VectorLinQ Vector Signal Analysis

**Key Features**

- Comprehensive signal demodulation and vector signal analysis
- Supports RF modulated or direct I-Q inputs
- PSK, QAM, Circular QAM, ASK, and Custom input signal types
- OFDM Visualization and Analysis with VectorLinQ Advanced
- Up to 8 data streams
- I-Q constellation plots with trajectory, symbol, and reference symbol views
- I, Q EVM, Phase, Magnitude, and Power Eye Diagrams
- Spectral views of I, Q, and Total Spectrum
- A comprehensive set of measurement parameters
- Built-in signal processing including filters, mixers, and equalizers
- Insert custom MATLAB processing blocks anywhere in the signal chain
- Flexible user interface to provide maximum insight and visualization

The VectorLinQ Vector Signal Analysis (VSA) option provides an extensive toolset for demodulation and analysis of RF and IQ modulated signals. These tools provide deep insight into advanced signal types with maximum measurement flexibility and sophisticated signal visualization. The intuitive user interface is easy to set up and allows for user customization to meet the needs of even the most complex signals.

**Ultimate Flexibility**

VectorLinQ transforms your Teledyne LeCroy oscilloscope into the most flexible vector signal analysis platform available. Acquire up to eight inputs through the oscilloscope channels - PSK, QAM, Circular QAM, and ASK signal types are all supported, as well as user-defined symbol configurations and OFDM formats. VectorLinQ operates through a unique, intuitive model, passing the signal through a chain of user-defined processing blocks, simplifying the most sophisticated analysis. Standard processing blocks include mixers, filters, phase estimators, and equalizers. Users may also insert custom MATLAB processing blocks at any point in the processing chain.

**Advanced Visualization and Measurement**

VectorLinQ VSA offers various ways to analyze and view demodulated waveforms. The I-Q constellation diagram helps identify signal quality issues such as amplitude imbalances, quadrature error, and phase noise. I and Q components, Amplitude, Power, Phase, and EVM can be viewed as “traces” in the time domain, fully correlated with other waveforms in the oscilloscope. Any trace can also be viewed as an eye diagram, providing deeper insight into the signal quality of the demodulated waveforms. Spectral views of the total signal, as well as the individual I and Q components, are also available as standard. For OFDM signals, EVM can be visualized on both a by-subcarrier and by-symbol basis.
VectorLinQ VSA offers a unique user interface and feature set, with the ability to analyze up to eight signal streams simultaneously. Each stream can analyze a separate input signal, or the same signal can be distributed to multiple streams to compare different processing chains. The example above shows how to easily assess the performance of an equalizer on a 28 Gbaud 16QAM signal, by comparing the raw input signal on Stream 1 with the equalized version on Stream 2.

1. **Constellation Diagrams**
Each stream contains its own constellation diagram view. Visualize symbol locations, trajectories, and reference symbol positions for QAM, PSK, circular QAM, and user-defined modulation formats.

2. **Eye Diagrams and Traces**
Achieve deeper insight with time-domain views of I and Q waveforms, total power, EVM% and more. New waveform grids appear automatically to support selected views.

3. **Measurement Parameters**
EVM, IQ skew, Q factor (in % or dB), and many other common measurements are available. Measurements are made on a “per-stream” basis, enabling easy comparisons.

4. **Signal Setup**
Select modulation format, symbol rate, and bits per symbol (supporting up to 1024-symbol modulation formats).

5. **Signal Processing Chain**
The signal processing chain is the core of VectorLinQ’s unique architecture. Connect up to 8 standard and custom processing nodes together to build the most comprehensive visualization and analysis for your signal under test.

6. **Node Configuration**
Each processing node has its own independent configuration - adjust filter bandwidths, equalizer taps, and other parameters - and watch the visualizations and measurements react.

7. **Analyze Multiple Streams Simultaneously**
The multi-stream layout delivers the ultimate in flexibility. View one stream at a time in a tabbed layout, two streams side-by-side, or all streams simultaneously. The standard VectorLinQ package offers two simultaneous streams, and VectorLinQ Advanced offers an industry-leading eight streams of analysis.
**Complete Processing Flexibility**

Custom MATLAB blocks can be inserted at any point in the processing chain, and the results returned directly to VectorLinQ to be passed on to the next processing block, visualized, and measured. Example MATLAB code is included directly inside the VectorLinQ application.

VectorLinQ also allows analysis of completely custom modulation types through a set of user-defined symbol positions.

**OFDM Analysis with VectorLinQ Advanced**

For leading-edge communications R&D, VectorLinQ Advanced offers comprehensive OFDM analysis and visualization capabilities. Plot Pilot EVM, Data EVM, and Average EVM by subcarrier and by symbol. Measure EVM % values and magnitude error for data and pilot signals. 802.11a protocol support is included standard, as well as sample metadata for creating profiles for other standard and custom protocols. VectorLinQ Advanced is available for the WaveMaster 8Zi and LabMaster families of oscilloscopes.

**Seamless Integration**

VectorLinQ VSA is not a standalone application that “takes control” of the oscilloscope. Rather, it integrates seamlessly with Teledyne LeCroy’s MAUI - the most advanced oscilloscope user interface available. Signals and parameters from VectorLinQ are available to be used elsewhere in MAUI, for simple and complete control and analysis.
### VectorLinQ vs VectorLinQ Advanced*

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<td>EVM (% RMS), BER Estimate, Q-Factor (dB), Q-Factor, SNR (dB), SNR, IQ RF (Gain) Imbalance (dB), IQ RF (Gain) Imbalance (%), IQ Phase Imbalance (deg), IQ Skew (UI), IQ Skew (secs), I-Q Offset (dB), I-Q Offset (%), I-Q Offset phase, I Offset (%), Q Offset (%), EVM Phase Error @ Symbol, Magnitude Error</td>
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<td>Blocks</td>
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<td>Raised Cosine, Root Raised Cosine, Gaussian, Bessel, Butterworth, Brickwall</td>
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*VectorLinQ Advanced is available for the WaveMaster 8Zi and LabMaster families of oscilloscopes.*

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### Ordering Information

Please visit [teledynelecroy.com](http://teledynelecroy.com) for the most up to date compatibility and ordering information.

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### Customer Service

Teledyne LeCroy oscilloscopes and probes are designed, built, and tested to ensure high reliability. In the unlikely event you experience difficulties, our digital oscilloscopes are fully warranted for three years and our probes are warranted for one year. This warranty includes:

- No charge for return shipping
- Long-term 7-year support
- Upgrade to latest software at no charge

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