Logic Analyzers: Boosting the Power of Protocol Analyzers

Logic analyzers are the general-purpose tool for engineers developing and testing a variety of digital systems, such as embedded systems, network equipments, etc. They recognize a digital signal to be either low or high with a pre-defined threshold. This is the way the digital circuits under test look at the signal. Typically, logic analyzers can exam a large number of digital signal channels simultaneously and also trigger on complex patterns of highs and lows in these signals. By disclosing the timing relationships among many signals, they help engineers debug digital systems and find out the cause of error symptoms much easily and efficiently.

While protocol analyzers are intended to analyze digital events using multiple-layer protocols. They decompose received packets, extract all kinds of information from the data streams, and present the information in a structural and easy-to-understand manner, instead of simply show a string of zeros and ones. Although a protocol analyzer is only good with a specific architecture, it indeed helps engineers significantly in detecting and troubleshooting errors quickly and efficiently thanks to the way it presents the digital data and the protocol-specific features and functions it offers. Interestingly, the two types of analyzers are often considered as the rival of each other. What will happen if they are "friends" of each other?

Bus Doctor™ RX logic analyzer has the ability of viewing complete system activity, capturing a large number of signals simultaneously, and triggering on sophisticated signal patterns with high-speed timing resolution. Moreover, by integrating the logic analyzer and protocol analyzers together on the Bus Doctor RX platform, the logic analyzer becomes an assistant, rather than a competitor, of protocol analyzers. It gives engineers an opportunity to experience the ever unimagined view of the comprehensive digital data within just one platform.

TRANSFORM AND ROLLOUT

Logic analyzers are particularly useful for engineers working on next generation technologies, which are brand new and not employed by any existing products. Coming along with the various benefits, the new technologies bring in many unforeseeable architectural changes as well. To handle these architectural challenges, Bus Doctor logic analyzer allows users to customize various settings and configuration with great flexibility (Figure 1).

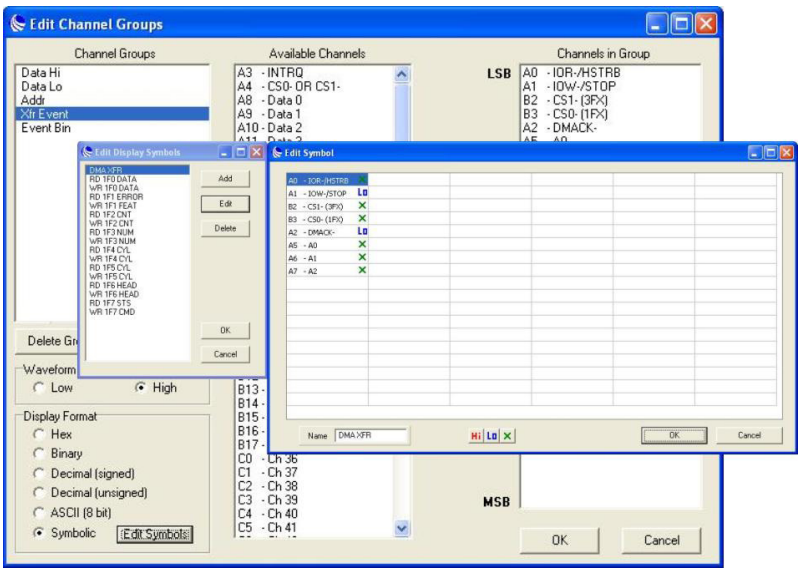

Figure 1: Customized Settings and Configuration

By systematically naming and grouping signals, setting up trigger patterns, and choosing capture mode, the users can easily "transform" the Bus Doctor logic analyzer into a customized protocol analyzer. A set of pre-canned trigger conditions are also available for users to accelerate their troubleshooting work.

INTEGRATED PLATFORM

Although with the flexibility provided by Bus Doctor logic analyzer, engineers can easily create their own brand new "protocol" analyzer. To perfectly configure the customized "protocol" analyzer, the users will have to acquire an expert level of knowledge about the protocols they are working on. In addition, many protocol-specific advanced features will be expectably unavailable as logic analyzers are essentially a general-purpose tool.

What if we can take advantages of both logic analyzers and protocol analyzers? Here is the affirmative answer from JDSU. JDSU seamlessly integrated the logic analyzer and other protocol analyzers into a universal platform. The logic analyzer and other protocol analyzers can be physically stacked in a chain. The digital events captured from both logic and protocol analyzers are processed simultaneously and displayed within the same GUI. Therefore the users can handily design a complicated cross trigger condition, quickly identify the inter-relationship of logical signals and data packets, and verify their performance and behavior much more easily

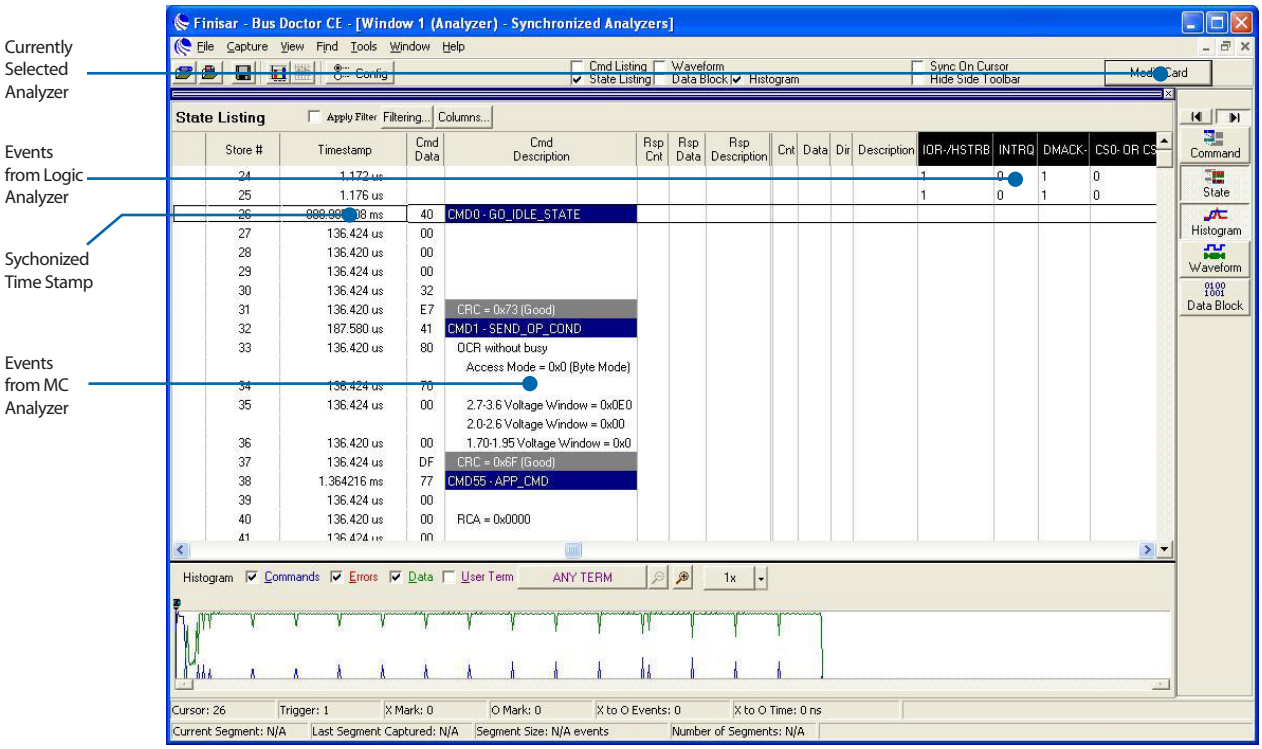

Figure 2: Integrated GUI for Captured Data from Both Analyzers

STACKING ANALYZERS

Using a small circuit card (called key), users can simply stack a logic analyzer on a protocol analyzer, e.g. a Media Card (MC) analyzer. The key will time synchronize the two analyzers. Each analyzer has its own trigger condition and capture mode, and any analyzer can trigger the stack.

After capturing, the captured digital data will be processed and displayed according to their time-stamps, which have been synchronized by the common reference clock. The MC events and logic events can be further configured respectively by switching between the two analyzers. Thus, the users can enjoy the advanced protocol decoding options of MC analyzer and the general testing ability of logic analyzer at the same time.

BOOSTING THE POWER OF PROTOCOL ANALYZERS

Nowadays, with the increasing complexities of digital systems, it becomes more and more difficult to debug these systems with a single tool. It is normally easy to identify the error symptoms when troubleshooting the systems. But it might take a long time to find out the causes of the symptoms since causes and symptoms could be in different domains. In these situations, a single protocol analyzer may help very limitedly.

Used in conjunction with a protocol analyzer, Bus Doctor logic analyzer provides the most effective solution for simple through complex debugging of systems. It offers users the ability of associating signals from other domains with the data streams from the protocol analyzers. It is time to upgrade your "weapons" and bring their performance characteristics to modern level.

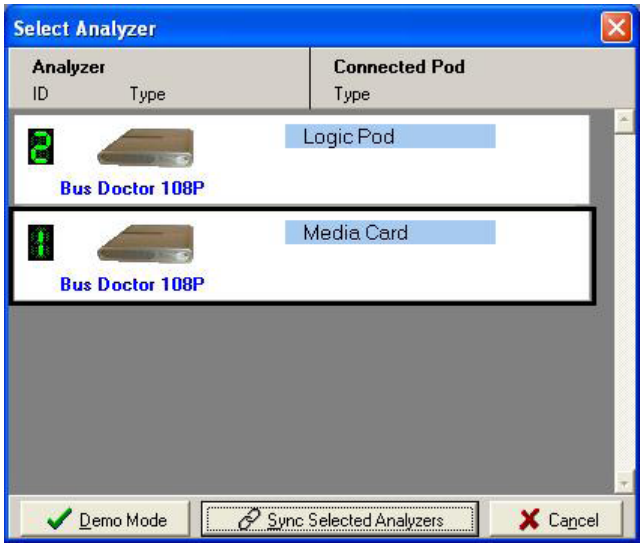

Figure 3: Stack Analyzers

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