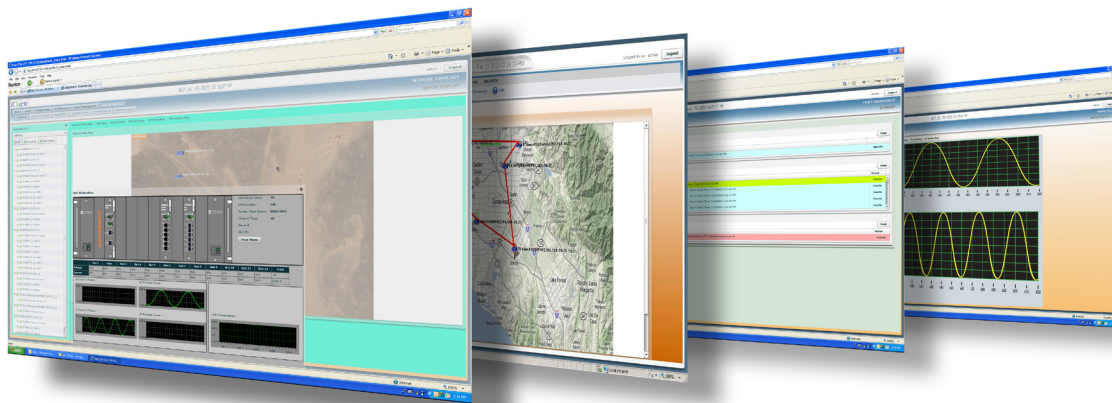


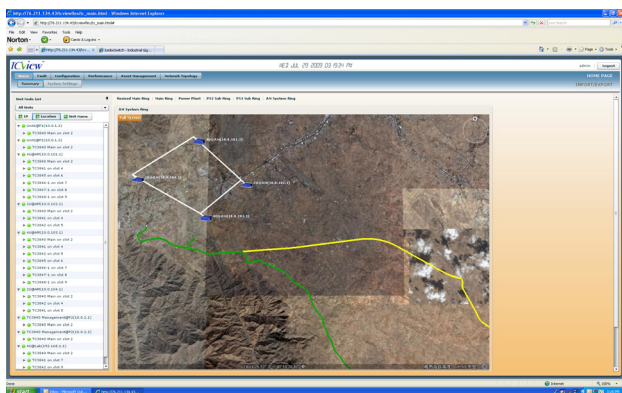
TCView®

Network Management System for TC Networking Devices



TCView® provides the integrated and comprehensive management tools needed to simplify the configuration, administration, monitoring, troubleshooting and servicing of JumboSwitch® networks and other TC Communications networking devices. Going beyond traditional element manager applications, it delivers a unique platform of cross-functional management capabilities that integrate all TC networking products into one network administration platform.

Based on the highest industrial standard in the industry, FCAPS (Fault, Configuration, Asset, Performance, Security), TCView greatly enhances the effectiveness of network administration. For example, it simplifies both routine and one-time tasks such as reconfiguring switches and gateways, monitoring network performance and isolating faults. Moreover, TCView is a robust administration tool that is applicable to both small enterprise deployments and large networks with up to 1000 network devices.



Key Features

TCView enhances the functionality of JumboSwitch switching, routing, and gateway products with a wide variety of important features including device discovery, topology maps, event logging, and VLAN management.

Five TCView features are particularly important and beneficial to JumboSwitch network users:

- Remote Software/Firmware download capability
- Extensive Asset Management capabilities including ongoing collection of system part/serial numbers and version numbers/upgrade dates for precise inventory management
- Remote Monitoring for "live" operating temperatures of each interface card
- Remote Monitoring for "live" power consumption of each interface card
- Remote Monitoring for "live" fiber ports TX/RX power of critical fiber links

It should be noted that the above features are standard on the JumboSwitch but typically not available on traditional Industrial Switches from other vendors. In addition, these features can be especially critical for industrial applications. For example, TCView's precise power consumption and temperature sensing capabilities could be used to create real time preventive maintenance parameters (e.g. identify any degradations) for network IEDs in extremely hot or cold environments.

Fault Management

TCView's fault management detects, isolates, corrects, and logs malfunctions that occur in a JumboSwitch network. When the network is configured and operating, TCView constantly performs a wide variety of important functions including accepting and acting on error detection notifications, tracing and identifying faults, carrying out diagnostics test sequences, correcting faults, reporting error conditions and tracing faults with error logs.

TCView also assigns alarms for various low to high severity levels through its unique filtering system. Severity levels can be defined from "debug" to "emergency" levels and graphically illustrated in TCView for convenient management purposes. Features include:

- Active and passive fault monitoring
- Color-coded alarm severity levels
- Notification of predetermined alarm conditions (e.g. by e-mail)
- Alarm/event archiving, exporting, filtering, or searching
- Network node, interface, or service failure reporting
- Security violation reporting
- Threshold condition notification
- Automatic or manual fault fixing
- 802.1ag and 802.3ah supported

Configuration Management

Configuration is a simple but important task on a JumboSwitch network. With TCView's configuration management, all levels of configuration tasks can be streamlined under one management screen.

In addition to offering all popular configuration management features, TCView offers network hardware and software inventory management capabilities that are unique to the JumboSwitch when compared with standard Ethernet Switches. These features include ongoing collection of part numbers, serial numbers, version numbers, upgrade dates and locations. As every network administrator knows, these features are invaluable for efficient long term asset and security management. Configuration management features include:

- Centrally managed configurations and upgrades
- Version tracking on both hardware and software components
- Version change logging with date, time and user
- Current configuration comparisons with baseline (factory default, etc.)
- Configuration auditing to check conflicts & compare with performance data
- Backup and synchronization versions
- Access directly to a managed device
- Fail-over and fault-tolerance configuration
- MIBs import/export for network management integration (subject to TC Communications approval)

Asset Management

TCView can organize and create inventories for all information related to the JumboSwitch and its Interface Cards. For example, TCView can easily inventory firmware versions, EPROM versions and serial numbers. Features include:

- Exporting items to an Excel Spreadsheet
- Assigning Custom IDs for asset tracking
- Tracking asset locations
- Providing easy and organized views of assets including serial numbers, firmware number and interface card names

Performance Management

TCView improves the performance of a JumboSwitch network by enhancing management of Latency, Capacity and Reliability. TC engineers have employed a sophisticated bandwidth management mechanism to guarantee that desirable performance levels can be achieved. Features include:

- Element management detailed to component temperatures and power consumption ratings
- VLAN configuration and management
- Baseline and threshold setup
- RMON traffic analyzer
- Traffic shaping or rate limiting
- Bandwidth management to optimize performance
- Network performance reports

Security Management

Because Cyber Security is becoming an enterprise operation that focuses on network management, TCView is designed with a solid foundation of security functions. Also, for easy management, TCView organizes all security tasks into one management screen. Features include:

- SSH/SSL encryption
- Identity management
- User access policy management
- Multi-level password and privilege system with automatic expiration intervals
- Enable and disable switch ports
- SNMPv3 authentication and encryption
- 802.1Q VLAN
- 802.1x network access control
- Security-related information and event reports
- User logs and traces (radius and TACACS)

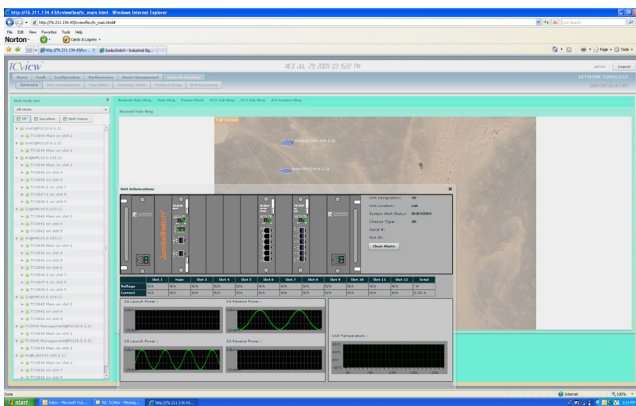
System Management

TCView's system management functions include:

- System Asset Management
- Reset of all system data to a default configuration
- System data consistency check
- System data maintenance and modification
- Graphical network view with health status
- System reports center

Service Management

- Event correlation to improve service efficiency
- Event automation with service ticket management



Specifications

Minimum System Hardware

- 3.0 GHz Intel Core™ or equivalent processor
- 4 GB RAM memory
- 250 GB storage
- 1000Mbit NIC

Recommended System Hardware

- Intel Xeon or equivalent processor
- 16 GB RAM memory
- 1 TB storage
- 1000Mbit NIC

Supported Software

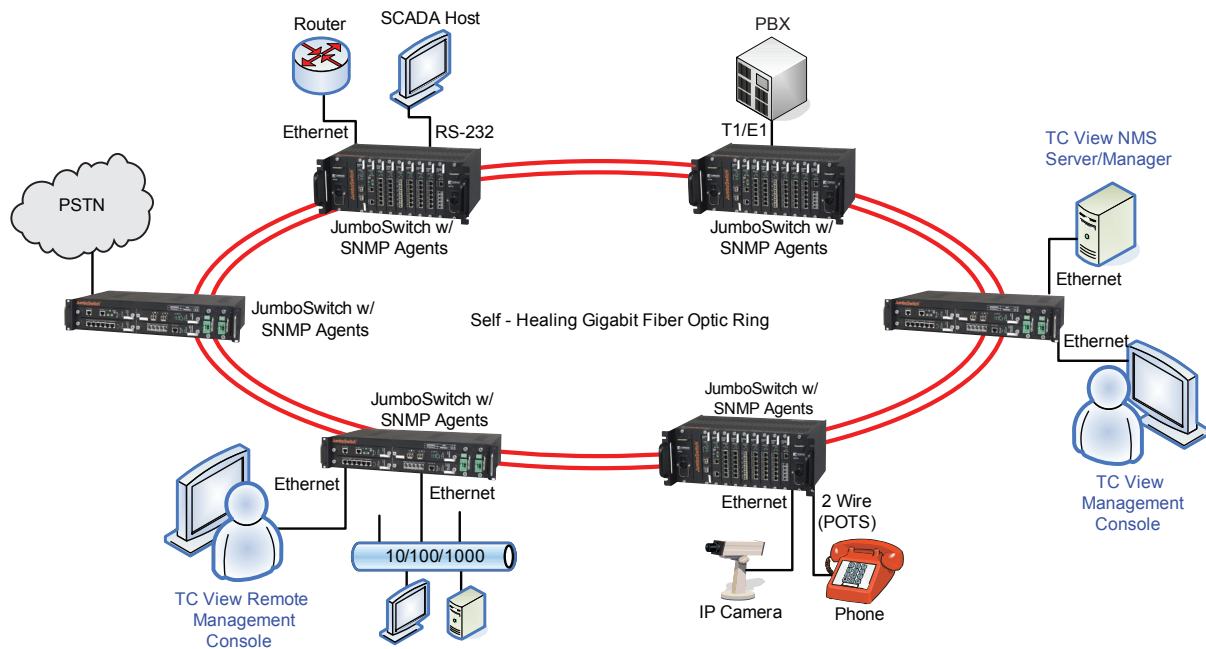
- Windows 10 Professional
- Microsoft Windows 2012 Server or later
- Microsoft SQL Server 2012 or later

Browser

Microsoft Internet Explorer version 11.0 or later

Supported Products List

- TC3240
- TC3840 Main
- TC3840 Management
- TC3840C Combo Card
- TC3840DR
- TC3840-5
- TC3841
- TC3841-2DR
- TC3842-1
- TC3842-2
- TC3842-3
- TC3842-3DR
- TC3842-4
- TC3844-1
- TC3845-1
- TC3845-3
- TC3846-1
- TC3846-2
- TC3846-6
- TC3847-1
- TC3847-1DR
- TC3847-1ML
- TC3847-3
- TC3847-4
- TC3847-5
- TC3847-6
- TC3847-7
- TC3848-1
- TC3848-2
- TC3848-3
- TC3848-4
- TC3850-1
- TC3852-4



TCView, Network Management System Implementation in a JumboSwitch, Self-Healing Ring Application

Note: Information contained in this data sheet is subject to change without prior notice.

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DTS-TCVIEW-01-05
Date: 120519

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