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

1 Introduction

About Error Distribution Analysis Package 6
Prerequisites for Plugins Installation 6
Installing Error Distribution Analysis Package 6
License Information 8
Locate Documentation 10
Contact Keysight Technologies 11

2 Error Distribution Analysis

Overview 14

Launching the Measurement User Interface 15
Toolbar 16
Status Indicator 17
Measurement History Window 18
Copy Measurement History Properties 18
Measurement Graph 19

Configuring Properties of Measurement Pattern 21
Properties Window 21
Calculated Results Pane 23

Symbol Errors per Frame - Histogram 24
Overview 24
Symbol Errors per Frame - Histogram 24

Consecutive Error Distance - Histogram 25
Overview 25
Consecutive Error Distance - Histogram 25
3 Remote Programming

Remote Programming Basics 32
  Important Points about SCPI 35
  Sending Commands to the Instrument 39
  Command Line Arguments 40
  Communication 41

Error Distribution Analysis Package PLUGin Subsystem 43
  :PLUGin:EDA:RUN Subnode 55

Index
1 Introduction

This chapter provides an overview of M8070EDAB Error Distribution Analysis Package.
Introduction

About Error Distribution Analysis Package

The M8070EDAB Error Distribution Analysis Package allows you to measure FLR (Frame Loss Ratio) in a data pattern using the acquisition and evaluation parameters. Errors in the pattern under test are measured and represented through the following graphs and a table:

- Histogram - Symbol Errors per Frame
- Histogram - Consecutive Error Distance
- Scatter Plot - Error Map
- Table: Data

**NOTE**
Error Distribution Analysis Package can be installed over M8070B software and requires a valid license for activation.

Prerequisites for Plugins Installation

- M8070B software version 6.0 or later installed.
- Error Distribution Analysis Package file (*.M8KP), which can be downloaded from Keysight web page.
- A valid license for Error Distribution Analysis Package plugin.
  For details on the required licenses, refer to the "License Information" on page 8.

Installing Error Distribution Analysis Package

The M8070B software comes with a **Plugin Manager** to simplify all the tasks related to plugin management. The **Plugin Manager** displays a list of plugins that are installed in the software. For each plugin, it displays the information such as Name, Version, Vendor, Description, State, and Build Date. In addition, the **Plugin Manager** also allows you to install, uninstall, and upgrade the plugins.

To launch **Plugin Manager**, open the M8070B user interface, and then go to the menu bar. Select **Utilities** and then **Plugin Manager**. The **Plugin Manager** window appears as shown in the following figure:
The **Plugin Manager** window enables you to install a plugin.

To install a plugin, perform the following steps:

1. Download the required plugin file from the Keysight web page.

2. Click the **Install plugin from file** icon.
   A standard Window’s **Open** dialog box appears.

3. Locate the plugin file (*.M8KP) to be installed, and click **Open**.
   On the successful installation of plugin, a message similar to the following appears:

![Installation Successful]

4. Restart the software.
   Once you restart the software, the plugin state changes to **Loaded**.

**NOTE**

Ensure to restart the M8070B software for the changes to take effect.

For further details on how to update or uninstall plugins, refer to the *M8000 Series BER Test Solutions Plugins Getting Started Guide*.
License Information

The usage of Error Distribution Analysis Package is governed by Keysight Licensing. It is based on FlexNet Publisher and supports most of the FlexNet licenses that have been issued by Keysight for its products over the years. Keysight Licensing provides tools and processes for floating, USB portable, node-locked, and transportable licenses.

The Keysight Licensing provides four types of licenses:

- **Node-locked** - A node-locked license permits the licensed software to run on only one machine. Each node-locked license is locked to an instrument or computer. Trial licenses are node-locked, time-based licenses.

- **USB portable** - A USB portable license is locked to a USB dongle (also called a USB key). Systems that run the licensed feature or product must have the license file resident on their hard disks, and have the dongle attached when they run the licensed feature or product.

Node-locked and USB portable licenses may be counted or uncounted.

- **Transportable** - A transportable license is a type of node-locked license that can be unlocked from one client host and then locked to another client host, via a network-enabled process performed in conjunction with the Keysight Software Manager website.

- **Floating** - Floating licenses (network licenses) reside on a license server (a separate computer) and are checked out for use by Keysight products (instruments or applications), then returned (checked in) when no longer needed so that they can be used on another computer or instrument.

Each license is either perpetual (permanent) or time-based (good for a limited amount of time).

These licenses can be installed using the **Keysight License Manager**. It helps you install licenses on your local machine (instrument or computer), or configure your local machine to use licenses from a remote license server.

Depending upon the license types, the following version of **Keysight License Manager** can be used to install the licenses:

- The node-locked and transportable licenses are installed by **Keysight License Manager 5**.
- The floating and USB probable licenses are installed by **Keysight License Manager 6**.
For details on how to install these licenses, refer the following documents:

- M8000 Series User Guide
  (https://literature.cdn.keysight.com/litweb/pdf/M8000-91B08.pdf)
- Keysight Licensing Administrator's Guide

The following table shows the various licenses available for Error Distribution Analysis Package:

<table>
<thead>
<tr>
<th>License Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8070EDAB-1FP</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, node-locked perpetual license</td>
</tr>
<tr>
<td>M8070EDAB-1TP</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, transportable perpetual license</td>
</tr>
<tr>
<td>M8070EDAB-1NP</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, floating perpetual license</td>
</tr>
<tr>
<td>M8070EDAB-1UP</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, USB portable perpetual license</td>
</tr>
<tr>
<td>M8070EDAB-1FL</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, node-locked 12 month license</td>
</tr>
<tr>
<td>M8070EDAB-1TL</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, transportable 12 month license</td>
</tr>
<tr>
<td>M8070EDAB-1NL</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, floating 12 month license</td>
</tr>
<tr>
<td>M8070EDAB-1UL</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, USB portable 12 month license</td>
</tr>
<tr>
<td>M8070EDAB-1FX</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, node-locked 24 month license</td>
</tr>
<tr>
<td>M8070EDAB-1TX</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, transportable 24 month license</td>
</tr>
<tr>
<td>M8070EDAB-1NX</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, floating 24 month license</td>
</tr>
<tr>
<td>M8070EDAB-1UX</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, USB portable 24 month license</td>
</tr>
<tr>
<td>M8070EDAB-1FY</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, node-locked 36 month license</td>
</tr>
<tr>
<td>M8070EDAB-1TY</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, transportable 36 month license</td>
</tr>
<tr>
<td>M8070EDAB-1NY</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, floating 36 month license</td>
</tr>
<tr>
<td>M8070EDAB-1UY</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, USB portable 36 month license</td>
</tr>
<tr>
<td>M8070EDAB-1FF</td>
<td>Error Distribution Analysis Package for M8000 Series BERT Test Solutions, node-locked 6 month license</td>
</tr>
</tbody>
</table>
1 Introduction

Locate Documentation

To access documentation related to the M8070EDAB Error Distribution Analysis Package, use one of the following methods:

- Browse the product CD
- Browse the manuals
- Go to the product website (www.keysight.com/find/M8000) and browse the manuals
- On installing the M8070EDAB Error Distribution Analysis Package, you can find the documentation at the plugin directory: C:\Program Files\Keysight\M8070B\Plugins\M8070EDAB\doc

Related Documents

Refer the following related documents:

<table>
<thead>
<tr>
<th>Document Part No.</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8000-91B01</td>
<td>M8020A Start Here Document</td>
</tr>
<tr>
<td>M8000-91B02</td>
<td>M8030A Start Here Document</td>
</tr>
<tr>
<td>M8000-91B03</td>
<td>M8040A Start Here Document</td>
</tr>
<tr>
<td>M8000-91B04</td>
<td>Tips for Preventing Damage</td>
</tr>
<tr>
<td>M8000-91B05</td>
<td>M8000 Series BER Test Solutions Installation Guide</td>
</tr>
<tr>
<td>M8000-91B06</td>
<td>M8020A/M8030A Getting Started Guide</td>
</tr>
<tr>
<td>M8000-91B07</td>
<td>M8040A Getting Started Guide</td>
</tr>
<tr>
<td>M8000-91B08</td>
<td>M8000 Series BER Test Solutions User Guide</td>
</tr>
<tr>
<td>M8000-91B09</td>
<td>M8000 Series BER Test Solutions Programming Guide</td>
</tr>
</tbody>
</table>
Additional Documents

Refer the following additional documents:


http://www.keysight.com/find/M9505A for 5-slot chassis related documentation.


Contact Keysight Technologies

For more information on Keysight Technologies’ products, applications or services, contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus
This chapter describes the Error Distribution Analysis Package in detail.
Overview

The M8070EDAB Error Distribution Analysis Package checks a data pattern for errors. It allows you to visualize the errors in a pattern through following types of graphs:

- Histogram - Symbol Errors Per Frame
- Histogram - Consecutive Error Distance
- Scatter Plot - Error Map
- Table - Data
In order to analyze the pattern for errors and visualize through graphs, the acquired pattern is simplified into the following parts:

- Frames - A frame consists of a configurable number of symbols.
- Symbols - A symbol consists of a configurable number of bits.
- Bits - A bit is simply a binary bit 0 or 1.

Launching the Measurement User Interface

To launch the Error Distribution Analysis Package user interface:

- Go to the Menu Bar > Measurements > Error Distribution Analysis to launch the Error Distribution Analysis Package user interface.

The following figure shows an example of the Error Distribution Analysis user interface:
The measurement user interface has the following GUI elements which are common to all measurements:
1 Toolbar
2 Measurement History Pane
3 Measurement Graph
4 Calculated Results Pane
5 Status Indicator
6 Parameter Window

The GUI elements are described in the following sections.

**Toolbar**

The toolbar contains the following icons:

<table>
<thead>
<tr>
<th>Elements</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Single]</td>
<td>Run Single</td>
<td>Starts a single run</td>
</tr>
<tr>
<td>![Start/Continue]</td>
<td>Start Measurement</td>
<td>Starts a continuous measurement</td>
</tr>
<tr>
<td>![Stop]</td>
<td>Stop Measurement</td>
<td>Stops the measurement</td>
</tr>
<tr>
<td>![Enable/Disable]</td>
<td>Enable/Disable Measurement Run History</td>
<td>Enables or disables the measurement run history. For details, refer to “Measurement History Window” on page 18.</td>
</tr>
<tr>
<td>![Clear]</td>
<td>Clear Measurement Run History</td>
<td>Clears the measurement run history.</td>
</tr>
</tbody>
</table>
Status Indicator

The status indicator shows the current state of a measurement. There can be various states of a measurement, depending on the type of measurement. These may be as follows:

- **Not Started**: Indicates that the measurement has not yet started.
- **Running**: Indicates that the measurement is currently running.
- **Stopped**: Indicates that the measurement is stopped.
- **Error**: Indicates an error while executing the measurement which is caused due to invalid parameter settings.
- **Suspended**: Indicates that the measurement is suspended.
- **Finished**: Indicates that the measurement is completed.

The following figure shows the status indicator while the measurement is running:
Measurement History Window

The **Measurement History** window maintains the history of executed measurements along with their time stamp. This allows you to refer to the previously run measurements and compare their results.

The **Measurement History** window is shown in the figure below:

![Measurement History Window](image)

Click the **Disable Run History** icon to enable/disable measurement run history in the **Measurement History** window.

Copy Measurement History Properties

This feature allows you to copy the properties of run measurement to currently running measurement.

To do so, perform the following steps:

1. Select a measurement from the list shown in the **Measurement History** window.
2. Click the **Copy Parameters** icon. The properties of the selected measurement will be copied to the current measurement.
Measurement Graph

The Measurement Graph displays the calculated graph and results.

The following figure displays the Measurement Graph (Histogram) of the Symbol Errors per Frame.

When you right-click on the Measurement Graph, a context menu appears which provides the following options:

- **Turn ON/OFF Fit to view (Ctrl+Home)** - Turns ON/OFF Fit to view option.
- **Fit to view (Home)** - Makes the visible area fit to display entire contents.
- **Copy screenshot (F11)** - Copies the screenshot of charts to clipboard.
- **Save screenshot (Ctrl+S)** - Saves the screenshot as an image (PNG) under a name.

Clicking this option displays the **Save Screenshot As** dialog box.
a On the **Save Screenshot As** dialog box, select one of the following:

- **Displayed**: Saves the screenshot with default properties.
- **Custom**: Enables you to set the custom properties of the image. The following properties are available:
  - **Width**: Sets the width value of the image.
  - **Height**: Sets the height value of the image.
  - **Color Scheme**: Enables you to select a color scheme for the image. Two options; Dark and Light are available.
  - **Show Legends**: Allows you to save the legends in the screenshot.

b Click **OK** to save the screenshot.

- **Quick Help (Alt+F1)** - Opens a window that provides brief information about the dynamic display.
Configuring Properties of Measurement Pattern

This section allows you to simplify the acquired pattern into following parts:

- Frames - A frame consists of a configurable number of symbols.
- Symbols - A symbol consists of a configurable number of bits.
- Bits - A bit is simply a binary bit 0 or 1.

Properties Window

The Properties window allows you to set the parameters for a location or a group. For each measurement, it contains two types of parameters:

- Acquisition Parameters - Pre-Parameters influence how the data for a measurement is collected; changes require a re-run in order to be effective. It also allows you to select a location or location group against which the data acquisition is performed.
- Evaluation Parameters - Post-Parameters influence how the collected measurement data is evaluated. Changes do not require a re-run in order to be effective.

The acquisition and evaluation parameters differ from measurement to measurement.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition Parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyzer</td>
<td>Location or location group against which the data acquisition is performed.</td>
<td>M1.DataIn1, M1.DataIn2, M2.DataIn1, M2.DataIn2, or etc.</td>
</tr>
<tr>
<td>Data Framing Presets</td>
<td>Specify frame size of data. <strong>NOTE:</strong> This parameter changes the value of different parameters as per the data framing preset value selected.</td>
<td>Custom, KP4, KR4, PRBS9, PRBS10, PRBS11, PRBS13</td>
</tr>
<tr>
<td>Bits per Symbol</td>
<td>Specify the number of bits in a symbol.</td>
<td>Min - 1, Max - 10000</td>
</tr>
</tbody>
</table>
## Error Distribution Analysis

### Symbols per Frame
Specify the number of symbols in a frame.

<table>
<thead>
<tr>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min - 1</td>
</tr>
<tr>
<td>Max - 10000</td>
</tr>
</tbody>
</table>

### No. of Frames
Specify the number of frames to be captured.

<table>
<thead>
<tr>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min - 1</td>
</tr>
<tr>
<td>Max - 2000000000</td>
</tr>
</tbody>
</table>

### Evaluation Parameters

#### Correctable Symbols per Frame
Specify the number of symbols that can be corrected in a frame.

<table>
<thead>
<tr>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min - 0</td>
</tr>
<tr>
<td>Max - 100</td>
</tr>
</tbody>
</table>

#### Burst Error Analysis
Specify either to calculate burst based on error density or error distance.

<table>
<thead>
<tr>
<th>Density</th>
<th>Distance</th>
</tr>
</thead>
</table>

#### No. of Symbol Errors
Specify the minimum number of error symbols within the received block to be identified as a burst.

- NOTE: This option is applicable only when **Density** is selected under **Burst Error Analysis** parameter.

<table>
<thead>
<tr>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min - 2</td>
</tr>
<tr>
<td>Max - 1000</td>
</tr>
</tbody>
</table>

#### Analyzed Block Size
Specify the size of the analyzed block used for burst detection.

- NOTE: This option is applicable only when **Density** is selected under **Burst Error Analysis** parameter.

<table>
<thead>
<tr>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min - 10</td>
</tr>
<tr>
<td>Max - 20000</td>
</tr>
</tbody>
</table>

#### No. of Consecutive Errors
Specify the minimum number of consecutive errors to be identified as a burst.

- NOTE: This option is applicable only when **Distance** is selected under **Burst Error Analysis** parameter.

<table>
<thead>
<tr>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min - 2</td>
</tr>
<tr>
<td>Max - 1000</td>
</tr>
</tbody>
</table>

#### Error Distance Threshold
Specify the maximum distance between two consecutive errors to be considered part of the same burst.

- NOTE: This option is applicable only when **Distance** is selected under **Burst Error Analysis** parameter.

<table>
<thead>
<tr>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min - 2</td>
</tr>
<tr>
<td>Max - 10000</td>
</tr>
</tbody>
</table>

### Show Parameters

#### Comment
Specify a comment before running a measurement; so that, the same may be visible in measurement history.

-  

#### Vertical Axis Scale
Specify the Y axis scale.

<table>
<thead>
<tr>
<th>Linear</th>
<th>Logarithmic</th>
</tr>
</thead>
</table>

#### Show Error Map in
Show Error Map in Bits/Symbols.

<table>
<thead>
<tr>
<th>Bits</th>
<th>Symbols</th>
</tr>
</thead>
</table>

#### Graph Legends
Show/hide graph legends.

<table>
<thead>
<tr>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
</table>

#### Show Poisson Distribution
Show/hide poisson distribution.

| ON | OFF |
Calculated Results Pane

The **Calculated Results** pane displays the calculated results in the form of measurement parameters for each location. The calculated measurement parameters vary from measurement to measurement.

The **Calculated Results** pane is shown in the following figure:

![Calculated Results Pane](image)

**Table 4 on page -23** describes the labels in the **Calculated Results** pane.

<table>
<thead>
<tr>
<th>Labels</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Location or location group against which the data acquisition is performed.</td>
</tr>
<tr>
<td>Total Frames</td>
<td>Shows the total number of frames into which the pattern has been divided.</td>
</tr>
<tr>
<td>Frames with Errors</td>
<td>Shows the total number of frames which have errored symbols.</td>
</tr>
<tr>
<td>Un-Correctable Frames</td>
<td>Shows the total number of frames which have non-correctable symbols.</td>
</tr>
<tr>
<td>Measured FLR</td>
<td>Measured FLR is the ratio of number of measured frames that have number of errors greater than “Correctable Symbols Per Frame” and total number of frames captured.</td>
</tr>
<tr>
<td>Estimated FLR</td>
<td>Estimated FLR is the ratio of number of predicted frames that have number of errors greater than “Correctable Symbols Per Frame” and total received frames. This estimation is based on the assumption that errors are randomly distributed.</td>
</tr>
<tr>
<td>No. of Burst Errors</td>
<td>Shows the total number of burst errors.</td>
</tr>
<tr>
<td>No. of Random Errors</td>
<td>Shows the total number of random errors.</td>
</tr>
</tbody>
</table>

**NOTE**

FLR means frame loss ratio which signifies the ratio of number of frames that have number of errors greater than “Correctable Symbols Per Frame” (parameter under evaluation parameters) and total number of frames.
Symbol Errors per Frame - Histogram

Overview

This graph (histogram) allows you to visualize how many symbol errors a certain number of frames actually have.

Symbol Errors per Frame - Histogram

The x and y axis are labeled in the following manner:
1. Y Axis - Represents the number of frames or Frame Count
2. X Axis - Represents the number of Symbol Errors per Frame

The graph follows the below conventions:
- The yellow bars depicts the number of symbols that are errored in the defined number of frames.
- Bars with white border depicts the predicted values, i.e. calculated probability of symbol errors in frames using “Poisson distribution” parameter.

You can turn off the “Show Poisson distribution” parameter under Show parameter, if you do not want to see these probabilities.
Consecutive Error Distance - Histogram

Overview

This graph (histogram) allows you to visualize the consecutive error occurrences against the distance in bits.

Consecutive Error Distance - Histogram

The x and y axis are labeled in the following manner.
1. Y Axis - Represents the **Occurrences**
2. X Axis - Represents the **Distance in Bits**
Error Distribution Analysis

Error Map - Scatter Plot

Overview

This graph (Scatter Plot) allows you to visualize which symbols are errored on individual frames.

Error Map - Scatter Plot

The x and y axis are labeled in the following manner.

1. Y Axis - Represents the **Frame Number**
2. X Axis - Represents the **Error Position** or **symbol number**
The Error Map includes the below features:

- Displays the random errors and burst errors. An error can be considered a burst error in the following cases:
  - In case of Density, when more than \( n \) number of wrong symbols (bit, PAM4 or FEC - symbols) are received within \( m \) number of symbols.
    - \( n \) - Number of error symbols
    - \( m \) - Number of received symbols
  - In case of Distance, when at least \( n \) number of consecutive errors with error distance lower than \( d \) are detected.
    - \( n \) - Number of consecutive errors
    - \( d \) - Error distance threshold

NOTE

You can change the values for calculating the burst using the Evaluation Parameters.

When Density option is selected under Burst Error Analysis parameter, use the following parameters:

- No. of Symbol Errors
- Analyzed Block Size

When Distance option is selected under Burst Error Analysis parameter, use the following parameters:

- No. of Consecutive Errors
- Error Distance Threshold

- A random error is displayed in yellow color, and a burst is displayed in red color.
When you click an errored bit in the Error Map, a Pattern pane displaying the highlighted bit value appears.
Measurement Data Table

Overview

This table displays the data for individual measurements.

Data - Table

The **Data** table stores the measurement results in two sections which consist of three columns each as described in the following table.

**Table 5**    Data table for Measurement Result

<table>
<thead>
<tr>
<th>Labels</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 1: Symbol Errors vs Frame Count Data</strong></td>
<td></td>
</tr>
<tr>
<td>Symbol Errors per Frame</td>
<td>Number of symbol errors per frame</td>
</tr>
<tr>
<td>Frame Count</td>
<td>Number of frames</td>
</tr>
<tr>
<td>Frames Count (%)</td>
<td>Percentage of frames counted</td>
</tr>
<tr>
<td><strong>Section 2: Error Distance vs Occurrences Data</strong></td>
<td></td>
</tr>
<tr>
<td>Error Distance</td>
<td>Error distance in bits</td>
</tr>
<tr>
<td>Occurrences</td>
<td>Number of times error occurred</td>
</tr>
<tr>
<td>Occurrences (%)</td>
<td>Percentage of number of times error occurred</td>
</tr>
</tbody>
</table>
Error Distribution Analysis

Click the down arrow icon to expand the data.
3 Remote Programming

Remote Programming Basics / 32
Error Distribution Analysis Package PLUGin Subsystem / 43

This chapter describes the remote programming for measurements provided by Error Distribution Analysis Package.
Remote Programming Basics

SCPI Command Language - Introduction

The Serial BERT is compatible with the standard language for remote control of instruments. Standard Commands for Programmable Instruments (SCPI) is the universal programming language for instrument control.

SCPI can be subdivided into the following command sets:
- SCPI Common Commands
- SCPI Instrument Control Commands
- IEEE 488.2 Mandatory Commands

SCPI Common Commands

This is a common command set. It is compatible with IEEE 488.2 and contains general housekeeping commands. The common commands are always preceded by an asterisk. A typical example is the reset command:

*RST

The IEEE 488.2 command set also contains query commands. Query commands always end with a question mark.

SCPI Instrument Control Commands

The programming commands are compatible with the Standard Commands for Programmable Instruments (SCPI) standard. For more detailed information regarding the GPIB, the IEEE 488.2 standard, or the SCPI standard, refer to the following books:
IEEE 488.2 Mandatory Commands

In order to comply with the SCPI model as described in IEEE 488.2, the Serial BERT implements certain mandatory commands. Other commands are implemented optionally.

Overlapped and Sequential Commands

IEEE 488.2 defines the distinction between overlapped and sequential commands. A sequential command is one which finishes executing before the next command starts executing. An overlapped command is one which does not finish executing before the next command starts executing.

It is not reliable to use wait statements in the control program to facilitate the use of overlapped commands.

Because these commands may allow the execution of more than one command at a time, special programming techniques must be used to ensure valid results. The common commands *OPC, *WAI and *OPC? can be used for this purpose. They help synchronize a device controller with the execution of overlapped commands.

The behaviors of these commands, in brief, are as follows:

- **OPC**
  The *OPC command sets the Operation Complete (OPC) bit of the Event Register when the No Operation Pending flag is TRUE (No Operation Pending flag is attached to each overlapped command). Until that time, the controller may continue to parse and execute previous commands. It is good technique, then, to periodically poll the OPC bit to determine if the overlapped command has completed.

- **WAI**
  The *WAI command allows no further execution of commands or queries until the No Operation Pending flag is true, or receipt of a Device Clear (dcas) message, or a power on. The *WAI command can be used for overlapped commands. It stops the program execution until any pending overlapped commands have finished. Specifically, it waits until the No Operation Pending flag is TRUE, or receipt of a dcas message, or a power on.
Remote Programming

- *OPC?
  The *OPC? query returns the ASCII character "1" in the Output Queue when the No Operation Pending flag is TRUE. At the same time, it also sets the Message Available (MAV) bit in the Status Byte Register. The *OPC? will not allow further execution of commands or queries until the No Operation Pending flag is true, or receipt of a Device Clear (dcas) message, or a power on.

**NOTE**

The command behaviors described above are for overlapped commands. When the same commands are used with sequential commands, the behaviors may be different.

Data Types

The M8020A/M8030A/M8040A has the capability of receiving and returning data in the following formats:

**STRING**

A string of human-readable ASCII characters, either quoted or nonquoted.

**NUMERIC**

The M8020A/M8030A/M8040A handles the following numeric formats:

- `<NR1>`: Integer (0, 1, 2, -1, etc.)
- `<NR2>`: Number with an embedded decimal point (0.1, 0.001, 3.3, etc.)
- `<NR3>`: Number with an embedded decimal point and exponent (1e33, 1.3e-12, etc.)
- `<NRf>`: Represents `<NR1>`, `<NR2>` and `<NR3>`
- Binary preceded by #b (#b010101, #b011111, etc.)
- Octal preceded by #q (#Q777111, #q7331777, etc.)
- Hex preceded by #h (#haff, #h8989fffff, etc.)

**BOOLEAN**

Boolean values can be sent to the M8020A/M8030A/M8040A as either ON | OFF or 0 | 1. The M8020A/M8030A/M8040A answers queries with 0 | 1.
**Definite Length Arbitrary Block Data**

Block data is used when a large quantity of related data is being returned. A definite length block is suitable for sending blocks of 8-bit binary information when the length is known beforehand. An indefinite length block is suitable for sending blocks of 8-bit binary information when the length is not known beforehand or when computing the length beforehand is undesirable.

It has the following format:

```
#<Length of length><Length of data><data>
```

<Length of length> is a single integer that contains the number of digits in <Length of data>, which in turn contains the length of the data. For example, a 512-byte pattern would be defined as:

```
#3512<data>
```

**Important Points about SCPI**

There are a number of key areas to consider when using SCPI for the first time. These are as follows:

- Instrument Model
- Command Syntax
- Optional Parts of Commands
- Sending Commands
- Command Separators
- SCPI Command Structure

**Instrument Model**

SCPI guidelines require that the M8020A/M8030A/M8040A is compatible with an instrument model. This ensures that when using SCPI, functional compatibility is achieved between instruments that perform the same tasks. For example, if two different instruments have a programmable clock frequency setting, then both instruments would use the same SCPI commands to set their frequency. The instrument model is made up of a number of subsystems.

The sub-system defines a group of functions within a module and has a unique identifier under SCPI, which is called the Root Keyword.
Command Syntax

Commands may be up to twelve characters long. A short-form version is also available which has a preferred length of four characters or less. In this document the long-form and short-form versions are shown as a single word with the short-form being shown in upper-case letters.

For example, the long-form node command SOURce has the short-form SOUR. Using the short form saves time when entering a program; however, using the long form makes a program more descriptive and easier to understand.

SCPI commands may be commands only, commands and queries, or queries only. A question mark at the end of a command indicates that it is a query. If the question mark appears in brackets ([?]), the command has a command and query form.

Optional Command Keywords

Some layers in the SCPI command structure are optional. These optional keywords are indicated by square brackets ([ ]). A typical use for these types of keywords is with a command that is unique to one module. In this case, the top layer (Root Keyword) of the command structure may be omitted.

For example, the following command code segments are functionally identical:

[:SOURce]:JITTer[:GLOBal][:STATe] <ON|OFF|1|0>

:JITTer <ON|OFF|1|0>

:JITT <ON|OFF|1|0>

:jitt <ON|OFF|1|0>

Note that it is not necessary to include the syntax inside the square brackets ([ ]).
Query Responses

It is possible to interrogate the individual settings and status of a device using query commands. Retrieving data is a two-stage operation.

The query command is sent from the controller using the OUTPUT statement and the data is read from the device using the ENTER statement. A typical example is the SCPI IEEE 488.2 Common Command *IDN? which queries the identity of a device.

NOTE

When sending strings to the instrument, either the double quote (") or the single quote may be used ('), the latter being more suited to PASCAL programs, which make use of a single quote; the former being more suited to use in BASIC programs, which use a double quote as a delimiter.

Command Separators

The SCPI command structure is hierarchical and is governed by commas, semicolons and colons:

- Commas are used to separate parameters in one command.
- Colons are used to separate levels.
- Semicolons are used to send more than one command to the instrument at a time.

It is possible to send several commands in one pass, as long as the commands all belong to the same node in the SCPI tree. The commands have to be separated by semicolons.

The following SCPI commands provide examples of this.

SOURce:VOLTage:OFFSet ‘M2.DataOut2’,-0.99
SOURce:VOLTage:AMPLitude ‘M2.DataOut2’,1.11

These commands can also be sent as follows:

VOLT:OFFS ‘M2.DataOut2’,-0.99; ‘M2.DataOut2’,AMPL 1.11
SCPI Command Structure Example

The SCPI command structure can be best examined by means of an example. For example, the command to set the pattern generator’s output amplitude is:

[:SOURce]:VOLTage[:AMPLitude] ‘M1.DataOut1’,1.11

The structure of this command can be illustrated as follows:

- [:SOURce] This is the top layer of the command structure and identifies the source subsystem.
- :VOLTage This is the next layer and defines the subnode for setting a voltage level.
- [:AMPLitude] This is the command itself for setting the output amplitude level.
- ‘M1.DataOut1’,1.11 This specifies pattern generator 1, channel 1 and specifies an amplitude of 1.11.

NOTE

Any optional commands are enclosed in square brackets [ ] and any optional characters are shown in lower case.

A colon indicates a change of level in the command hierarchy. Commands at the same level in the hierarchy may be included in the same command line, if separated by a semi-colon.

The bar symbol (|) indicates mutually exclusive commands.

To translate this syntax into a command line, follow the convention described above. Remember, however, that the command line can be created in several different ways. It can be created with or without optional keywords and in a long or short form. The following example gives three possible forms of the command line; all are acceptable.

In long form:

:SOURce:VOLTage:AMPLitude ‘M1.DataOut1’,1.11

In short form:

With the optional commands removed:

:VOLT "M1.DataOut1",1.11

The long form is the most descriptive form of programming commands in SCPI.

Sending Commands to the Instrument

A command is invalid and will be rejected if:
- It contains a syntax error.
- It cannot be identified.
- It has too few or too many parameters.
- A parameter is out of range.
- It is out of context.

Sending Commands using VISA

The following is a list of the available hardware interfaces for sending commands to the M8020A/M8030A/M8040A firmware:

SCPI Access (HiSLIP): TCPIP0::localhost::hislip0::INSTR (High-Speed LAN Instrument Protocol)

SCPI Access (VXI-11): TCPIP0::localhost::inst0::INSTR (VXI-11 is a TCP/IP instrument protocol defined by the VXIbus Consortium)

SCPI Access (Socket): TCPIP0::localhost::5025::SOCKET (Standard SCPI-over-sockets port)

SCPI Access (Telnet): telnet localhost 5024 (Communication with LAN instrument through SCPI Telnet port).

**NOTE**

If you use the VXI-11 (TCP/IP instrument protocol) in your test programs, you must change the resource string to the HiSLIP protocol if the software is running on Windows 8 or Windows 8.1. VXI-11 is not supported at this time on Windows 8 or Windows 8.1.

For example:

"TCPIP0::192.17.34.0::inst0::INSTR" -> "TCPIP0::192.17.34.0::hislip0::INSTR"
Command Line Arguments

(See "Communication" on page 41 for details about /Socket, /Telnet, /Inst, /AutoID, /NoAutoID, /FallBack).

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/AutoId</td>
<td>Start in auto ID mode (this is the default) [optional]</td>
</tr>
<tr>
<td>/NoAutoId</td>
<td>Do not start in auto ID mode - use communication parameters from command line [optional]</td>
</tr>
<tr>
<td>/FallBack</td>
<td>Use auto ID mode if the communication parameters from the command line don't work [optional]</td>
</tr>
<tr>
<td>/Socket &lt;socket port&gt;</td>
<td>Set the socket port for the SCPI communication (only used with /NoAutoId) [optional]</td>
</tr>
<tr>
<td>/Telnet &lt;telnet port&gt;</td>
<td>Set the telnet port for the SCPI communication (only used with /NoAutoId) [optional]</td>
</tr>
<tr>
<td>/Inst &lt;instrument number&gt;</td>
<td>Set the instrument number for VXI-11.3 and HISLIP SCPI communication [optional]</td>
</tr>
<tr>
<td>/rcl</td>
<td>Recall last used setting [optional]</td>
</tr>
<tr>
<td>/rst</td>
<td>Reset to factory default [optional]</td>
</tr>
<tr>
<td>/IgnoreAwg</td>
<td>M8070B software don't grab M8195A modules [optional]</td>
</tr>
</tbody>
</table>
Communication

Depending on the command line arguments /Socket, /Telnet, /Inst, /AutoID, /NoAutoID, /FallBack, the M8070B software starts several servers to handle SCPI commands. (Refer to the table above.)

/Socket, /Telnet, /Inst: If -1, don’t start the respective servers

*Defaults:
Socket port: 5025 (e.g. TCPIP0::localhost::5025::SOCKET)
Telnet port: 5024
HiSLIP, VXI-11.3: 0 (e.g. TCPIP0::localhost::hislip0::INSTR, TCPIP0::localhost::inst0::INSTR)

/FallBack: If starting a server fails because of a conflict, try using another port or number

*HiSLIP, VXI-11.3: increase the index until a server can be started successfully

*Socket, Telnet: start with port 60000, then increase it until the servers can be started successfully. If neither socket nor telnet is disabled the M8070B software tries to start the servers on two consecutive ports

(socket port = telnet port + 1)

/AutoID: Automatically select ports and number for the connections, which are unique per instrument.

*This is the default behavior; it is not necessary to specify this argument on the command line.

*/Socket, /Telnet, /Inst are ignored (unless they are -1 and a server is disabled)

*If the M8070B software detects more than one AXIe module, use a special mechanism to obtain a number for the HiSLIP and VXI-11.3 servers, which makes sure that the M8070B software always uses the same VISA resource string per module

*The socket and telnet port are then calculated from the HiSLIP index:
telnet port = 60000 + 2 * <HiSLIP index>
socket port = 60000 + 2 * <HiSLIP index> + 1
Note: Ports may already be in use by Windows or other applications, so they are not available for M8195A.

/NoAutoID: Do not automatically select ports and number for the connections, use the values specified with /Socket, /Telnet, /Inst or their respective default values instead.

If both /NoAutoID and /AutoID are specified, /AutoID overrides /NoAutoID.

NOTE

The first port not assigned by IANA is 49152 (IANA, Internet Assigned Numbers Authority, http://www.iana.org).
Error Distribution Analysis Package PLUGin Subsystem

The M8020A/M8030A/M8040A platform supports a plugin interface used to implement certain interfaces recognized by the software and integrated into the M8070B GUI and instrument software. Output Timing, Jitter Tolerance, Output Level, Eye Diagram and Parameter Sweep measurements are examples of the plugin concept.

The Advanced Measurement Package provides the following measurements when it is installed on the M8070B system software

- Error Distribution Analysis Measurement

**NOTE**

The Error Distribution Analysis Package requires a valid license for activation.

This subsystem has the following SCPI structure:
This subsystem has the following subnodes:

Table 7

<table>
<thead>
<tr>
<th>Name</th>
<th>Description under</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>ACQuisition:ALOCation[?]</em></td>
<td>:PLUGin:EDA:ACQuisition:ALOCation[?] on page 45</td>
</tr>
<tr>
<td><em>ACQuisition:BITSPersym[?]</em></td>
<td>:PLUGin:EDA:ACQuisition:BITSPersym[?] on page 46</td>
</tr>
<tr>
<td><em>ACQuisition:FRAMes[?]</em></td>
<td>:PLUGin:EDA:ACQuisition:FRAMes[?] on page 46</td>
</tr>
<tr>
<td><em>ACQuisition:SYMPerframe[?]</em></td>
<td>:PLUGin:EDA:ACQuisition:SYMPerframe[?] on page 46</td>
</tr>
<tr>
<td><em>DELETE</em></td>
<td>:PLUGin:EDA:DELETE on page 48</td>
</tr>
<tr>
<td><em>FETCH</em></td>
<td>:PLUGin:EDA:FETCH:DATA? on page 48</td>
</tr>
<tr>
<td><em>NEW</em></td>
<td>:PLUGin:EDA:NEW on page 49</td>
</tr>
<tr>
<td><em>RESET</em></td>
<td>:PLUGin:EDA:RESET on page 49</td>
</tr>
<tr>
<td><em>SINGLE</em></td>
<td>:PLUGin:EDA:SINGLE on page 49</td>
</tr>
<tr>
<td><em>START</em></td>
<td>:PLUGin:EDA:START on page 50</td>
</tr>
<tr>
<td><em>STOP</em></td>
<td>:PLUGin:EDA:STOP on page 50</td>
</tr>
<tr>
<td>:PLUGin:EDA:EVALuation:BBASis[?]</td>
<td>:PLUGin:EDA:EVALuation:BBASis[?] on page 50</td>
</tr>
<tr>
<td>:PLUGin:EDA:EVALuation:CERRor[?]</td>
<td>:PLUGin:EDA:EVALuation:CERRor[?] on page 51</td>
</tr>
</tbody>
</table>
**Name**

:PLUGin:EDA:ACQuisition:ALOCation

**Description under**

:PLUGin:EDA:ACQuisition:CFrames

---

**Name**

:PLUGin:EDA:SHOW:COMment

**Description under**

:PLUGin:EDA:SHOW:COMment

---

**Name**

:PLUGin:EDA:SHOW:SEMapin

**Description under**

:PLUGin:EDA:SHOW:SEMapin

---

**Name**

:PLUGin:EDA:SHOW:SPD

**Description under**

:PLUGin:EDA:SHOW:SPD

---

**Name**

:PLUGin:EDA:SHOW:VSCale

**Description under**

:PLUGin:EDA:SHOW:VSCale

---

**Name**

:PLUGin:EDA:SHOW:SINGle

**Description under**

:PLUGin:EDA:SHOW:SINGle

---

:RUN

**Description under**

:PLUGin:EDA:RUN Subnode

---

**:PLUGin:EDA:ACQuisition:ALOCation**

**Syntax**

:PLUGin:EDA:ACQuisition:ALOCation 'identifier', '<location-string>'

:PLUGin:EDA:ACQuisition:ALOCation? 'identifier'

**Input Parameters**

'identifier': Specify the EDA (Error Distribution Analysis) measurement name.

<location-string>: Specify location or group name identifier.

**Return Range**

<location or group name>

**Description**

This command associates the location or group name identifier with a measurement name identifier against which the data acquisition is performed. The group name identifier is defined using the :SYSTem:INSTrument:GROup:DEFine command.

The query returns the current location or group name identifier against which the measurement name identifier is configured for the data acquisition.

This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.

**Example**

:PLUG:EDA:ACQ:ALOC 'Error Distribution Analysis 1', 'M1.DataIn1'

:PLUG:EDA:ACQ:ALOC? 'Error Distribution Analysis 1'
Remote Programming

**:PLUGin:EDA:ACQuisition:BITSPersym[?]**

**Syntax**

**:PLUGin:EDA:ACQuisition:BITSPersym 'identifier', <numeric value>**

**:PLUGin:EDA:ACQuisition:BITSPersym? 'identifier'**

**Input Parameters**

'identifier': Specify the EDA measurement name.

<numeric value>: Specify bits per symbol.

**Return Range**

1 to 10000

**Description**

This command sets the bits per symbol value.

This query fetches the bits per symbol value.

This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.

**Example**

**:PLUG:EDA:ACQ:BITSPersym 'Error Distribution Analysis 1',1**

**:PLUG:EDA:ACQ:BITSPersym? 'Error Distribution Analysis 1'**

**:PLUGin:EDA:ACQuisition:FRAMes[?]**

**Syntax**

**:PLUGin:EDA:ACQuisition:FRAMes 'identifier', <numeric value>**

**:PLUGin:EDA:ACQuisition:FRAMes? 'identifier'**

**Input Parameters**

'identifier': Specify the EDA measurement name.

<numeric value>: Specify number of frames.

**Return Range**

1 to 2000000000

**Description**

This command sets the number of frames value.

This query fetches the number of frames value.

This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.

**Example**

**:PLUGin:EDA:ACQ:FRAMes 'Error Distribution Analysis 1',10000**

**:PLUGin:EDA:ACQ:FRAMes? 'Error Distribution Analysis 1'**

**:PLUGin:EDA:ACQuisition:SYMPerframe[?]**

**Syntax**

**:PLUGin:EDA:ACQuisition:SYMPerframe 'identifier', <numeric value>**

**:PLUGin:EDA:ACQuisition:SYMPerframe? 'identifier'**

**Input Parameters**

'identifier': Specify the EDA (Error Distribution Analysis) measurement name.
Remote Programming 3

<numeric value>: Specify symbols per frame.

Return Range 1 to 10000

Description This command sets the symbols per frame value.
This query fetches the symbols per frame value.
This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.

Example :PLUGin:EDA:ACQuisition:SYMPerframe 'Error Distribution Analysis 1',512
:PLUGin:EDA:ACQuisition:SYMPerframe? 'Error Distribution Analysis 1'

:PLUGin:EDA:ACQuisition:PRESets[?]

Syntax :PLUGin:EDA:ACQuisition:PRESets 'Identifier',
<CUST|KP4|KR4|PRBS9|PRBS10|PRBS11|PRBS13>
:PLUGin:EDA:ACQuisition:PRESets? 'Identifier'

Input 'Identifier': Specify the EDA (Error Distribution Analysis)
measurement name.

Parameters Presets: CUST|KP4|KR4|PRBS9|PRBS10|PRBS11|PRBS13

Return Range CUST|KP4|KR4|PRBS9|PRBS10|PRBS11|PRBS13

Description This command sets the presets. It changes values of Bits per symbol,
Symbols per frame and Correctable No. of frames, depending on the value set.
This query fetches the symbols per frame value.
This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.

Example :PLUG: EDA:ACQ: PRES 'Error Distribution Analysis 1', KP4
:PLUG: EDA:ACQ: PRES? 'Error Distribution Analysis 1' -> KP4

:PLUGin:EDA:CATalog?

Syntax :PLUGin:EDA:CATalog?

Description This query returns the names of all the EDA (Error Distribution Analysis)
plug-ins open in M8070B software.

Example :PLUGin:EDA:CATalog?

Output "Error Distribution Analysis 1","Error Distribution Analysis 2","Error Distribution Analysis 3"
Remote Programming

:PLUGin:EDA:DELeTe

Syntax :PLUGin:EDA:DELeTe ‘identifier’

Input ‘identifier’: Specify the EDA (Error Distribution Analysis) measurement name to delete.

Description This command deletes a previously created EDA measurement addressed by the measurement name identifier.

This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.

Example The following example deletes an EDA (Error Distribution Analysis) measurement with the measurement name identifier ‘Error Distribution Analysis 1’:

:PLUGin:EDA:DELeTe “Error Distribution Analysis 1”

:PLUGin:EDA:FETCh:DATA?

Syntax :PLUGin:EDA:FETCh:DATA? ‘identifier’

Input ‘identifier’: Specify the EDA (Error Distribution Analysis) measurement name.

Description This query returns the Symbol Errors vs Frame Count data in the format [Symbol Errors, Frame Count].

Example :PLUGin:EDA:FETCh:DATA? ‘Error Distribution Analysis 1’

Output ("M1.DataIn1", [195, 7], [196, 21], [197, 86], [198, 166], [199, 310], [200, 396], [201, 397], [202, 225], [203, 220], [204, 289], [205, 266], [206, 263], [207, 441], [208, 406], [209, 460], [210, 469], [211, 451], [212, 500], [213, 562], [214, 588], [215, 642], [216, 567], [217, 494], [218, 457], [219, 297], [220, 199], [221, 234], [222, 184], [223, 145], [224, 92], [225, 51], [226, 57], [227, 29], [228, 14], [229, 15])

:PLUGin:EDA:FETCh:DISTdata?

Syntax :PLUGin:EDA:FETCh:DISTdata? ‘identifier’

Input ‘identifier’: Specify the EDA (Error Distribution Analysis) measurement name.

Description This query returns the data for Error distance graph.

Example :PLUGin:EDA:FETCh:DIST? ‘Error Distribution Analysis 1’
:PLUGin:EDA:NEW
Syntax :PLUGin:EDA:NEW 'identifier'
Input 'identifier': Specify a new EDA (Error Distribution Analysis) measurement name.
Parameters
Description This command creates a new EDA name identifier.
This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.
Example The following example creates an EDA measurement with the measurement name identifier called 'Error Distribution Analysis 3':
:PLUGin:EDA:NEW 'Error Distribution Analysis 3'

:PLUGin:EDA:RESet
Syntax :PLUGin:EDA:RESet 'identifier'
Input 'identifier': Specify the EDA measurement name to reset.
Parameters
Description This command resets an EDA measurement addressed by the measurement name identifier.
This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.
Example The following example resets an EDA measurement addressed with the measurement name identifier called 'Error Distribution Analysis 3':
:PLUG:EDA:RES 'Error Distribution Analysis 3'

:PLUGin:EDA:SINGle
Syntax :PLUGin:EDA:SINGle 'identifier'
Input 'identifier': Specify the EDA measurement name.
Parameters
Description This command executes a single measurement addressed by the measurement name identifier.
This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.
Example PLUG:EDA:SING 'Error Distribution Analysis 3'
:PLUGin:EDA:STARt

Syntax: :PLUGin:EDA:STARt 'identifier'

Input Parameters:

- 'identifier': Specify the EDA measurement name to start.

Description: This command starts a continuous EDA measurement addressed by the measurement name identifier.

This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.

Example: The following example starts an EDA (Error Distribution Analysis) measurement with the measurement name identifier called 'Error Distribution Analysis 3':

:PLUG:EDA:STAR 'Error Distribution Analysis 3'

:PLUGin:EDA:STOP

Syntax: :PLUGin:EDA:STOP 'identifier'

Input Parameters:

- 'identifier': Specify the EDA measurement name to stop.

Description: This command stops an EDA (Error Distribution Analysis) measurement addressed by the measurement name identifier.

This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.

Example: The following example stops an EDA measurement with the measurement name identifier called 'Error Distribution Analysis 3':

:PLUG:EDA:STOP 'Error Distribution Analysis 3'

:PLUGin:EDA:EVALuation:BBASis

Syntax: :PLUGin:EDA:EVALuation:BBASis 'Identifier', <SYMB|DIST>

:PLUGin:EDA:EVALuation:BBASis? 'Identifier'

Input Parameters:

- 'identifier': Specify the EDA (Error Distribution Analysis) measurement name.
- <SYMB|DIST>: Burst Error basis.

Description: This command sets the value for Burst Error basis. Depending on the value, the burst is calculated.

This query returns the current set Burst Error basis.
Example

:PLUG: EDA:EVAL:BBAS 'Error Distribution Analysis 1', SYMB
:PLUG: EDA:EVAL:BBAS? 'Error Distribution Analysis 1' -> SYMB

:PLUGin:EDA:EVALuation:DTHReshold?

Syntax  :PLUGin:EDA:EVALuation:DTHReshold 'Identifier', < NRf >
          :PLUGin:EDA:EVALuation:DTHReshold ? 'Identifier'

Input

'identifier': Specify the EDA (Error Distribution Analysis) measurement name.

Parameters

Description

This command sets the value for evaluation parameter Error Distance Threshold.

This query returns the currently set value of Error Distance Threshold.

Example

:PLUG: EDA:EVAL:DTHR 'Error Distribution Analysis 1', 5

:PLUGin:EDA:EVALuation:CERRor?

Syntax  :PLUGin:EDA:EVALuation:CERRor 'Identifier', < NRf >
          :PLUGin:EDA:EVALuation:CERRor? 'Identifier'

Input

'identifier': Specify the EDA (Error Distribution Analysis) measurement name.

Parameters

Description

This command sets the value for evaluation parameter No. of Consecutive Errors.

This query returns the currently set value of No. of Consecutive Errors.

Example

:PLUG: EDA:EVAL:CERR 'Error Distribution Analysis 1', 5

:PLUGin:EDA:EVALuation:BSErr?

Syntax  :PLUGin:EDA:EVALuation:BSErr 'Identifier', < NRf >
          :PLUGin:EDA:EVALuation:BSErr? 'Identifier'
Input Parameters

Description

Example


:PLUGin:EDA:EVALuation:BSRec[]

:PLUG: EDA:EVAL:BSE 'Error Distribution Analysis 1', 5


:PLUGin:EDA:EVALuation:CFRames[]

:PLUG: EDA:EVAL:BSE 'Error Distribution Analysis 1', 5


:PLUGin:EDA:EVALuation:BSRec[]

:PLUG: EDA:EVAL:BSE 'Error Distribution Analysis 1', 5


:PLUGin:EDA:EVALuation:CFRames[]

:PLUG: EDA:EVAL:BSE 'Error Distribution Analysis 1', 5


:PLUGin:EDA:EVALuation:BSRec[]

:PLUG: EDA:EVAL:BSE 'Error Distribution Analysis 1', 5


:PLUGin:EDA:EVALuation:CFRames[]

:PLUG: EDA:EVAL:BSE 'Error Distribution Analysis 1', 5

:PLUGin:EDA:SHOW:COMment[?]

Syntax  :PLUGin:EDA:SHOW:COMment 'Identifier', <string>

:PLUGin:EDA:SHOW:COMment? 'Identifier'

Input  'identifier': Specify the EDA (Error Distribution Analysis) measurement name.

Parameters  <string> - "Comment"

Description  This command is used to enter a comment for each measurement. This comment will be displayed on the Measurement History tab.

This query returns the currently set value.

Example  :PLUG: EDA:SHOW:COM 'Error Distribution Analysis 1', "This is an example of EDA plugin"

:PLUG: EDA:SHOW:COM? 'Error Distribution Analysis 1' -> "This is an example of EDA plugin"

:PLUGin:EDA:SHOW:SEMapin[?]

Syntax  :PLUGin:EDA:SHOW:SEMapin 'Identifier', < BITS|SYMB >

:PLUGin:EDA:SHOW:SEMapin? 'Identifier'

Input  'identifier': Specify the EDA (Error Distribution Analysis) measurement name.

Parameters  < BITS|SYMB >

Description  This command sets the value for show parameter Show error map in. Changes the view of error map.

This query returns the currently set value.

Example  :PLUG: EDA:SHOW:SEM 'Error Distribution Analysis 1', SYMB


:PLUGin:EDA:SHOW:SPD[?]

Syntax  :PLUGin:EDA:SHOW:SPD 'Identifier', < ON|OFF|1|0 >

:PLUGin:EDA:SHOW:SPD? 'Identifier'

Input  'identifier': Specify the EDA (Error Distribution Analysis) measurement name.

Parameters  < ON|OFF|1|0 >

Description  This command enables or disables the EDA plugin for the specified measurement.

This query returns the currently set value.
Remote Programming

< ON|OFF|1|0 >

Description This command sets the value for show parameter Show position distribution. Changes the view of Symbol error per frame graph. This query returns the currently set value.

Example :PLUG: EDA:SHOW:SPD 'Error Distribution Analysis 1', ON
          :PLUG: EDA:SHOW:SPD ? 'Error Distribution Analysis 1' -> 1

:PLUGin:EDA:SHOW:VSCale[?]

Syntax :PLUGin:EDA:SHOW:VSCale 'Identifier', < LOG|LIN >
         :PLUGin:EDA:SHOW:VSCale? 'Identifier'

Input
Parameters

'identifier': Specify the EDA (Error Distribution Analysis) measurement name.
< LOG|LIN >

Description This command sets the value for vertical scale (Y-axis).
This query returns the currently set value.

Example :PLUG: EDA:SHOW:VSC 'Error Distribution Analysis 1', LIN
          :PLUG: EDA:SHOW:VSC? 'Error Distribution Analysis 1' -> LIN

:PLUGin:EDA:SHOW:SINGle

Syntax :PLUGin:EDA:SHOW:SINGle 'Identifier'

Input
Parameters

'identifier': Specify the EDA (Error Distribution Analysis) measurement name.

Description This command runs single measurement i.e. data for one capture is analyzed.

Example :PLUG: EDA:SHOW:SING 'Error Distribution Analysis 1'
:PLUGin:EDA:RUN Subnode

This subnode lists EDA (Error Distribution Analysis) run commands related to measurement history, logs, messages, progress, status, state, etc.

This subnode has the following SCPI structure:

```
:RUN
  :-:HISTORY
    :-:CLEar
      [:-:STATe][?]
    :-:LOG?
    :-:MESSage?
    :-:PROGress?
    [:-:STATus]?
```

This subnode has the following commands:

Table 8

<table>
<thead>
<tr>
<th>Name</th>
<th>Description under</th>
</tr>
</thead>
<tbody>
<tr>
<td>[:STATus]?</td>
<td>:PLUGin:EDA:RUN[:STATus]? on page 58</td>
</tr>
</tbody>
</table>
3 Remote Programming

:PLUGin:EDA:RUN:HISTory:CLEar
Syntax :PLUGin:EDA:RUN:HISTory:CLEar 'identifier'
Input
Parameters
'identifier': Specify the measurement name.
Description This command deletes the EDA (Error Distribution Analysis) measurement history addressed by the measurement name identifier.
This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.
Example The following example deletes the EDA measurement history with the measurement name identifier called 'Error Distribution Analysis 3':
:PLUG:EDA:RUN:HIST:CLE 'Error Distribution Analysis 3'

:PLUGin:EDA:RUN:HISTory[:STATe][?]
Syntax :PLUGin:EDA:RUN:HISTory[:STATe]'identifier',<0|1|OFF|ON>
:PLUGin:EDA:RUN:HISTory[:STATe]? 'identifier'
Input
Parameters
'identifier': Specify the EDA (Error Distribution Analysis) measurement name.
Return Range 0|1
Description This command enables/disables the storage of EDA measurement results addressed by the measurement name identifier.
This query returns the current setting.
This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.
Example The following example enables storage of EDA measurement results with the measurement name identifier called 'Error Distribution Analysis 3':
:PLUG:EDA:RUN:HIST 'Error Distribution Analysis 3', 1
Remote Programming

:PLUGin:EDA:RUN:LOG?

Syntax :PLUGin:EDA:RUN:LOG? 'identifier'

Input 'identifier': Specify the EDA measurement name.

Parameters

Description This command returns logs for the addressed EDA measurement. This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.

Example This command returns logs for the EDA measurement 'Error Distribution Analysis 3'.

:PLUGin:EDA:RUN:LOG? 'Error Distribution Analysis 3'

The format of log returned is in the following way:

#XY Message Log

where X denotes the length of digits for Y, Y denotes the number of characters in the log then followed by the log message.

For example:

#10 means, there is 1 digit after 1 and there is 0 character in the log.

#2492 means, there are 3 digits after 2 and there are 492 characters in the log message.

:PLUGin:EDA:RUN:MESSage?

Syntax :PLUGin:EDA:RUN:MESSage? 'identifier'

Input 'identifier': Specify the EDA measurement name.

Parameters

Description This command returns a string describing the state of an EDA measurement addressed by the measurement name identifier. Possible states include NotStarted, Running, Suspended, Finished, Error, or Stopped.

This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.

Example The following example returns the state of an EDA measurement with the measurement name identifier called 'Error Distribution Analysis 3':

:PLUG:EDA:RUN:MESS? 'Error Distribution Analysis 3'

Output Running
:PLUGin:EDA:RUN:PROGress?

Syntax :PLUGin:EDA:RUN:PROGress? 'identifier'

Input 'identifier': Specify EDA measurement name.

Parameters

Return Range 0.0 to 1.0

Description This command returns a number in the range of 0.0 to 1.0 to indicate the progress of an EDA measurement addressed by the measurement name identifier. A 0.0 indicates that the measurement has not started and 1.0 indicates the measurement is finished.

This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.

Example The following example returns the progress of an EDA measurement with the measurement name identifier called 'Error Distribution Analysis 3':

:PLUG:EDA:RUN:PROG? 'Error Distribution Analysis 3'

Output 0.51

:PLUGin:EDA:RUN[:STATus]?

Syntax :PLUGin:EDA:RUN[:STATus]? 'identifier'

Input 'identifier': Specify EDA measurement name.

Parameters

Return Range 0|1

Description This command returns the running status of an EDA measurement addressed by the measurement name identifier. A 0 indicates the measurement is not running and 1 indicates the measurement is running.

This SCPI is applicable for M8041A, M8051A, M8062A, and M8046A.

Example The following example returns the running status of an output timing measurement with the measurement name identifier called 'Error Distribution Analysis 3':

:PLUG:EDA:RUN? 'Error Distribution Analysis 3'

Output 1
# Index

## Symbols

*OPC, 33
*OPC?, 34
*WAI, 33

## C

Calculated Results, 23
Copy Measurement History Property, 18

## D

Data Formats
  - block data, 35
  - boolean, 34
  - numeric, 34
  - string, 34

## E

Error Distribution Analysis Package, 5

## F

Floating, 8

## I

IEEE, 32

## K

Keysight License Manager, 8
Keysight Licensing, 8

## M

Measurement Graph, 19
Measurement History, 18

## N

Node-locked, 8

## P

Plugin Commands
  - Plugin Manager, 6
  - Plugin Output Timing Commands
    - :PLUGin:OTIMing:ACQuisition:ACQation[?], 45, 46, 47
    - :PLUGin:OTIMing:DELeTe, 48
    - :PLUGin:OTIMing:NEW, 49
    - :PLUGin:OTIMing:RESet, 49
    - :PLUGin:OTIMing:RUN:HISTORY:CLEar, 56
    - :PLUGin:OTIMing:RUN:HISTORY[:STATE], 56
    - :PLUGin:OTIMing:RUN:LOG?, 57
    - :PLUGin:OTIMing:RUN:MESSage ?, 57
    - :PLUGin:OTIMing:RUN:PROGress ?, 58
    - :PLUGin:OTIMing:STArt, 50
    - :PLUGin:OTIMing:STOP, 50

## S

SCPI
  - command keywords, 36
  - command separators, 37
  - command structure, 38
  - command syntax, 36

  common commands, 32
  - concepts, 35
  - consortium, 35
  - instrument control commands, 32
  - instrument model, 35
  - mandatory commands, 33
  - overlapped and sequential commands, 33
  - query response, 37
  - send commands, 39, 40, 41
  - VISA, sending commands using, 39
  - Software, 7

## T

Transportable, 8

## U

USB portable, 8