

# **LXI instruments Enable Test Engineers to Take Advantage of Game-Changing Technologies**

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The widespread use of mobile devices is quickly transforming the way we communicate. Wirelessly accessing information, entertainment and the Internet is becoming increasingly more important. Not only is the method by which we communicate changing at an accelerated pace, the preferred choice of communication device is changing at an even faster pace.

In fact, the technological advancements in the past decade have had an astounding impact on the way we communicate, both personally and in the workplace. The once monstrous computers that occupied an entire room have now been reduced to compact, lightweight, portable systems with an unprecedented amount of processing power.

It is hard to believe that the now commonplace laptop was once overpriced and out-of-reach for most households when it was first introduced only a few decades ago. As technology continued to develop, the popularity and viability of laptop computers greatly increased. Lowered costs, combined with improved battery life, displays, processors, and network connectivity have all served to increase the availability and popularity of laptop computers.

In the near future, the portability and increasing screen size of tablets is pushing them to the forefront as the technology of choice at both home and in the workplace, with forecasts predicting tablet sales to overcome that of laptops as early as 2014. Based on a recent survey from Forrester<sup>1</sup>, forecasts estimate that tablets will reach an installed base of 905 million users by 2017 — up from just 15 million users in 2010.

While the majority of tablet users are still consumers, the use of tablets in business areas has steadily increased. So much so, that a new phenomena coined bring your own device (BYOD) can no longer be ignored by IT departments. With the majority of workers becoming increasingly mobile, enterprises need to support the growing number of employees who use mobile devices such as smart phones and tablets to do their work at the office, at home, and while traveling.

Mobile devices such as smart phones or tablets in the workplace have typically been used to read documents, spreadsheets or presentations and view web pages. The larger screen sizes of tablets also enable more sophisticated uses such as accessing web meetings or videoconferences and even controlling test & measurement (T&M) instrumentation, especially to perform remote operation.

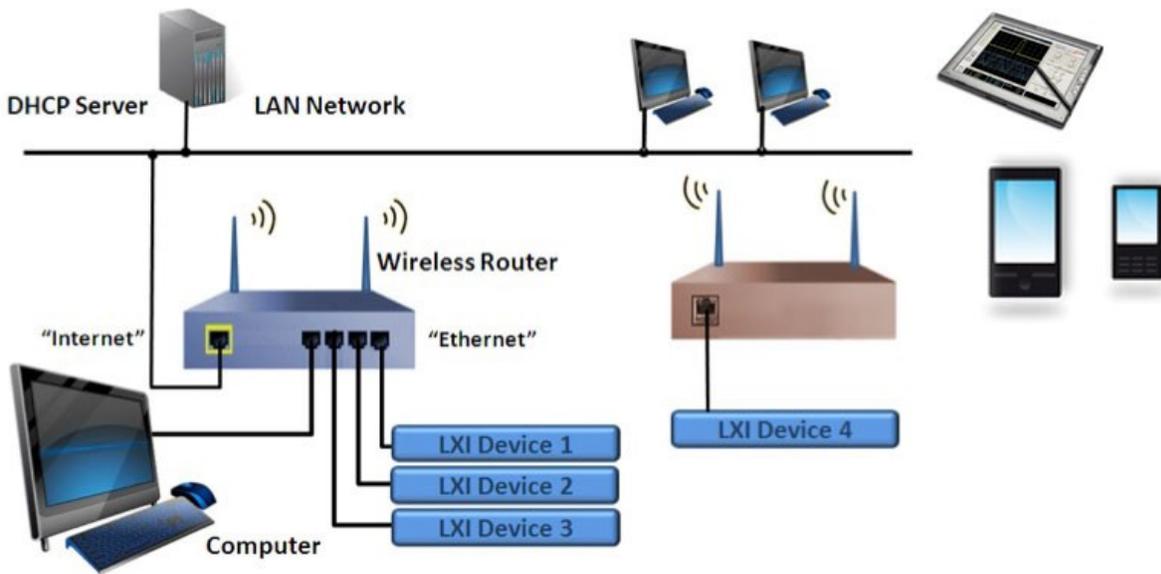
Few T&M companies have ported device driver software of their test instruments to tablet operating systems such as iOS and Android. In addition, the lack of USB ports or other forms of instrument connectivity in tablets today necessitates the use of wireless communication between the tablet and a test instrument.

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<http://www.forrester.com/Global+Business+And+Consumer+Tablet+Forecast+Update+2013+To+2017/fulltext/-/E-RES97182>

LXI (LAN extensions for Instrumentation) is the standard for LAN control of instrumentation and is one of the few viable options facilitating the use of tablets and smart phones for instrument control today. Figure 1 illustrates a wireless network configuration for users accessing LXI devices from a computer connected to the LAN or wirelessly from a smart phone, tablet or laptop.



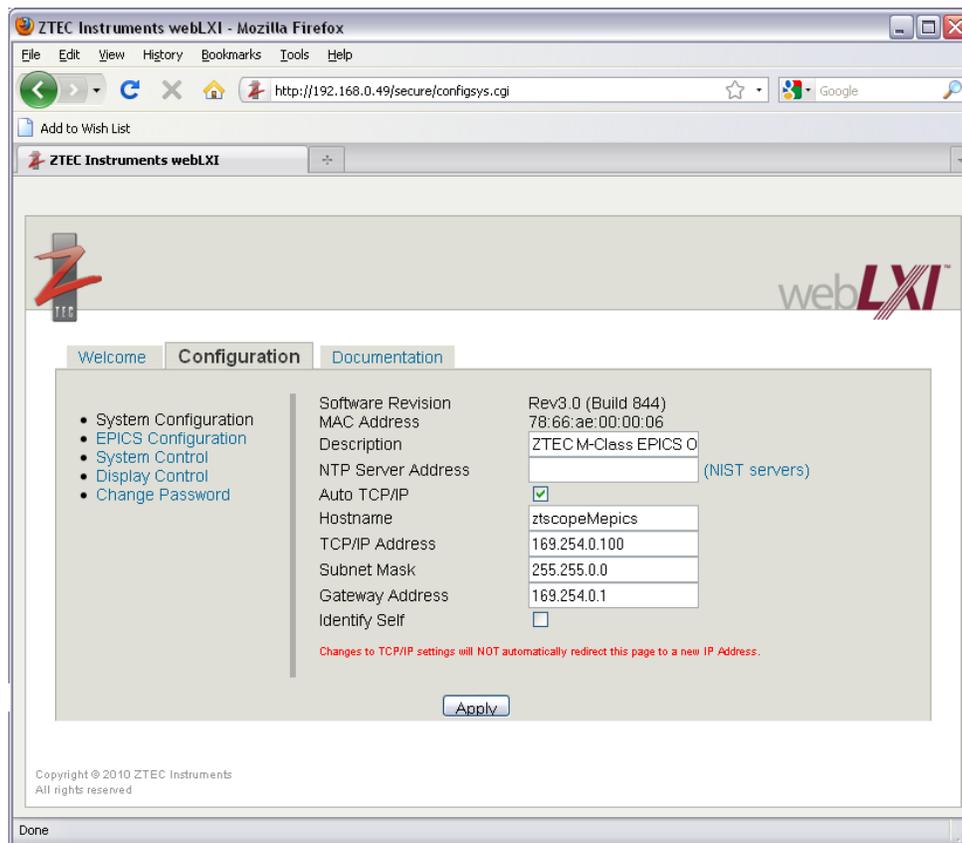
**Figure 1 Wireless Network Configuration**

LXI also supports communication via a Wide Area Network (WAN) for distributed applications or remote testing and diagnostics. Figure 2 is an example of ZTEC's ZT4611 LXI modular oscilloscope that communicates via a wireless LAN connection to a tablet.



**Figure 2 ZTEC ZT4611 LXI Modular Oscilloscope with LAN Interface to Tablet**

The LXI standard requires that compliant instruments provide a Web interface that allows users to easily configure and operate the instrument from a graphical user interface (GUI) and collect and analyze data without software programming. Figure 3 is an example of ZTEC's ZT4611 LXI Web interface.



**Figure 3 ZTEC ZT4611 LXI Web Interface**

Use of an LXI Web interface is sufficient for basic remote instrument control and operation and is ideally suited for instrument use with a tablet. In addition, many T&M instruments today provide powerful on-board processing capabilities that alleviate the need for post-processing of data on a PC. For example, ZTEC's ZT4611 LXI modular oscilloscope provides continuous memory mode for deep waveform capture and on-board calculation of over 40 waveform parameters related to voltage, time, and frequency (FFT).

Since LXI is the standard for controlling instruments over the LAN, it is well suited for a variety of applications. This is especially true where instruments have been installed in locations that are difficult to access or that are distributed by a significant distance. Tablets provide easy mobile access to T&M instruments, and the standardized LXI Web interface provides the interactive GUI necessary to configure and control the device.

Workers are increasingly mobile and enterprises must find a way to support the growing number of employees who want to use mobile devices such as smart phones and tablets to perform their work. The LXI standard is at the forefront of enabling the use of mobile devices with test instrumentation. Corporate mobility support for BYOD programs and the use of LXI for instrumentation will lead to increased employee responsiveness and productivity, enable new distributed applications, and overcome the challenge of performing remote testing. The LXI standard simplifies the use of LAN for test systems, and provides a low-cost, cross-platform computer interface that supports the rapid expansion of mobile technology to offer exciting new choices for test engineers.

Other examples of remote oscilloscope applications include:

- An oscilloscope floating at high voltage to make power-supply measurements (behind a high-voltage cage),
- Large facilities (factory floor, particle accelerator, etc.) with a centralized control room,
- Portability of data: taking a tablet from the test floor to an engineering office to discuss a particular waveform,
- A classroom environment where multiple viewers can see experiment waveforms on large screen or multiple simultaneous displays.

#### **About the Author**

Christopher Ziomek is founder and former President of ZTEC Instruments, a manufacturer of leading-edge modular instrumentation products. He now is General Manager, Design Test Solutions at LitePoint. Christopher has over 25 years experience in the test equipment industry, as an entrepreneur, engineering manager, and instrument designer. Prior to founding ZTEC Instruments in 1996, he worked as a section leader at the Los Alamos National Laboratory and as a microwave engineer at the Stanford Linear Accelerator Center. Christopher holds a Bachelor's degree in Electrical Engineering from the University of California at Davis, and a Master's degree in Electrical Engineering from the University of New Mexico.