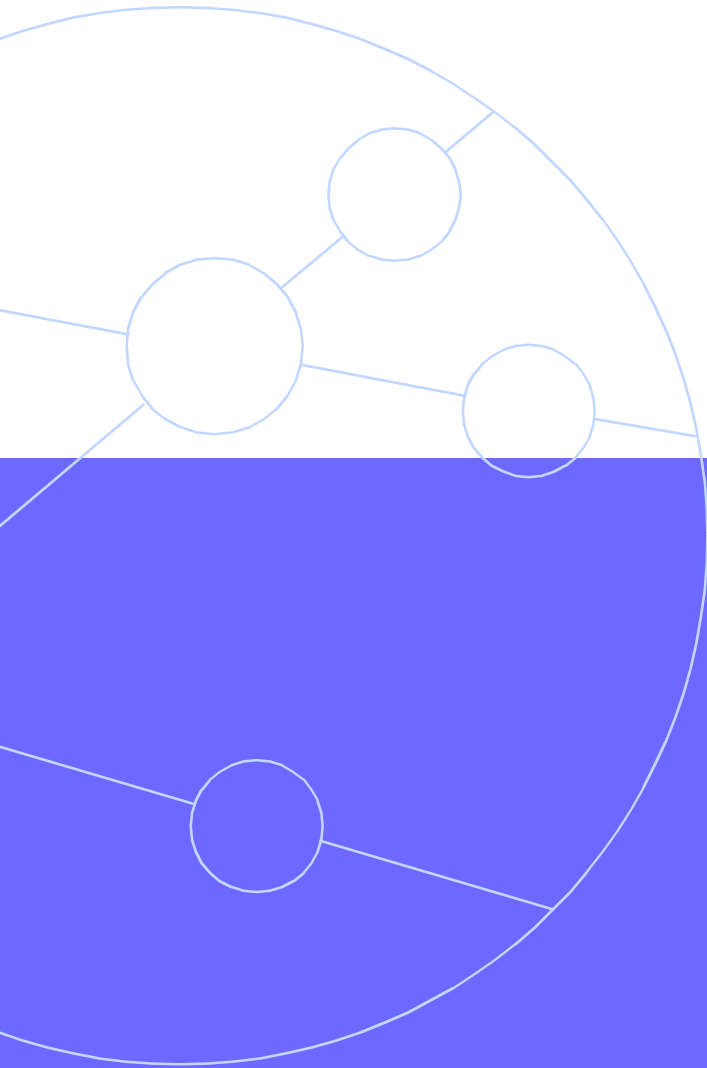


# VictoriaCombo



*Full testing up to 10 Gbit/s*



**SDH and SONET**

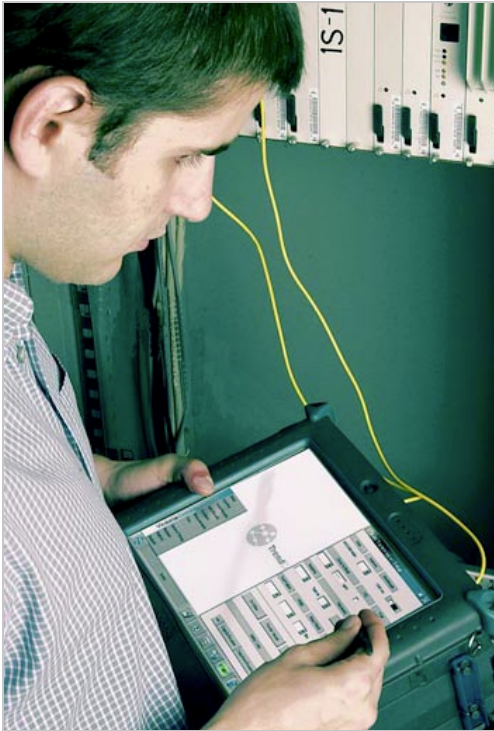
*Tailored Test Solution for the NGN*



**Trend**Communications

# Designed for the User

*the engineer assessment*



**W**hen working in the central office, we prefer to use testers with different modules and accessories that enable us to analyze each and every bit of the network. However, when we have to go and work out in the field, we often find out that even the nearest mains electricity supply is too far away. In these circumstances, light weight, long battery life and flexibility are keys to efficiency.

*“Naturally, human factors are very important as well. For example, in our department, not all of us have the same expertise or experience. Testers that do not meet the needs of different users and can only be used in a standard way tend to frustrate those members of our team who are not experts, and on the other hand leave our experts unsatisfied. And this, undoubtedly, has an effect on the results we obtain.”*

*“As technicians of transmission networks, we want testers tailored to our needs: modular, easy to handle and adapted to our working environment.”*

*An ideal tester, for me, must be able to adapt to all working environments and all technologies, and it must also offer an effective way to communicate with the outside world to transfer results, import configurations or access the Internet to download the latest applications. I would also love to see that our experts could use Remote Control when they need to solve problems.”*

**Fran Hens** (L'H Network Commissioning)



## Victoria Combo

Multi-task, Multi-user, Multi-technology

- Universal tester up to 10 Gbit/s for both SDH and SONET
- Modular, stackable and expandable, designed to work in a wide range of applications
- Easy to integrate into centralized remote control platforms
- Battery and mains operated
- With TCP/IP connectivity you can control Victoria Combo from anywhere, via any network
- Multi-Task and Multi-User
- Ethernet, TCP/IP, Wireless and RS-232 connectivity
- All you need for installation, Bringing-into-Service and maintenance



**More Information:** Technical details available at [www.trendcomms.com/combo](http://www.trendcomms.com/combo), including modules, datasheets, presentations, application notes, PR, etc.

# The NGN Challenge

*All the Best Features in One Single Tester*



## New Generation

New technologies, deregulatory policies and the appearance of Next Generation Networks (NGN) have redefined the telecoms business.

The Internet and all the technologies associated with it have modified network architectures by giving rise to circuit and packet convergence. Today, TCP/IP, 10 GbEnet, ATM, SDH, SONET and DWDM are mixed in NGN nodes that integrate access, routing, multiplexing and switching to create flexible networks.

The Internet and all the technologies associated with it have modified network architectures by giving rise to circuit and packet convergence. Today, TCP/IP, 10 GbEnet, ATM, SDH, SONET and DWDM are mixed in NGN nodes that integrate access, routing, multiplexing and switching to create flexible networks.

## Deregulation

This new and innovative generation of nodes as such does not guarantee perfect operation, nor profitability, as deregulation policies and the appearance of new operators have reduced margins and improved the quality of SLA.

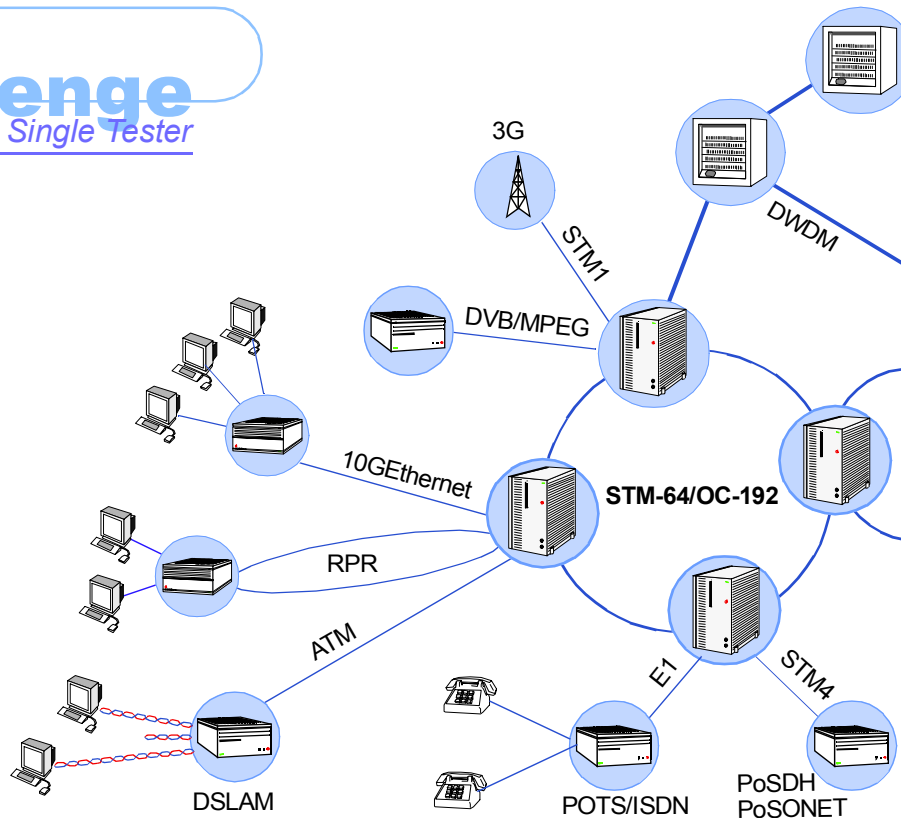
Today's operators have to reduce operational costs while constantly improving the profitability of their networks, to maintain the existing customers and attract new clients.

*Now more than ever our customers need to make their networks more profitable and follow the SLA without any extra costs.*

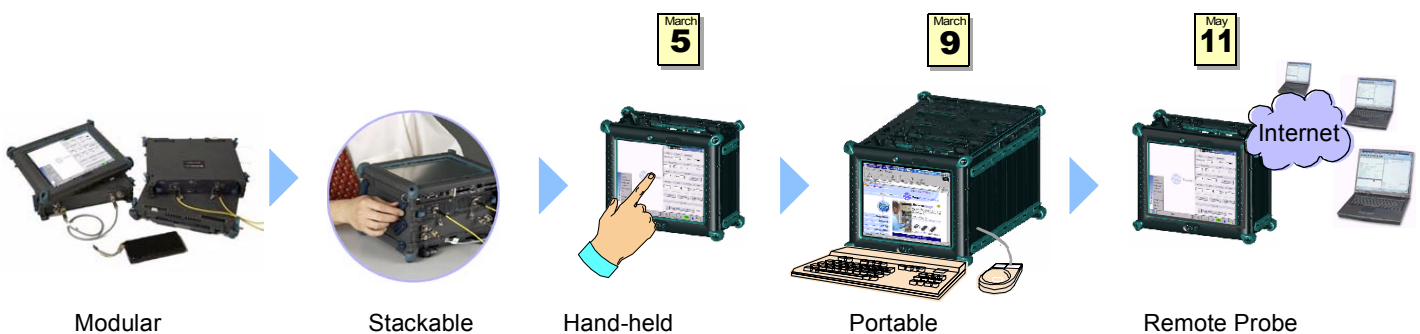
## Victoria Combo

This growing need for solution to meet these challenges has now been addressed. Using advise from test and measurement professionals around the world, the concept of multifunctional tester has been redefined. The result is Victoria Combo, an open stackable solution that is sophisticated and easy for any user to manage.

As a stackable tester, Victoria Combo is both a hand-held and a desktop equipment, or even a probe that can be integrated into a remote control platform or an OSS system.



*The Next Generation Network is built using multi-technology SDH/SONET nodes.*



*You can build Victoria Combo to meet any conditions. It is a tester that takes many forms, while running a variety of applications.*

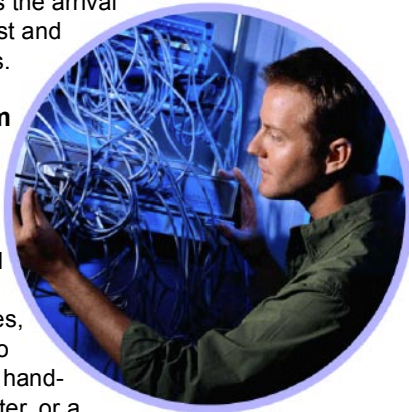
# Install, Maintain, Monitor

- the World is Yours

Victoria Combo heralds the arrival of a new concept of Test and Measurement solutions.

## One Single Platform

Victoria Combo's stackable design makes it a tester that adapts, both in size and technology, to any test scenario. Within minutes, you can change Combo from a light battery-fed hand-held into a portable tester, or a remote control platform.



## Steady and Reliable

Trend Communications has chosen LINUX as the operating system of Victoria Combo, since it is the only really reliable system. This way we can guarantee you years of continuous operation, essential for remote control platforms and for long-term measurements.

## Universal

Victoria Combo is equipped with all the SDH and SONET interfaces up to 10 Gbit/s, which makes it your ideal tester for international connections.

*A Test and Measurement solution must be easy to use and efficient, to speed up the development of new networks while reducing operational costs.*

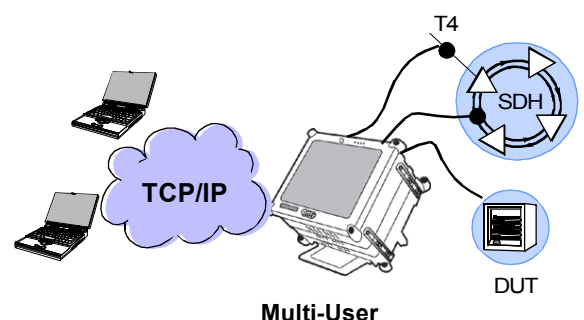
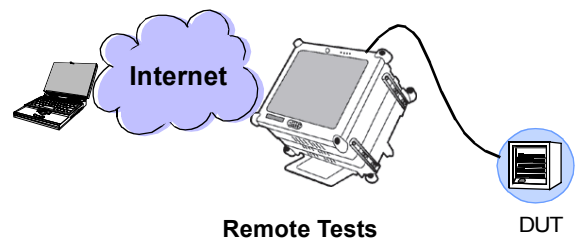
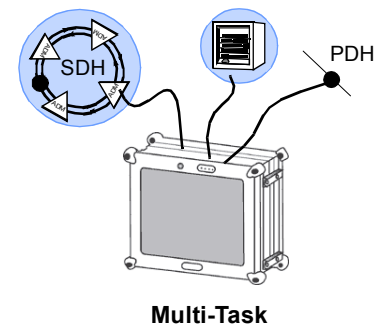
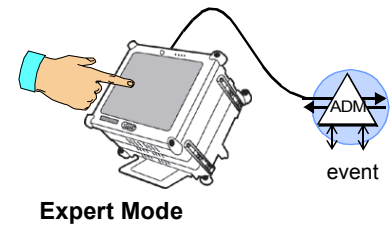
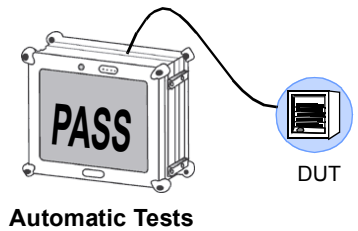
## Operating Modes

You can interact with Victoria Combo in the way not appropriate to your needs. In Local or Remote Mode, by touchscreen, keyboard or mouse. Whichever way you choose, you will either be running automatic Pass/Fail tests or detailed specialist analysis in Expert mode.



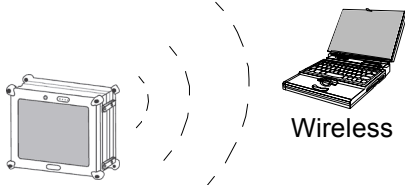
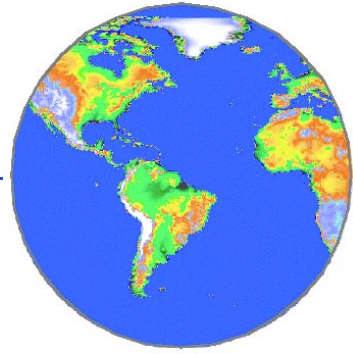
## Multi-task and Multi-user

Combo is a multi-task tester that can run both simultaneous and separate tests with each and every one of its modules. It is also a multi-user instrument, offering fast and flexible Test and Measurement access to many technicians at a time.

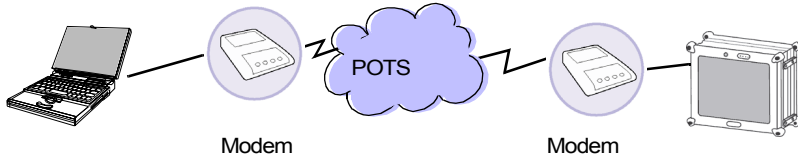


# Universal Connectivity

- Your Window to the World

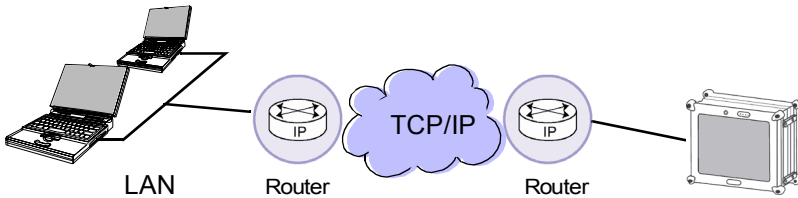


Wireless



Modem

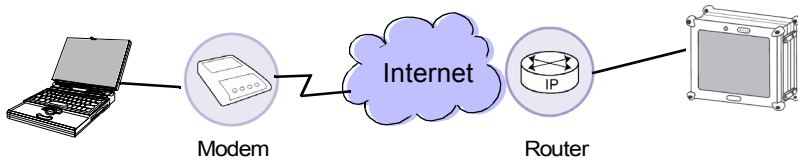
Modem



LAN

Router

Router



Modem

Router

Victoria Combo

Do you want to manage the most versatile modular test product in the Telecom market? We provide everything including universal interfaces, touchscreen, SoftLEDs and time-plus. But we believe you need something more... certainly Remote Control over the Internet or perhaps 10Gb/s capability?

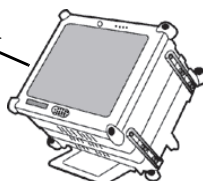
Victoria Combo is a portable test unit for the analysis and evaluation of SDH, SONET, PDH and T-Carrier networks and equipment. Combo is fully modular yet unlike any other modular tester. It is built in layers to achieve exactly what the engineer requires for a particular operational exercise. There is no plugging and unplugging of modules into a main unit as the engineer proceeds, but a unit with all conceivable requirements available at the fingertips. It has all the ITU-T and Bellcore interfaces up to 10Gb/s!

SDH	SONET	PDH	T-Carrier
STM4	OC192	E4	DS3
STM16	OC48	E3	DS1
STM4	OC12	E2	mi36/64kb/s
STM1	OC3	E1	
STM0	STS-3c	mi64kb/s	

www.trendcomms.com/combo



Internet



Web-browser

## Connectivity

Victoria Combo has built-in Ethernet, USB and RSR-232 connectors.



The two CF slots extend the possibilities for wireless links and memory modules, making your work as mobile and independent as possible.

## Web Browser

The built-in browser of Victoria Combo provides you with on-screen help, and you can also use it to connect to the Trend web site. This makes it quick and easy for you to update and download programs and documentation, or access the latest user information.

## Sleep Mode

You can switch Victoria Combo into power save mode any time, and quickly set it back into action when you wish to continue testing.

This feature has many advantages. You save the battery when you are not working with the tester. You also save time, as you can quickly get back to work without needing to restart the tester.

When the tester reactivated, it automatically returns to the state it was left when entering Sleep mode. Needless to say all your test results were automatically saved, so you can truly go back to where you left off.

## Operating on LAN

When connected to a LAN in Sleep mode, you can quickly activate Victoria Combo just by sending an Ethernet message. After receiving the message, your tester is all set and ready to go.

# Full Functionality

Trend's Big Band



Victoria Combo is a universal unit that meets all the require-

ments of testing Next Generation Nodes.

## Auto-Setup

This function detects the signal structure, coding and mapping automatically.

## Event Scan

The FastScan is a function that examines the signal and detects alarms and errors in synchronous tributaries.

## First Class Optical Interfaces

We have used the best possible optical interfaces to offer you the most advanced features. Furthermore, Victoria Combo includes removable connectors for easy cleaning, to prevent faults and errors from occurring.

## Programmable Frame Capture

To check the network status or analyze protocols, the evolution of some parameters must be examined across several consecutive frames.

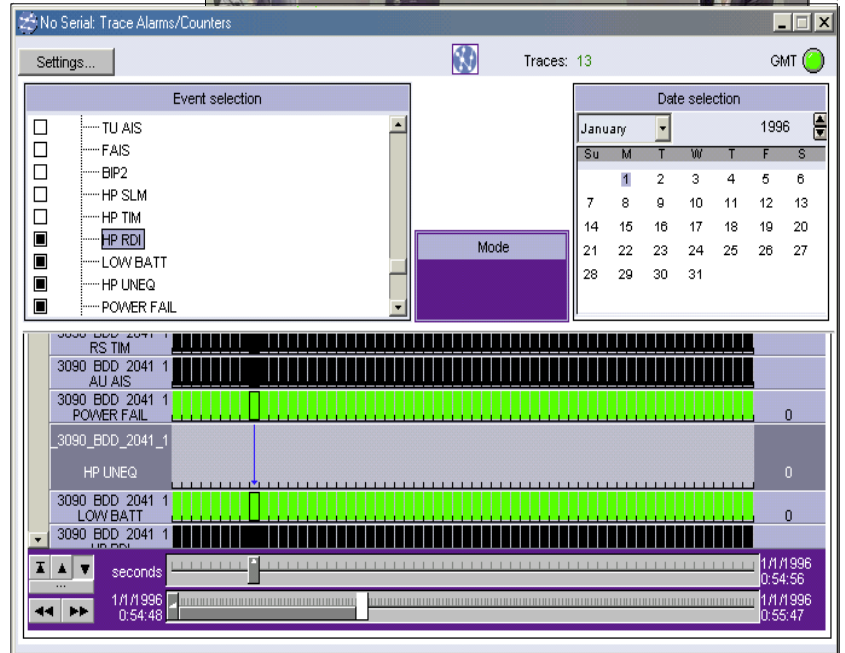
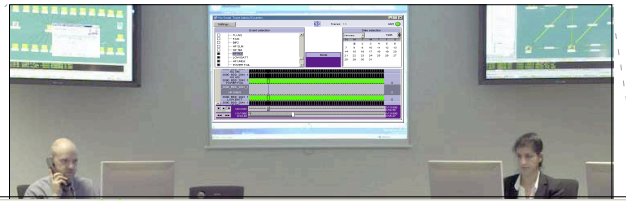
To define the type of traffic being transmitted across the network (C2 and V5 signal tags), analyze its behaviour in uncommon situations (APS K1 and K2 bytes) or verify synchronization performance, the evolution of certain frame OH bytes must be evaluated across consecutive frames. The programmable Capture function enables you to capture and check a set of consecutive frames.

## Automatic Test

A customizable set of widely used tests can be automated by means of a program screen that displays the progress of each test and gives obvious pass/fail indication at the end of the process. This functionality makes Victoria Combo easy to use with practically no training at all.

- Easy-to-clean optical connectors
- One single connector for all electrical interfaces
- Optical Receiver Shut-Down
- ITU-T-compliant line attenuation compensation
- Combined SDH/SONET tests
- Obvious PASS/FAIL screen
- Built-in Stratum 3 clock
- Reference Clock Output
- Fast-charge batteries





- Simultaneous measurements
- Advanced Event Log and Trace
- Ergonomic, multi-position support leg for desktop use
- Hand-held, probe or desktop equipment
- Built-in output clock

## Simultaneous Measurements

Thanks to its multi-tasking OS and fully independent modules, you can use Victoria Combo to carry out simultaneous measurements and correlate their results to easily identify faults.



## Event Log and Trace

Tracing is the most powerful analyzing tool any tester can have. With Victoria Combo you can register, filter, search and quantify all the events that occur. It is also very easy to save, print or transfer results onto a PC.



## Remote Network Control

Thanks to the connectivity options on Victoria Combo, you can access its resources from anywhere, in a variety of ways. The first application is a direct USB connection.

If you use a TCP/IP network, your possibilities are multiple, such as LAN, Intranet, VPN, and even Internet. All you need is a PC and an Internet browser to start taking full advantage of all the features of Victoria Combo.

You can also integrate Combo as a permanent measurement and monitoring probe in your Control Centre, by means of an OSS.

# Superior Capacity

*the Best Features for All Test Scenarios*

## Event Insertion and Analysis

The Alarm and Error display of Victoria Combo ranges from Event tables to Graphical traces. You always have access to all your results in real time. Furthermore, Combo is able to generate M/N alarm sequences to check the Network Equipment event detection criteria.

## Generation of G.783 Sequences

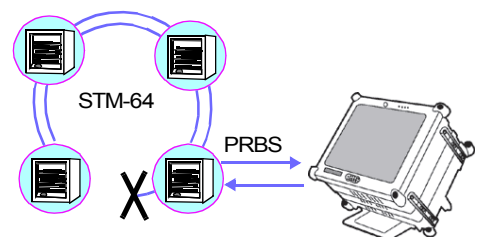
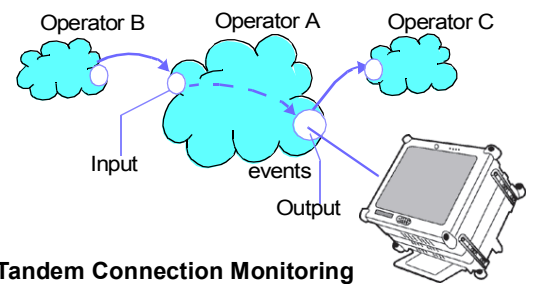
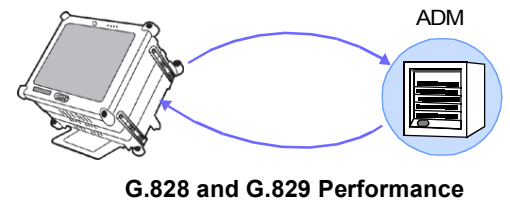
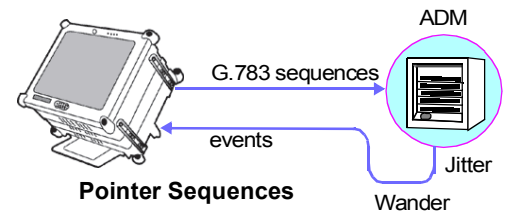
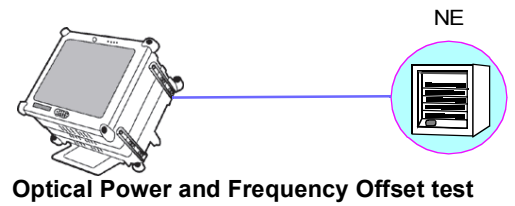
One of the main causes of error in SDH and SONET are phase fluctuations (Jitter) due to pointer adjustments. Combo can generate pointer movement sequences (ITU-T G.873) to simulate real situations and carry out stress tests in Network Equipment.

## Header and SPE Tests

Victoria Combo gives you access to all frame and container headers and enables you to program and analyze them. With this tester, you can also carry out standardized or programmable BER tests both in containers/SPE and OH bytes.

## Frequency Offset

This function is essential for stress measurements in networks and nodes, as it deviates the signal frequency from its nominal value until it finds the limit where errors, alarms or unacceptable Jitter start to occur.





# For the Next Generation of SDH/SONET networks



## Tandem Connection Monitoring

The TCM function of Victoria Combo enables you to establish those network trails where impairments occur to test that SLA is met when the link is shared by many Service Providers.

The TCM function of Victoria Combo enables you to establish those network trails where impairments occur to test that SLA is met when the link is shared by many Service Providers.

## Automatic Protection Switching

SDH and SONET networks are fault-tolerant where Automatic Protection Switching (APS) is used as the protection strategy. Victoria Combo evaluates those APS mechanisms that are in charge of reestablishing the service in case of failure, and measures the APS switching time.

## G.707 In-Band FEC

Victoria Combo implements a Forward Error Correction Service for errors detected in the regeneration section. This is defined in Recommendation G.707 for STM-64.

## G.828 and G.829

With Victoria Combo you can carry out all the existing performance measurements: G.821, G.826, M.2100.1, including the new G.828 and G.829 measurements.



- Universal SDH, SONET, PDH and T-Carrier interfaces up to 10 Gbit/s
- BER in overhead bytes (OH)
- Path trace in J0, J1 and J2
- G.821, G.826, G.828, G.829, M.2100 and M.2101 performance measurements.
- APS byte Analysis/Generation
- Network latency (RTD)
- Tandem Connection Monitoring (TCM) and APid tests
- G.783 Pointer Sequences
- Frequency and offset measurement
- Compensation of line attenuation in line with ITU-T G.703
- Frequency Offset generation
- VC-4-4c / STS-12c SPE  
VC-4-16c / STS-48c SPE  
VC-4-64c/STS-192c SPE
- SDH at 34 Mbit/s in line with ITU-T G.832
- PDH/T-Carrier frame structures at 1.5, 2 and 45 Mbit/s
- CAS signalling for 2 Mbit/s
- Robbed bit for 1.5Mbit/s



# Man-Machine Interface

*Optimal Ergonomics*



*“Victoria Combo is highly efficient, thanks to its intuitive Man-Machine Interface.”*

Testers with touchscreens have proven to be the most adequate for field work. To make your work as ergonomic and comfortable as possible, Victoria Combo includes a USB port for keyboard and mouse.

Combo has a spectacular 10,4” color touchscreen with standard 800 x 600 pixel SVGA resolution, backlight and contrast control. The menu, based on windows and icons, is very comfortable to use, and the desktop is as familiar as on your PC. The result is simply amazing.

*All the manufacturers say they have interactive user interfaces, but how many of them offer a graphical 10” touchscreen, SoftLEDS (c), Net Manager and intelligent navigation? Only one: Trend Communications with Victoria Combo.*

The screenshot displays three overlapping software windows. The top window, 'Tx\_Setup', contains various configuration options like 'Network', 'Mode', 'Optical Transmitter', and 'Clock & Offset'. The middle window, 'LedsSummaryResults', shows a grid of status indicators for different lines and systems, with a 'Reset History' button at the bottom. The bottom window, 'Trigger Byte Location', features a grid for defining trigger byte locations across columns and pointers, with options for 'Condition', 'Capture Mode', and 'Trigger Byte Value'.



## We Multiply Your Possibilities

### Ergonomics

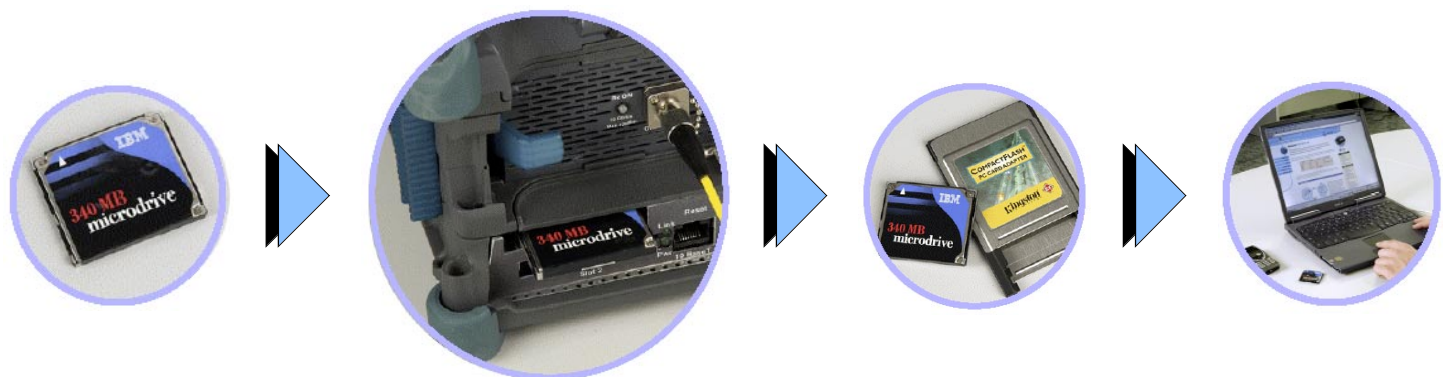
By making use of Victoria Combo's folding support leg, you can choose the position that best suits your needs - vertical, horizontal or leaning - and this way make your desktop working conditions even more comfortable.

### Connectable Interfaces

There are many ways to connect Victoria Combo to the outside world: Ethernet, wireless, USB connections...

### Flash Slots

Generating results files and programming automated tasks is easy to achieve by transferring files to/from a PC. Victoria's compact Flash slots make it quick by using Micro-drive memory cards, which also work as a memory extension.



Interfaces	<p>Optical: 155, 622 Mbit/s y 2.5 Gbit/s (1310 y 1550 nm); 10 Gbit/s (1550 nm)                  Switch-off timer for optical receivers                  Easy-to-clean, FC/PC, SC or ST type* optical connectors (field-replaceable)                  Optical outputs with frequency offset from 0 to ±40 ppm in steps of 0.01 ppm                  Electrical: 1.5, 2, 8, 34, 45, 52, 140 and 155 Mbit/s in one single BNC or DIN 1.6/5.6 connector**                  Electrical outputs with frequency offset from 0 to ±20000ppm in steps of 0.01 ppm                  Reference input: E1/T1, E1/T1 (-20 dB), 1544 kHz, 2048 kHz, signals from 64 kHz to 10 MHz                  Reference output: 1544 or 2048 kHz, selectable</p>
SDH/SONET	<p>In- and Out-of-Service Measurements                  1.5, 2, 34, 45 and 140 Mbit/s signal mapping                  Concatenation: VC-4-4c/STS-12c SPE, VC-4-16c/STS-48c SPE, VC-4-64c/STS-192c SPE                  BER testing in containers / SPE payload                  Value programming and programmable SDH/SONET overhead byte capture                  Generation/analysis of path trace messages, errors, alarms and FEC G.707 blocks***                  Generation/analysis of pointer adjustments, programmable sequences and G.783</p>
PDH/T-Carrier	<p>In- and Out-of-Service Measurements                  BER testing on framed/unframed patterns                  Generation/analysis of errors and alarms in framed and unframed signals                  PCM30/31 for 2 Mbit/s signals with/without CRC and fractional T1 for 1.5 Mbit/s signals                  Programming and display of signalling bits for 2 Mbit/s and 1.5 Mbit/s signals                  Framed M13 and C-bit for 45Mbit/s signals and SF, ESF and SLC-96 for 1.5 Mbit/s signals</p>
Functions	<p>Auto-setup: automatic identification of the incoming signal                  FastScan: automatic error, alarm and event scan                  Round Trip Delay (RTD) measurement                  Automatic Protection Switching (APS) measurement                  BER testing in SDH/SONET OH channels</p>
Additional features	<p>G.828, G.829, G.821, G.826, M.2100, M.2101.1 performance statistics                  Optical power measurement, frequency and offset measurement                  Graphical results: real-time event trace with time graphs and histograms                  Tandem Connection Monitoring (TCM)                  G.832 transport of SDH signals in 34 Mbit/s frames                  Automatic preprogrammed tests                  Remote Control via a standard browser and TCP/IP connectivity                  Connectivity: Ethernet, Wireless (2 slots for compact flash), RSR-232, 2xUSB                  Measurement report printout and file transfer to a Microdrive Memory Card</p>
Relevant Standards	<p>ITU-T: O.181, G.707, G.783, G.957, G.961, G.821, G.826, G.828, G.829, M.2100, M.2101.1                  ANSI: T1.105-1995, Telcordia GR-253</p>
Safety	<p>Radiated and conducted emission (EMC): EN55022, Immunity to EMC: EN61000-3-3                  Immunity to electrostatic discharge (ESD): EN61000-3-2, Electrical Safety: EN60950</p>
Ergonomics	<p>10.4" Colour Touch Screen with SVGA (600x800 pixels) resolution and automatic backlight control                  Multi-position desk leg                  Stackable modules. Customizable position.                  Mainframe size (w x h x d): 270 x 220 x 34.3 mm                  Rear module size (w x h x d): 270 x 220 x 28.1 mm                  Application module size 2" for 10 and 2.5 Gbit/s (w x h x d): 270 x 220 x 50.8 mm                  External power supply or Li-Ion 4.1Ah, 14.8V battery-powered (1 or 2 battery packs)                  Power Saving mode and fast restart                  External LEDs: ON/OFF, battery status, LAN connection and USB port activity.</p>

\* & \*\* Ask for your connector

\*\*\*Optional

Available upon request: Built-in attenuator in the 10 Gbit/s optical interface transmitter module and Splitter in the 10 Gbit/s optical interface receiver module.



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A member of the Telemetrix pic Group



Distributor

To arrange a demonstration or obtain the latest information on the Trend Victoria Combo or any of Trend's other equipment, contact your nearest Trend Distributor.

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