# ORION TELECOM NETWORKS INC.

# T1 Protection (Fail-Over) Switch

## Product Brochure & Data Sheet

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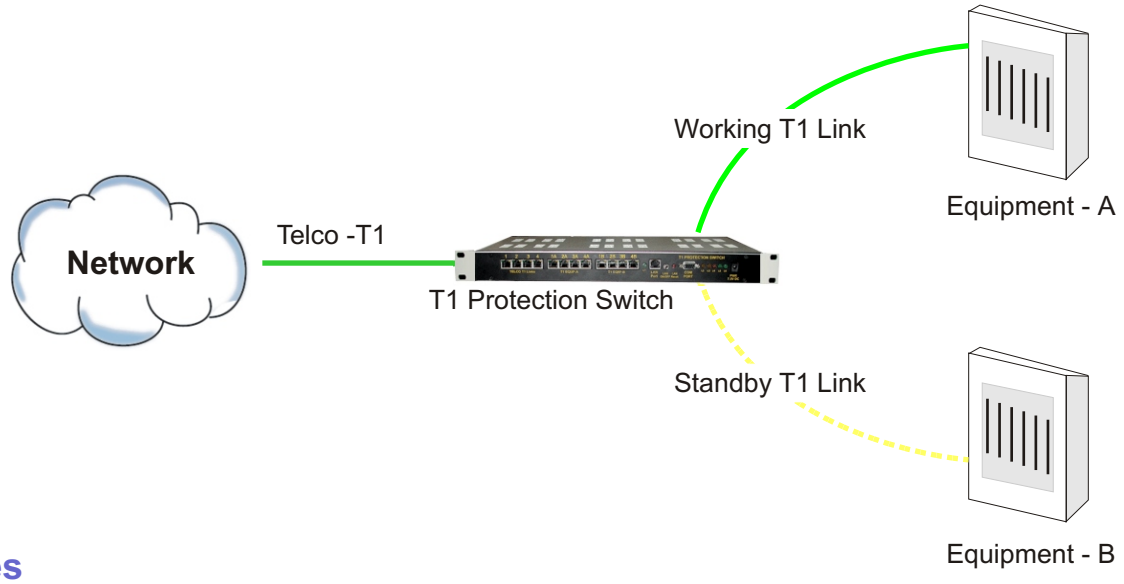
## Product Overview

Orion's 4 Port T1 Protection (Fail-Over) Switch allows the user to connect upto four T1 lines from the telephone company to **"active",** as well as to **"standby"** terminal(s), such as data server(s) etc. at the customer premises.

**T1 Protection (Fail-Over) Switch**

In the event of the failure of the data server(s) / equipment connected to the **"A / active"** ports, the T1 Protection (Fail-Over) Switch shall automatically switch and connect the T1 line(s) from the telephone company to the data server(s) / equipment connected to **"B / standby"** ports. This ensures minimum downtime - that would have otherwise occurred due to equipment failure. Enhances the efficiency of that network.

## Application Diagram




## Features

- Allows the users to connect upto 4 T1 lines from the Telephone Company to 4 active and 4 standby T1 terminals
- User configurable. May be used for a single T1 link and scaled upto 4 T1 links though user configuration
- Independent, user configurable switching parameters for each T1 link
- Built-in real-time clock / real-time logging maintains a history of all events
- Remotely accessible over a TCP-IP networks. Allows the user to access and carry out maintenance, or and T1 switch the links remotely, if required.

## Benefits

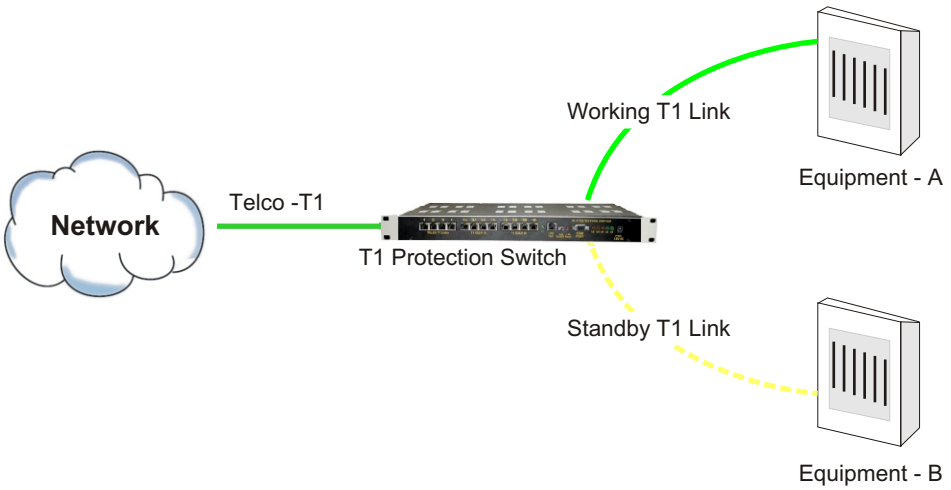
- Allows the users to create and maintain active/standby/duplicate customer premises data networks/data servers, without requiring to bear the recurring $$$ expense of leasing additional expensive T1s lines from the telephone company
- Automatically switches the T1 link(s) from the Telephone Company between the **"active"** and **"standby"** T1 equipment at the customer premises, according to the customer-defined criterion
- Improves security. Allows the user to co-locate the **"backup" / "standby"** equipment in a different room/building and prevent data loss
- User programmable switching criterion independent for each T1 link
- Increases the reliability of the customer data/IT networks without the recurring additional cost of leasing additional T1 lines from the telephone company. The equipment may be used to create secondary/backup systems at the customer premises to provide virtually uninterrupted service.

## User programmable criterion for switching between Active and Standby T1 Links at the customers premises:

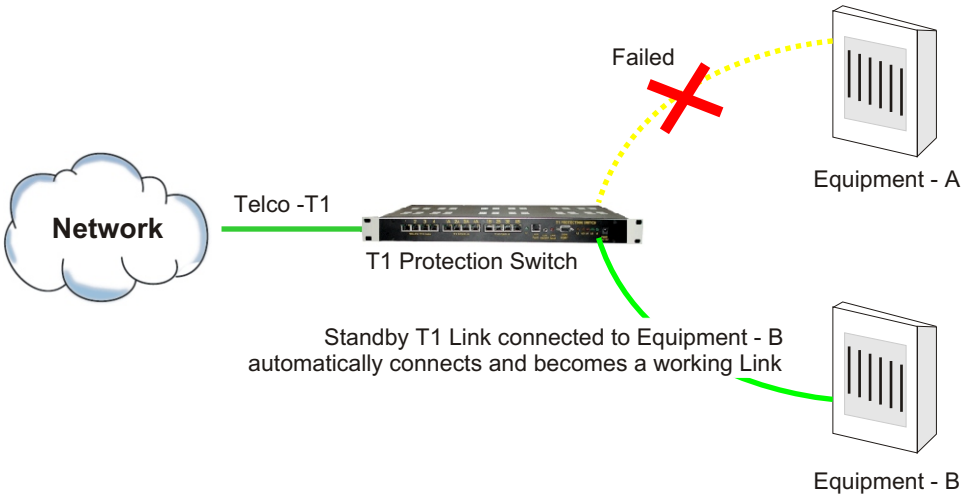
| | |
|---|---|
| Loss Of T1 Signal (LOS) | The Loss of Signal condition in a T1 may occur due to:<br><br>a) The failure of the T1 Port of the customer premises equipment.<br>b) Or due to loss of power to the customer premises equipment.<br>c) Or due to the disconnection of the T1 cable between the Protection Switch and the T1 Port of the customer premises equipment.<br><br>The cause of LOF is 2 out of 5 Ft bits are in error for D4 Framing and 2 out of 5 frame bits are in error for ESF framing. |
| Loss Of Frame (LOF) | This Alarm is also known as Blue Alarm. This Alarm indicates unframed all ones being detected in the incoming pulses on the receiver of T1 Protection Switch. |
| Alarm Indication Signal (AIS) | This Alarm is also known as Yellow Alarm. This Alarm indicates in D4 Framed bit 2 of each DS0 for 255 consecutive channels has been detected as a zero. |
| Remote Alarm (RA) | When ESF Framed: Alternating eight ones/eight zeros have been detected in the ESF Datalink. A Yellow Alarm is typically transmitted to indicate a failure on the receive side of the Failed end. |
| CRC ERROR | This parameter is the number of CRC-6 errors (Cyclic Redundancy Check Errors) that occurred during the test period.<br>CRC-6 errors are only counted while the Telco T1 framing is selected as ESF (Extended Superframe). The CRC-6 can be monitored either on In-Service or Out-of-Service T1 Spans. Since the expected value of the CRC pattern can be anticipated, the received data can be compared to the expected results. Whenever the expected value does not equal the actual value a CRC error event is counted. |

# Application Diagram

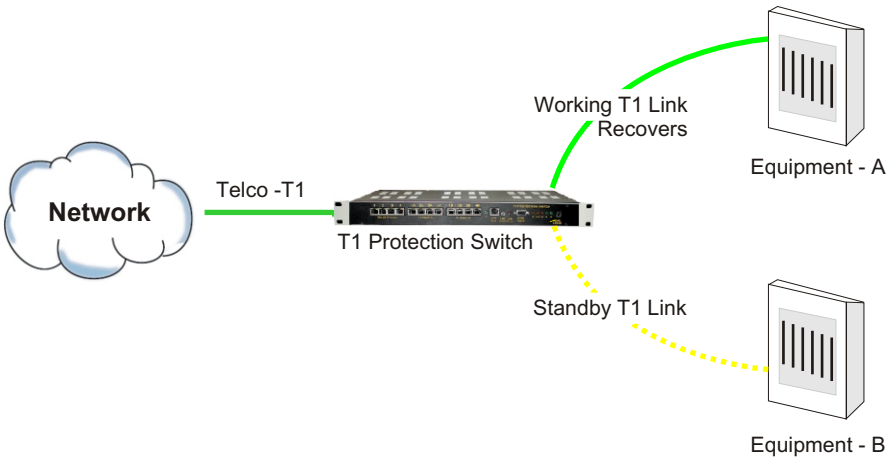
## Telco T1 link connected to Equipment-A




## Equipment-A fails - Telco T1 automatically switches to Equipment-B




## Equipment-A recovers - Telco T1 automatically switches to Equipment-A




Please see note on page for **“recovery”** criteria selection.

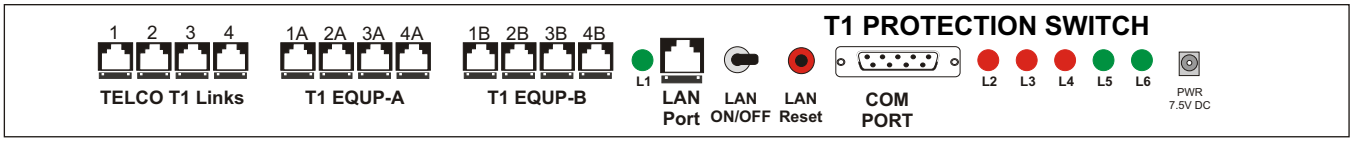
# T1 Protection (Fail-Over) Switch

## Shelf Description:

The T1 Protection (Fail-Over) Switch is fitted in a 19-inch 1U shelf that provides access to all external interfaces.

The T1 interfaces, power input and access and Management Ports (RS232) and 10BaseT Ethernet interfaces) are accessible from the front panel. The external alarm extension are accessible at the rear panel.

### Front view of the shelf




## T1 Protection (Fail-Over) Switch LED Indications

The LEDs indicate the following:

L1- (Green) LAN ON
L2 - Equipment Port A “In Use” for at least one of the four (enabled) Links
L3 - Equipment Port B “In Use” for at least one of the four (enabled) Links
L4 - (Red) Self test failure/Hardware failure
L5 - (Green) + 5V DC
L6 - (Green) - 48V DC

## Mechanical Specifications

| | |
|---|---|
| Rack mounting | Standard 19-Inch. DIN Rack |
| Height | 44.00 mm. |
| Depth | 260.00 mm. |
| Width | 477.00 mm. |
| Weight | 4.00 kg. |

# Technical Specifications

## Network Interface

| | |
|---|---|
| Number of Interfaces | 4 Telco T1 Links (common link/Telco T1s)<br>4 Active T1 Links (for Equipment-A)<br>4 Standby T1 Links (for Equipment-B) |
| Line Rate | T1 - 1.544 Mbps |
| Line Code | B8ZS, AMI (User Selectable) |
| Frame Structure | SF, ESF (User Selectable) |
| Bit Rate | 1544 Kbps ± 50 ppm |
| Jitter Tolerance | As per ITU-T G.823 |
| Output Jitter | < 0.05 UI (in the frequency range of 20 Hz to 100 KHz) |
| Nominal Line Impedance | 100 Ohms Balanced RJ-45 |
| Nominal Pulse Width | 244ns |
| Pulse Mask | As per ITU (CCITT) Rec. G.703 |
| Loss and recovery of frame alignment | As per clause 3 of ITU (CCITT) G.732 |
| Loss and recovery of multiframe alignment | As per clause 5.2 of ITU (CCITT) G.732 |

# AC Power Supply Specifications

| | |
|---|---|
| Output voltage of AC Adapter | 100 - 240 Volt AC |
| Range of input AC voltage | 100V to 240V AC, 50Hz / 60Hz. |
| System Input voltage | 7.5V DC to 9.0V DC, DC input polarity protection. |
| Maximum full load output current | 2.5A at 7.5V DC / 9.0V DC |
| Input voltage reversal protection | Provided in the Card |
| Efficiency at full load | >86% |

# Temperature

| | |
|---|---|
| Operating | $0^{o}$C to $50^{o}$C |
| Humidity | 5% to 95% Non-Condensing |

## NMS (with Telnet) XPort Specifications

| | |
|---|---|
| Network Interface | RJ-45 Ethernet 10BaseT or 100BaseT-TX (auto sensing) |
| Compatibility | Ethernet Version 2.0 IEEE802.3 |
| Protocols Supported | ARP, UDP/IP, TCP/IP, Telnet, ICMP, SNMP, DHCP, BOOTP, TFTP, Auto IP, SMTP and HTTP |
| LEDs | 10Base-T and 100Base-TX Activity, full/half duplex |
| Management | Internal web server, SNMP (read only), Serial login, Telnet login |
| EMI Compliance | - Radiated and conducted emissions - complies with Class B limits of EN55022:1998<br>- Direct and Indirect ESD - complies with EN55024:1998<br>- RF Electromagnetic Field Immunity - complies with EN55024:1998<br>- Electrical Fast Transient/Burst Immunity - complies with EN55024:1998<br>- Power Frequency Magnetic Field Immunity - complies with EN55024:1998<br>- RF Common Mode Conducted Susceptibility - complies with EN55024:1998 |

## Management Ports (COM Port)

| |
|---|
| Serial Port: 9.6Kbps (Async). ASCII/VT100/HyperTerminal. |
| 10BaseT Ethernet: Telnet |

## Command Language

| |
|---|
| Command Line Interface (English text commands) |

## Compliance/Regulatory

| |
|---|
| • EMC FCC Part 15 Class 2 |
| • Operation ETS 300 019 Class 3.2 |
| • Storage ETS 300 019 Class 1.2 |
| • Transportation ETS 300 019 Class 2.3 |

## Ordering Information

| Sr. # | Product Description | Part # |
|---|---|---|
| 1. | 4 Port Protection (Fail-Over) Switch<br>- 19” Shelf 1U High Mount Version<br>-48V DC on-board power | VCL-T1-PRO-1421 |

## Note:

Technical specifications are subject to changes without notice.
All brand name and trademarks are the property of their respective owners.
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