Keysight Technologies
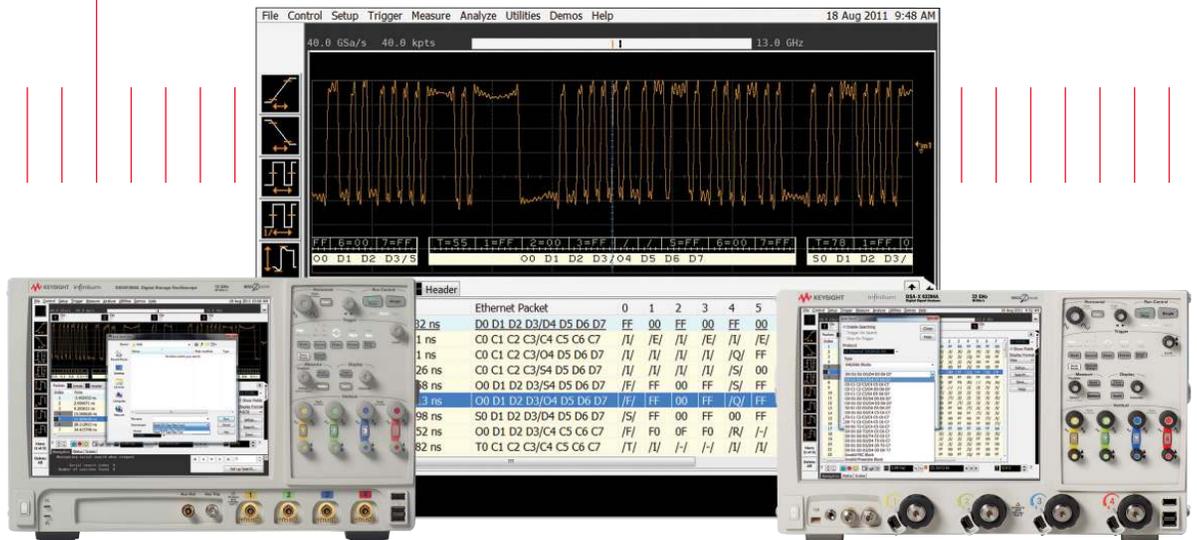## N8815A
Infiniium 64b/66b 10Gbase-KR
Ethernet Decoder Software for the
90000A and 90000 X-Series Oscilloscopes

Data Sheet

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Introduction

64b/66b encoding is a principal line code that is used in data networking and transmission. 64b/66b encoding is the principal encoding scheme behind the 10Gbase-KR (x1/x4) technology as it achieves DC balance across a serial stream. The 64b/66b encoding also has less overhead than the 8b/10b encoding scheme.

Keysight Technologies, Inc. N8815A Infiniium protocol viewer software for 10 Gbase-KR Ethernet is the only 64b/66b protocol analyzer technology available on a real time oscilloscope, providing time-correlated views of physical layer and transaction layer errors.

You get packet-level decode for 64b/66b Ethernet signals built into a real-time oscilloscope. This software provides you with a fast, easy way to isolate signal integrity problems from logic-level coding errors simultaneously on up to four lanes of serial data streams. This capability allows you to test, debug and characterize your designs to the logic and link layer. The N8815A Infiniium protocol analyzer software is designed to work with 10 Gbase-KR Ethernet technologies. It also comes with the unique ability to identify PRBS signal lengths to verify the correct signals are being passed though the DUT.

Features

The N8815A Infiniium protocol viewer software offers several features to simplify the validation of your 64b/66b designs:

– Setup wizard for quick setup, configuration and test

– Packet-level decode of primitives as well as link and transaction layers

– Serial data analysis with 64b/66b bit streams

– Serial data analysis with PRBS detect

– Decode of scrambled and unscrambled symbols

– Quad-directional symbol and packet level decode

– Simultaneous display of packet/ symbol lists and waveform overlay

– Capability to save symbol and packet data lists to .csv and .txt files

– Packet decode details tab provides detailed information on packets

   – Channel information
   – Listing index
   – Link primitive type
   – Control symbols
   – Reserved-bit settings
   – Data payload popup
   – CRC
   – Packet length

– Payload display shows data payload

– Unique packet-waveform correlation marker "blue line" makes it easy to scroll through waveforms to view synchronized packet and symbol lists

– Comprehensive serial search capabilities

   – Trigger and stop on search
   – Primitive, control symbol and packet search capability

Comprehensive Decode Capability

With the N8815A Infiniium 64b/66b protocol analyzer software, you can use the same oscilloscope you use for everyday debugging and signal quality testing to perform protocol-level viewing. The software automatically decodes symbols, packets and primitives and provides informative results. It includes decode of reserved bit settings during training sequences and speed negotiation, greatly simplifying debugging of link training failures.

Some of the difficulties in validating 10 Gbase-KR communication links are determining if link failures or instability is due to electrical problems or logic-level problems. The N8815A Infiniium 64b/66b protocol analyzer software allows you to analyze the root cause of these issues with a single piece of test equipment.

Easy Measurement Setup

The N8815A Infiniium 64b/66b protocol analyzer software uses the Serial Data Wizard to simplify setup of the clock recovery algorithm used to decode the various speeds of serial traffic that it supports. The wizard guides you quickly through the steps required to set up and perform symbol and packet-level decode.

N8815A is compatible with numerous clock recovery algorithms including first and second order PLL, constant, and explicit clock recovery. The N8815A is also compatible with Infiniium's Serial Data Equalization software, making it possible to decode signals even on equalized data.

To further simplify the decoding setup process, the N8815A includes an AUTO SETUP (see figure 2) button that will automatically setup the entire decoding setup. This includes clock recovery, memory depth, thresholds, and data rate. After the AUTO SETUP is complete, the setup can be adjusted using the manual setup button (see figure 3).
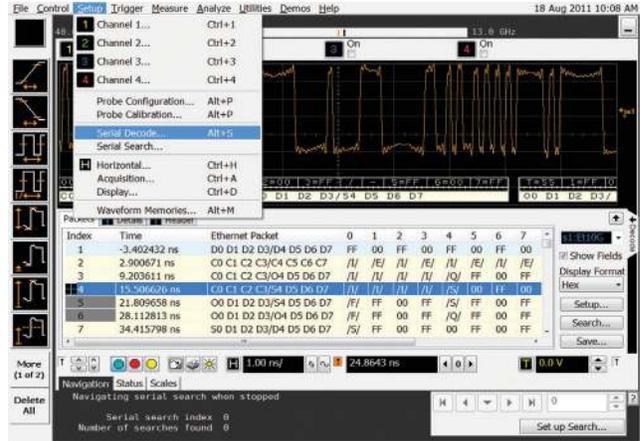

Figure 1. The 64b/66b setup is conveniently located in the "Setup" tab of the Infiniium 90000 and 90000 X-Series oscilloscopes
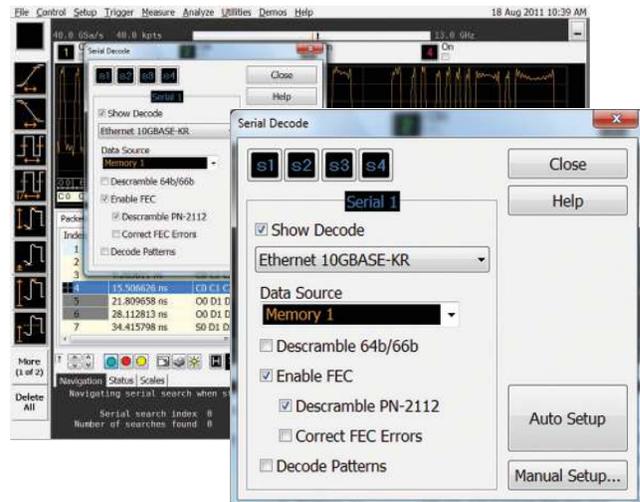

Figure 2. The 64b/66b setup menu includes an "Auto Setup" tab, which enables you to begin decoding 10Gbase-KR signals in less than 30 seconds
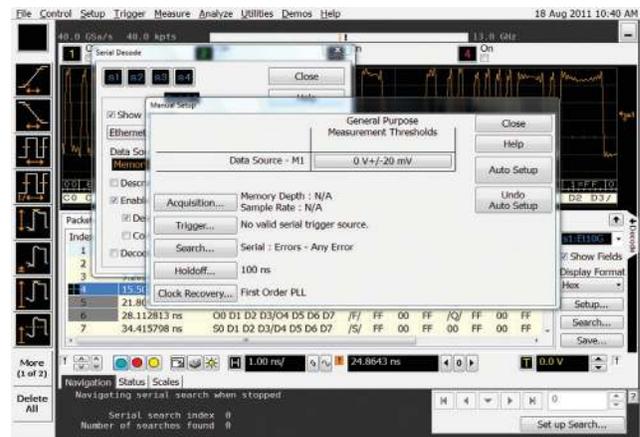

Figure 3. Customize your decoding setting using the manual tab. Image above shows the manual menu option.

Synchronized Analog and Digital Display

The N8815A 64b/66b decode software provides the ability to perform 64b/66b bit and 8b/10b based packet decoding via a Keysight exclusive technique to capture and display serial data synchronized with the analog view of traffic of a serial data stream. Decode is displayed directly on the analog waveform as well as in the decode list with associated time and index displays.

In conjunction with the decode list, using the multi-grid waveform display you can simultaneously display analog bi-directional waveforms with corresponding decode listings.

The unique packet-waveform correlation marker "blue line" allows for convenient and intuitive correlation of analog and digital domains. You can easily scroll to analog anomalies that are visually distinct, making navigating and checking for errors easy, even for industry leading record depths.

The expandable decode list provides an extendable indexed view of packet decode for users who are more accustomed to logic analyzer "vertical style" packet decode traffic list-ings. The list includes color-coded packet types for easier visual searching of traffic patterns as well as a blue highlight that shows the packet that corresponds to the "blue line" in the waveform view. The side bar also shows how much of the waveform display is on the screen by providing a gray background on the index field, as shown in Figure 5.
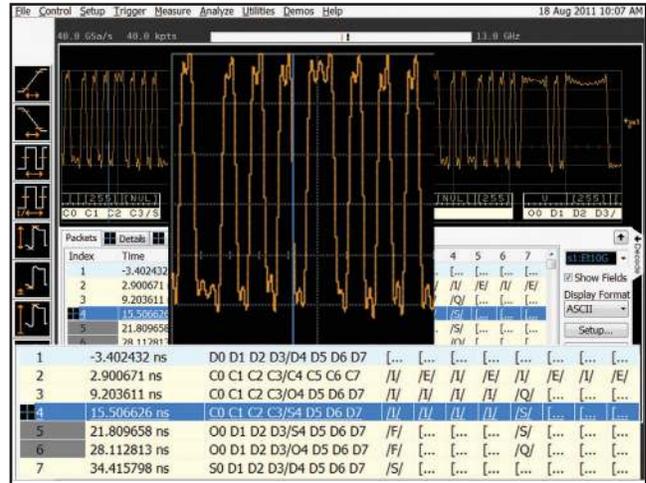

Figure 4. The 64b/66b includes a viewing pane and alignment marker, making it easy to identify problems in the system
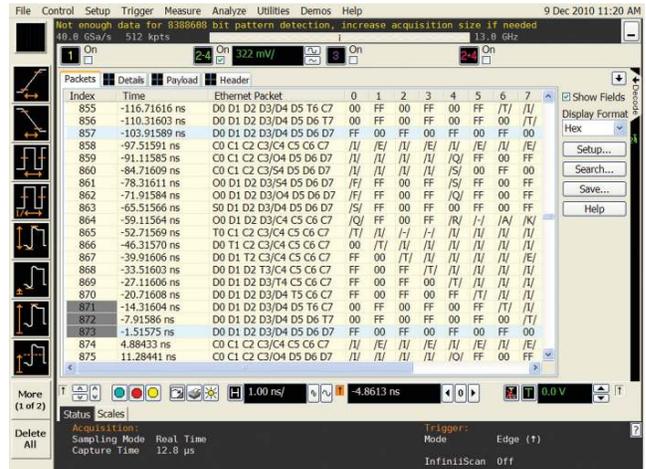

Figure 5. Maximize the window pain to see the full details of your design.

Comprehensive Search Capabilities

The N8815A 64b/66b ethernet 10Gbase-KR protocol analyzer software includes a powerful serial search tool which allows you to search for a pattern that is a primitive, control symbol or packet.

The search capability also includes a comprehensive packet search and trigger capability that allows you to specify search conditions like errors or data packets. This allows you to specify desired trigger conditions and makes finding errors or packet types easy by eliminating the need to do manual searches of very long records.

– Errors

  – Any error
  – Unknown Control Sequence
  – Unknown Block Type
  – Invalid Ordered Set
  – Invalid FEC Block
  – Invalid 64b/66b Preamble

– 64b/66b blocks

  – Numerous blocks as specified by the 10Gbase-KR specification
  – Example: D0 D1 D2 D3/D4 D5 D6 D7

– Pattern Detection

  – PRBS7
  – PRBS15
  – Square Wave
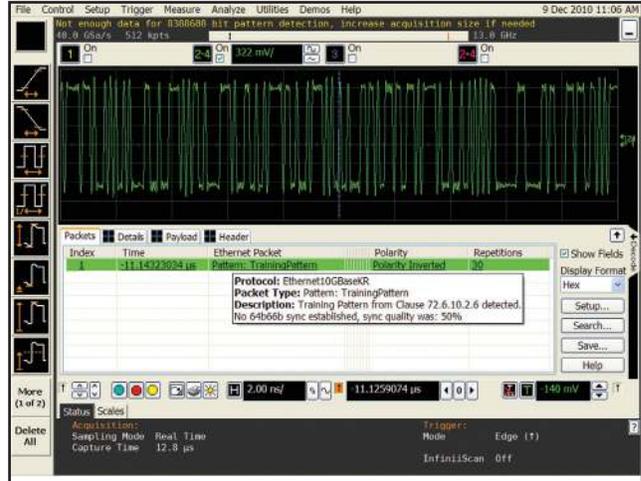 – Compliance Pattern
  – Many more

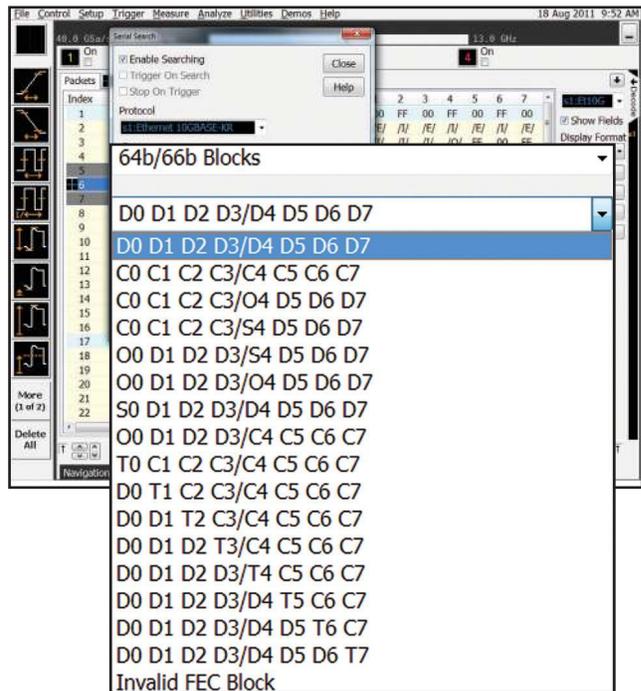*Figure 6. Training sequence of 10Gbase-KR ethernet*

Figure 7. Search for specific blocks related to 64b/66b

Oscilloscope Compatibility

The N8815A Infiniium protocol analyzer software is compatible with Keysight 90000 Series oscilloscopes with operating software revision 3.10 or higher (Windows XP Pro). For oscilloscopes with earlier software revisions, free upgrade software is available at: http://www.keysight.com/find/infiniium_sw_download

	Software revision	Compatible
90000 X-Series	3.10 or later	YES
90000A	3.10 or later	YES
9000A	NONE	NO

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