



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

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## **Product Brochure & Data Sheet**

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## Product Overview

Valiant'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" T1 terminal(s), such as data server(s), routers etc. at the customer.



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 routers /data server(s) / equipment connected to "B / standby" ports. This ensures minimum downtime-that would have otherwise occurred due to equipment failure.

## Features and Benefits

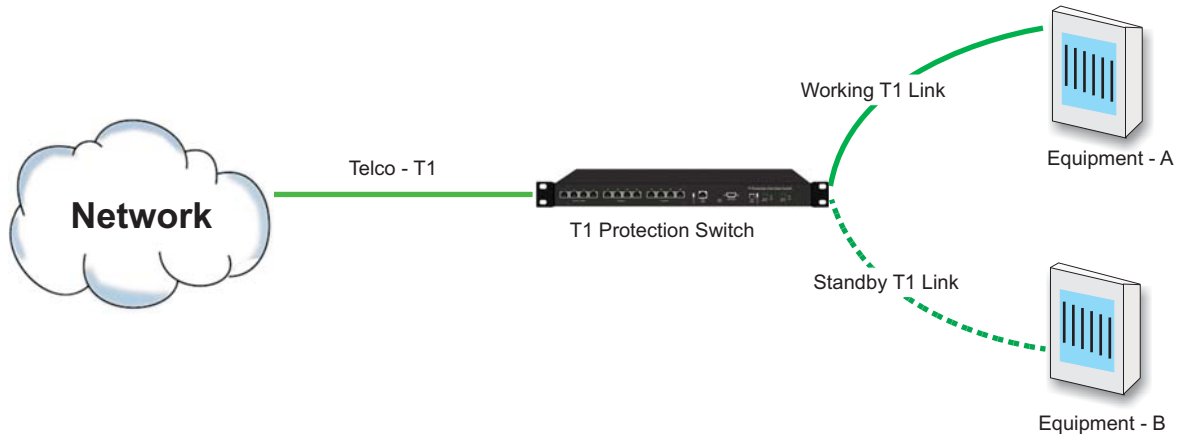
- Allows the users to connect upto 4 T1 lines from the Telephone Company to 4 active and 4 standby T1 terminals
- User configurable. May be used for a single T1 link and scaled upto 4 T1 links though user configuration
- Independent, user configurable switching parameters for each T1 link
- Built-in 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.
- RS232 and USB Serial Management and Monitoring.
- SNMP Management and Monitoring.
- 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:

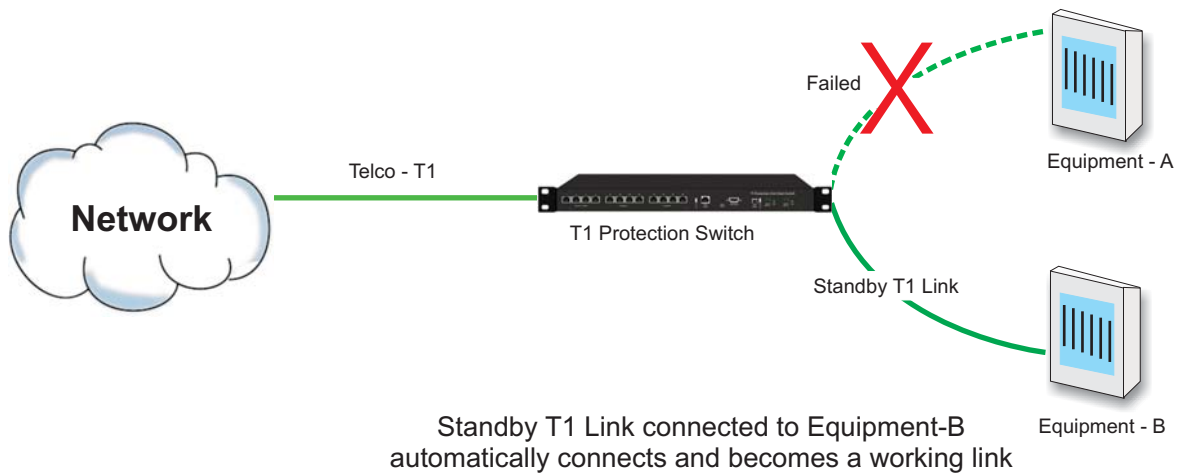
Loss of T1 Signal (LOS)	The Loss of Signal condition in a T1 may occur due to: a) The failure of the T1 Port of the customer premises equipment. b) Or due to loss of power to the customer premises equipment. c) Or due to the disconnection of the T1 cable between the protection Switch and the T1 Port of the customer premises Equipment. 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 signal 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. CRC-6 errors are only counted while the Telco T1 framing is selected as ESF (External 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

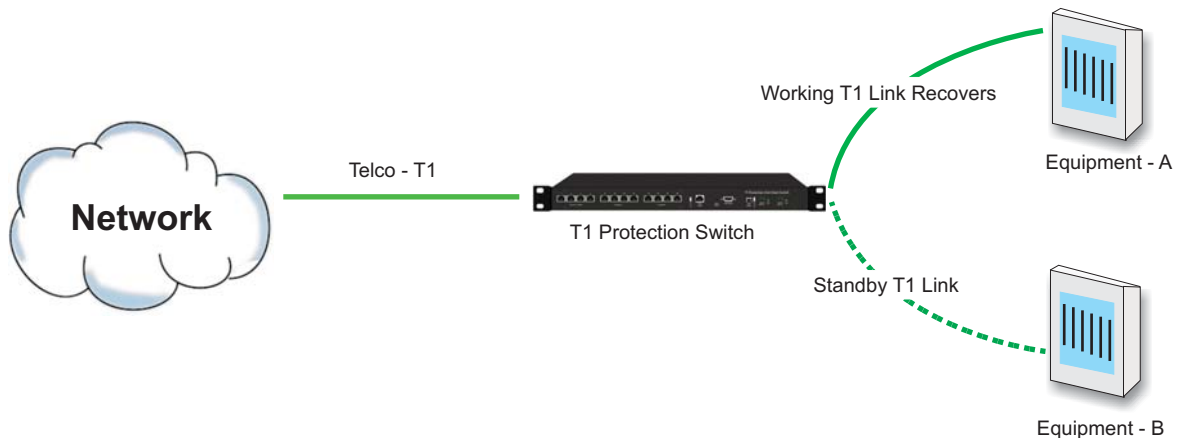
Telco T1 link connected to Equipment-A



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



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

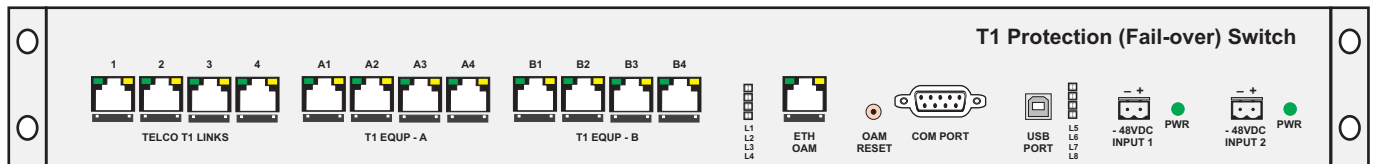


## Shelf Description

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) USB ports 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 - Equipment Port A "In Use" for at least one of the four (enabled) Links
- L2 - Equipment Port B "In Use" for at least one of the four (enabled) Links
- L3 - Not used
- L4 - Not used
- L5 - Green ON indicates 3.3V DC is present  
OFF indicates 3.3V DC is absent
- L6 - Green ON indicates system is accessible through USB and 10/100BaseT USB ports  
OFF indicates USB is not connected, system is accessible through RS232 and 10/100BaseT USB ports
- L7 - Green ON indicates system is accessible through Serial RS232 port.  
OFF indicates system is not accessible through Serial RS232 port.
- L8 - Bi-Color Green indicates self test is pass Red indicates self test ERROR.

## 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) 4 Active T1 Links (for Equipment-A) 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 $\pm$ 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	244 ns
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 V to 240 V AC
Range of input AC voltage	100 V to 240 V AC, 50Hz / 60Hz
System Input voltage	7.5 V DC to 9.0 V DC, DC input polarity protection.
Maximum full load output current	2.5 A at 7.5 V DC/9.0 V DC
Input voltage reversal protection	Provided in the Card
Efficiency at full load	>86%

### DC Power Supply Specifications

Input DC voltage - Dual Input	-48V DC (nominal)
Range of input voltage	-18V to -72V DC
System voltage	3.3 V
Input voltage reversal protection	Provided in the Card
Short circuit protection	Provided
Power consumption	$\leq$ 10W

### Temperature

Operating	0°C to 50°C
Humidity	5% to 95% Non-Condensing

### Management and control ports

- Serial Management Port - RS232 COM Port and USB Port
- 10/100 BaseT for remote management over a LAN
- 10/100 BaseT Telnet over a TCP-IP network

## Technical Specifications

### 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, SSH
LEDs	10Base-T and 100Base-TX Activity, full/half duplex
Monitoring and Management	SNMP V2, Serial login, Telnet login

### 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

S. No.	Part No.	Product Description
1	VCL-T1-PRO-1421-DLX-2DC048	4 Port T1 Failover Protection Switch (4xT1 Inputs, 8xT1 Outputs) 19" Shelf 1U High Mount Version Dual (redundant 1+1) 2 x -48V DC power supply input (DC Powered Version)
2	VCL-T1-PRO-1421-DLX-1AC220	4 Port T1 Failover Protection Switch (4xT1 Inputs, 8xT1 Outputs) 19" Shelf 1U High Mount Version 1 x 100-240V DC power supply input (adapter option) (AC Mains Powered Version)
3	VCL-T1-PRO-1421-DLX-2AC220	4 Port T1 Failover Protection Switch (4xT1 Inputs, 8xT1 Outputs) 19" Shelf 1U High Mount Version 2 x 100-240V AC power supply input (adapter option) (AC Mains Powered Version)

Technical specifications are subject to changes without notice.  
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