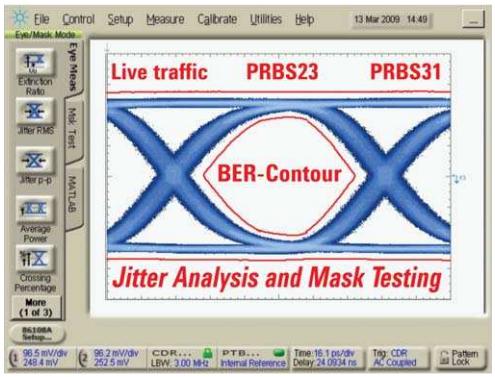
Agilent 86100CU-401
Agilent 86100DU-401
Advanced EYE Analysis Software

Provides a simple and accurate solution to the challenging process of measuring jitter on very long patterns and performs precision mask testing using BER contours

86100 Series Option 401 is an advanced software application providing:

- Compliant jitter measurements such as:
  - Random Jitter (RJ)
  - Deterministic Jitter (DJ)
  - Total Jitter (TJ)
  - J2 Jitter
  - J9 Jitter
  - Data Dependent Pulse Width Shrinkage (DDPWS)
- Jitter measurements on long patterns, including PRBS23, PRBS31, and live traffic.
- Precision mask testing capability using BER contour based masks.



Make accurate and compliant jitter measurements on long patterns

To ensure that digital communications systems approach error-free performance, data test patterns that emulate actual traffic are often used. Some of these test patterns can be extremely long and can be problematic for test instruments. Option 401 software makes precision jitter measurements on long data patterns, such as PRBS23, PRBS31, and live traffic. By way of example, PRBS31 is often used when testing 10GbE (802.3ae-2002), 40GbE/100GbE (802.3ba-draft), and SFP+ (SFF-8431).

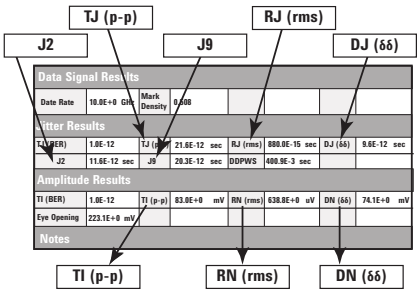


Figure 1 – Jitter and Amplitude Results while testing with PRBS31 pattern.

Measure with confidence using the accuracy and ease-of-use of the 86100C and 86100D Infiniium Digital Communication Analyzer (DCA)

Accurate jitter measurements are achieved as the result of accurate waveform measurements and robust algorithms. The 86100C DCA-J and 86100D DCA-X offer the optimum combination of low intrinsic jitter, low noise, and wide bandwidth. As a result, the DCA is the tool of choice for making precision measurements on high-speed digital designs.

Option 401 runs on an external PC, or DCA mainframe, running Microsoft® Office Excel 2003/2007. It extracts waveforms from the DCA and processes them in MS Excel. For the highest accuracy jitter measurements the application leverages measurements made by 86100C/D-200 Enhanced Jitter Analysis (Jitter Mode). Alternatively, it can also operate standalone if Jitter Mode is not installed - the choice is yours!

Figure 2 – Perform compliant jitter measurements easily and accurately using the 86100C DCA-J or 86100D DCA-X Option 401 Advanced EYE Analysis

Evolving standards, new measurements

Standards like SFF-8431 continue to evolve and new measurements are often the result. Data Dependent Pulse Width Shrinkage (DDPWS), a component of Data Dependent Jitter (DDJ), is reported by Option 401 when operating together with 86100C/D-200.

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Calibrate stressed eye transmitters

The dual-Dirac model is commonly used in technology standards to quickly and accurately estimate total jitter defined at a low BER such as TJ @ 1E-12. However, calibrating a stressed eye transmitter with large amounts of jitter can often be a challenge for test equipment using this standards-based estimation technique. In the presence of increasing RJ injection, for example, reported DJ will tend to decrease and seem to "disappear" on BERTs and scopes using this model. J2 jitter, sometimes referred to as "99% Jitter" or "all but 1% for jitter", is sometimes used by engineers when calibrating stressed-eye signals for receiver testing. Why? J2 "measures" jitter directly from histogram data rather than "estimating" jitter based on models. IEEE 802.3ae (2002) and draft specifications such as IEEE 802.3ba and SFF-8431 are examples of standards that use this high probability jitter measurement. J9 Jitter is "all but 10E-9" of the jitter distribution and is estimated at a BER of 2.5E-10.

86100CU-401 and 86100DU-401 are capable of measuring jitter in excess of 0.7UI so they are an ideal solution for calibrating stressed eye transmitters. It also reports J2 and J9, thereby saving engineers from having to measure histogram data and calculate these parameters offline.

Compliant BER-contour based mask testing

Sampling scopes, due to their unmatched signal fidelity, continue to be the de facto standard for mask testing. However, some specifications like CEI 2.0 and XFP MSA, specify an eye mask test based on a specified BER such as 1E-12. While these masks can be modified and run using traditional scope-based mask testing, it's now possible to perform BER-contour based mask testing using Option 401.

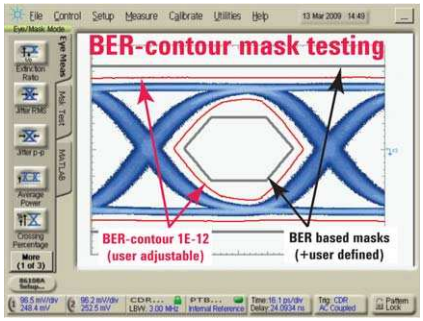

Figure 3 —Precision mask testing using BER contours. Image shows 1E-12 contour (red line) compared to OIF-CEI 2.0 mask.

86100CU-401 and 86100DU-401 Measurements

The application performs the following measurements:

Jitter Measurements

Total Jitter (TJ), Random Jitter (RJ), Deterministic Jitter (DJ), J2 Jitter (J2), J9 Jitter (J9), Data Dependent Pulse Width Shrinkage (DDPWS)*

* Requires 86100C/D-200

Amplitude Measurements

Total Interference (TI), Random Noise (RN), Deterministic Interference (DI), Eye Opening.

Mask Test

Pass/Fail Status, BER limit.

Standards based BER contour masks, such as OIF-CEI-2.0 and XFP, included. User-defined masks also supported.

Typical System Configurations

Advanced EYE Analysis software application operates with any 86100C/D hardware configuration. It performs compliant jitter and mask measurements on optical or electrical signals. Option-401 is ordered as a software upgrade and is licensed to a single 86100C/D mainframe using the instruments's host ID and serial number.

86100 Hardware:

- 86100C or 86100D Mainframe
- 86100C-001 Enhanced Trigger or 86100D-ETR Enhanced Trigger (required for DDPWS, otherwise optional)
- Any DCA measurement module

86100 Software:

- 86100CU-401 Advanced EYE Analysis or 86100DU-401 Advanced EYE Analysis
- 86100C/D-200 Enhanced Jitter Analysis (required for DDPWS, optional for all other measurements)

Note - For ultra-low level jitter measurements (RJ<500fs) we recommend using Option-401 in conjunction with 86100C/D-200.

PC Software:

- Microsoft® Office Excel2003 or Excel 2007
- Agilent IO Libraries Suite Rev 15.0 (or later)

Optional Hardware:

- External PC
- 82357B USB/GPIB Interface USB 2.0

Instrument control is made using either LAN or GPIB.

For more information visit:

www.agilent.com/find/eye

Figure 4 – A typical hardware configuration includes 86100C C/D DCA Wideband oscilloscope and an 86108A Precision Waveform Analyzer.

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