page 1 of __**

Test Facility:

		Report No.	
		Date	
		Customer	
		Tested by	

Software Rev.		Ambient temperature	°C
Options		Relative humidity	%

System Configuration of the Agilent 81200 Data Generator / Analyzer Platform:

☐	Mono–Frame System	If so : ☐	Agilent E4840A Mainframe
		☐	Agilent E4849A/B/C Mainframe
☐	Multi–Frame System	If so : ☐	1 Extender Frame (Agilent E4848A/B)
		☐	2 Extender Frames (Agilent E4848A/B)

Agilent 81200 System: Performance Test Record **Page__ of ____**

Mainframe Configuration:

Slot No.	System Component	Y/N	Model No.	Serial No.
	VXI MXI Interface Board		Agilent E1482B	
	Central Board			
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:

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Extender Frame 1 Configuration:

Slot No.	System Component	Y/N	Model No.	Serial No.
1	VXI MXI Interface Board	Y	Agilent E1482B	
2	Central Board	Y		
3	Generator/Analyzer Module Board	Y	Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A	
	Front-Ends: 1:	2:	3:	4:

Agilent 81200 System: Performance Test Record **Page __ of __**

Extender Frame 2 Configuration:

Slot No.	System Component	Y/N	Model No.	Serial No.	
1	VXI MXI Interface Board	Y	Agilent E1482B		
2	Central Board	Y			
3	Generator/Analyzer Module Board	Y	Agilent E4841A		
	Front-Ends:	1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A		
	Front-Ends:	1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A		
	Front-Ends:	1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A		
	Front-Ends:	1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A		
	Front-Ends:	1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A		
	Front-Ends:	1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A		
	Front-Ends:	1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A		
	Front-Ends:	1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A		
	Front-Ends:	1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A		
	Front-Ends:	1:	2:	3:	4:
	Generator/Analyzer Module Board		Agilent E4841A		
	Front-Ends:	1:	2:	3:	4:

Agilent 81200 System: Performance Test Record **Page __ of __**

Central Board Tests, Test 1 and 2:

Type of Front-end Module: ☐ Agilent E4842A ☐ Agilent E4843A ☐ Agilent E4846A ☐ Agilent E4838A

Location of host Agilent E4841A Module: ☐ Mainframe ☐ Extender Frame 1 ☐ Extender Frame 2

Position within Agilent E4841A Module: ☐ 1 ☐ 2 ☐ 3 ☐ 4

Slot No. of host Agilent E4841A Module: _____

Serial No. of host Agilent E4841A Module: _____

Test 1: System Clock Performance

Central Board E4805A	Counter reading	Specification	Pass/Fail
E4838A		1000Hz +/-0.050Hz	P / F
		660MHz +/-33kHz	P / F
E4842A		1000Hz +/-0.050Hz	P / F
		330MHz +/-16,5kHz	P / F
E4843A		1000Hz +/-0.050Hz	P / F
		660MHz +/-33kHz	P / F
E4846A		1000Hz +/-0.050Hz	P / F
		100MHz +/-5kHz	P / F

Central Board E4831A	Counter reading	Specification	Pass/Fail
E4838A		1000Hz +/-0.050Hz	P / F
		660MHz +/-66kHz	P / F
E4842A		1000Hz +/-0.050Hz	P / F
		330MHz +/-33kHz	P / F
E4843A		1000Hz +/-0.050Hz	P / F
		660MHz +/-66kHz	P / F
E4846A		1000Hz +/-0.050Hz	P / F
		100MHz +/-10kHz	P / F

Test 2: Clock Jitter

	Oscilloscope reading	Specification	Pass/Fail
E4838A		<10ps typ.	P / F
E4842A		<10ps typ.	P / F
E4843A		<10ps typ.	P / F
E4846A		<10ps typ.	P / F

Agilent 81200 System: Performance Test Record **Page __ of __**

Central Board Tests, Test 3 to 7:

Type of Front-end Module: ☐ Agilent E4842A ☐ Agilent E4843A ☐ Agilent E4846A ☐ Agilent E4838A

Location of host Agilent E4841A Module: ☐ Mainframe ☐ Extender Frame 1 ☐ Extender Frame 2

Position within Agilent E4841A Module: ☐ 1 ☐ 2 ☐ 3 ☐ 4

Slot No. of host Agilent E4841A Module: _____

Serial No. of host Agilent E4841A Module: _____

Test 3: Generator Delay:

	Oscilloscope reading	Specification	Pass/Fail
E4838A		+/-50ps +/-50ppm	Functionality P / F
E4842A		+/-50ps +/-50ppm	Functionality P / F
E4843A		+/-50ps +/-50ppm	Functionality P / F
E4846A		+/-50ps +/-50ppm	Functionality P / F

Delay=3000ns	Oscilloscope reading	Specification	Pass/Fail
E4838A		Funktionality	P / F
E4842A		Funktionality	P / F
E4843A		Funktionality	P / F
E4846A		Funktionality	P / F

Test 4: Generator Width:

	Oscilloscope reading	Specification	Pass/Fail
E4838A		50ns +/-200ps +/-0,1%	P / F
		10ns +/-200ps +/-0,1%	P / F
E4842A		50ns +/-300ps +/-0,1%	P / F
		10ns +/-300ps +/-0,1%	P / F
E4843A		50ns +/-50ps +/-0,1%	P / F
		10ns +/-50ps +/-0,1%	P / F

Test 5: Generator Level:

	Digital Voltmeter	Specification	Pass/Fail
E4838A		4,4V +/-152mV	P / F
		-0,9V +/- 29mV	P / F
E4842A		3,5V +/-205mV	P / F
		-0,9V +/-127mV	P / F
E4843A		3V +/-190mV	P / F
		-0,9V +/-127mV	P / F
E4846A		2,5V +/-225mV	P / F
		-0,9V+/-145mV	P / F

Test 6: Generator Transition Time:

	Oscilloscope reading	Specification	Pass/Fail
E4838A		0,5ns@2,5V +/-125ps	P / F
		0,5ns @ 2,5V +/-350s	P / F
		@ECL 350ps	Functionality P/F
E4842A		0,7ns@2,5V +/-270ps	P / F
		5ns @ 2,5V +/-800ps	P / F
		@ECL <600ps	P / F
E4843A		@ 2,5V 500ps	Functionality P/F
		@ 2,5V 500ps	Functionality P/F
		@ ECL <350ps	Functionality P/F
E4846A		@ 2,5V <2,5ns	Functionality P/F
		@ 2,5V <2,5ns	Functionality P/F
		@ ECL <1,2ns	Functionality P/F

Test 7: Generator Overshoot

	Oscilloscope reading	Specification	Pass/Fail
E4838A		@ECL <56mV	Functionality P / F
E4842A		@ECL <140mV	P / F
E4843A		@ECL <40mV	Functionality P / F
E4846A		@ECL <160mV	P / F

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Central Board Tests, Test 8:

Type of Front-end Module: ☐ Agilent E4842A ☐ Agilent E4843A ☐ Agilent E4846A ☐ Agilent E4838A

Location of host Agilent E4841A Module: ☐ Mainframe ☐ Extender Frame 1 ☐ Extender Frame 2

Position within Agilent E4841A Module: ☐ 1 ☐ 2 ☐ 3 ☐ 4

Slot No. of host Agilent E4841A Module: _____

Serial No. of host Agilent E4841A Module: _____

Test 8: Receiver Threshold Range

	Oscilloscope reading	Specification	Pass/Fail
E4837A		Set1: <37mV	P / F
		Set2: <42mV	P / F
E4844A		Set1: <37mV	P / F
		Set2: <42mV	P / F
E4845A		Set1: <37mV	P / F
		Set2: <42mV	P / F
E4847A		Set1: <37mV	P / F
		Set2: <42mV	P / F