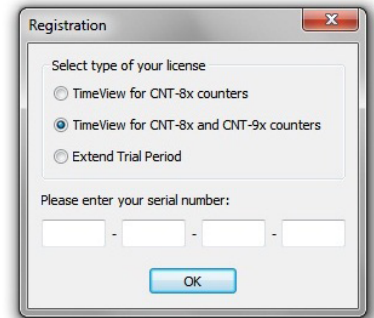


Pendulum TimeView™ 2.1 SW Start-up Procedures

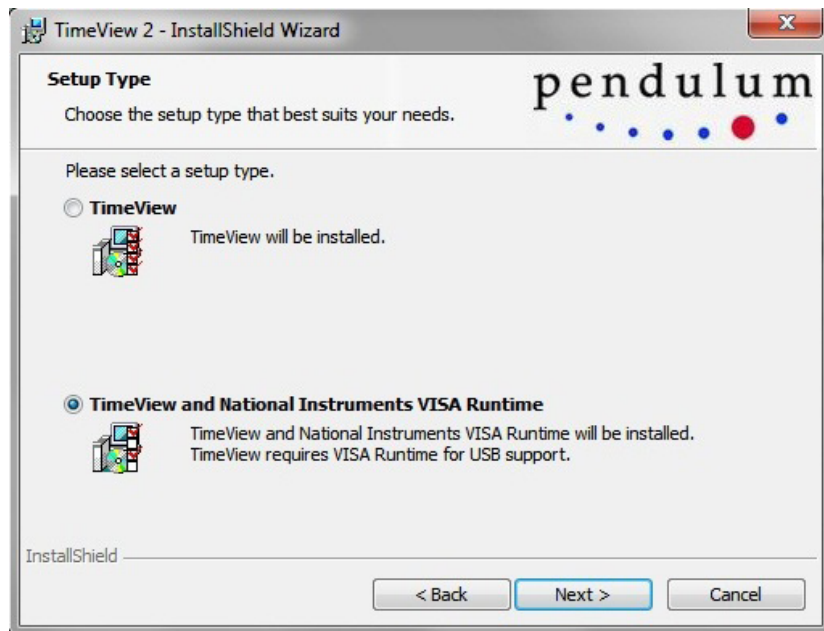
TimeView converts a CNT-81 or CNT-9X Pendulum counter/analyzer into a modulation domain analyzer. The software can be loaded into the computer in either of two ways, from the Pendulum Instruments website or from a CD.

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 Pendulum Instruments is required for this to happen. Please contact your local distributor/sales representative (you find them at www.pendulum.se) or call +48 (58) 681 89 01.



1) Loading TimeView from the website

Go to www.pendulum.se. Go to the Support menu and select Software. Select TimeView Modulation Domain Analysis software from the list and then choose the TimeView 2.1 Modulation Domain Analysis SW. You can then run the software and go through the install wizard. It will ask you to select either TimeView or TimeView and National Instruments Visa runtime.



Please select TimeView and National Instruments Visa 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

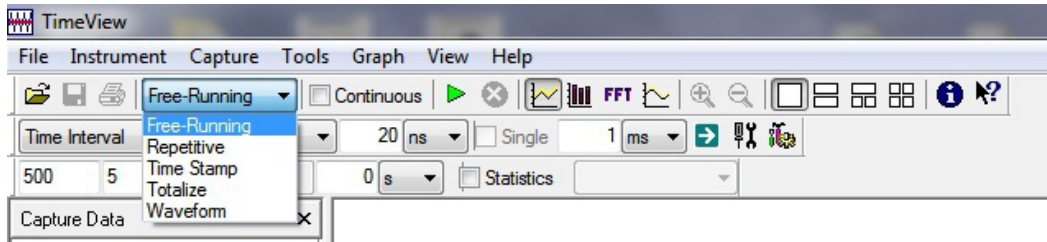
The procedure for installing from a CD is very similar to that for downloading from the website. **Please select TimeView and National Instruments Visa runtime.** This will download USB drivers and allow the instruments to work in a National Instruments environment. Once the download and licensing issues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

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3) Documentation

Download the user manual from our website or from the **help** section. A description of the entire system is explained. There are several measurement types TimeView can perform as follows:



Free running measurements: Measures the variations of the measured parameter in real time. This mode also allows measurements of modulated signals (see below). Frequency range is up to 400 MHz (Ch A and B) and up to 3, 8, 16, or 20 GHz (Ch C). CNT-90XL has a range up to 60 GHz (This is the basic modulation domain capture mode setting).

Repetitive measurements: 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 limited to 10 MHz.

Raw timestamping: In this mode TimeView collects N samples of timestamp data on channel A or B and presents the result graphically. Timestamp data comes in clusters of 8 values of event counts (E) plus timestamp value in seconds (T), grouped as 4 (E, T) value pairs. Every second value pair is for a positive slope trigger and every second is for a negative slope trigger. Measured timestamp data can be viewed in 7 different display modes, including ADEV and MADEV vs τ . The particular view mode is selected via context menu of the source data graph pane (right button click).

Totalize measurements: In this mode TimeView totalizes the pulse on channel A and B (CNT-91 only, not CNT-90 or CNT-90XL).

Access to any of these measurement types can be made through the capture button in TimeView. For further applications information, please refer to application note "ABCs of Modulation Domain Analysis" or contact Pendulum Instruments at +48 (58) 681 89 01 (world-wide).

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. Go to **file, open** and **samples**.

Several sample data files are included as follows:

1) TimeView free running measurement data

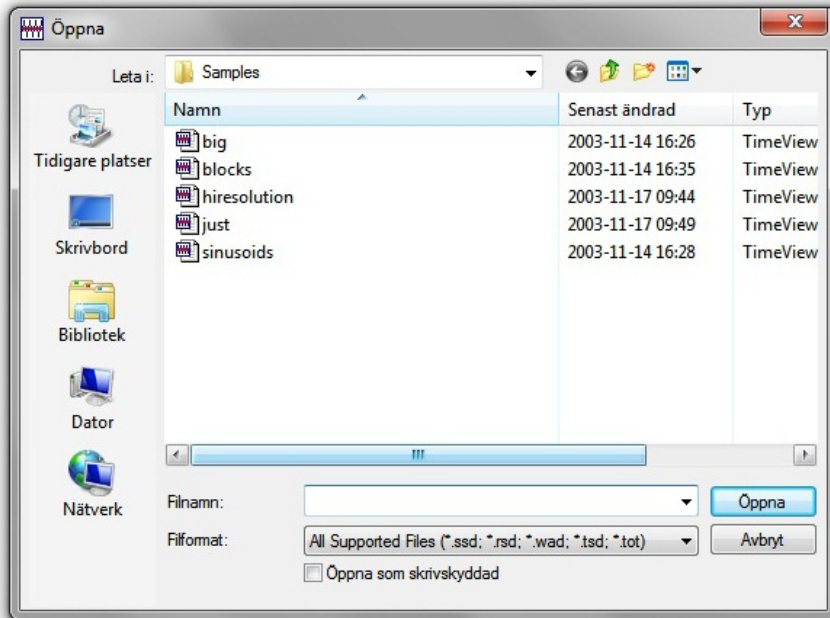
big.ssd
blocks.ssd
sinusoids.ssd

2) TimeView waveform data

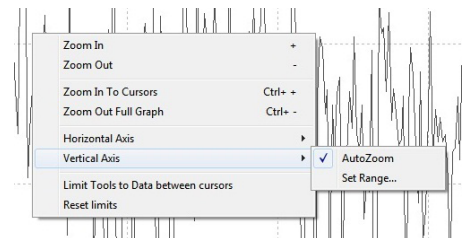
hiresolution.wad

3) Repetitive sampling data

just.rsd

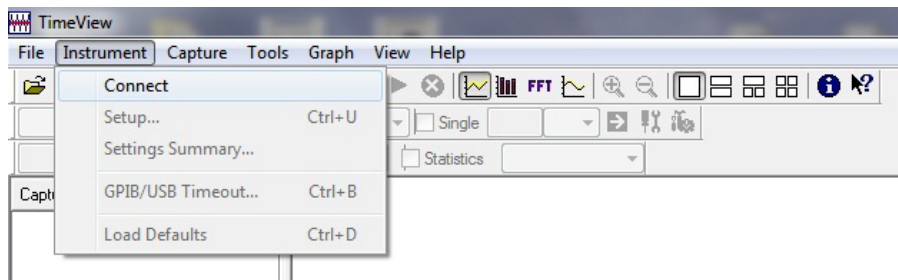


Right clicking on displayed screen for any of these signals will give you additional options for viewing the data.



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 counters front panel. Select "interface" and "type USB". After that, select "connect" again from TimeView.

Basic modulation domain measurements:

Modulation domain is frequency vs time, so select on TimeView's toolbar (top of screen):

- **Frequency BtB** (back-to-back) measurement function (CNT-91) or **Frequency** (CNT-90 and CNT-90XL)
- **Free run** capture mode
- **100 µs** measurement time
- **0** pacing time (no delays between freq samples)

Sample measurement:

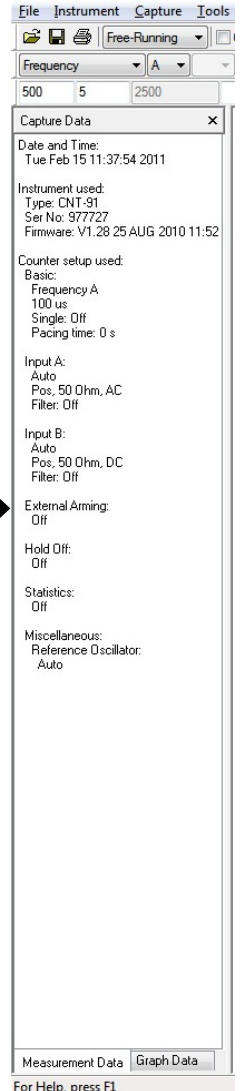
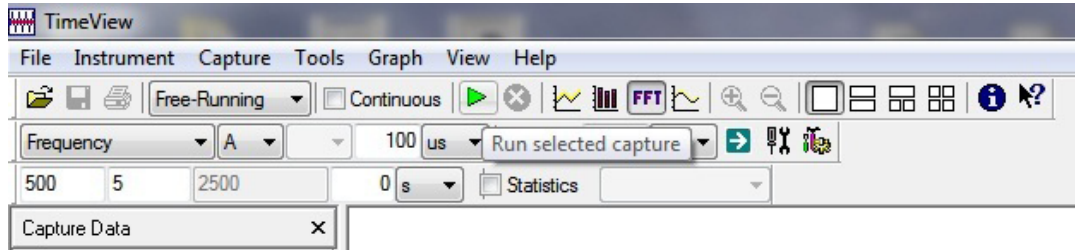
If you wish to make a sample measurement on the counter/analyzer timebase output, connect a BNC cable from the **10 MHz out** on the rear of the counter/analyzer to the **channel A input** on the front panel. Select **instrument** and **setup**.

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In the basic tab, select **measurement function: frequency, channel 1: A, measurement time: 100 μ s, pacing: 0 s.**

In the **input** tab, select **auto trigger level, slope: pos, impedance: 50 Ω , coupling: AC.**

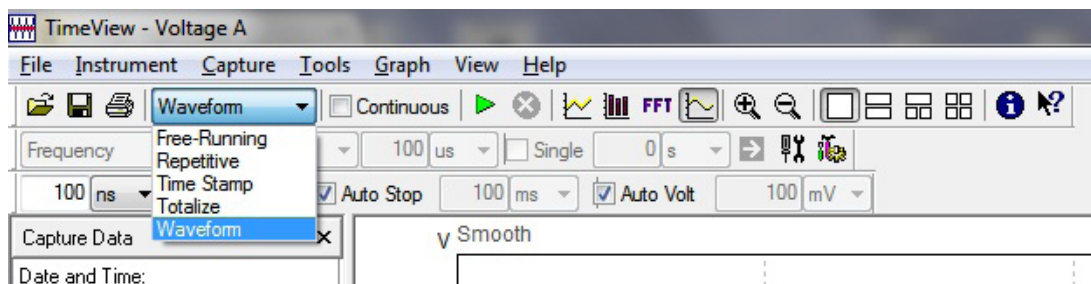


Press the **green** triangle on the front of TimeView to commence a measurement. The display will show a graph of frequency vs. time.

On the left of the screen you should see **capture data** which allows you to see either **measurement data** or **graph data**. If this panel does not appear, go to **view** and select **information pane**.

Measurement data includes the date and a summary of the system parameters. **Graph data** 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.

To the right of the **green** triangle "run selected capture button" there are four selections: show **captured data**, show **statistics**, show fast Fourier transform (**FFT**) and show **smooth data**.



Going from **free-running** to **waveform** in **select capture type**, converts TimeView into an oscilloscope, displaying amplitude (volts) vs. time (ns).

Measurements of modulated signals:

TimeView allows measuring parameters of modulated signals. Select a short enough measuring time to follow the modulation periods. Rule of thumb: measurement time = 10% of modulation period. For e.g. FM measurements with 1kHz modulation frequency (modulation period is 1 ms), set measuring function to Frequency (BitB) and Measurement time to 100 μ s, set no of samples to 1024, set correct input channel (Ch A for carriers to 300 MHz and Ch C for higher frequencies). Start the measurement and view modulation.

The calculated fm parameters are found as:

- Carrier freq.: Statistics pane – mean value
- Frequency deviation: Statistics pane – 50% of peak-peak value
- Modulation freq.: FFT window and green cursor read-out