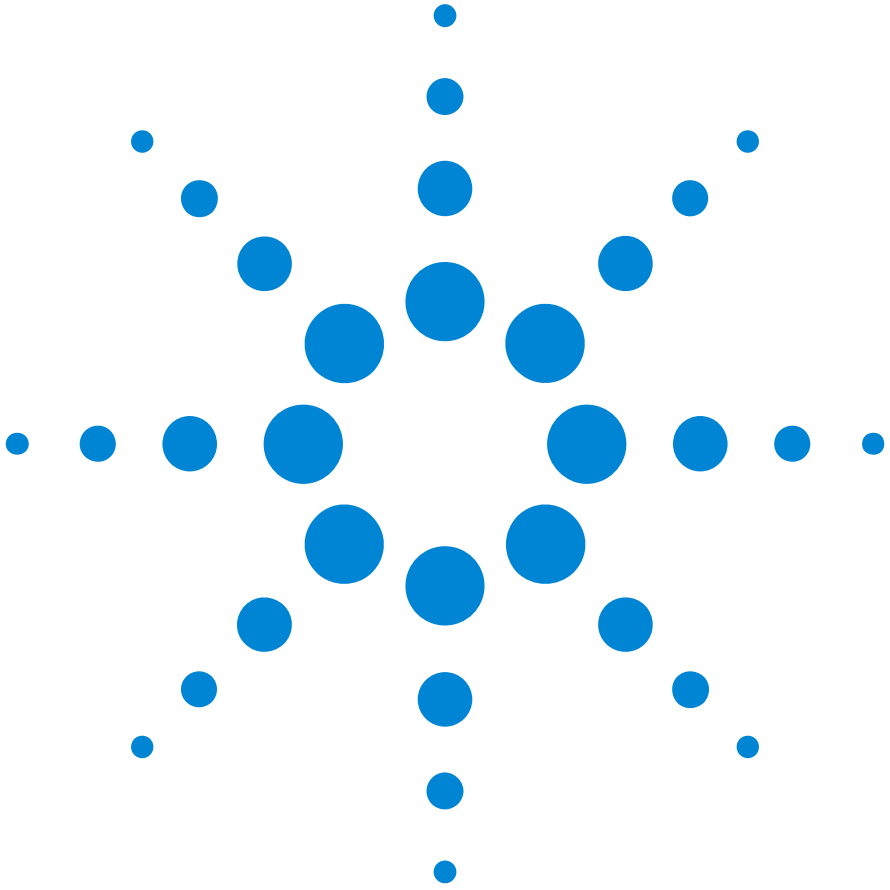

Agilent ParBERT 81250 Measurement Software

Bit Error Rate Measurement User Guide

Agilent Technologies

Important Notice

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Introduction

The bit error rate (BER) measurement allows you to determine the ratio of error bits versus the total number of bits received from a device under test (DUT) with one or several output ports and associated terminals.

The *Agilent 81250 User Software* already includes a simple bit error rate measurement. The *Agilent 81250 Measurement Software* provides enhanced capabilities.

Modes of the Bit Error Rate Measurement

The bit error rate measurement of the *Agilent 81250 Measurement Software* can be run in two modes:

- Single mode is similar to the standard BER test of the *Agilent 81250 User Software*.

  However, the enhanced bit error rate measurement is able to differentiate between 1s errors (logical 1 expected, but logical 0 received) and 0s errors (logical 0 expected, but logical 1 received).

  More important: It is possible to specify one or several stop criteria. This creates defined measurement conditions which make it possible to compare the measurement results of several executions or devices at a glance.

  By setting suitable stop criteria, one can obtain comparable results at minimum time.

- Repetitive mode is mainly used to measure the long term stability of a device.

  In this mode, the measurement is divided into time intervals of equal duration. The results can be saved in a log file. This file contains one record for each measurement interval.

  The log file, which can be imported into any spreadsheet or text processing program, allows to investigate any changes of the bit error rate due to time, temperature, humidity, or other varying conditions.

  As the timely position of the signal's eye opening may change over time, it is possible to initiate an automatic resynchronization procedure if the bit error rate exceeds a certain threshold. This helps to obtain reliable results even if the measurement runs unattended.

Document Structure This document provides the following information:

- For a quick start, read the example session given in *"Example of a BER Measurement" on page 7*.
- *"Basics of the BER Measurement" on page 21* provides detailed information on the prerequisites and the parameters shown in the result window.
- *"Setting the Properties of a BER Measurement" on page 29* explains how to specify the measurement parameters.

NOTE It is assumed that you are familiar with the general characteristics and features of the Agilent 81250 Measurements. The general capabilities and operating principles are documented in the *Agilent 81250 ParBERT Measurements Framework User Guide*.

Example of a BER Measurement

This chapter shows how to set up and perform a bit error rate (BER) measurement:

1. Use the *Agilent 81250 User Software* for connecting the device under test with the system.

   See *"Setting Up and Connecting the DUT" on page 8*.

2. Prepare a bit error measurement with the *Agilent 81250 User Software*.

   See *"Preparing the Measurement" on page 9*.

3. Use the *Agilent 81250 Measurement Software* for creating a workspace and measurement and run the measurement.

   See *"Executing a BER Measurement in Single Mode" on page 11*.

4. Change the measurement properties and run the measurement in repetitive mode.

   See *"Executing a BER Measurement in Repetitive Mode" on page 15*.

For this example, we use the following hardware components:

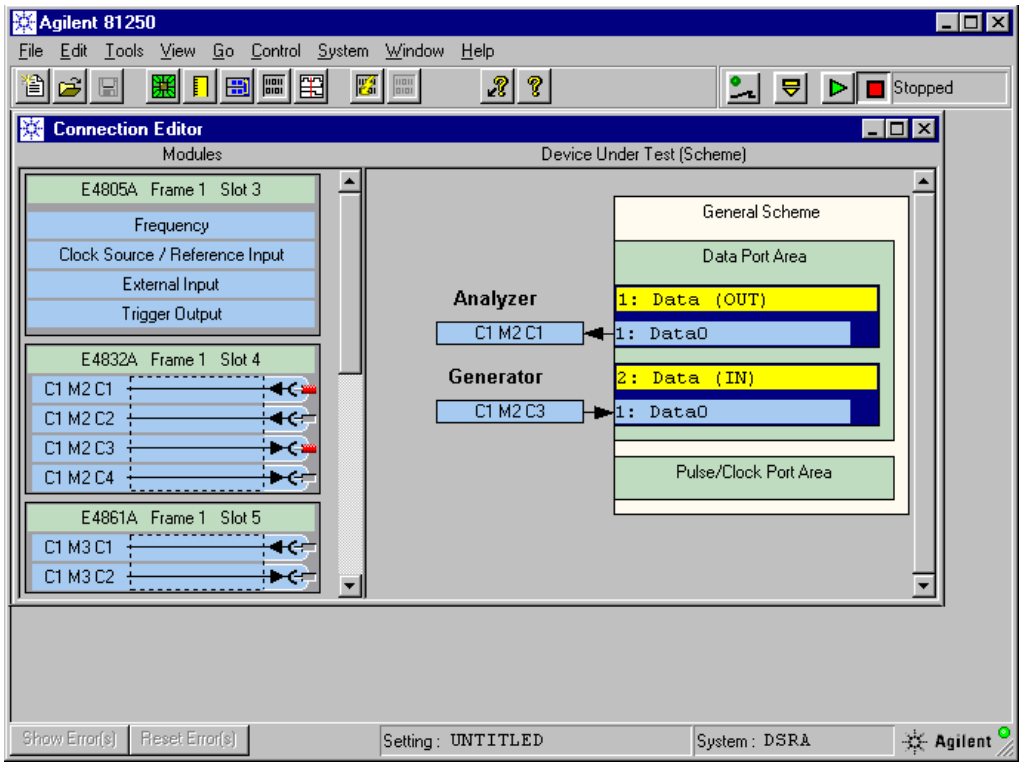
- E4832A generator/analyzer 667 Mbit/s module
- E4843A as generator frontend
- E4835A as analyzer frontend

Setting Up and Connecting the DUT

Use the *Agilent 81250 User Software* to create a model of the hardware. For a detailed description of the *Agilent 81250 User Software*, refer to the *Agilent 81250 System User Guide*.

1 Create a DUT output port and a DUT input port.

2 Connect the analyzer to the DUT output port and the generator to the DUT input port.



3 Using two shielded cables, connect the analyzer physically with the generator. The cable connection will be our device under test.

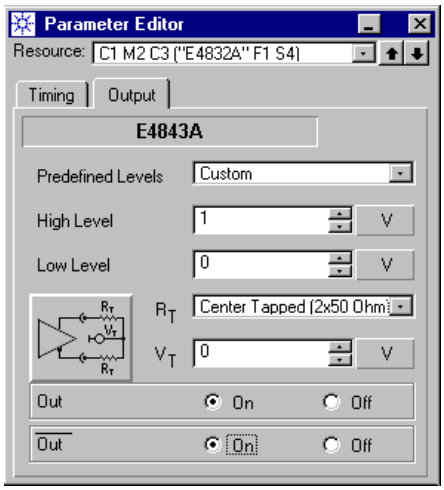
Preparing the Measurement

Use the *Agilent 81250 User Software* to prepare a bit error rate test:

1 Adjust the clock frequency, if desired.

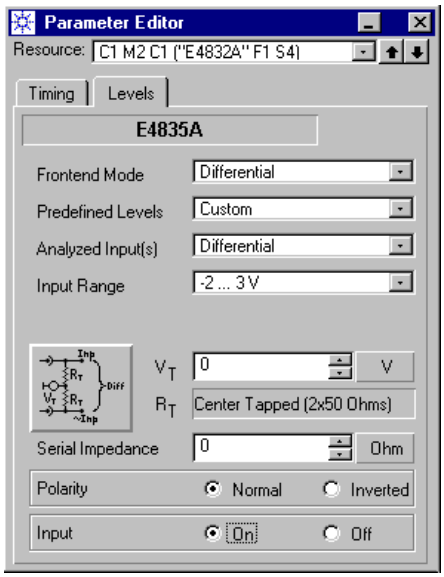
We use a clock rate of 125 MHz in this example. This corresponds to a clock period of 8 ns.

2 Set the high and low voltage levels of the generator frontend and switch the frontend on.



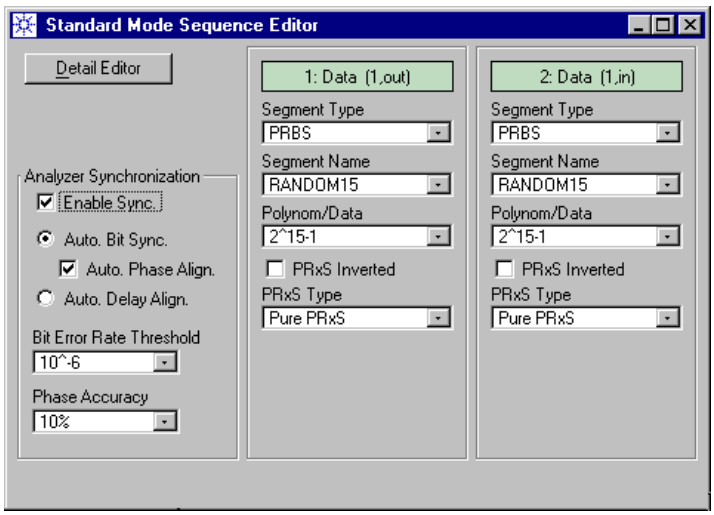
We use a voltage swing of 0 V (*Low Level*) to 1 V (*High Level*) in this example.

3 Check the *Frontend Mode* and the setting of *Analyzed Input(s)* of the analyzer frontend. We will use “Differential”, which is the default for this frontend. Switch the analyzer on.



4 Create the test sequence with the *Standard Mode Sequence Editor*. We use the same PRBS segment for the generator and the analyzer.

5 Activate *Automatic Bit Synchronization* with *Automatic Phase Alignment*. Set the *Phase Accuracy* to 10 %.



Automatic Bit Synchronization with *Automatic Phase Alignment* ensures that the analyzer will position its sampling point automatically at the optimum, no matter what the total signal delay is.

You could also use *Automatic Delay Alignment*, but this requires that you specify a suitable analyzer start delay with the Parameter Editor.

6 Save the setting as *MUI_DEMO*.

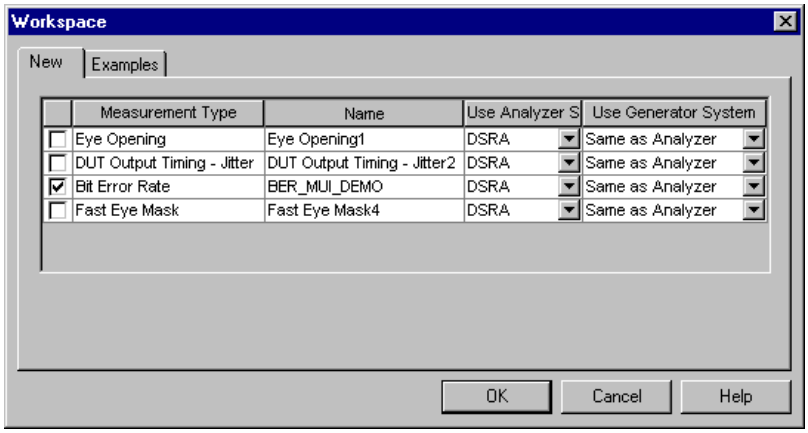
Once you have saved the setting, you may terminate the *Agilent 81250 User Software* if you wish to do so.

Executing a BER Measurement in Single Mode

Use the *Agilent 81250 Measurement Software* to set up and perform the bit error rate measurement:

1 Start the *Agilent 81250 Measurement Software* and select the measurement type *Bit Error Rate*.

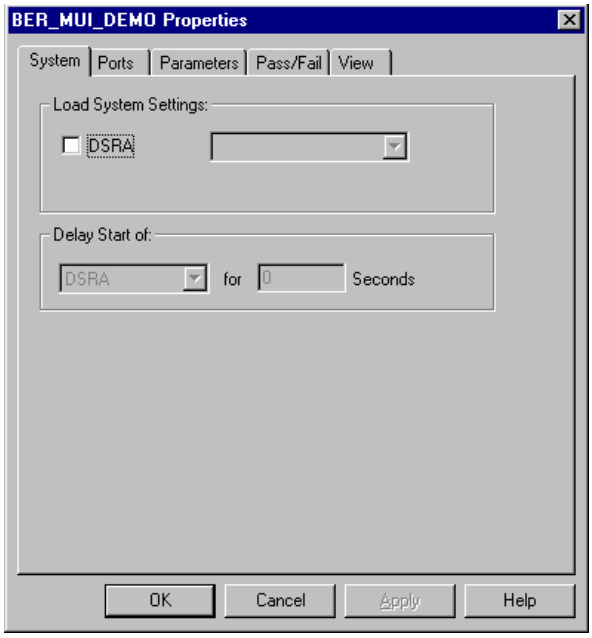
2 Enter a name for the measurement: BER_MUI_DEMO.



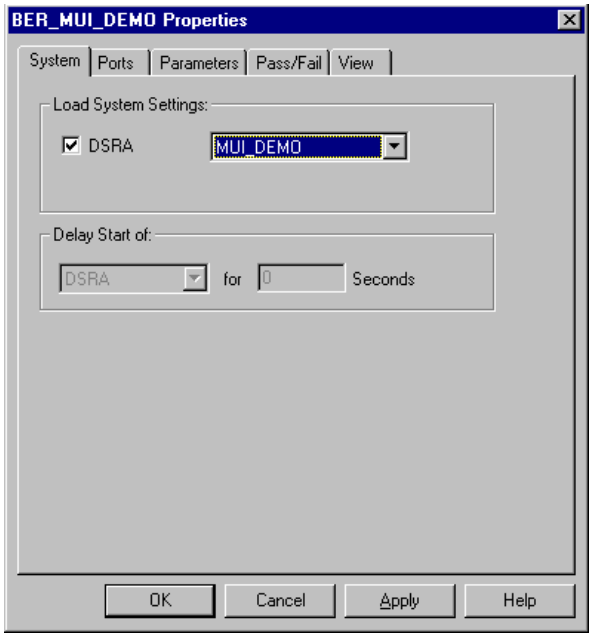
Only one system (DSRA) is used in this example. In case of two systems you would now select the analyzing and generating systems.

3 Click *OK*. This creates a new measurement and opens the measurement's *Properties* dialog.

The *System* page shows the chosen system(s) and the presently loaded setting of each system.



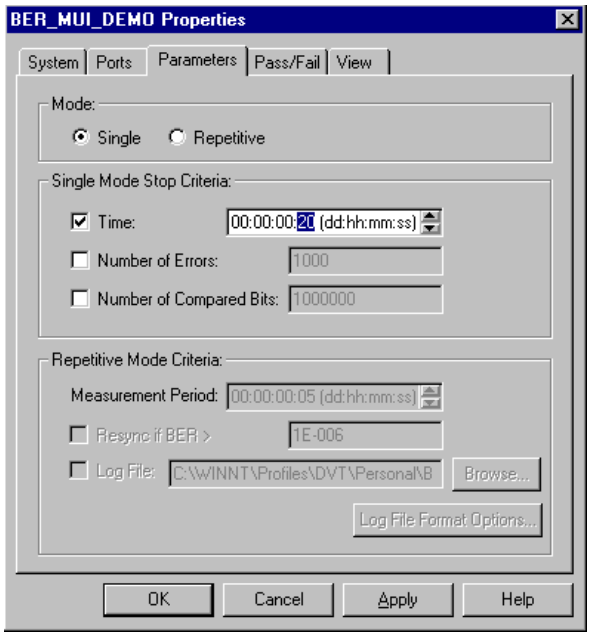
4 If no setting is loaded (as in the figure above) or a different setting than *MUI_DEMO*, click the system's check box and choose the setting *MUI_DEMO* from the drop-down list.



5 Click *Apply* to accept your changes without terminating the *Properties* dialog.

6 Click the *Parameters* tab. *Single* mode is active by default.

7 Enable the stop criterion *Time* and set the measurement duration to 20 seconds.



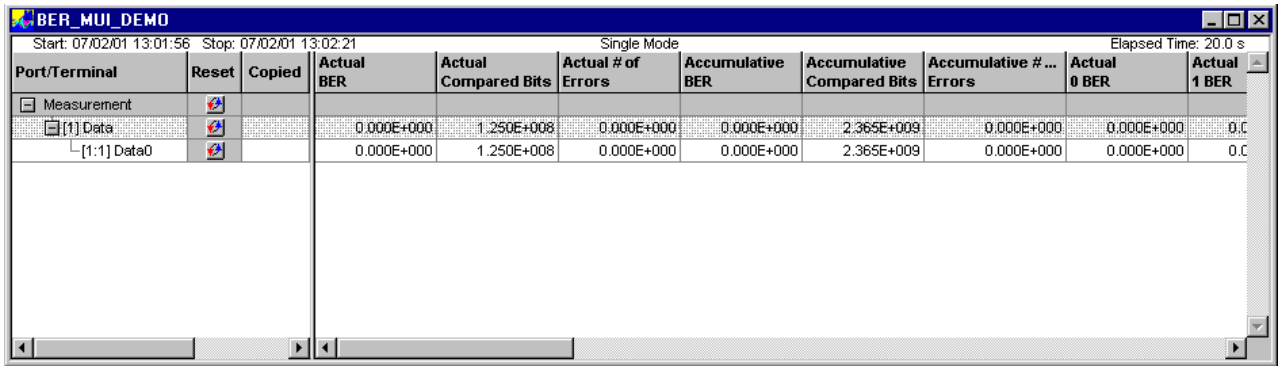
For the moment, there is no need to change the other parameters and options.

8 Click *OK*. This terminates the *Properties* dialog.

9 In the tool bar, click the *Run* button to execute the measurement.

The measurement is run and the results are continually updated (generally once a second). After 20 seconds, the measurement stops.

In order to see more result columns, you may wish to close the workspace browser.

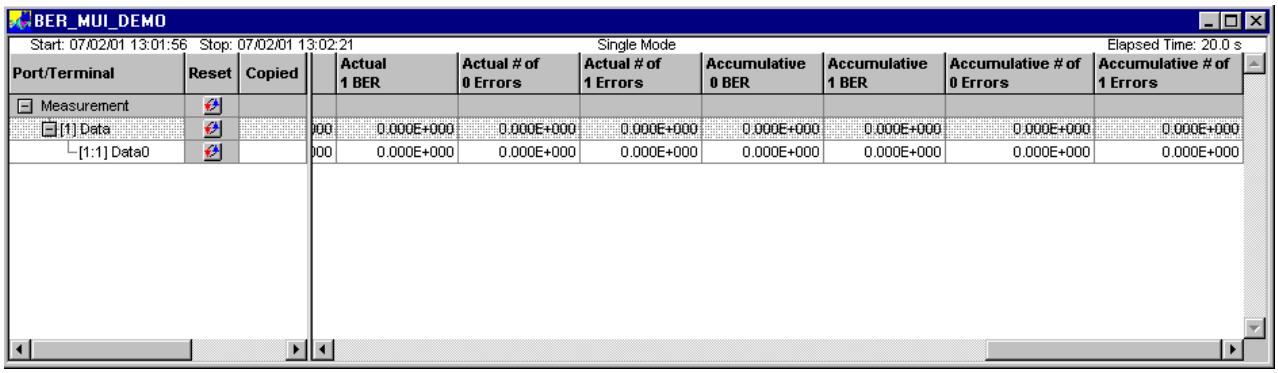


The number of received bits since the last update (column *Actual Compared Bits*) was 1.250e5.

A total number of 2.365e9 bits (column *Accumulative Compared Bits*) was received without any error.

NOTE After 20 seconds, you might expect a total number of 2.5e9 bits. But we have enabled the automatic analyzer sampling point adjustment. That means, the test sequence contains a sync block which is used for analyzer synchronization and precedes the data used for the measurement.

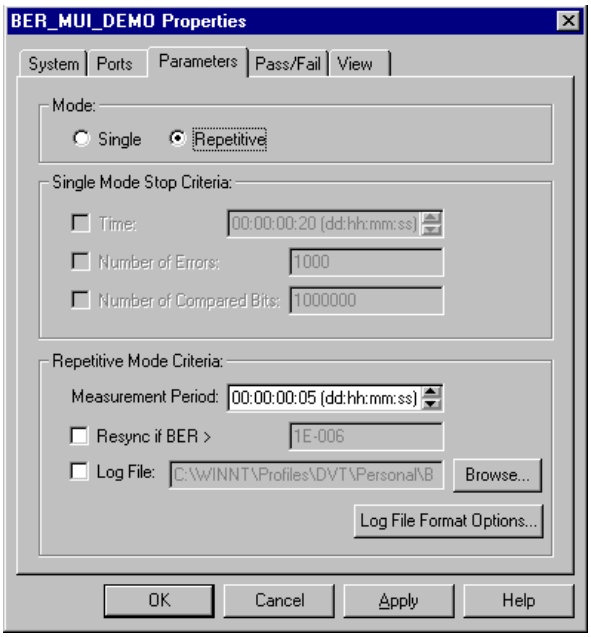
10 Use the slider at the bottom of the window to view the detailed results of expected logical ones and zeros.



Executing a BER Measurement in Repetitive Mode

The bit error rate measurement can also be run in repetitive mode. This enables you to investigate long term effects that may be caused by inherent characteristics of the device or environmental conditions.

1 Open the *Properties* dialog and click the *Parameters* tab. Activate *Repetitive*.



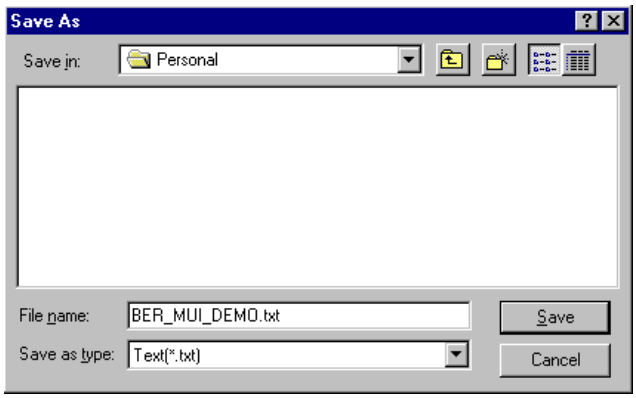
2 Set the *Measurement Period* to 10 seconds.

The *Measurement Period* is the duration of one measurement interval. The measurement result window is not updated until the measurement interval has elapsed. The “actual” columns of the measurement result window refer to the last *Measurement Period*.

3 Enable the *Resync if BER* > check box.

This instructs the measurement to resynchronize the analyzers if the bit error rate exceeds one per million.

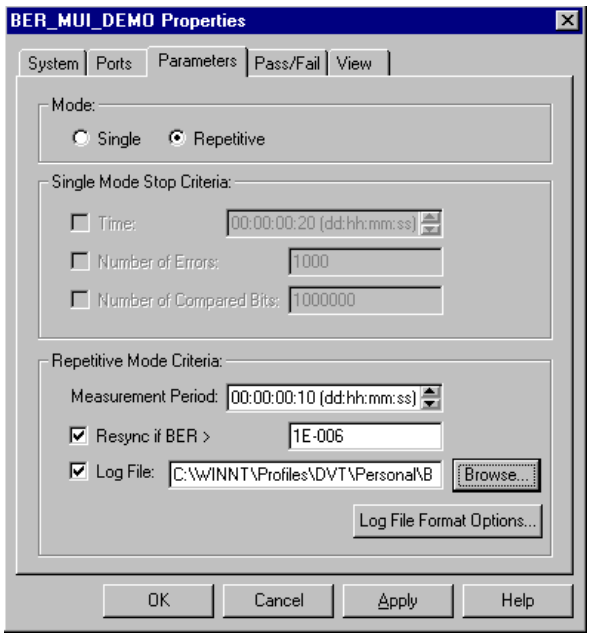
4 Enable the *Log File* and use the browser to specify the location and name of the file.



We keep the default directory and use the name BER_MUI_DEMO.txt.

5 Click *Save* to close the browser.

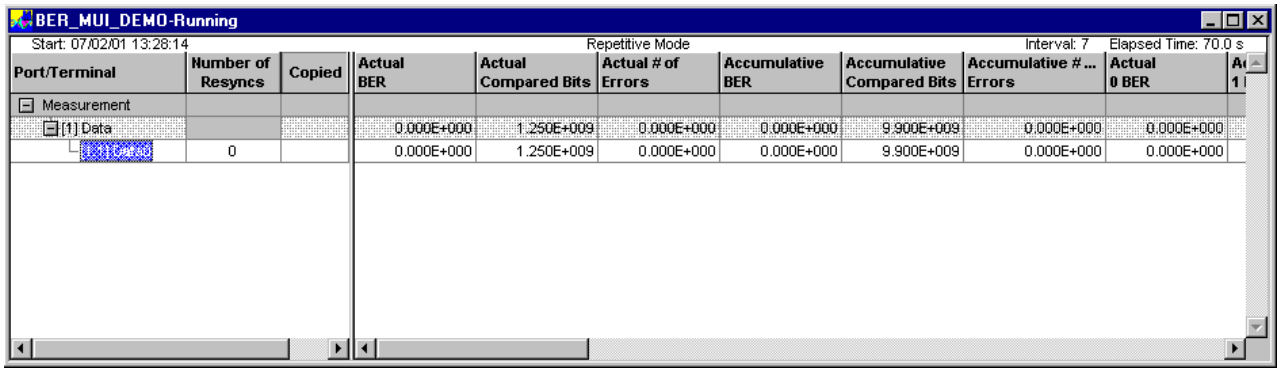
The resulting setup looks as shown below:



6 Clock *OK* to accept your changes and to close the *Properties* dialog.

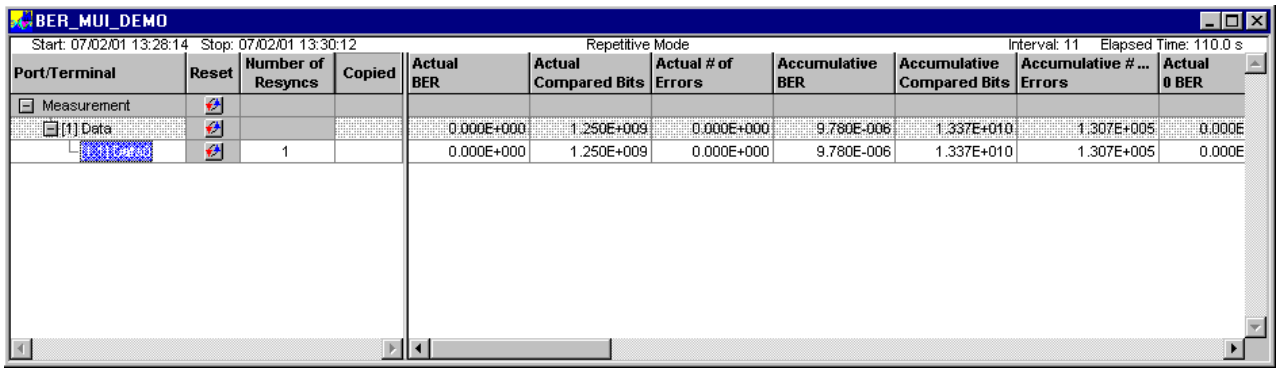
7 In the tool bar, click the *Run* button to execute the measurement.

The measurement is run and the result window is updated after each measurement period (in our case every 10 seconds).



The heading row of the window shows the time interval number and the elapsed time since starting the measurement. The results refer to that period.

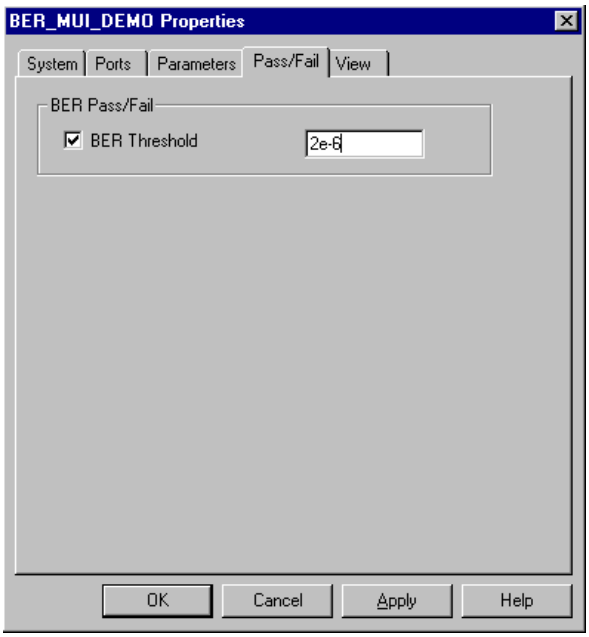
8 Click the *Stop* button to terminate the measurement.



In this example, the measurement has been run for 110 seconds.

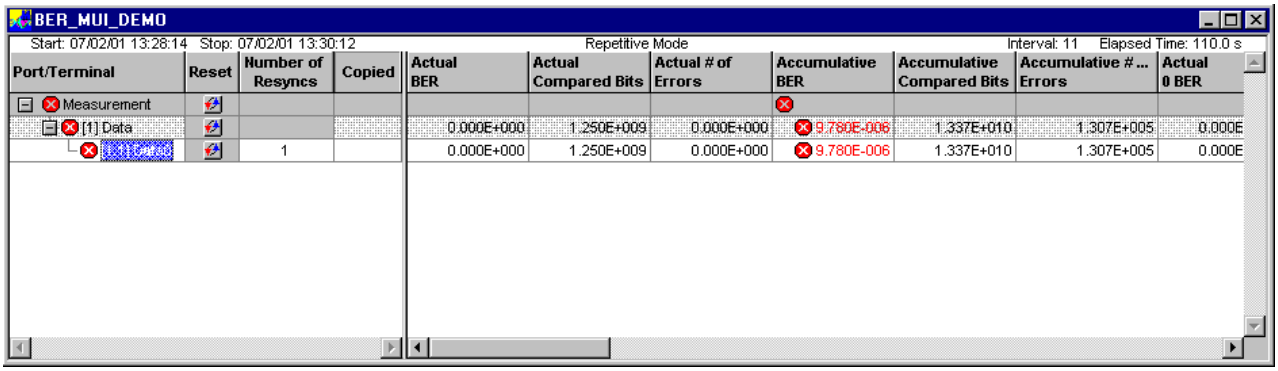
Errors have occurred (column *Accumulated # of Errors*), and the analyzer was resynchronized (column *Number of Resyncs*).

9 Open the *Properties* dialog and click the *Pass/Fail* tab. Activate the *BER Threshold* and set the pass/fail limit to 2e–6.

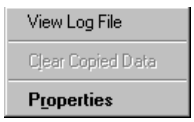


10 Click *OK*.

Now you can see how a failing measurement is highlighted.

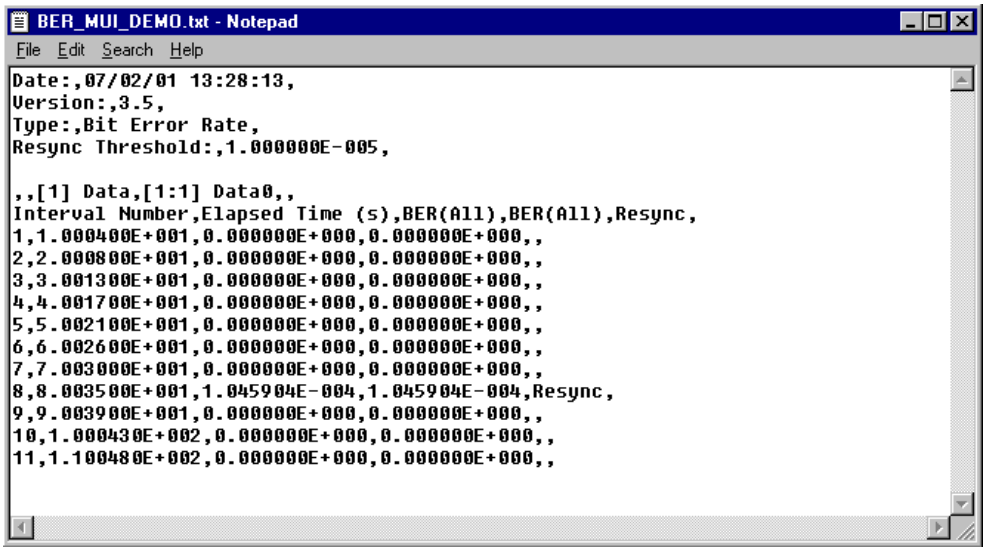


11 Press the right mouse button to open the context menu.



12 Choose *View Log File*.

For convenience, the log file is opened using the Notepad editor.



The log file contains one row for each measurement interval.

In this example, each row has five entries which are separated by commas: Interval Number, Elapsed Time (in seconds), BER of the port, BER of the terminal, Resync.

A Resync column is reserved for every terminal to indicate whether it caused a resynchronization.

A log file can have many more columns. It can be configured from the *Parameters* page of the *Properties* dialog using the *Log File Format Options* (see *"How to Specify the BER Log File Format" on page 36*).

Basics of the BER Measurement

In this chapter you find the following information:

- For the preconditions to be met to run the measurement, refer to *"Prerequisites for BER Measurements" on page 21*.
- For the explanation of the measurement results, refer to *"BER Measurement Results" on page 22*.

Prerequisites for BER Measurements

In order to perform bit error rate measurements, the following prerequisites have to be met in addition to the global ones (see *Prerequisites* in the *Framework User Guide*):

- The analyzers should be synchronized to the incoming data stream
  - either manually (specify a valid start delay)

    or
  - by automatic analyzer sampling point adjustment (Automatic Bit Synchronization or Automatic Delay Alignment).
- If automatic analyzer sampling point adjustment is used, the phase verniers of the analyzers should be in zero position.

BER Measurement Results

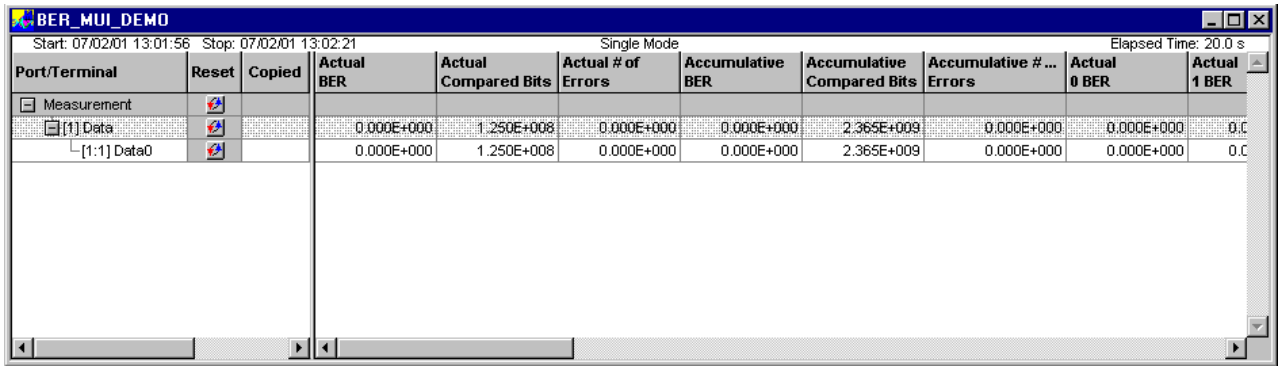
The results of a bit error rate measurement are displayed in tabular form. If you have run the measurement in repetitive mode, you can also inspect the generated log file.

For details see:

- *"The Bit Error Rate Result Display" on page 22*
- *"Explanation of the Measured Parameters" on page 24*
- *"Special Features in Repetitive Mode" on page 26*

The Bit Error Rate Result Display

The result display of the bit error rate measurement shows a table:



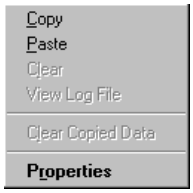
The left-hand section identifies the ports and associated terminals by numbers and names. The terminal number [1:1] means "port one, terminal one".

The right-hand side shows the measured values for each terminal and the calculated values for each port.

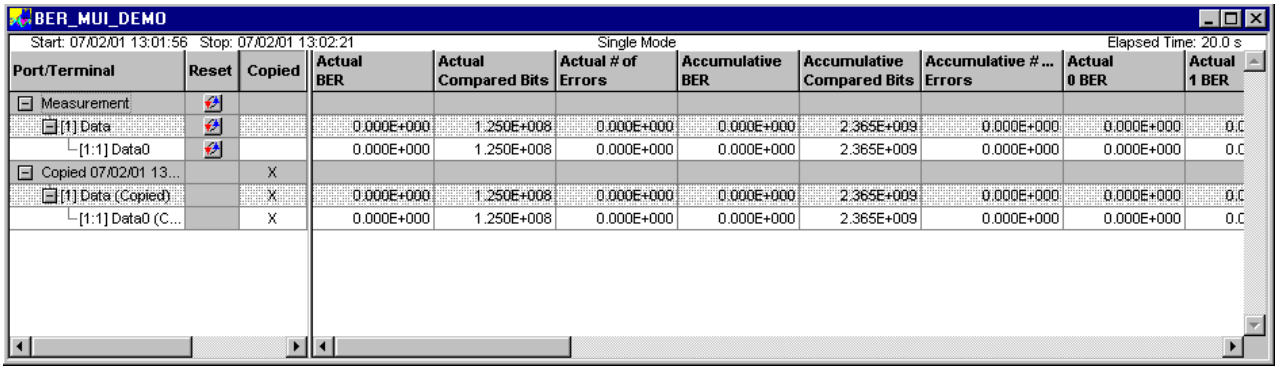
Reset *Reset* buttons at the left-hand side allow to reset the results of a terminal, a port, or the whole measurement to "no data". In single mode, the results can be reset while the measurement is running. In repetitive mode, the results can be reset after the measurement has been stopped.

Changing the Display

Context menus are opened by clicking the right mouse button. They provide a convenient means to change the display or to access the *Properties* dialog (see also *"Setting the Properties of a BER Measurement" on page 29*). The available options depend on the current cursor position.



Copy and paste You can copy all measurement results or just a few rows to the clipboard and paste them below the present results. This looks as shown below:

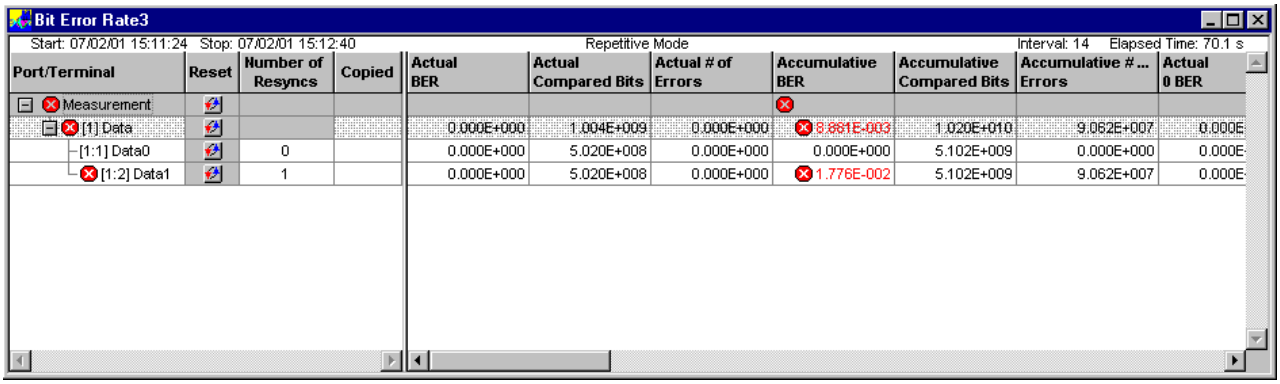


These standard functions are described in the *ParBERT Measurement Software Framework User Guide*. If copied data is present, the *Clear Copied Data* menu option becomes enabled.

Show/Hide Part of Calculation You can show or hide the results of selected ports or terminals.

Pass/Fail Indicators

If a bit error rate limit has been set on the *Pass/Fail* page of the *Properties* dialog, failing bit error rates, terminals, and ports are highlighted as shown below:



Explanation of the Measured Parameters

Actual vs. accumulated

The columns show *actual* and *accumulated* values.

- **Actual values** refer to the last measurement interval.

  In single mode, this is one second. In repetitive mode, the measurement period can be set.

- **Accumulated values** summarize the actual values as long as the test continues.

Measured parameters The measured parameters are:

Parameter	Meaning
BER (All)	The number of errored bits divided by the number of received bits. $BER_{AllErrors} = \frac{(\sum Error1s + \sum Error0s)}{(total\ \#\ of\ Bits)}$
Compared Bits	The total number of bits. Does not include bits used for automatic analyzer sampling point adjustment.
# of Errors	A number that includes all errors. $\#\ of\ Errors = (\sum Error1s + \sum Error0s)$
0 BER	Counts the number of bits where logical zero was expected but logical one received, and divides the result by the number of bits. $BER_{0sErrors} = \frac{\sum Error0s}{(total\ \#\ of\ Bits)}$
1 BER	Counts the number of bits where logical one was expected but logical zero received, and divides the result by the number of bits. $BER_{1sErrors} = \frac{\sum Error1s}{(total\ \#\ of\ bits)}$
# of 0 Errors	The number of errors where logical zero was expected but logical one received.
# of 1 Errors	The number of errors where logical one was expected but logical zero received.

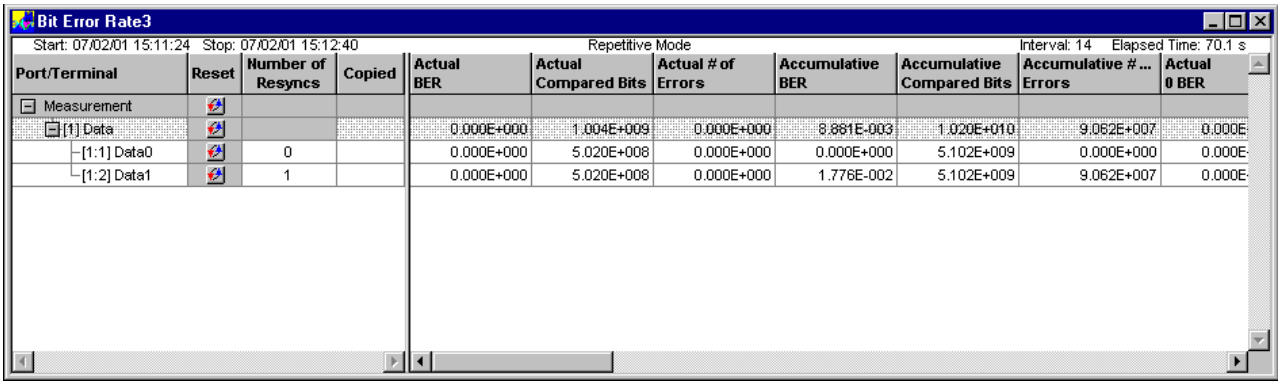
Port values The port values are calculated as follows:

Parameter	Meaning
Counters (port)	The counter values displayed for the ports are calculated by adding the terminal counters. $\#(\text{port}) = \sum \#(\text{term})$
BER (port)	Divides the number of port errors by the number of bits received by the port. $\text{BER (port)} = \frac{\sum \text{Errors (port)}}{\#\text{ of Bits (port)}}$

NOTE A bit error rate of 1.0 generally indicates that the analyzer could not synchronize to the incoming data. This has no impact on the values calculated for the ports, but is used to determine whether the measurement has passed or failed.

Special Features in Repetitive Mode

If you have run a bit error rate test in repetitive mode, you may get a result display like this:

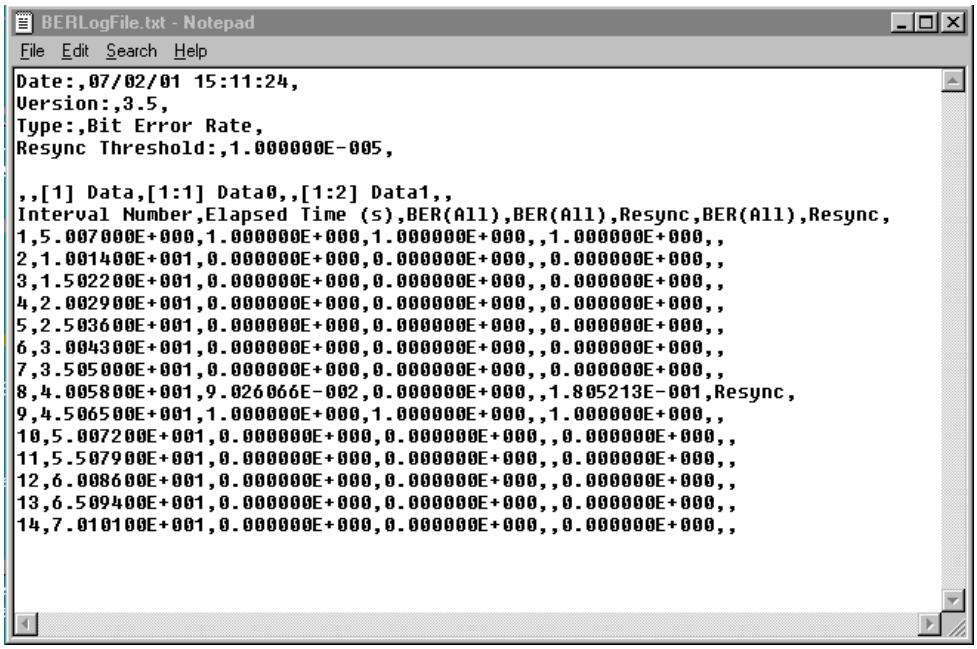


Measurement interval The values refer to the measurement interval which is indicated in the headline of the window. The headline shows also how long the measurement has been run.

The duration of one measurement interval can be calculated as *Elapsed Time* divided by *Interval Number*. In the example above, the measurement period was set to 70 s / 14 = 5 s.

Number of Resyncs The *Number of Resyncs* column shows how often an analyzer had to resynchronize to the incoming data because its bit error rate exceeded a certain threshold (see also *"How to Set Repetitive Mode Criteria" on page 35*).

Log file If you have enabled a log file, you can open it and inspect the results of the measurement intervals. The following log file refers to the measurement shown in the figure above:



The heading lines identify the DUT ports and terminals and the measured parameters. The terminals are identified by number and name: For example, [1:2] means port 1, terminal 2.

Each of the following lines starts with the measurement interval number and the elapsed time since the beginning of the test.

This log file was created using the default settings:

- The columns are separated by commas.
- Only the overall bit error rates "BER (All)" and "Resyncs" are logged.
- There is hence one column for every port and two columns for every terminal.
- Due to a high bit error rate (greater than 10^{-5}) the analyzer of the terminal "Data1" caused a resynchronization in the measurement interval 8.

A log file like this allows you to detect changes of the bit error rate over time, temperature, or other varying conditions. It can be easily imported into any text processing or spreadsheet program. An example is shown in the figure below.

	A	B	C	D	E	F	G	H
1	Date:	07/02/01 15:11:24						
2	Version:	3.5						
3	Type:	Bit Error Rate						
4	Resync Threshold:	1.000000E-005						
5								
6			[1] Data	[1:1] Data0		[1:2] Data1		
7	Interval Number	Elapsed Time (s)	BER(All)	BER(All)	Resync	BER(All)	Resync	
8	1	5.007000E+000	1.000000E+000	1.000000E+000		1.000000E+000		
9	2	1.001400E+001	0.000000E+000	0.000000E+000		0.000000E+000		
10	3	1.502200E+001	0.000000E+000	0.000000E+000		0.000000E+000		
11	4	2.002900E+001	0.000000E+000	0.000000E+000		0.000000E+000		
12	5	2.503600E+001	0.000000E+000	0.000000E+000		0.000000E+000		
13	6	3.004300E+001	0.000000E+000	0.000000E+000		0.000000E+000		
14	7	3.505000E+001	0.000000E+000	0.000000E+000		0.000000E+000		
15	8	4.005800E+001	9.026066E-002	0.000000E+000		1.805213E-001	Resync	
16	9	4.506500E+001	1.000000E+000	1.000000E+000		1.000000E+000		
17	10	5.007200E+001	0.000000E+000	0.000000E+000		0.000000E+000		
18	11	5.507900E+001	0.000000E+000	0.000000E+000		0.000000E+000		
19	12	6.008600E+001	0.000000E+000	0.000000E+000		0.000000E+000		
20	13	6.509400E+001	0.000000E+000	0.000000E+000		0.000000E+000		
21	14	7.010100E+001	0.000000E+000	0.000000E+000		0.000000E+000		
22								

Setting the Properties of a BER Measurement

Before you can run a bit error rate measurement you have to set the required parameters on the measurement's *Properties* pages. See:

- *"How to Set Up the System to be Used" on page 30*
- *"How to Select the Ports to be Measured" on page 32*
- *"How to Specify the Measurement Parameters" on page 33*
- *"How to Set Pass/Fail Criteria" on page 39*
- *"How to Specify the View" on page 40*

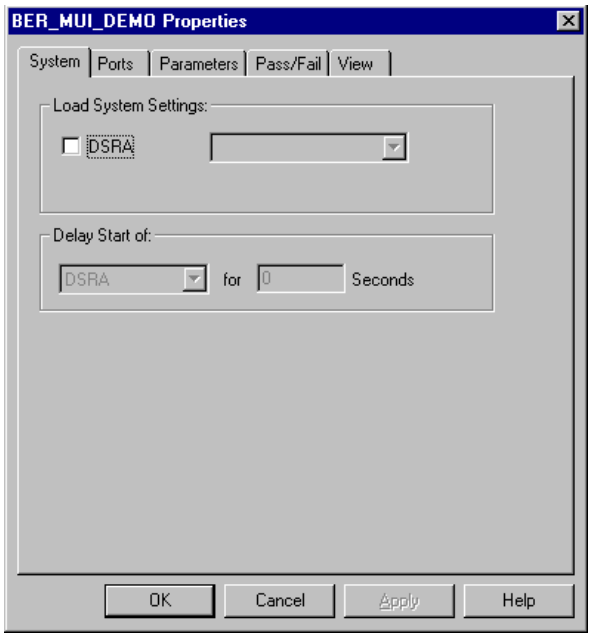
When you create a new measurement the *Properties* dialog opens automatically. To change the parameters of an existing measurement, choose *Measurement – Properties* from the menu bar. Or click the right mouse button and choose *Properties* from the context menu.

If you change the measurement settings after the measurement has been run, please note:

- Changes on the *View* and *Pass/Fail* pages have only an impact on the result display. There is no need to repeat the measurement.
- Changes on the *System*, *Ports*, and *Parameters* pages take only effect if you rerun the measurement. To remind you that the present results have not been obtained with the modified settings and that you should repeat the measurement, the result display shows a yellow bar.

How to Set Up the System to be Used

The *System* page of the *Properties* dialog appears automatically if you have set up a new measurement. The *System* page shows one or two systems, depending on your selection when creating the measurement.



If you have already loaded a setting with the *Agilent 81250 User Software*, the name of this setting will be displayed, and it will be used by default.

If no setting is indicated, as in the figure above, or if the name of a different setting than required is displayed, you have to load one or two settings.

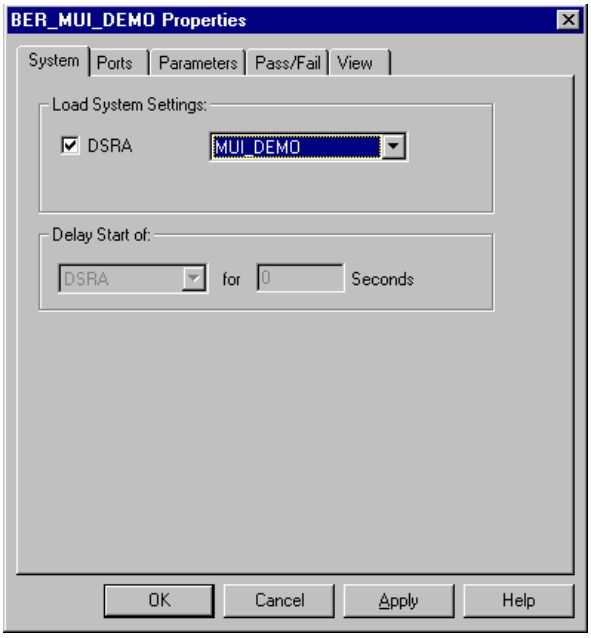
To load a setting:

1 Click the check box belonging to the system.

This activates the setting name field.

2 Choose a suitable setting from the drop-down list.

When you choose a new system setting, it will be downloaded to the firmware. You have to confirm this action before it will actually be performed.



NOTE On one system only one setting can be loaded at one time. The *Agilent 81250 User Software* and the *Agilent 81250 Measurement Software* therefore always refer to the same setting. If the *Agilent 81250 User Software* is active and you load a different setting from the *Agilent 81250 Measurement Software*, the *Agilent 81250 User Software* will be updated, and vice versa.

If you add or delete ports or terminals or change their connections with the *Agilent 81250 User Software*, then the *Agilent 81250 Measurement Software* will detect such changes when you attempt to run the measurement.

TIP If you have changed the current setting with the *Agilent 81250 User Software* and wish to keep your modifications, save the setting with the *Agilent 81250 User Software* before loading a different one. The *Agilent 81250 Measurement Software* does not save settings.

3 In case of two systems, you can specify a start delay for one of the systems.

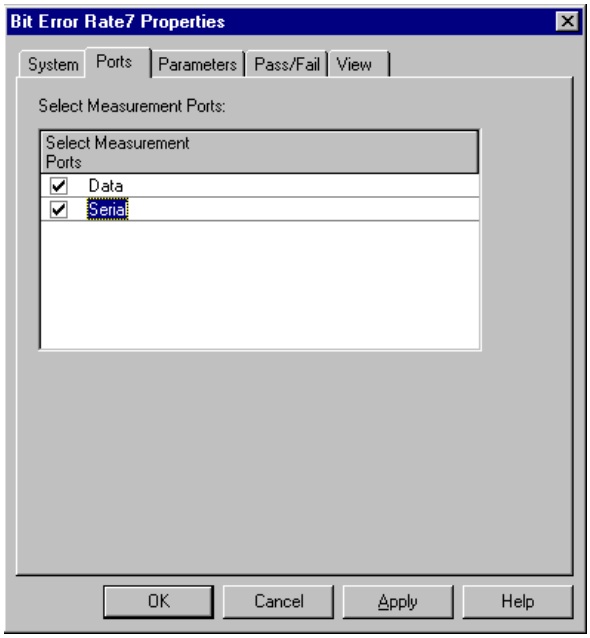
This may be useful, for instance, to allow a PLL or clock recovery circuit in the DUT to lock onto the incoming data stream.

4 Click *Apply* to accept the modifications without leaving the *Properties* dialog. Or click *OK* to accept the modifications and close the *Properties* dialog.

How to Select the Ports to be Measured

After you have specified the measurement system and the related system settings, you may wish to exclude one or several DUT output ports from the measurement.

1 In the *Properties* dialog, select the *Ports* tab.



The *Ports* page lists all the output ports of the device under test, as defined in the loaded setting. In case of two systems, this is the setting loaded on the analyzing system. By default, all these ports are enabled and will be measured.

The display is not automatically updated if you change the loaded setting by means of the *Agilent 81250 User Software*.

2 Disable the ports that shall not be measured.

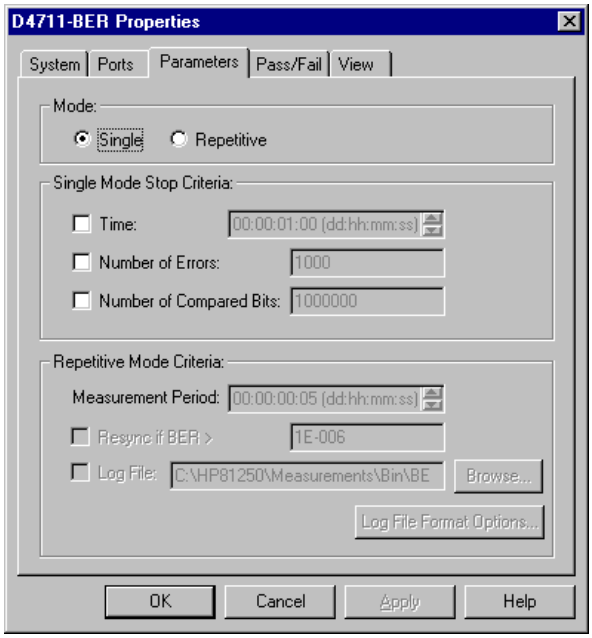
3 Click *Apply* to accept the modifications without leaving the *Properties* dialog. Or click *OK* to accept the modifications and close the *Properties* dialog.

How to Specify the Measurement Parameters

The *Parameters* tab of the *Properties* dialog allows you to specify the mode of the BER measurement: Single or repetitive.

NOTE If you modify the settings of this page, you have to rerun the measurement to update the results.

1 In the *Properties* dialog, click the *Parameters* tab.



By default, single mode is enabled.

If you wish to run the BER measurement in single mode, see *"How to Set Single Mode Stop Criteria" on page 34*.

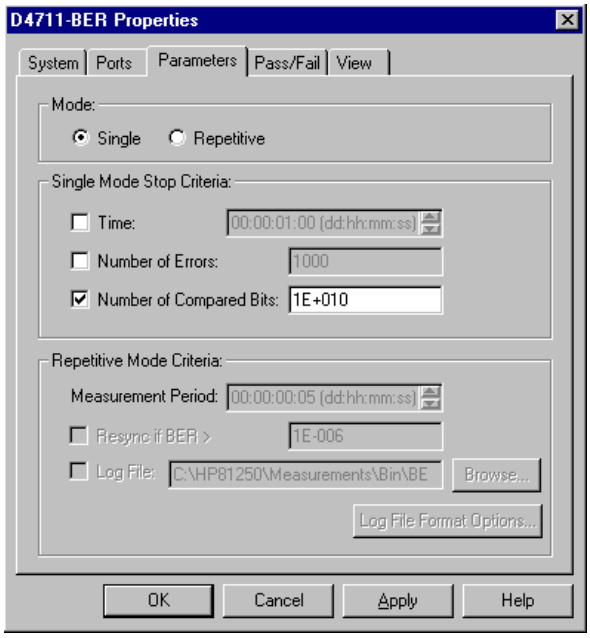
For repetitive mode see *"How to Set Repetitive Mode Criteria" on page 35*.

How to Set Single Mode Stop Criteria

To stop the single mode BER measurement automatically:

1 Activate and set one or several stop conditions.

NOTE If you do not activate one of the stop conditions, you will have to stop the BER measurement manually by clicking the *Stop* button.



The single mode stop criteria are:

- *Time*: The measurement will be stopped after the specified time span has elapsed.
- *Number of Errors*: The measurement will be stopped after the specified number of errors has been detected. This refers to the total number of errors detected by all terminals.
- *Number of Compared Bits*: The measurement will be stopped after the specified number of bits has been compared.

NOTE When setting a *Number of Errors* or a *Number of Compared Bits*, please note:

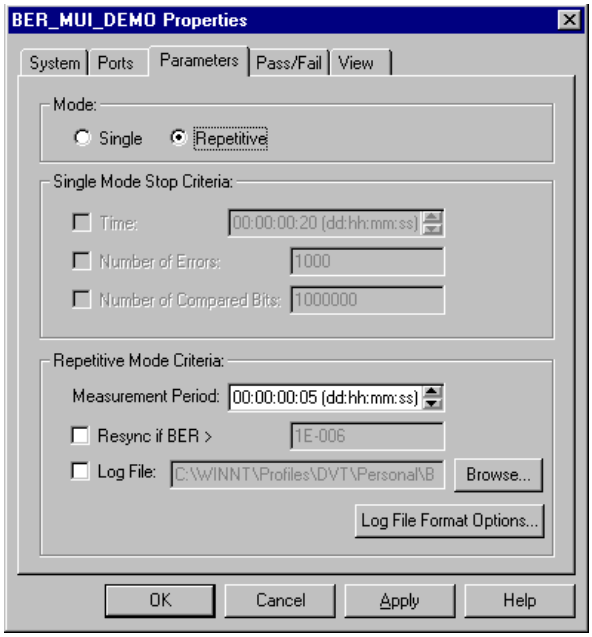
The single mode measurement is stopped by the built-in controller or PC. The software polls the analyzer frontends once a second and then compares the results with the stop criteria. This should be taken into account. For example, if the measurement is running at 100 MHz, the *Number of Compared Bits* should be greater than 10^8.

2 Click *Apply* to accept the modifications without leaving the *Properties* dialog. Or click *OK* to accept the modifications and close the *Properties* dialog.

How to Set Repetitive Mode Criteria

In repetitive mode the BER measurement runs until you click the *Stop* button. The result window and the log file are updated after every measurement interval.

1 Click *Repetitive* to enter the repetitive mode.



2 Set the repetitive mode criteria:

– *Measurement Period*: The duration of a measurement interval. After this time the measurement result display and the log file are updated.

  Default is a period of 5 s.

– *Resync if BER exceeds limit*: If this check box is enabled and the bit error rate of a terminal becomes greater than the specified value, the test sequence is restarted.

  Default is a BER threshold of 10^{-6}.

  If the automatic analyzer sampling point adjustment is enabled, the corresponding procedure will be performed—either Automatic

Delay Alignment or Automatic Bit Synchronization, as specified in the loaded setting.

If the automatic analyzer sampling point adjustment is disabled, the sequence restarts with the start block.

NOTE The software decides after every measurement interval whether a Resync is required. If so, then the terminal that caused the Resync is marked with the label “Resync” in the log file.

If the resynchronization fails, all following measurements of the respective terminals will show a bit error rate of 1.0.

– *Log File*: In repetitive mode, the results can be saved in a log file. You can specify a different name and location, either directly or from the browser.

You can also specify the file contents and change the format. For details see *“How to Specify the BER Log File Format” on page 36*.

3 Click *Apply* to accept the modifications without leaving the *Properties* dialog. Or click *OK* to accept the modifications and close the *Properties* dialog.

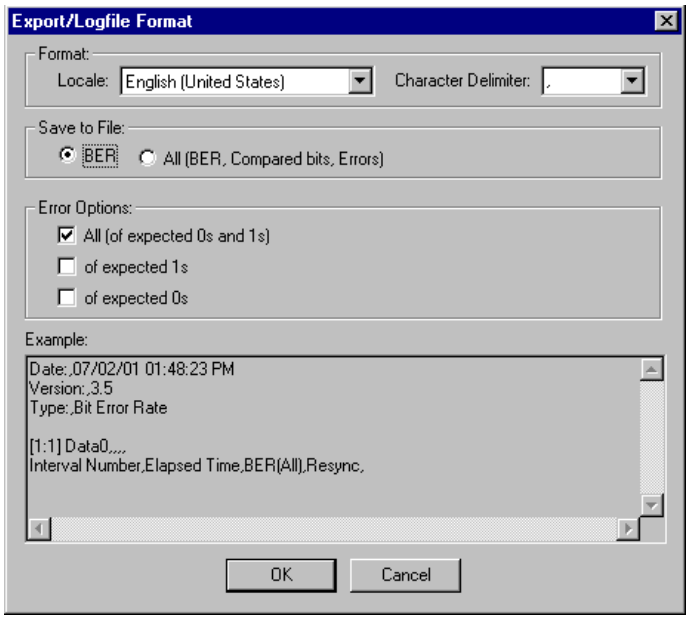
How to Specify the BER Log File Format

The log file of a BER test in repetitive mode is an ASCII file. It contains a header and one line for each measurement interval. The results are arranged in columns and the file is well suited to be imported into a spreadsheet or text processing program.

An example of a BER log file is explained in *“Special Features in Repetitive Mode” on page 26*.

To specify the format and contents of the BER log file:

1 On the *Parameters* page of the *Properties* dialog click *Log File Format Options*.

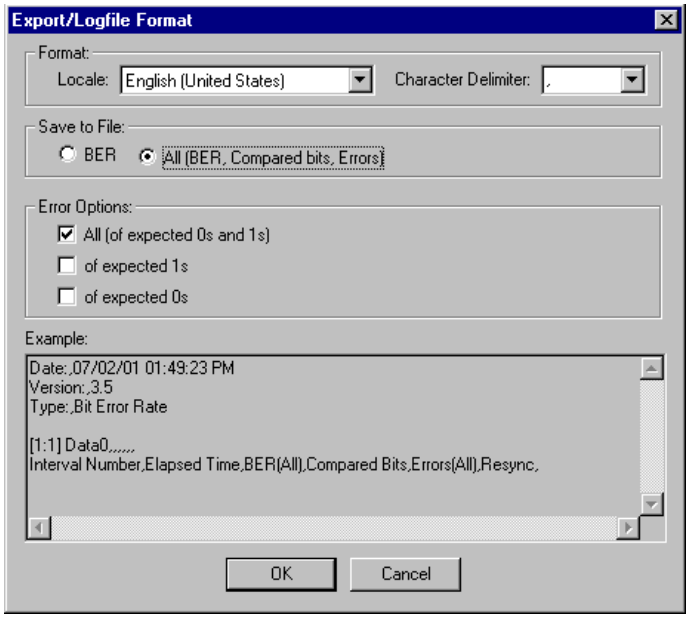


2 Choose the *Character Delimiter*. This is the character that separates the columns. Choices are comma or tabulator.

3 Decide what you wish to log. Choices are BER only or also the counters of compared bits and errors.

4 From the *Error Options* section choose the kinds of bit error rates you wish to log. Choices are All, logical one expected but zero received, logical zero expected but one received.

The *Example* section shows the terminals which are going to be measured and a preview of the resulting table columns.



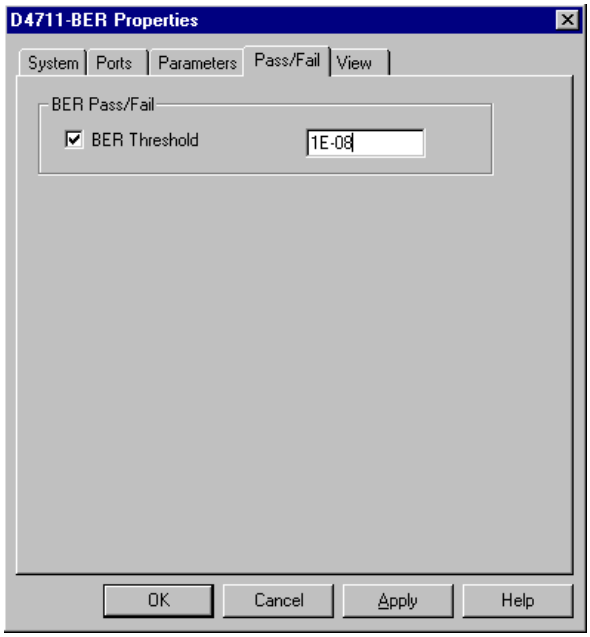
5 Click *OK* to finish.

How to Set Pass/Fail Criteria

The *Pass/Fail* tab of the *Properties* dialog allows you to specify the criteria which determine whether the DUT has passed or failed the test. If you have set pass/fail limits, the result display will show markers for the ports and terminals that failed (see also *"Pass/Fail Indicators" on page 24*).

You can change the pass/fail criteria without rerunning a test. The software compares the criteria with the test results.

1 In the *Properties* dialog, select the *Pass/Fail* tab.



The Bit Error Rate measurement has only one pass/fail condition.

2 If desired, enable the *BER Threshold* and set a suitable threshold.

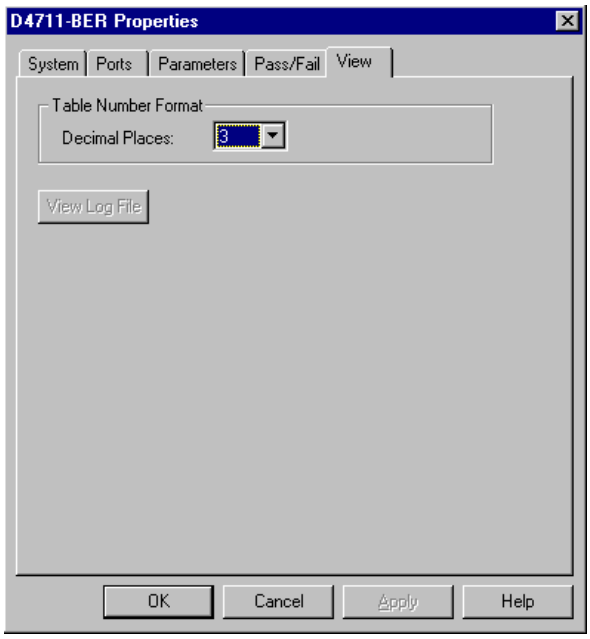
This threshold applies to all ports and terminals. All measurements where the measured bit error rate is higher than this threshold will be marked as "failed".

3 Click *Apply* to accept the modifications without leaving the *Properties* dialog. Or click *OK* to accept the modifications and close the *Properties* dialog.

How to Specify the View

The *View* tab of the *Properties* dialog allows you to modify the display of the measurement results.

1 In the *Properties* dialog, select the *View* tab.



2 If desired change the number of decimals shown in the result display.

3 If you have run a test in repetitive mode and enabled a log file, you can also click *View Log File* to investigate the measurement results.

4 Click *Apply* to accept the modifications without leaving the *Properties* dialog. Or click *OK* to accept the modifications and close the *Properties* dialog.

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