

80SJARB
Jitter Analysis of Arbitrary Data Software
Printable Online Help



80SJARB
Jitter Analysis of Arbitrary Data Software
Printable Online Help

Copyright © Tektronix. All rights reserved. Licensed software products are owned by Tektronix or its subsidiaries or suppliers, and are protected by national copyright laws and international treaty provisions.

Tektronix products are covered by U.S. and foreign patents, issued and pending. Information in this publication supersedes that in all previously published material. Specifications and price change privileges reserved.

TEKTRONIX and TEK are registered trademarks of Tektronix, Inc.

This document supports 80SJARB software version 3.0.X and greater, operating on a DSA8300 Digital Serial Analyzer oscilloscope.

Contacting Tektronix

Tektronix, Inc.
14150 SW Karl Braun Drive
P.O. Box 500
Beaverton, OR 97077
USA

For product information, sales, service, and technical support:

- In North America, call 1-800-833-9200.
- Worldwide, visit www.tektronix.com to find contacts in your area.

Table of Contents

Welcome

Welcome to the 80SJARB Jitter Analysis of Arbitrary Data Software	1
Using Online Help	1
Conventions	2
Feedback and Technical Support	3

Getting Started

Requirements	5
Install and Activate the Software	5
Install from the Jitter Application CD	5
Download and Install from the Tektronix Web Site	6

Operating Basics

Starting the 80SJARB Application	7
The User Interface	
The 80SJARB User Interface	7
Menu Items	8
Function Buttons	9
Measurement Readout	10
Status Bar	11
Bathtub and Histogram Graphs	12
Measurement Workflow	13

Reference

Measurement Setup Modes	15
Automatic Setup of Waveform Database and Histogram	15
Manual Setup of Waveform Database and Histogram	15
Comparison of Jitter Measurement Applications	16
Measurement Methodology	17
Measurement Readouts and Accuracy	18
Remote Control	
Remote Control Introduction	19
GPIB Reference Materials	19
Programming Tips	20
Syntax	22
80SJARB GPIB Commands	22
Error and Warning Codes and Messages	24

Index

Welcome to the 80SJARB Jitter Analysis of Arbitrary Data Software

The 80SJARB Jitter Analysis of Arbitrary Data software enhances the capabilities of the Tektronix DSA8300 Digital Serial Analyzer sampling oscilloscope. This application provides basic jitter measurements for arbitrary data signals, including:

- J2 – Total jitter for Bit Error Rate (BER) = 2.5E-03
- J9 – Total jitter for BER = 2.5E-10
- Tj – Total jitter for BER = 1.0E-12
- DJdd – Deterministic jitter (Dual Dirac method)
- RJdd – Random jitter (Dual Dirac method)
- Jitter bathtub curve graph (both measured and extrapolated data)
- Histogram of the acquired data

The accuracy and repeatability of all measurements improves as the application acquires additional data. While the standards specify that J2 and J9 measurements be taken on a minimum of 10,000 points, the 80SJARB application acquires data beyond this minimum requirement (in free-run mode) and shows the number of points used for the extrapolated measurement calculations.

Tektronix also offers two other optional jitter measurement applications for the DSA8300 oscilloscope: 80SJNB (Jitter, Noise and BER Analysis Essentials) and 80SJNB-01 (Jitter, Noise and BER Analysis Advanced). [Comparison of Jitter Measurement Applications \(see page 16\)](#) provides a comparison of the jitter analysis applications.

See Also:

- [Requirements \(see page 5\)](#)
- [Starting the 80SJARB Application \(see page 7\)](#)

Using Online Help

Online help has many advantages over a printed manual because of advanced search capabilities. The main (opening) Help screen shows a series of book icons and three tabs along the top menu, each of which offers a unique mode of assistance:

- Contents tab - organizes the Help into book-like sections. Select a book icon to open a section; select any of the topics listed under the book.
- Index tab - enables you to scroll a list of alphabetical keywords. Select the topic of interest to display the corresponding help page.
- Search tab - enables you to search the entire help contents for keywords. Select the topic of interest to display the corresponding help page. Search results do not include text contained within illustrations or screen shots.

NOTE. *Blue-underlined text in a topic indicates a hyperlink to another topic. For example, select the blue text in this sentence to jump to the topic on [Feedback and Technical Support \(see page 3\)](#).*

TIP. *When you use a mouse, the normal cursor changes to a link cursor when over an active hyperlink.*

Conventions

Online help topics use the following conventions:

- The terms “80SJARB”, “80SJARB application” or “application” refer to the 80SJARB Jitter Analysis of Arbitrary Data software.
- The term “oscilloscope” refers to the product on which this application runs.
- The term “select” is a generic term that applies to the two mechanical methods of choosing an option: with a mouse or with the touch screen.
- When steps require a sequence of selections in the application interface, the “>” delimiter marks each transition between a menu and an option. For example, **File > Exit** indicates to select the File menu, then select the Exit submenu item.

Feedback and Technical Support

Tektronix values your feedback on our products. To help us serve you better, please send us your suggestions, ideas, or comments about your application or oscilloscope.

When you contact Tektronix Technical Support with suggestions, or to help you resolve a problem, please include the following information (be as specific as possible):

General Information

- Oscilloscope model number, firmware version number, and hardware options, if any.
- Module and probe configuration. Include model numbers and the channel/slot location.
- Serial data standard.
- Signaling rate.
- Pattern type and length.
- Your name, company, mailing address, phone number, FAX number.

Application-Specific Information

- 80SJARB Software version number.
- Description of the problem such that technical support can duplicate the problem.
- If possible, save the oscilloscope waveform file as a .wfm file.
- If possible, save the oscilloscope and application .stp setup files.

Once you have gathered this information, you can [contact Tektronix](#) by phone or through e-mail. If using e-mail, be sure to enter *80SJARB Problem* in the subject line, and attach the .stp and .wfm files.

TIP. To include screen shots, select **Print > Save as File** from the oscilloscope menu bar. Enter a file name and image type. The recommended .png format preserves all pixels in the image. The .jpg format is not recommended as it compresses the image and can change some pixels. Click **Save** to save the file in the C:\Users\<username>\Documents\TekScope\UI directory.

Requirements

- A Tektronix DSA8300 oscilloscope running Microsoft Windows 7.
- TekScope firmware version 6.0.3.X or higher.
- An 80SJARB, 80SJNB, or 80SJNB-01 application license. To check if an application license is already active on the instrument, click **Utilities** > **System Properties** and look at the **Options** tab contents.

NOTE. *You do not need to purchase a license for 80SJARB if you already have a license for 80SJNB or 80SJNB-01.*

NOTE. *You can run the 80SJARB software up to ten times in the free trial mode. Once the trials are used, the software will no longer start.*

See Also:

- [Install and Activate the Software \(see page 5\)](#)

Install and Activate the Software

NOTE. *Make sure to check the [requirements \(see page 5\)](#) before installing and activating the 80SJARB application.*

See Also:

- [Starting the 80SJARB Application \(see page 7\)](#)

Install from the Jitter Application CD

1. Power on the instrument and wait until the startup procedure is complete.
2. Insert the *DSA8300 Digital Serial Analyzer Jitter Analysis Software* CD into the instrument media drive to open the install application.
3. Click **80SJARB Arbitrary Jitter Analyzer**. Follow on-screen instructions.
4. Restart the oscilloscope after installing the 80SJARB software.
5. Click the **Applications** menu and verify that 80SJARB is listed.
6. Click **Utilities** > **Option Installation** and follow the instructions to enable the 80SJARB application if you purchased a license and key code.

NOTE. *You do not need a license and Option Installation Key for 80SJARB if you already have a license and key for 80SJNB or 80SJNB-01. If you do not have a license and key for the 80SJNB or 80SJNB-01 application, you must purchase a license and key code for 80SJARB.*

Download and Install from the Tektronix Web Site

1. Go to **www.tek.com/software**.
2. Enter the application name (80SJARB) in the Search Software field and click **GO**.
3. Click the **Sort by DATE** link at the top of the list.
4. Click the link for the latest version of 80SJARB application software to open a Web page with more information on the application.
5. Click **Download File**. Follow instructions to log in.
6. When requested, specify to **Save** the application file to your PC.
7. Copy the install software to the DSA8300 oscilloscope.
8. Double-click the install software file to begin installation. Follow on-screen instructions.
9. Restart the oscilloscope after installing the 80SJARB software.
10. Click the **Applications** menu and verify that 80SJARB is listed.
11. Click **Utilities > Option Installation** and follow the instructions to enable the 80SJARB application if you purchased a license and key code.

NOTE. *You do not need a license and Option Installation Key for 80SJARB if you already have a license and key for 80SJNB or 80SJNB-01. If you do not have a license and key for the 80SJNB or 80SJNB-01 application, you must purchase a license and key code for 80SJARB.*

Starting the 80SJARB Application

Use any of the following methods to start the 80SJARB application:

- Click **Applications > 80SJARB** in the oscilloscope menu.
- Double-click the **80SJARB** shortcut on the desktop.
- Click **Start > All Programs > Tektronix Applications > 80SJARB > 80SJARB**.
- Activate 80SJARB remotely by using GPIB commands with the oscilloscope programmable interface. See [Remote Control Introduction \(see page 19\)](#).

All of these methods open [the 80SJARB user interface \(see page 7\)](#).

NOTE. *You can run only one oscilloscope application at a time. Running more than one application causes one or more of the running applications to fail. To run the 80SJARB application, close all other applications (such as 80SJNB). To run another application, you must close the 80SJARB application. The optional applications communicate with the oscilloscope over VISA to detect commands to itself. A communications conflict happens when two applications run simultaneously.*

Please contact Tektronix if activating multiple applications simultaneously is important to your use of the instrument.

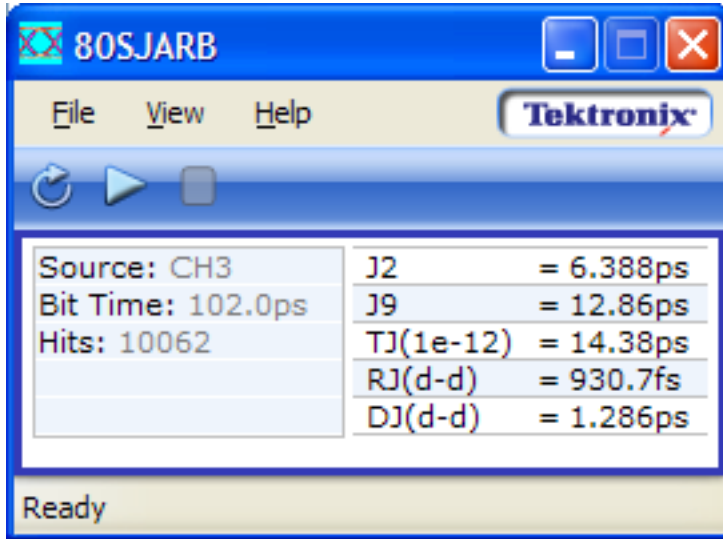
NOTE. *To start the 80SJARB application more quickly, click the oscilloscope Run/Stop button to stop the oscilloscope signal acquisition before you start the 80SJARB application.*

See Also:

- [The 80SJARB User Interface \(see page 7\)](#)
- [Measurement Workflow \(see page 13\)](#)
- [Operating Modes \(see page 15\)](#)
- [Remote Control Introduction \(see page 19\)](#)

The 80SJARB User Interface

The 80SJARB user interface consists of menus, function buttons, a measurement readout pane, and a status bar at the bottom of the display. The application also displays a progress bar to indicate the approximate completion status of each step.



See Also:

- [Menu Items \(see page 8\)](#)
- [Function Buttons \(see page 9\)](#)
- [Measurement Readout \(see page 10\)](#)
- [Status Bar \(see page 11\)](#)
- [Bathtub and Histogram Graphs \(see page 12\)](#)
- [Measurement Workflow \(see page 13\)](#)
- [Operating Modes \(see page 15\)](#)

Menu Items

Menu	Submenu	Description
File	Hibernate	Places 80SJARB in a hibernation state; the application remains running but does not communicate with the oscilloscope. This prevents 80SJARB from interfering with other applications. To wake up the application, click File and unselect the Hibernate menu item. You can also wake up the application by selecting Applications > 80SJARB in the oscilloscope menu, or using commands through the programmatic interface (see page 19) .
	Exit	Exits the application.
View	BER Bathtub	Displays a graph of the cumulative density function, in Q scale versus time.
	Histogram Data	Displays a normalized histogram of the acquired data.




Menu	Submenu	Description
Help	Online Help	Displays the application online help (this document).
	About 80SJARB	Displays an About dialog box that contains the version number of 80SJARB.

See Also:

- [Function Buttons \(see page 9\)](#)
- [Measurement Readout \(see page 10\)](#)
- [Status Bar \(see page 11\)](#)
- [Bathtub and Histogram Graphs \(see page 12\)](#)

Function Buttons

80SJARB provides three control buttons: Free Run, Run, and Stop.

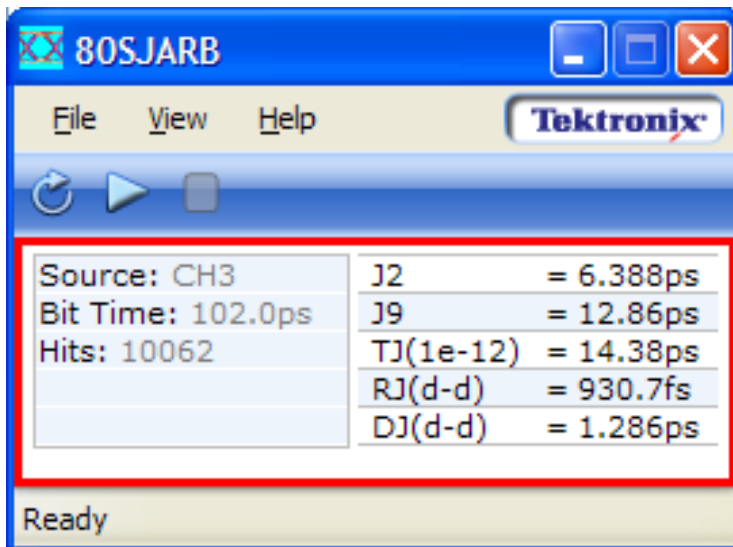
Button	Name	Description
	Free Run	Enables or disables the Free-Run (continuous) measurement mode. In Free Run mode the oscilloscope continues to acquire data after a single measurement is taken. 80SJARB continues to process and display updated measurement results, including the number of hits in the histogram. The number of hits continues to increase when in this mode. This button does not start a measurement acquisition; you must click the Run button to start taking measurements.
	Run	Starts a measurement sequence (single or Free Run). 80SJARB takes a measurement acquisition based on the oscilloscope settings, then processes and displays the measurement values.
	Stop	Stops the 80SJARB measurement sequence. The application does not display measurements from a stopped single Run sequence. The application displays measurements from a stopped Free Run sequence if the application has acquired the minimum 10,000 points.

See Also:

- [Menu Items \(see page 8\)](#)
- [Measurement Readout \(see page 10\)](#)
- [Status Bar \(see page 11\)](#)

Measurement Readout

The Measurement Readout pane displays the 80SJARB measurement results. You can select and copy measurement readout values to paste them into a report or other document.



See Also:

- [Menu Items \(see page 8\)](#)
- [Function Buttons \(see page 9\)](#)
- [Status Bar \(see page 11\)](#)

Status Bar

The status bar at the bottom of the display shows the measurement status and [error and warning messages](#) (see page 24). The following table lists the measurement status messages:

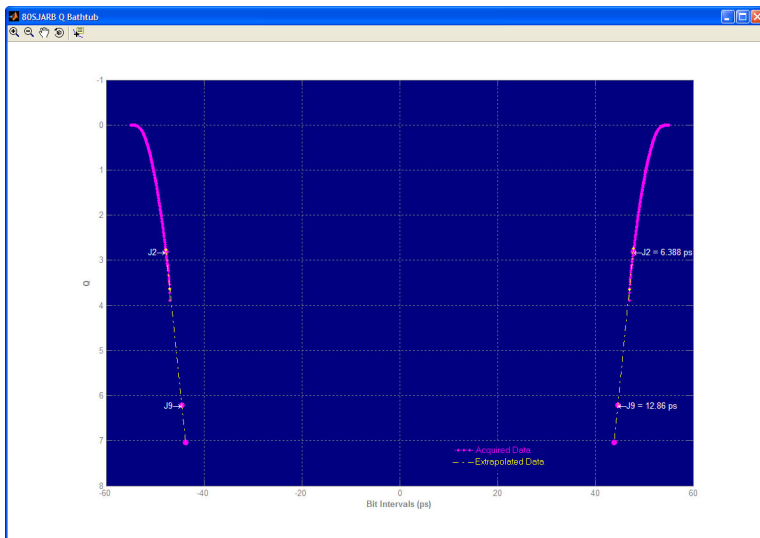
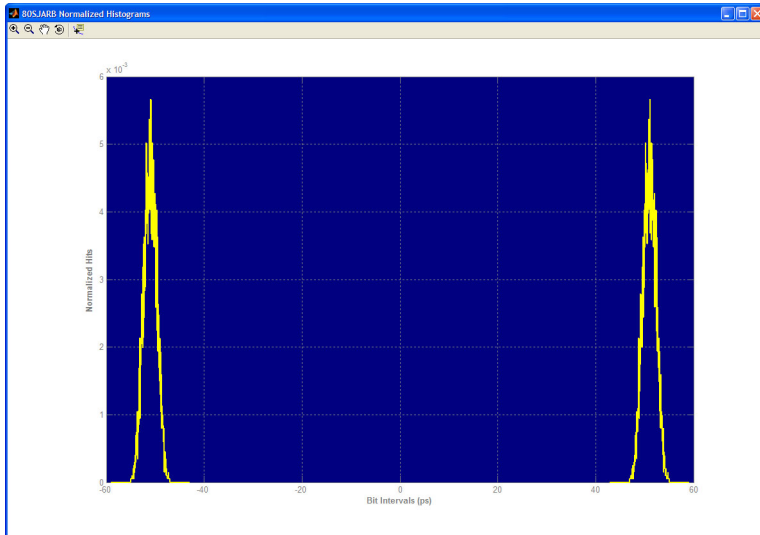
Message	Description
Ready	80SJARB is ready to take measurements.
Setting up	80SJARB is taking preliminary measurements and setting up the oscilloscope as needed to acquire the histogram data.
Acquiring	The oscilloscope is acquiring data into the histogram for later processing.
Processing	80SJARB is processing the histogram data to produce the J2 and J9 measurement results.
Stopped	The Stop button was clicked during a Run mode before the measurement and processing sequence was completed.
Hibernating	80SJARB has stopped communicating with the oscilloscope to allow another application to run. To wake up the application, click File and unselect the Hibernate menu item. You can also wake up the application by selecting Applications > 80SJARB in the oscilloscope menu.

See Also:

- [Menu Items \(see page 8\)](#)
- [Function Buttons \(see page 9\)](#)
- [Measurement Readout \(see page 10\)](#)

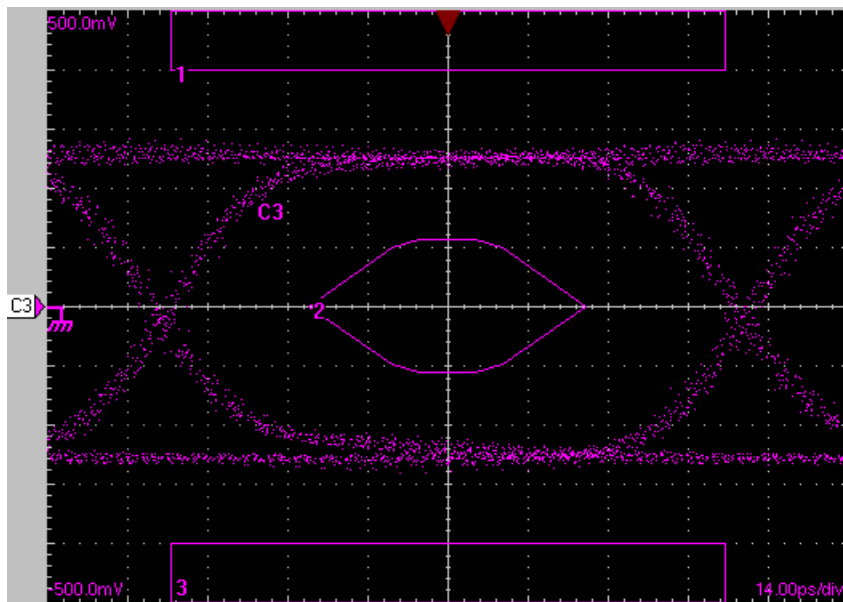
Bathtub and Histogram Graphs

Select **BER Bathtub** or **Histogram Data** in the **View** menu to display a graph of these items. Use the Toolbar buttons on the graphs to zoom in or out of the graph, pan the graph, rotate the graph to view it in 2D or 3D mode, or use cursors to take measurements on the graph. Each graph mode has its own unique context-sensitive menu (displayed by right-clicking on the graph).



Measurement Workflow

1. Click **Utilities > Default Setup** to restore the oscilloscope to the default instrument settings.
2. Set the oscilloscope to properly display an eye diagram. One method is to use a defined test mask and then perform a mask autoset.



3. In the 80SJARB application, click the **Run** button. For more accurate measurements, click the **Free Run** button to enable the Free Run mode before clicking Run. 80SJARB communicates with the oscilloscope, changes measurement settings as required, and displays the measurement values in the Measurement Results pane.
4. Click **View > BER Bathtub** or **View > Histogram Data** to view a Bathtub or histogram plot.
5. Click **File > Exit** to close the application.

See Also:

- [Measurement Modes \(see page 15\)](#)
- [Measurement Methodology \(see page 17\)](#)

Measurement Setup Modes

All 80SJARB measurements require that the DSA8300 oscilloscope be set up to acquire and display a clean eye diagram, with two crossings, in the instrument Main time base view. The waveform can be for an active (channel) or a math waveform.

There are two measurement setup modes: automatic setup (default) and manual setup. The application selects the measurement setup mode based on whether the application or the user sets up the histogram and waveform database before acquiring data for jitter analysis.

Automatic Setup of Waveform Database and Histogram

For automatic measurement setup, 80SJARB requires a two-crossing eye diagram on the Main acquisition window (actively acquiring or stopped) with no histograms enabled. The application uses the oscilloscope waveform database and measurement system to find the amplitude of the signal and the crossing level of the eye diagram on the Main view, then calculates the size and position of a histogram box (set to 1% of the signal amplitude, centered on the crossing level). It then activates a Mag1 acquisition positioned on the first eye crossing, turns on the histogram and acquires 10,000 hits in the histogram box.

When the acquisition is complete, the application analyzes the histogram data, returns the oscilloscope to its pre-measurement state, turns off the histogram, waveform database and Mag1 view, and displays the J2 and J9 measurements.

The oscilloscope acquisition can be running or stopped. The Stop After acquisition mode should be set to Run/Stop Button Only (default).

Automatic measurements are the fastest way to capture a new set of data for jitter analysis.

Manual Setup of Waveform Database and Histogram

80SJARB uses manual measurement setup mode when a histogram and waveform database are already set up for a measurement. Reasons to use manual measurement setup include:

- When jitter testing is coupled with other measurements, such as Mask testing.
- Data is already accumulated, for which you would like additional information.
- More precise or custom definition of the eye crossing histogram area to submit for jitter analysis.

There are two forms of manual setups:

1. A histogram with an infinite persist waveform database is defined on just the selected **Main** waveform. This waveform must display an eye pattern and the histogram must include two edges.
 - If acquisitions are running, JARB waits for the required number of histogram hits before completing its measurements using the Main view of the selected waveform.
 - If acquisitions are stopped, JARB uses the existing waveform database data to take its measurements using the Main view of the selected waveform. If the number of points in the

histogram are significantly below the requirement, the application may show a low resolution warning message.

2. A histogram with an infinite persist waveform database is defined on the **Mag1** view and the **Main** view of the selected waveform. The Main view must display an eye pattern.
 - If acquisitions are running, 80SJARB waits for the required number of histogram hits before completing its measurements using the Mag1 view of the selected waveform.
 - If acquisitions are stopped, 80SJARB uses the existing waveform database data to make its measurements using the Mag1 view of the selected waveform. If the number of points in the histogram is significantly below the requirement, the application may show a low resolution warning message.

In all other cases, 80SJARB adjusts instrument settings to measure the bit period and acquire sufficient points in the histogram to correctly measure in compliance with the standard requirements.

See Also:

- [Measurement Methodology \(see page 17\)](#)
- [Measurement Readouts and Accuracy \(see page 18\)](#)

Comparison of Jitter Measurement Applications

Capability	80SJARB	80SJNB	80SJNB-01
NRZ data supported	Any data, including PRBS31 or random traffic	Repetitive pattern up to 100,000 bits	Repetitive pattern up to 100,000 bits
J2 jitter result	Yes (on a histogram according to IEEE 802.3ba)	Yes (on every edge; set the BER level to BER=2.5E-03)	Yes (on every edge; set the BER level to BER=2.5E-03)
J9 jitter result	Yes (on a histogram according to IEEE 802.3ba)	Yes (on every edge; set the BER level to 2.5E-10)	Yes (on every edge; set the BER level to 2.5E-10)
TJ total jitter result	Yes (at BER=1E-12)	Yes (at settable BER; default BER=1.0E-12)	Yes (at settable BER; default BER=1.0E-12)
DJdd, RJdd ¹	Yes	Yes	Yes
Jitter and Noise analysis (PJ, RJ, DDJ, PN, RN, DDN, and so on)	No	Yes	Yes
BER surface graphs	No	Yes	Yes

Capability	80SJARB	80SJNB	80SJNB-01
SDLA features (channel emulation, fixture de-embedding, equalization)	No	No	Yes
Additional Features	As the tools are updated periodically, please consult the latest data sheet from www.tek.com for up-to-date information.		

¹ dd = Dual Dirac.

Measurement Methodology

80SJARB works with the selected channel or math waveform. If no waveform is selected, or if the selected waveform is not a channel or math waveform, 80SJARB displays an error message.

80SJARB uses the oscilloscope's measurement system to capture eye diagram parameters to take proper measurements. This means that at least one measurement slot (measurement type is set to NONE) and one waveform database must be available. If a measurement slot or waveform database is not available, 80SJARB displays an error message.

Under certain conditions 80SJARB enables the Mag1 viewer, a high-resolution acquisition window, to gather histogram data for its measurements. It also enables waveform database and histogram analysis if needed. When the 80SJARB enables an additional resource (such as a waveform database or a Magnification view), it turns off the resource after completing the measurements.

See Also:

- [Measurement Readouts and Accuracy \(see page 18\)](#)

Measurement Readouts and Accuracy

80SJARB provides the following measurement readouts: J2, J9, TJ (at 1.0E-12), DJdd, RJdd, and the number of hits in the histogram.

The J2 measurement is the total jitter measured at a BER of 2.5E-3 by measuring from 0.5th to the 99.5th percentile of the jitter histogram according to IEEE 802.3, paragraph 86.8.3.

Remaining measurements are calculated from a linear extrapolation in Q-space. The J9 measurement is the total jitter measured at a BER of 2.5E-10. TJ is the total jitter at BER=1.0E-12. DJdd and RJdd are the Deterministic Jitter Dual Dirac and Random Jitter Dual Dirac measurements, respectively.

NOTE. *While 80SJARB allows measurement on any data (such as larger PRBS patterns, scrambled data, or live traffic), the accuracy of extrapolated jitter measurements depends on many factors (such as type of data, probability function of jitter, and amount of data captured) and is less reliable than in a measurement method that performs full jitter analysis, such as 80SJNB. For this reason the extrapolated results, and the DJdd and RJdd in particular, should be considered as mostly relative values. For best accuracy, use the Free Run mode until the extrapolated results stabilize, or use the 80SJNB application.*

For additional information on the Dual Dirac method, please see the Tektronix white paper *What the Dual-Dirac Model is and What it is Not*, available at www.tek.com.

80SJARB resets the measurement results when you click the Run button and updates the Hits measurement with the number of hits that have accumulated into the histogram. After processing is completed, the readouts show the latest results.

In Free Run mode, once the first set of data is processed, the analysis continues processing new sets of histogram data and updates the measurement readouts until you click the Stop button.

See Also:

- [Measurement Methodology \(see page 17\)](#)

Remote Control Introduction

You can control the 80SJARB application through the programmatic interface (PI) of the sampling oscilloscope on which it is running. You communicate with the application by using VARIABLE:VALUE remote GPIB commands.

Use the PI command `APPLiCation:ACTivate "80SJARB"` to start the 80SJARB application.

Your program should comply with the following guidelines:

- The 80SJARB application startup must complete before sending GPIB commands to the application. Querying the variable "Application" returns "80SJARB" when the application startup is complete.
- The measurements cycle must complete before you query data. Querying the variable "SequencerState" returns "Stop" when the data is ready.

Because the oscilloscope software hosts the GPIB interface for the 80SJARB application, there is some additional information that is helpful for successful programming.

See Also:

- [GPIB Reference Materials \(see page 19\)](#)
- [Programming Tips \(see page 20\)](#)
- [Syntax \(see page 22\)](#)
- [80SJARB GPIB Commands \(see page 22\)](#)
- [Error and Warning Codes and Messages \(see page 24\)](#)

GPIB Reference Materials

To use GPIB commands with your oscilloscope, see the programmer manual for your oscilloscope.

See Also:

- [Remote Control Introduction \(see page 19\)](#)
- [Programming Tips \(see page 20\)](#)
- [Syntax \(see page 22\)](#)
- [80SJARB GPIB Commands \(see page 22\)](#)
- [Error and Warning Codes and Messages \(see page 24\)](#)

Programming Tips

How the Variable Value Table Works

Programmable Interface (PI) commands for the 80SJARB application use a variable/value table. This table associates named variables with text values. These values are set (variable:value “VariableName”, “VariableValue”) or queried (variable:value? “VariableName”) from the PI.

If the variable does not already exist in the table when a set command is received, that variable is created and the specified value is associated with that variable. If the variable is already in the table, the specified value replaces the existing value. There is no checking done by the table on variable names or values. Since both items are strings, any arbitrary pair of strings can be associated with each other in this table.

Polling and Limit of Variable Values

Each time a change is made to a variable’s value in the table, an event is generated. The 80SJARB software application polls the oscilloscope software application every 200 ms to see if an event occurred. If so, 80SJARB queries for the event information which tells 80SJARB which variable changed and the new value. 80SJARB parses this information to find the variables pertinent to its operation and reads the new values for those variables. These new values can change the state of 80SJARB (such as changing the state of the free-run mode) or can cause 80SJARB to perform an operation (such as setting the sequencer mode to Run).

Because 80SJARB polls for changes at a fixed rate, the oscilloscope application may indicate that a list of variables has changed since the last time 80SJARB polled for changes. A result of this operation is when 80SJARB receives a list of changes but does not necessarily execute those changes in the order in which they were sent. For example, sending a command to change the sequence mode (such as “SequenceMode”, “Freerun”) followed immediately by a command to start a measurement sequence (“SequencerState”, “Run”) does not guarantee that the sequencer mode changed before 80SJARB began the sequencing operation. To enable the proper execution order of these commands, insert a delay of at least 400 ms before the SequencerState command.

How the Variable Value Table is Updated

80SJARB updates table entries when sequencing is started and when there is new data to report. For example, if an error occurs during sequencing, 80SJARB updates the variables “ErrorCode” and “ErrorMessage” with new values. These values are set to null strings when sequencing starts again.

Variables to set to null strings (“”) before starting a sequence operation include:

- ErrorCode
- ErrorMessage
- WarningCode
- WarningMessage
- All measurement values

Determining if 80SJARB is Running

The “Application” variable indicates the run status of the 80SJARB application. When it is running, this variable is set to “80SJARB”. When 80SJARB exits normally, the variable is set to “Done”. However, if the application encounters an error and exits abnormally, 80SJARB does not set the “Application” variable to “Done”, leaving the variable set to “80SJARB”. If you are not sure that 80SJARB is running, you can send the command to start it again. If 80SJARB is already running, the new copy immediately exits (only one copy of 80SJARB can run at a time).

See Also:

- [Remote Control Introduction \(see page 19\)](#)
- [GPIB Reference Materials \(see page 19\)](#)
- [Syntax \(see page 22\)](#)
- [80SJARB GPIB Commands \(see page 22\)](#)
- [Error and Warning Codes and Messages \(see page 24\)](#)

Syntax

The VARIABLE:VALUE command structure accepts string arguments for a control or data variable and a value to which to set the argument.

To set a variable to a value:

```
VARIABLE:VALUE "<variableName>","<variableValue>"
```

For example:

```
VARIABLE:VALUE "SequencerState","Stop"
```

NOTE. *The arguments <variable name> and <variable value> are required in the order shown with no spaces allowed.*

To query the value in a variable:

```
VARIABLE:VALUE? <variable name>
```

For example:

```
VARIABLE:VALUE? "TJ"
```

NOTE. *The <variable name> and <variable value> arguments are case and space sensitive. The program will not operate correctly if you do not follow the capitalization and spacing precisely.*

See Also:

- [Remote Control Introduction \(see page 19\)](#)
- [GPIB Reference Materials \(see page 19\)](#)
- [Programming Tips \(see page 20\)](#)
- [80SJARB GPIB Commands \(see page 22\)](#)
- [Error and Warning Codes and Messages \(see page 24\)](#)

80SJARB GPIB Commands

Use the PI command APPLiCation:ACTivate "80SJARB" to start the 80SJARB application. This command also wakes up the application when it is in the hibernate state.

The following table lists the 80SJARB application commands. These arguments are in addition to the instrument and module PI arguments.

Variable	Value(s)	Description	Query form returns
Application	Exit Hibernate	Exits the application or enters the application hibernate state	Done
DJdd		Returns the deterministic jitter computed using the Dual-Dirac method	Current value 0 = results have been cleared
ErrorCode		Returns a numeric code corresponding to the last error	Current value 0 = errors have been cleared
ErrorMessage		Returns the last error message	Current value "" = errors have been cleared
Hits		Returns the number of hits in the processed histogram	Current value 0 = results have been cleared
J2		Returns the measured J2 value	Current value 0 = results have been cleared
J9		Returns the measured J9 value	Current value 0 = results have been cleared
RJdd		Returns the random jitter computed using the Dual-Dirac method	Current value 0 = results have been cleared
SequencerMode	{SingleSequence Freerun}	Sets or returns the sequencer mode Startup default is Free Run	Sequencer mode
SequencerState	{Run Stop}	Sets or returns the Measurement Sequencing or the Stop Sequencing command	Sequencer state
TJ		Returns the measured total jitter at BER 1E-12	Current value 0 = results have been cleared
WarningCode		Returns a numeric code corresponding to the last warning code	Current value 0 = warnings have been cleared
WarningMessage		Returns the last warning message	Current value "" = warnings have been cleared

See Also:

- [Remote Control Introduction \(see page 19\)](#)
- [GPIB Reference Materials \(see page 19\)](#)
- [Programming Tips \(see page 20\)](#)
- [Syntax \(see page 22\)](#)
- [Error and Warning Codes and Messages \(see page 24\)](#)

Error and Warning Codes and Messages

Table 1: Error codes and messages

Error code	Error message	Description
1	Error: No waveform is selected.	No waveforms have been turned on. Turn on the channel or math waveform on which you want to take measurements.
2	Error: Selected waveform is not a channel or math.	The selected waveform is a reference waveform. 80SJARB cannot take measurements on a reference waveform.
3	Error: Waveform database is not available.	All waveform databases are in use and none are available for use on the selected channel. Turn off at least one waveform database to make it available to take measurements.
4	Error: Measurement slot is not available.	All measurement slots are in use. Set at least one measurement slot type to NONE to make it available for use by 80SJARB.
5	Error: Histogram is not available.	The histogram is assigned to a waveform other than the selected waveform. Turn the histogram off or set its source to the selected waveform.
6	Error: Could not find the bit crossing level.	The oscilloscope measurement system reports an error when it cannot find the bit crossing level of the eye diagram. In most cases this error is generated because the eye diagram does not show an open eye, or one of the crossings is too close to the edge of the screen or is off the screen. Make sure that the oscilloscope displays an open eye diagram.
7	Error: Could not find the bit crossing time.	The oscilloscope measurement system reports an error when it cannot find the bit crossing time of the eye diagram. In most cases this error is generated because the eye diagram does not show an open eye, or the left transition is too close to the edge of the screen or is off the screen. Make sure that the oscilloscope displays an open eye diagram.
8	Error: Could not measure the bit interval.	The oscilloscope measurement system reports an error when it cannot find the bit interval of the eye diagram. In most cases this error is generated because the eye diagram does not show an open eye, or one of the crossings is too close to the edge of the screen or is off the screen. Make sure that the oscilloscope displays an open eye diagram.
9	Error: Could not measure the signal amplitude.	The oscilloscope measurement system reports an error when it cannot measure the amplitude of the signal. Make sure that the signal is not larger than the dynamic input range of the sampling module.
10	Error: Could not measure the peak-to-peak jitter.	The oscilloscope measurement system reports an error when it cannot measure the amplitude of the peak-to-peak jitter on the left crossing of the eye. In most cases this error is caused because the eye diagram does not show an open eye, or one of the crossings is too close to the edge of the screen or is off the screen. Make sure that the oscilloscope displays an open eye diagram.
11	Error: More than one eye on the main time base.	The oscilloscope is displaying more than one eye diagram associated with the main time base. 80SJARB only works properly with one eye diagram displayed on the main time base.

Table 1: Error codes and messages (cont.)

Error code	Error message	Description
98	Error: Measurement error.	The oscilloscope has returned a measurement error that is not covered by one of the error codes above.
99	Error MATLAB error.	An error occurred in MATLAB that was not otherwise handled.

Table 2: Warning codes and messages

Warning code	Warning message	Description
1	Warning: Low Resolution.	Several conditions can cause this warning to be issued, including: <ul style="list-style-type: none">■ An insufficient number of points in the histogram.■ The histogram is distributed in only a few vertical columns.

See Also:

- [Remote Control Introduction \(see page 19\)](#)
- [GPIB Reference Materials \(see page 19\)](#)
- [Programming Tips \(see page 20\)](#)
- [Syntax \(see page 22\)](#)
- [80SJARB GPIB Commands \(see page 22\)](#)

Index

Symbols and Numbers

80SJARB user interface, 7

A

Activate software, 5
 Application license, 5
 Application trial mode, 5
 Application user interface, 7
 Arguments and queries, 22

B

Back button (online help), 1
 Bathtub graph, 12
 Buttons (user interface), 9

C

Check if 80SJARB is running, 21
 Command syntax, 22
 Commands, 22
 Compare jitter analysis applications, 16
 Conventions, 2

D

Determining if 80SJARB is running, 21
 Download software, 5

E

Error codes, 24

F

Features, 1
 Feedback and technical support, 3
 Free application trial mode, 5

G

Getting help, 3
 GPIB
 arguments and queries, 22

 check if 80SJARB is running, 21
 command syntax, 22
 commands, 19
 error codes and messages, 24
 guidelines, 19
 limit of variable values, 20
 program, 19
 programming command, 22
 return values, 22
 starting 80SJARB, 19
 syntax, 22
 the variable value table, 20
 value table updates, 20
 variable value, 22
 warning codes and messages, 24

GPIB reference materials, 19

Graphs

 bathtub and histogram, 12
 context menus, 12
 right-click menus, 12
 toolbar buttons, 12

H

Help topics, 1
 Hibernate state, 22
 Histogram graph, 12
 Histograms and measurements, 15
 How to start the application, 7
 How to take measurements, 13

I

Install, 5
 Install software, 5
 Installation requirements, 5

J

J80SJARB, 80SJNB,
 80SJNB-01 measurement comparison, 16

Jitter analysis application comparison, 16

K

Key code, 5

L

Limit of Variable Values, 20

M

Measurement methodology, 17
 Measurement modes, 15
 Measurement readout pane (user interface), 10
 Measurement readouts and accuracy, 18
 Measurement workflow, 13

O

Online help, 1

P

Polling Variable Values, 20
 Product description, 1
 Programmer information (GPIB), 19
 Programming
 arguments and queries, 22
 check if 80SJARB is running, 21
 command syntax, 22
 commands, 22
 error codes and messages, 24
 GPIB commands, 22
 polling variable values, 20
 return values, 22
 syntax, 22
 The variable value table, 20
 value table updates, 20
 variable value, 22

- warning codes and messages, 24
- Programming tips, 20

Q

- Queries and arguments, 22

R

- Remote Control (GPIB), 19
- Requirements, 5
- Running the application, 7

S

- Send us your ideas or suggestions, 3
- Software
 - activate, 6
 - download, 6
 - install, 6
 - key code, 6

- Software key code, 5
- Starting 80SJARB using GPIB, 19
- Starting the application, 7
- Status bar (user interface), 11
- Syntax, 22

T

- Table of Contents (online help), 1
- Taking measurements, 13
- Terminology in online help, 2
- The 80SJARB user interface, 7
- The variable value table (programming), 20
- TOC (online help), 1
- Trial mode, 5

U

- Updates to the variable value table, 20

- User interface, 7
 - function buttons, 9
 - measurement readout pane, 10
 - menus, 8
 - status bar, 11
- Using online help, 1

V

- Variable value, 22
- Variable value table updates, 20

W

- Warning codes, 24
- Waveform database and measurements, 15