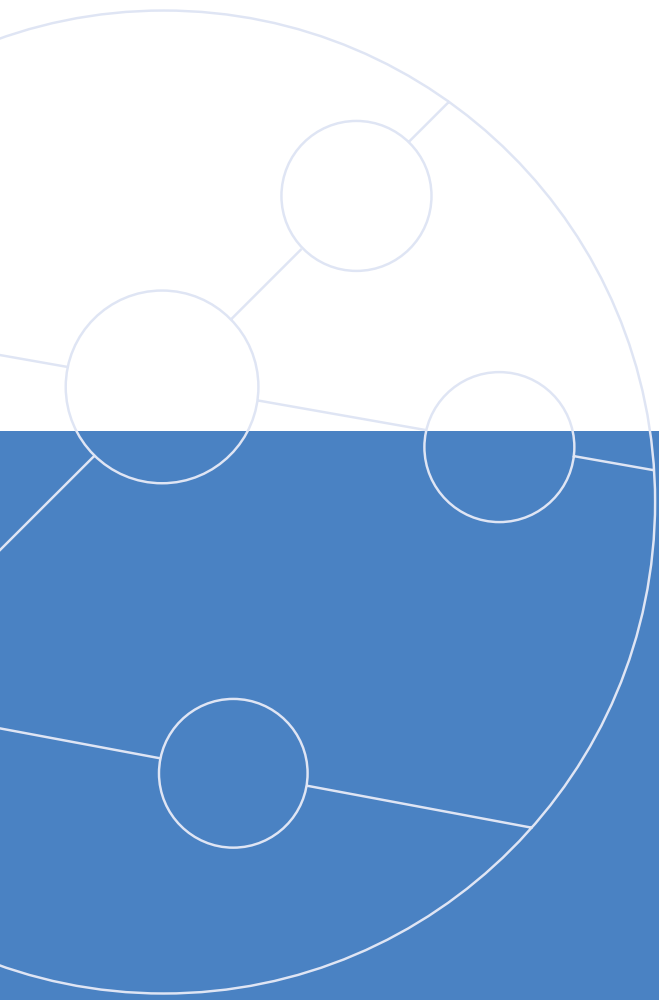


# Victoria Jitter/Wander



*Jitter and Wander Test Set*



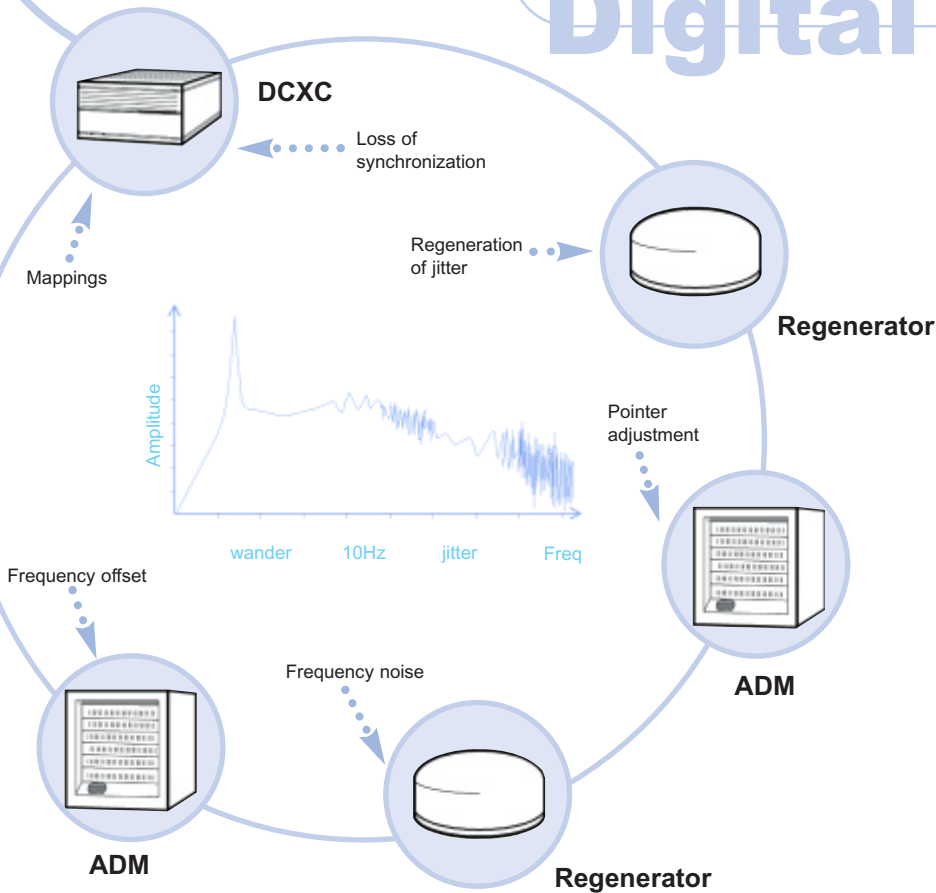
# Jitter/Wander

*in Real-Time for SDH, SONET, PDH and T-Carrier*



**Trend**Communications

# Digital Networks *and Phase Impairment*



The nodes of SDH and SONET networks must be synchronized by a master clock to guarantee faultless operation. However, due to physical and operative effects, the quality of synchronization might degrade and even produce errors.

This offset is modelled as jitter for high frequencies and wander for low frequencies. Jitter causes sampling errors and slips, whereas wander degrades the synchronization signal, forcing the multiplexers to introduce pointer movements that end up producing jitter.



## Victoria Jitter/Wander

*Unique Digital Technology*

Victoria Jitter/Wander is the first hand-held tester in the world with all the features for installing and maintaining SDH, SONET, PDH and T-Carrier networks, including simultaneous analysis and generation of jitter and wander.

### SDH/SONET/PDH/T-Carrier

- Meets the O.181 for SDH test instruments
- BER analysis in payload and in overhead bytes
- G.821, G.826, M.2100, M.2101 performance
- Trail trace in J0, J1 and J3
- Error and alarm tests
- Disruption time (APS)
- Round Trip Relay (RTD)
- Tandem Connection Monitoring (TCM) and APId tests
- SDH in G.832 frame at 34Mbit/s
- Nx64 and Nx56 kbit/s tests at E1 and DS1 rates

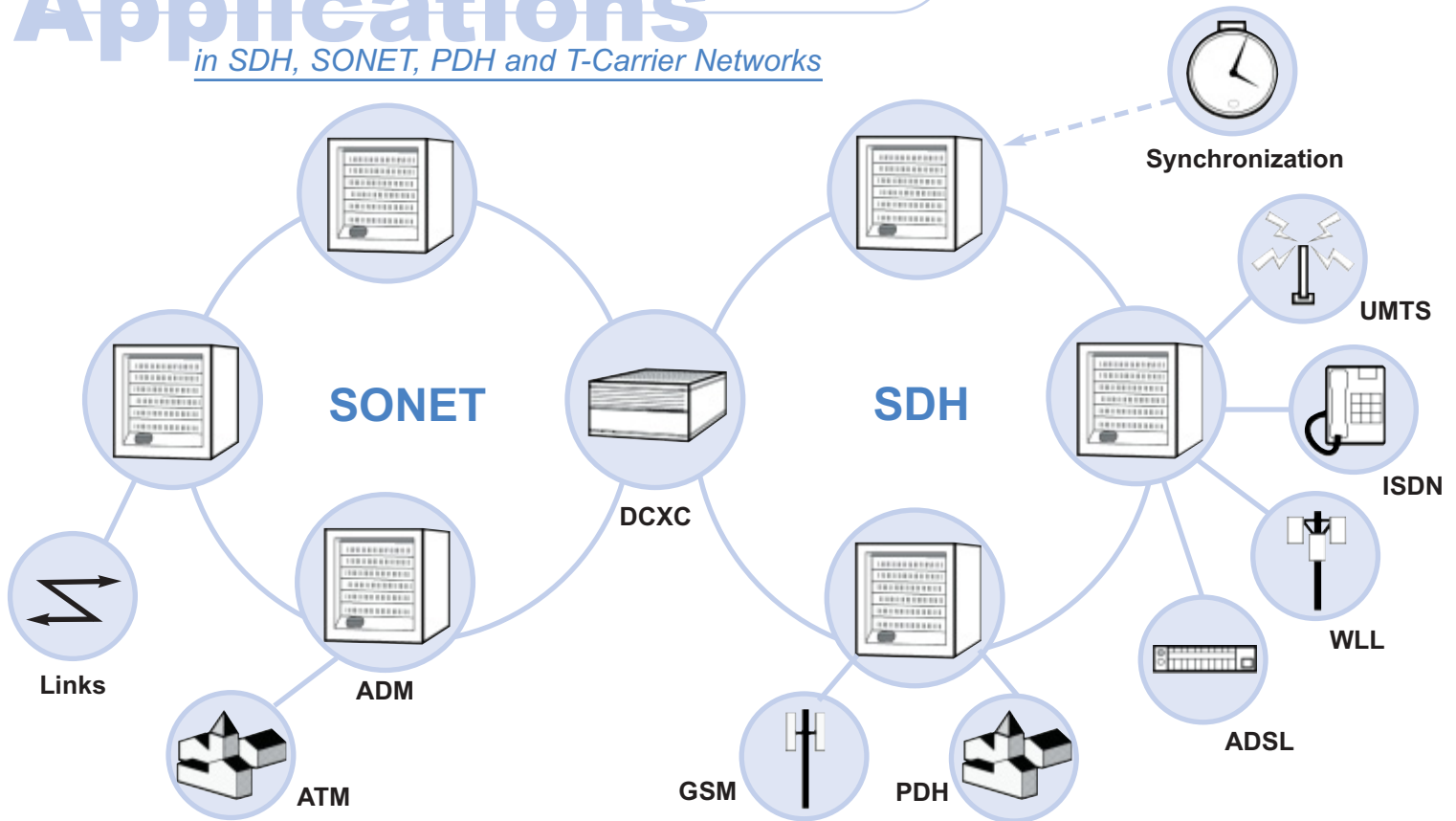


### Jitter/Wander

- Meets the O.171 and O.172 for jitter and wander test instruments
- Jitter starting from 0,1Hz to measure according to the ETSI standards
- Jitter and wander transfer measurement, checking the defined limits
- Programmable jitter filters
- Jitter and wander tolerance measurement with editable masks, graphical results and tables
- Offset and drift measurements verify the performance of the local clocks and the video transport
- Jitter and wander generation by means of arbitrary modulating signals (ETSI tests for ONP)
- Evaluating TIE, MTIE, MRTIE and TDEV in real time and without an external PC
- G.783 pointer sequences to analyse combined jitter

# Applications

*in SDH, SONET, PDH and T-Carrier Networks*

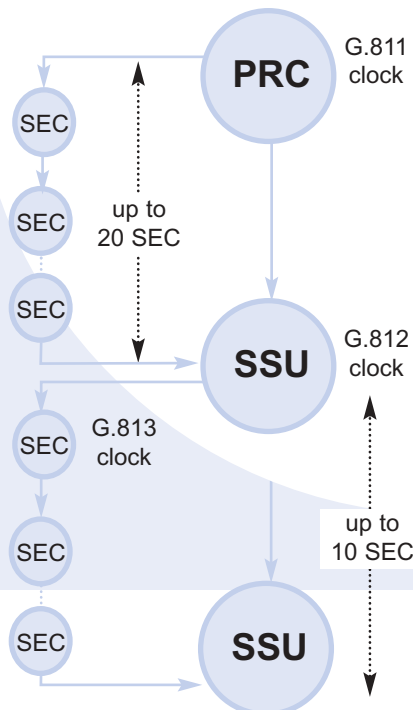


Powerful and easy to handle, Victoria is the ideal tool for both office and field work

## Synchronization of Networks

Bad synchronization is the main cause of errors in digital networks. Victoria Jitter/Wander can check the stability, frequency, drift and the phase transients of the clocks, as well as their capacity to filter the signal, their behavior when changing the reference, the performance of the signals they generate and loss of external synchronization.

- Installation, bringing-into-service and maintenance of SDH and SONET
- Tests to check the physical layer with jitter and wander for GSM, ADSL, ISDN, WLL, UMTS and ATM networks



## Synchronization Network and ITU-T Recommendations





# MTIE and TDEV

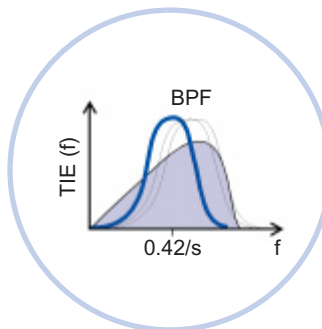
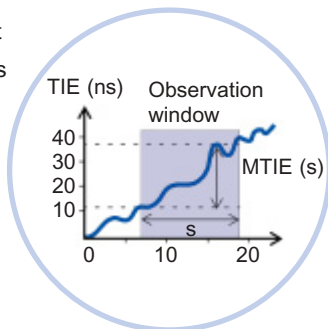
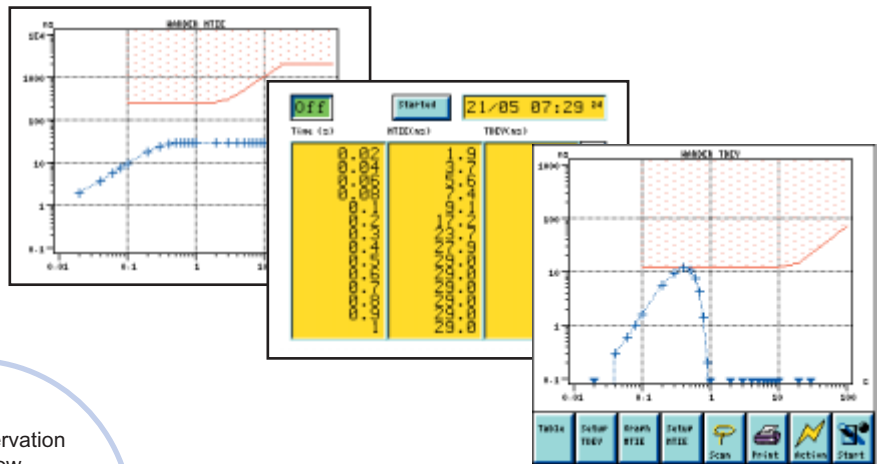
*in Real Time*

## MTIE, MRTIE and TDEV Calculation

The TDEV shows the spectral contents of wander and finds out how its frequency components are distributed.

The MTIE is the maximum TIE measured during a period of time, evaluating the long-term stability of a clock.

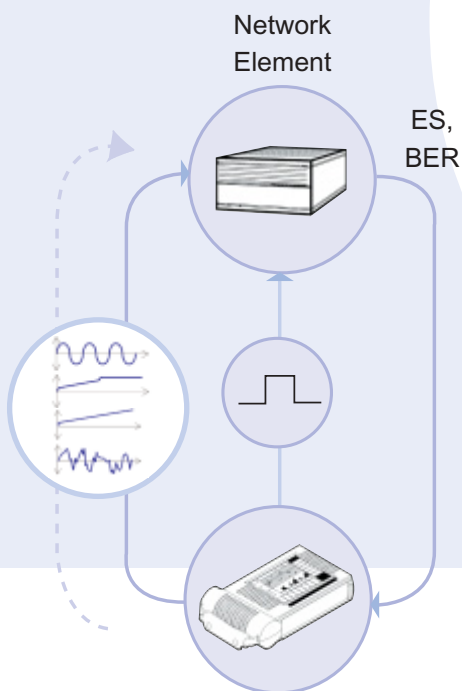
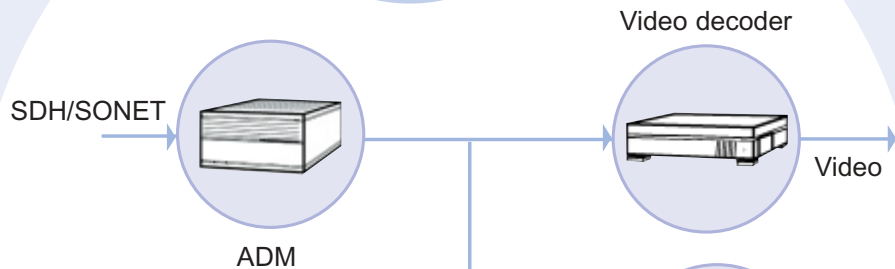
The MRTIE extracts the offset that appears in measurements performed with local reference clocks.



MTIE and TDEV results

## Offset and Drift of Signals

The offset, the drift and the frequency of the signal determine the type of decoder needed to recover the video signal.



## Editing Arbitrary Signals

To study the behavior and tolerance of network elements before any phase error, EDISA lets you create files that Victoria then uses to create any arbitrary phase modulation.

EDISA is a PC software designed to edit jitter/wander modulating signals, sinusoidal as well as arbitrary ones, and define the frequency and amplitude parameters associated with them.



# Interfaces

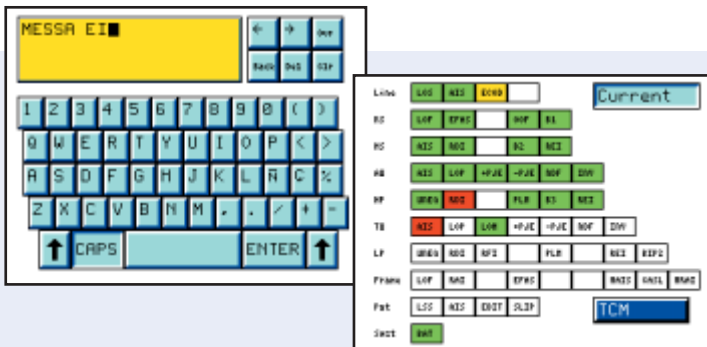
*without Limits*

Jitter and wander measurements can be performed in all the existing interfaces in digital SDH, SONET, PDH and T-Carrier networks, from 1.5 up to 155Mbit/s.

The selectable line coding includes AMI, B3ZS, B8ZS, HDB3 and CMI. The optical signals are of NRZ type.



	Interface	Bit Rate	Elect.	Opt.
SDH	G.832	34 Mbit/s	x	x
	STM-0	52 Mbit/s	x	x
	STM-1	155 Mbit/s	x	x
PDH	E1	2 Mbit/s	x	
	E2	8 Mbit/s	x	
	E3	34 Mbit/s	x	
	E4	140 Mbit/s	x	
SONET	STS-1/OC-1	52 Mbit/s	x	x
	STS-3c/OC-3	155 Mbit/s	x	x
T-Carrier	DS1	1.5 Mbit/s	x	
	DS3	45 Mbit/s	x	



# Power

*Easy to Handle*

## Touch&Play®

The simple syntax combined with the touch screen form the most natural and efficient user interface in the market.

## Dumping

All the models of Victoria provide you with a serial port for remote control, for connecting the tester to a printer or for exporting results to a PC with spreadsheets and text processors.

## Functions

The *Autoconfiguration* detects the whole signal structure. The *Fastscan* explores the alarms and errors in synchronous tributaries. The *Macros* perform tests with a single keypress.

## Modes

Termination mode, transparent mode, mux/demux, in and out of service.

## SoftLEDs®

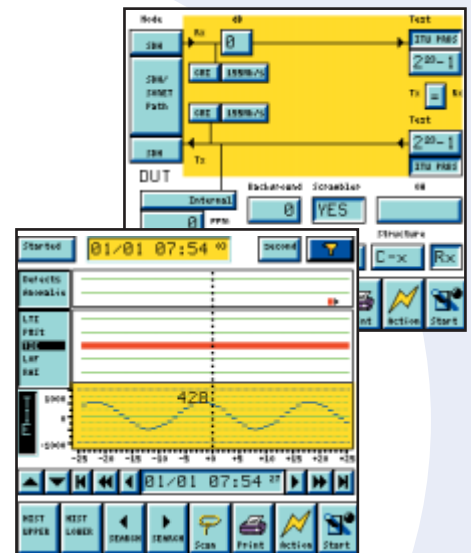
You can monitor up to 100 events simultaneously, with 10 tricolor LEDs labelled on the screen.

## Results

Victoria displays the results in real time and stores them in high resolution.

The trace of events includes time graphs, histograms and filters, together with search, identification and quantization functions.

The jitter and wander measurements are shown in tables and graphics, with masks you can easily create and edit.



## Victoria Jitter/Wander

<b>Interfaces</b>	Electrical: 1.5, 2, 8, 34, 45, 52, 140 and 155Mbit/s in one single connector Optical: 34, 52 and 155Mbit/s Outputs with frequency offset, from 0 to $\pm 20000$ ppm in steps of 0,01ppm Analog output with jitter/wander modulation of the entering signal
<b>Generator of jitter and wander</b>	Sinusoidal and arbitrary modulation
<b>Jitter analyzer</b>	Results: Ulpp, Max Ulpp, RMS, Jitter hits Storage and graphics of the evolution of Jitter (Ulpp) and Jitter (RMS) Programmable hit thresholds Frequency band: 0,1Hz to 3,5MHz Jitter measurement filters
<b>Jitter and wander tolerance</b>	Automated measurements Results in tables or graphics with masks
<b>Jitter transfer</b>	Transfer obtained by using a previous tolerance measurement as the input stimulus
<b>Wander analyzer</b>	Storage and graphics of the TIE evolution Evaluating MTIE and TDEV in real time without an external PC MTIE and TDEV results in tables or graphics with masks MRTIE: subtracting the frequency offset of the TIE, MTIE and TDEV Frequency offset (ppm), drift (ppm/s), current and maximum
<b>SDH/SONET test</b>	Mappings of 2, 34, 45 and 140 Mbit/s signals in their containers BER tests in containers and OH channels In-service/Out-of-service measurements Programmable OH bytes Analyzing and generating path trace, errors and alarms Analyzing and generating pointer movements (manual and G.783 sequences)
<b>PDH and T-Carrier test</b>	BER tests In-Service and Out-Of-Service measurements Analyses and generates errors and alarms in framed and non-framed signals PCM30/31 framing for 2Mbit/s, SF/ESF and SLC-96 for 1.5Mbit/s and M13/C-Bit for 45Mbit/s Programs and displays signalling bits Nx56 and Nx64 kbit/s test at 1.5 and 2Mbit/s
<b>Facilities</b>	Jitter and wander masks stored on the disk G.821, G.826, M.2100, M.2101.1 performance Transport of SDH entities in a frame at 34Mbit/s Tandem Connection Monitoring (TCM) Round Trip Delay (RTD) Automatic Protection Switching (APS) Autoconfiguration and Macros for automatic tests FastScan: automatic scan of errors, alarms and events Optical power measurement Frequency measurement Remote control, Printing of results Transferring the printouts onto a PC Macros to automatically perform programmed tests
<b>Relevant recommendations</b>	ITU-T: O.172, O.171, O.181
<b>Safety</b>	Radiated and conducted emission (EMC): EN55022 Immunity to EMC: EN61000-4-x Immunity to electrostatic discharge (ESD): EN61000-4-2 Electrical safety: EN61010-1
<b>Ergonomy</b>	Size: 257x147x70mm. Color touch-screen of 120x90mm 10 external tricolor LEDs Weight: 1.89kg Options weight: battery 0.37kg, rubber boot 0.36kg Power supply: network or NiMH batteries, single or double



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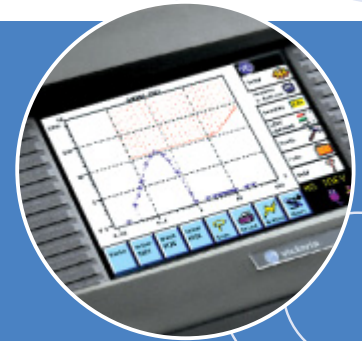
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A Member of the Telematrix plc Group



Distributor

To arrange a demonstration or to obtain the latest information on the Trend **Victoria** Jitter/Wander or any of Trend's other test equipment, contact your nearest Trend Distributor.