

Tektronix TVS600 VXIbus Oscilloscope Replacement Using the ZT42xVXI Series Digital Storage Oscilloscopes

Modular Test Equipment

Modular test equipment offers important advantages over traditional bench top test equipment for systems test applications. By their nature, modular instruments are highly integrated allowing close coordination of stimulus, control, and readout. Modular instruments are substantially smaller in size, which can allow test equipment to be unobtrusively mounted within the system being tested. Finally, modular instrument platforms such as the VXIbus are based on high-speed computer backplanes, allowing tests to be sequenced very quickly and results to be transferred orders of magnitude faster than older products using instrument interfaces such as the GPIB bus.

The oscilloscope is one of the most common test system elements. Its visual presentation of signals effectively condenses information so that many signal properties can be evaluated at a glance. Digital storage oscilloscopes (DSOs) add the ability to display reference traces for a side-by-side illustration of desired signal characteristics. Tektronix, a leader in the DSO field, has been a major supplier of modular VXIbus DSOs but has recently discontinued the popular TVS600 scope series leaving test systems designers without this valuable resource.

The ZT42xVXI Series DSOs

The ZT42xVXI series of DSOs were specifically designed to be drop-in replacements for the TVS600 DSOs. The Tektronix and ZTEC units have similar signal analysis capabilities and use a common SCPI command set for scope control, but the ZT42xVXI DSOs have several advantages over the TVS600 DSOs, including:

- deeper, faster access waveform storage, up to 512Mbytes of VXIbus A32 memory mapped waveform storage,
- much deeper, full speed, digitizer memory, 4 Msamples compared to 15 ksamples for the Tektronix DSO,
- superior dynamic range, 43 dB (7 bits) compared to 36 dB (6 bits) for the Tektronix DSO, and
- smaller size, the ZT42xVXI units reside in a single-wide slot, consuming half of the valuable rack space of the TVS600s.



Figure 1. ZT422VXI Digital Storage Oscilloscope

ZT42xVXI DSO Features

The ZT42xVXI DSOs are delivered with a LabVIEW™ demo panel that highlights scope-style operation and a full set of VISA compatible Virtual Instruments (.vi's). As shown in Figure 2 the demo panel emulates a traditional bench top scope having two input channels, two configurable waveform math channels and four selectable waveform parameter analysis displays.

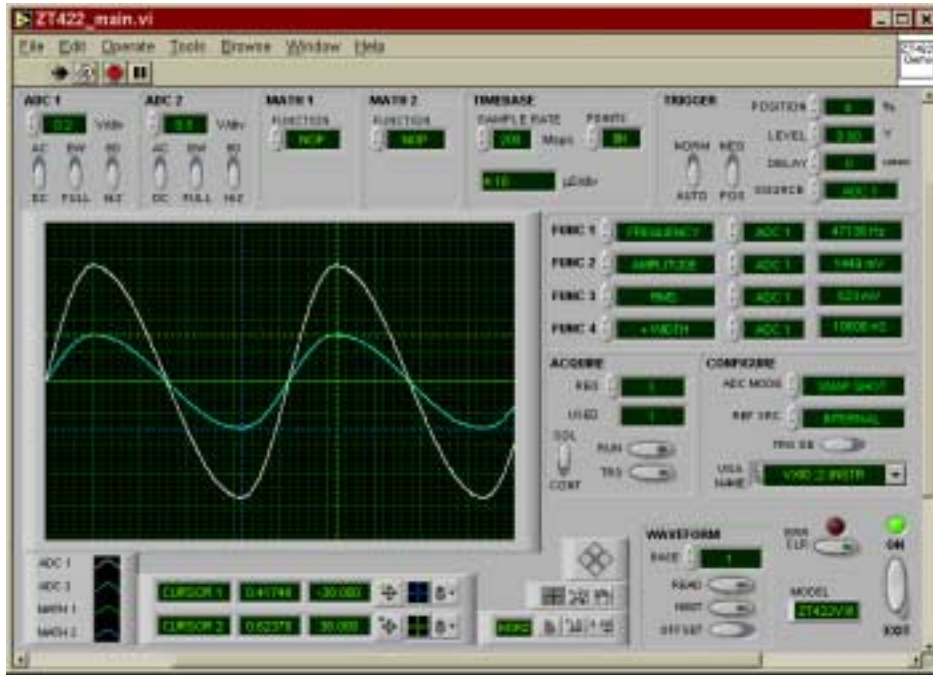


Figure 2. ZT42xVXI LabVIEW™ Demo Panel

Also shown in Figures 2 and 3 are controls for the multiple waveform capture capability of the ZT42xVXI DSOs. In many cases designers need to observe several fast events separated by relatively long times. An example of this would be analysis of a serial communication bus with intermittent traffic. A traditional short memory, single capture, DSO forces the designer to choose either a high sample rate to capture one fast event (and sacrifice other events) or a low sample rate to capture event groups (and sacrifice event detail). The deep memory, multiple capture, ZT42xVXI DSOs allow designers to capture entire event sequences at high sample rates in one record or to capture multiple records, up to 512,000 waveforms for the maximum ZT42xVXI configuration, focused on the desired events.

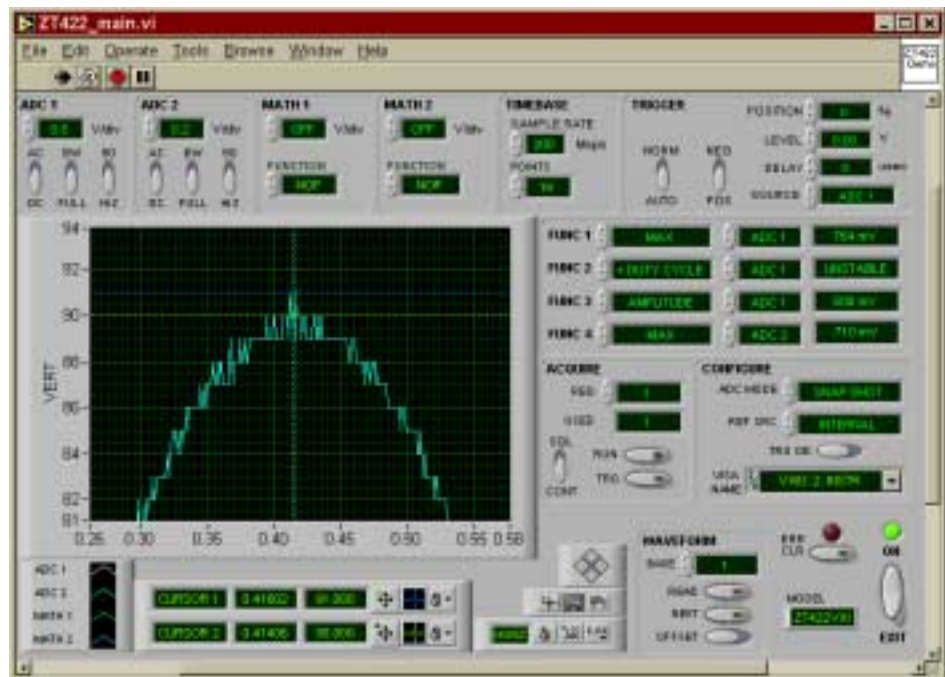


Figure 3. ZT42xVXI Digitizer Noise Performance

Figure 3 is a zoomed display showing the ZT42xVXI's superior noise performance, only *one code's* worth of digitizer noise.

Technical Specs Comparison

Tektronix TVS621A

2 Channels, 250 MHz, 1 GS/s Digital Oscilloscope

Input Channels

2 acquisition channels

Bandwidth

DC to 250 MHz

Input Ranges

10 mV to 100 V full scale in 1400 steps.

Resolution

8 bits (256 digitized levels)

Input DC Gain Accuracy

± 1.5 % for input ranges ≥ 20mV full scale.
± 2 % for input ranges <20 mV full scale.

Input Impedance

1 MΩ or 50 Ω

Input Coupling

DC, AC, or Off.

Input Noise Filter Bandwidth

Full, 250 MHz, 20 MHz

Delay Between Channels

≤ 100 ps.

Sample Rate

5 S/s to 1 GS/s

Real Time Acquisitions

Up to five 15 k waveforms per second

Record Length Maximum

2 channels up to 15 kSample

Internal Time Base Reference

10 MHz ± 100 ppm

External Time Base

10 MHz over VXI backplane

Pre & Post Trigger Acquisition

Pre-trigger: 0% to ≈ 100% of record time
Post-trigger 0 seconds to 250 seconds

ZTEC ZT422VXI

2 Channel, 100 MHz, 200 MS/s Digital Oscilloscope

2 acquisition channels

DC to 100 MHz

1V to 50 V full scale in 6 steps

8 bits (256 digitized levels)

± 1 %

50 Ω or 5 kΩ

DC or AC or Ground

Full, 10% of sample rate

≤ 500 ps.

10 MS/s to 200 MS/s in 10 MS/s steps

Up to fifty 15 k waveforms per second

2 channels up to 4 MSample

10 MHz ± 2 ppm

10 MHz over VXI backplane or front panel

Pre-trigger: 0% to ≈ 100% of record time
Post-trigger 0 ms to 13 ms

Trigger Sources

Internal, External, VXI TTLTRGn*,
ECLTRGn*

Internal, External, VXI TTLTRGn*,
ECLTRGn*, Software

Triggering Modes

Normal, Single, or Auto

Normal, Single, Auto

Trigger Range Internal

$\pm 100\%$ of Full Scale Input Range in steps of
1.0%.

$\pm 100\%$ of Full Scale Input Range in steps of
0.5 mV

Trigger Range External

± 1 V settable in steps of 6 mV

± 5 V in steps of 1 mV

Trigger Coupling

DC, AC, LF Reject, HF Reject, Noise Reject

DC

Trigger Slope

Positive or negative

Positive or negative

Arm Input

Internal, External, TTLTRGn*, ECLTRGn

Maximum Power

106.5 W

25 W

Command Set

Message-Based SCPI

Message-Based SCPI Command
Register-Based A32 Data

Physical Parameters

VXIbus – C size, 2 slots wide

VXIbus – C size, 1 slot wide

ZT42xVXI Command Tree

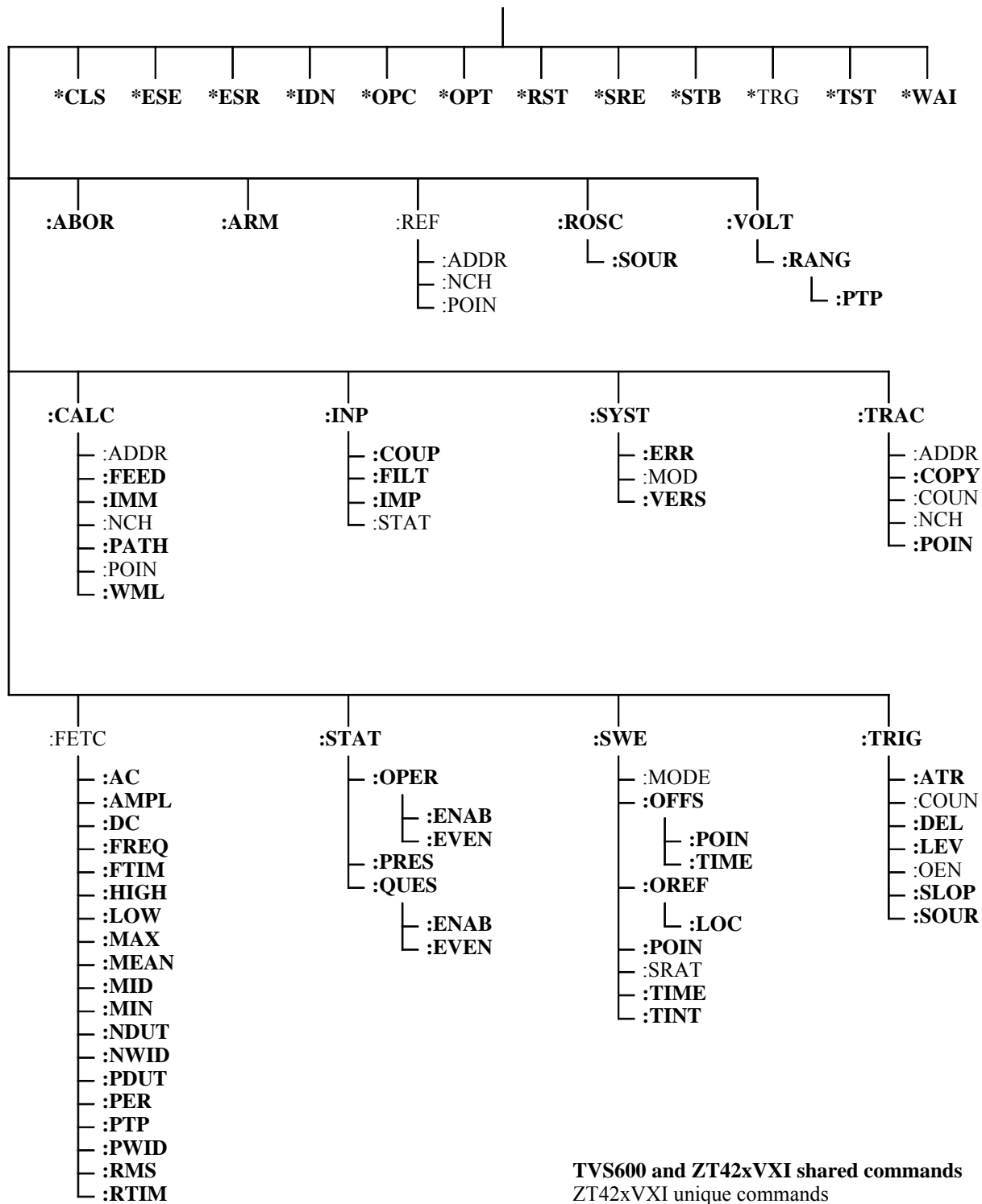


Figure 4. ZTEC ZT42xVXI – Tektronix TVS600 Command Set Comparison