# pendulum

Test & Measurement by Spectracom

# Pendulum Instruments TimeView™ 3.0 SW Start-up Procedures

TimeView converts a Pendulum CNT-91/91R counter/analyzer into a modulation domain analyzer. The software can be loaded into the computer in either of two ways, from the Spectracom website or from a CD.

After loading the demonstration software, it will run for 30 days, after which it requires purchase of a license or extension of the trial period. In either case, a license key is required. Entering the key is done through the (help) tab and (registration) sub-tab at the top of the TimeView screen. Demonstration software will not allow a user to save or print data. A license or special authorization from Spectracom is required for this to happen. Please contact your local distributor/sales representative (you find them at www.spectracomcorp.com) or call +46 8 598 510 00 (world-wide) or +1 (585) 321-5800 (US/Canada).
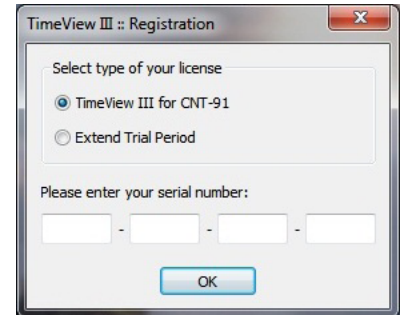
1) Loading TimeView from the website

Go to www.spectracomcorp.com. Go to the Support menu and select Software. Select TimeView Modulation Domain Analysis software from the list and then choose the TimeView 3.0 Modulation Domain Analysis SW. You can then run the software and go through the install wizard. After TimeView is installed, a Completing the TimeView Setup Window will appear. The box will be checked to Install National Instruments VISA.
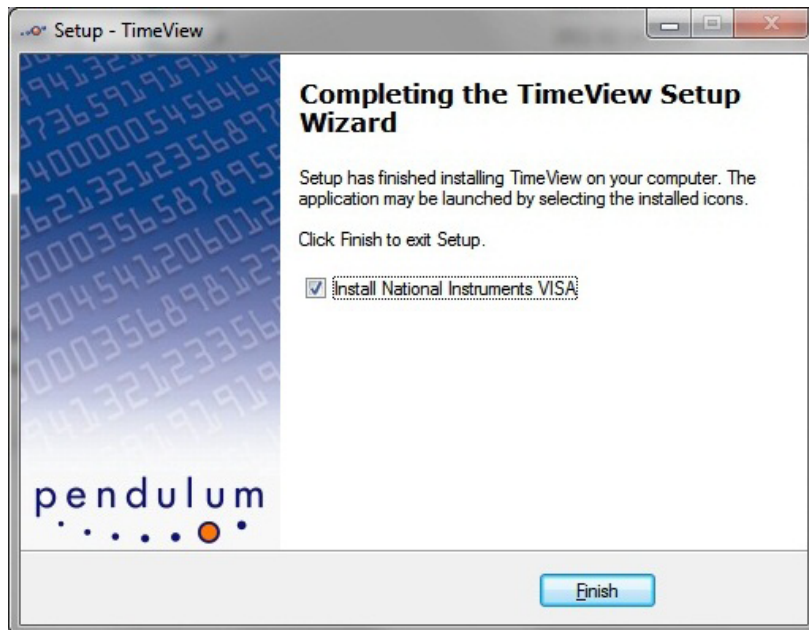
Please select Finish to install the National Instruments runtime. This will download USB drivers and allow the instrument to work in a National Instruments environment. Once the download and licensing issues are completed, measurements can be made. **National Instruments Visa runtime is required even if you have USB drivers installed.**

2) Loading TimeView from the CD

The procedure for installing from a CD is very similar to that for downloading from the website. **Please install the National Instruments runtime.** This will download USB drivers and allow the instruments to work in a National Instruments environment. Once the download and licensing issues are completed, measurements can be made. **National Instruments Visa runtime is required even if you have USB drivers installed.**

3) Documentation

Documentation is located in the **help** section. A description of the entire system is explained. There are several measurement types TimeView can perform as follows:
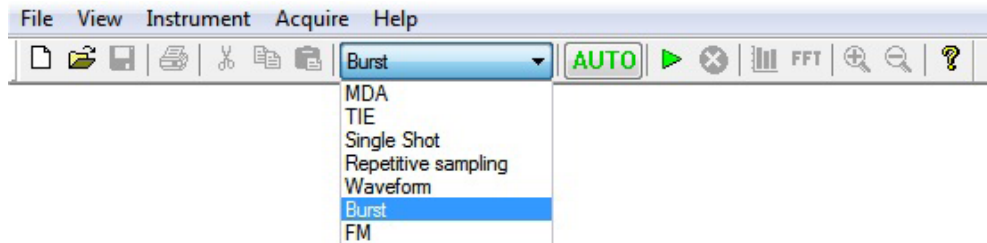
MDA: The purpose of this mode is to behave more like the Agilent 53310A Modulation Domain Analyzer, and to have settings that are familiar for oscilloscope users.

Single-shot: Measures the variations of the measured parameter in real time. This mode also allows measurements of modulated signals. Frequency range is up to 400 MHz (Ch A and B) and up to 3, 8, 15, or 20 GHz (Ch C). (This is the basic modulation domain capture mode setting)

Repetitive Sampling: If you select repetitive measurement mode, TimeView measures the variations of the measured parameter through repeated measurements. TimeView delays the start of each measurement relative to a synchronization signal. The delay is incremented between each measurement. This data capture mode requires a repetitive signal with periodic variations and a synchronization signal using external arming (for advanced users).

Waveform measurements: If selected, TimeView acts like a normal oscilloscope and presents an amplitude/time diagram of the signal. Only repetitive signals can be captured, and the frequency range is 10 Hz to 50 MHz.

Burst measurements: This mode is used to characterize and calculate main parameters in burst signals. The burst frequency values are drawn on display as a horizontal line between the start time (timestamp T(i)) and the stop time (T(i) + measurement time).

Output parameters are:
- Average frequency in burst in Hz
- PRF (Pulse Repetition Frequency = number of bursts per second) in Hz
- PRI (Pulse Repetition Interval = 1/PRF) in s
- Burst duration in s

FM measurements: This mode is targeted for sinewave-modulated carriers.

Output parameters are:
- Carrier frequency
- Modulation frequency
- Frequency deviation

TIE measurements: This is a special mode that uses continuous time stamping (single time stamps) to generate TIE output compared to fixed known frequency. Various post-processing alternatives give ADEV, MADEV for short-term stability measurements and MTIE, MRTIE, TDEV for wander analysis.

A more detailed description of each measurement type can be found in the help section. For further applications information, please refer to application note "ABCs of Modulation Domain Analysis" or contact Spectracom at +46 8 598 510 00 (world-wide) or +1 (585) 321-5800 (US/Canada).

A more detailed description of each measurement type can be found in the help section. Sample data is loaded in the software if you wish to see typical measurement results. Normally, go to C:\Program\Pendulum Instruments\TimeView\Samples.

Several sample data files are included as follows:

1) TimeView MDA/free running measurement data

big.tv3
blocks.tv3
sinusoids.tv3
fm.tv3
burst.tv3
tie.tv3

2) TimeView waveform data

hiresolution.tv3

3) Repetitive sampling data

just.tv3

Right clicking on displayed screen for any of these signals will give you additional options for viewing the data.

4) Making measurements
Connect the counter/analyzer to the computer via a USB cable. In TimeView go to **instrument** and **connect**. The counter/analyzer will now be completely under the control of TimeView. The display on the counter/analyzer will read "display off". The only way to see measurement data at this time is through TimeView.
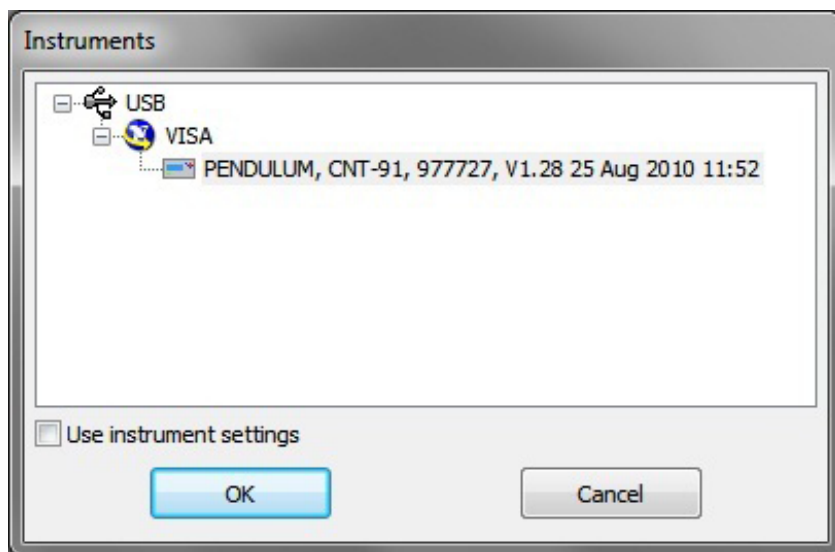
If the counter does not connect, then check the counter's interface setting in the "user option" menu on the counter's front panel. Select "interface" and "type USB". After that, select "connect" again from TimeView.

Sample measurement:
If you wish to make a sample measurement on the counter/analyzer timebase output, connect a BNC cable from the **10 MHz out** on the rear of the counter/analyzer to the **channel A input** on the front panel. Select Single Shot on TimeView's toolbar (top of screen) or from the Make a Measurement dialog.

In the **Capture parameters** menu, select:
Main -
Function: **Frequency BtB,**
Input: **A**
Sample interval: **100 µs**,
Number of samples: **10000**
Input A –
Auto trigger: **On**
Slope: **Positive**
Impedance: **50** Ω
Coupling: **AC**

Press the **green** triangle on the front of TimeView to commence a measurement. The display will show a graph of frequency vs. time.

Left cursor		dN	584	Minimum	14.99882037966 MHz	Carrier frequency	14.99997503899 MHz
X	0 s	dX	4.683209417 ms	Maximum	15.00107257669 MHz	Modulation frequency	1.060654342 kHz
Y	15.00049663806 MHz	dY	32.13057472743 Hz	Delta	2.252197029749 kHz	Frequency deviation	799.120623 Hz
		dY/dX	6860.802468238	Mean	14.99997187318 MHz		
Right cursor							
X	4.683209417 ms			Std. dev.	575.6676540821 Hz		
Y	15.00052876864 MHz			Allan dev.	9.127447518872e-006		

Ready		Capture finished			CNT-91 online

On the bottom of the screen you should see **capture data**. If this panel does not appear, go to **view** and select **data details**. The left side of this pane displays X and Y data for each of the red and green markers. It also displays Min, Max, Delta, Mean, Standard Deviation and Allan Deviation for the displayed data on the right.

To the right of the **green** "run selected capture button" there are options to show the captured data as a histogram or Fourier transform (FFT). These will open in a new window, allowing you full access to the original data while viewing the post processing results. Other post processing options are available from the calculate menu, these include Smooth, ADEV, Overlapping ADEV, and MADEV. Selecting any of these options will also open the data in a new window.