BERTScope CR and BERTScope CR HS

Clock Recovery Instruments

Quick Start Guide

Pictures are for guidance only - supplied product may vary in appearance.

1 Welcome and where to go next

Thank you for purchasing the BERTScope CR clock recovery instrument. We at SyntheSys Research welcome you into the family of users who are benefiting from the many innovations to get their product to market faster. To enable you to start making measurements as quickly as possible, this Quick Start Poster will guide you through the steps needed to make clock recovery measurements. You can utilize the BERTScope CR with the BERTScope S Analyzer, or any BERT or sampling oscilloscope.

With very best wishes,
The BERTScope Team

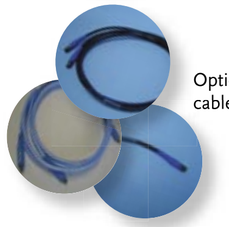
2 What's in the box

Power cord

Documents

USB cable

Rack mount hardware



Optional 5-piece cable set

Replacement fuse

3 Easy steps to connect your clock recovery instrument

A Connect the power cable to a properly grounded AC supply

B Press the 'On' button
(Green illumination should appear).

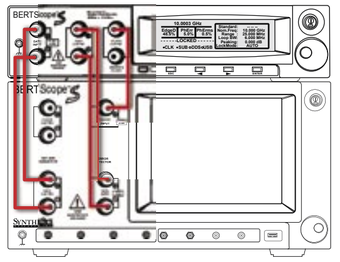
C Ensure proper precautions
Ensure that proper precautions are observed against electrostatic discharge. Using suitable high quality coaxial cables with APC-3.5, 2.92mm or SMA connectors, connect to the front panel interfaces as follows.

General Safety

Please review the following general safety precautions to avoid injury and prevent damage to this product or any products connected to it. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Only qualified personnel should perform service procedures.

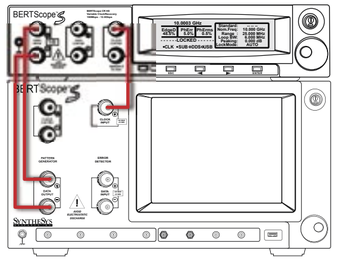
- Observe all Terminal Ratings
- Confirm Available Power Source
- Do Not Operate with Cover Off
- Do Not Operate with Suspected Failures
- Do Not Operate in Wet or Damp Conditions
- Do Not Operate in Explosive Atmosphere
- Provide Proper Ventilation
  Convection into and out of the product must not be restricted.
  Ventilation fans are located on the side of the chassis and must not be obstructed.
  The CR Ventilation is from side to side, intake vents are on the left, and exhaust fans are on the right side of the chassis.

4 Simple configurations to get started



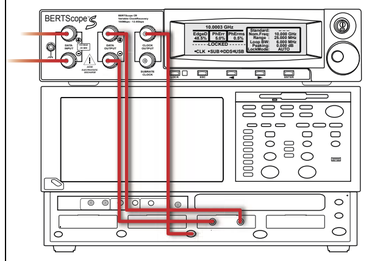
Connecting the BERTScope CR clock recovery instrument to the BERTScope S Analyzer

- BERTScope S pattern generator data output to clock recovery data input
- Clock recovery data output to BERTScope S error detector data input
- Clock recovery clock output to BERTScope S clock input



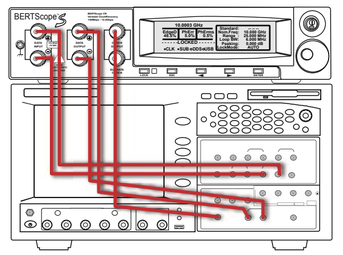
Connecting the BERTScope CR HS clock recovery instrument to the BERTScope S Analyzer

- The user must supply a splitter to split the data signal between the clock recovery data input and the BERTScope S error detector data input.
- BERTScope S pattern generator data output to clock recovery data input
- Clock recovery clock output to BERTScope S clock input
- For optical applications, always use AC coupling with the Newport or Picometrix amplified reference receiver.



Connecting the BERTScope CR clock recovery instrument to a sampling oscilloscope

- Data input to clock recovery from signal under test
- Clock recovery data output to data input of oscilloscope sampling module
- Clock recovery clock output to scope trigger input



Connecting the BERTScope CR clock recovery instrument to a BERT

- BERT pattern generator data output to clock recovery data input
- Clock recovery data output to BERT error detector data input
- Clock recovery clock output to BERT clock input

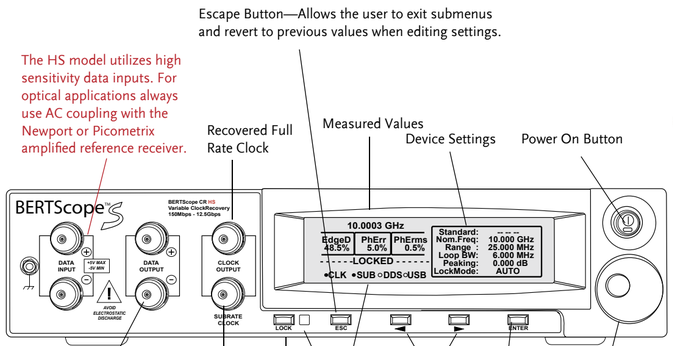
BERTScope CR Specific Cautions

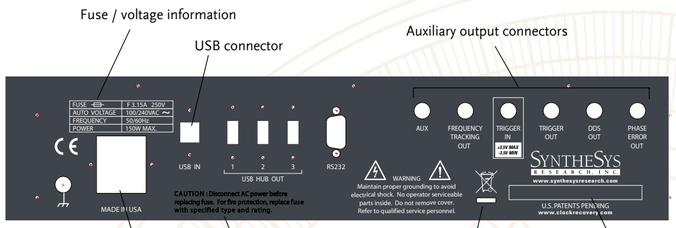
⚠	To prevent damage to the instrument when the data outputs are not in use, terminate the data outputs with the SMA terminations provided.
⚠	To prevent damage to the high sensitivity data circuitry, ensure that the input voltage does not exceed ± 5 V range, 3 V peak-peak.

5 You are now ready to move to the other side of this guide for instructions on setting up clock recovery measurements

6 BERTScope CR front and rear panel descriptions

Standard configuration** / **High-sensitivity configuration





7 Setting up the BERTScope CR to make measurements with clock recovery

A. After the proper connections have been made for data input and clock out, and the instrument has been powered on, the user may adjust the input settings. *Caution:* Data outputs should be terminated if not in use or reflections will severely degrade performance.

B. Current settings are displayed on the right side of the display. Use the knob or cursor keys to scroll through menu items. Press the knob or enter key to select an item to adjust. Use the escape key to back out of a menu or cancel an adjustment. When editing a numeric setting, use the left and right cursor keys to move through digits and use the knob to make changes. Press the knob or enter key to accept a change, or press the escape key to cancel changes.

C. Many industry standards are also available from the front panel menu. If the user selects a standard, the nominal data rate, loop bandwidth and peaking settings will be entered automatically.

D. The user can manually enter the following settings:

Nominal Data Rate	Nominal rate of the recovered clock.
Lock Range	The frequency range around the nominal rate that will be scanned during locking.
Bandwidth	Bandwidth of the recovery loop measured at -3dB.
Peaking	Peaking of the recovery loop. Also sets 1st or 2nd order roll-off of untracked jitter.
Nominal Edge Density	Expected edge density of incoming data. Required to set bandwidth correctly.
Edge Density Mode	Sets bandwidth. Calculations are based on Nominal Edge Density or edge density measured during lock.
Clock Amplitude	Output amplitude of the full rate clock.
Sub-rate Amplitude	Output amplitude of the sub-rate clock.
Sub-rate Division	Division ratio of the sub-rate clock

E. By default, all settings will be saved automatically on power off and restored at power on. The user can also save current settings to one of four Setups that can be recalled later.

F. Several continuously updated measurements are displayed on the left side of the display.

Frequency	The measured frequency of the recovered clock.
Edge Density	The measured edge density. A 1010 data pattern transmitted at the Nominal Data Rate would have 100% edge density.
Phase Error	The peak-to-peak phase error between the incoming data and the recovered clock. This measured value will increase if jitter is present on the input data that is not being tracked by the recovered clock.
Phase Error RMS	The RMS phase error between the incoming data and the recovered clock.
Lock State	Reports whether the CR is locked, unlocked, or in the process of locking.

G. By default, the CR is configured in Auto Lock Mode, where it will automatically attempt to acquire lock if the detected Phase Error exceeds the Phase Error Limit setting or the recovered clock is unstable. The user may force a relock at any time by pressing the Lock key.

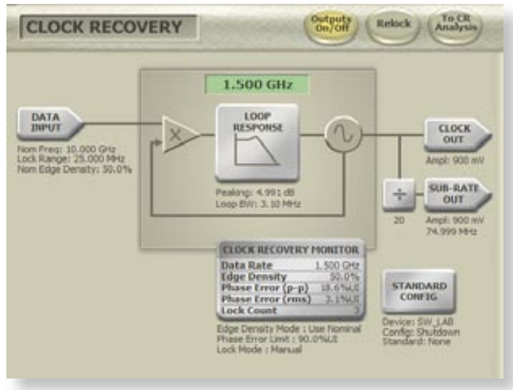
8 Setting up the BERTScope CR to make measurements with clock recovery and the BERTScope S Analyzer

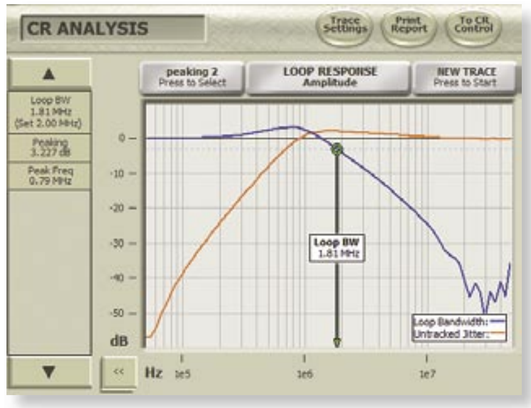
A. You can utilize the clock recovery instrument with the BERTScope S Analyzer by connecting the USB cable between the two instruments.

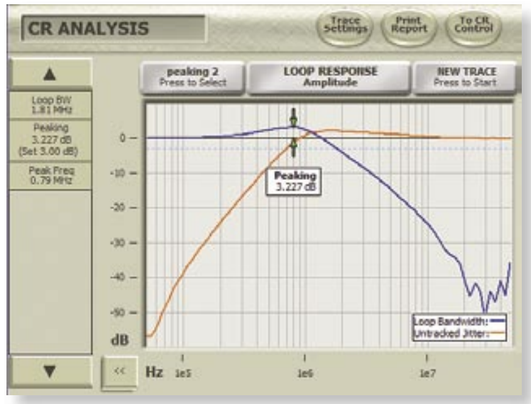
B. Use the pull down menu on the BERTScope S Analyzer user interface. Press the "View" soft key to access the clock recovery setup menu.

C. The device settings can be selected by touching the soft keys. All functionality is available via the BERTScope user interface AND the clock recovery front panel.

D. Graphing capability can be displayed on the BERTScope S Analyzer by pressing the "To CR analysis" soft key.







www.clockrecovery.com

INTERNATIONAL ENGINEERING CONSORTIUM DESIGNVISION AWARD 2006 WINNER

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20 BEST IN TEST 06 TEST & MEASUREMENT WORLD HONORABLE MENTION

About BERTScope™

BERTScope™ is a trademark of SyntheSys Research, Inc., a privately held California corporation founded in 1989 with the mission to develop advanced test instruments for identifying and locating the source of errors in high-speed digital bit streams. BERTScope CR pairs with BERTScope to offer the vision of a scope, the confidence of a BERT, and clock recovery you can count on. More information is available at www.bertscope.com.

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