Product Overview

VCL-SafeComm-E is a family of Ethernet Failover Protection Switches that provide 1+1 Automatic Ethernet Failover / AB Fallback Protection between an “active” and “standby” equipment; or between “main” and “standby” networks which are connected to the network through an Ethernet interface.

VCL-SafeComm-E-D – 10/100BaseT Fast Ethernet Failover (Compact DIN-Rail) unit which supports a maximum of 100MBits/sec. data throughput on its primary and standby interfaces. The unit is powered from a 12VDC power source with the option of an external AC-DC adapter.

Number of interfaces available in Fast Ethernet version: Three
- 1 x 10/100 Ethernet Interface: Network A (Primary)
- 1 x 10/100 Ethernet Interface: Network B (Standby)
- 1 x 10/100 Ethernet Interface User (Protected)

Use Case #1: The VCL-SafeComm-E, Ethernet Failover equipment provides 1+1 Automatic Ethernet Failover Switching / Fallback Protection between two, Main and Standby Switches, Servers, RTUs or any other similar terminals to provide equipment redundancy in applications which require 99.99% terminal equipment up-time. The Ethernet 1+1 fail-over protection automatically switches to the “standby” terminal equipment in the event of failure of the “primary” terminal equipment to ensure that the 99.99% terminal equipment up-time requirements are always being met.

Use Case #2: The VCL-SafeComm-E, Ethernet Failover equipment provides 1+1 Automatic Ethernet Failover / AB Fallback Switch provides protection between an "active" and "standby" IP / Ethernet / MPLS Networks (including "active" and "standby" Gateways and Routers) to provide 1+1 automatic ethernet fail-over protection between two distinctly separate networks through an ethernet interface.

VCL-SafeComm-E-D providing 1+1 Equipment Failover Protection:
- Provides 1+1 Ethernet Equipment Fail Over Protection
- Fail-Safe: Never becomes a point of failure. Automatically reverts and connects to the primary equipment even in power down condition
- Fast automatic equipment switching upon equipment failure. Eliminates Equipment Downtime
- Completely eliminates re-routing of Ethernet cables. Ethernet cables are automatically moved to the available equipment port
- Essential for any application that requires 1+1 Terminal / Equipment redundancy such as Corporate Networks, Industrial Installations, Sub-Stations, Airports and Air Traffic Control Centres, Railway Signalling Networks etc., requiring minimum service interruption due to equipment failure
- Disaster Recovery.

Use Case #3: The VCL-SafeComm-E, Ethernet Failover equipment provides 1+1 Automatic Ethernet Failover / AB Fallback Switch provides protection between an “active” and “standby” IP / Ethernet / MPLS Networks (including “active” and “standby” Gateways and Routers) to provide 1+1 automatic ethernet fail-over protection between two distinctly separate networks through an ethernet interface.

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Salient features:
- Fail-Safe. The equipment never becomes a point of failure. It automatically reverts to and reconnects the “primary network” / even in a power down condition.
- The Ethernet Failover equipment monitors end-to-end link connectivity.
- User configurable test parameters
- User configurable switching parameters
- Built-in real-time clock / real-time logging maintains a history of all events
- Serial Management Interface (USB) for local access
- Remote access over TCP-IP networks. Allows the user to access and carry out maintenance, or / and switch the links remotely, if required
- Password Controlled Access. Maintains a complete log of all logins
- Script Assisted Switching. Automatically initiates switching upon the receipt of the scripted message / SNMP Trap
- Manual Switching through front-panel buttons.

Applications:
- Enhances equipment availability and reliability
- Eliminates equipment downtime by automatically / seamlessly switch to the “backup” / “standby” equipment in the event of the failure of the primary / active equipment
- Disaster Recovery. To provide automatic failover protection in mission critical applications requiring minimum equipment downtime
- To switch between and automatically re-route IP traffic to the “standby” terminal equipment upon the failure of the “primary” terminal equipment
- VCL-SafeComm-E-D may be used to provide automatic fail-over protection and switching between two terminal equipment such as Routers, Servers, Gateways, RTUs, SCADA Servers, Railway Signalling Equipment, Data Terminal equipment (any type of Ethernet device) etc.
- Automatic Test Feature. Concurrently tests both “active” and “standby” equipment, for “end-to-end” link and terminal equipment availability
- Alerts the user upon the failure or unavailability of any one of the two “active” / “primary”, or “secondary” / “standby” terminal equipment.
User programmable criterion for switching between Primary and Standby (Protected) Terminal Equipment:

- Automatically switches between “active” and “standby” equipment upon failure of the “connected” equipment.
- Completely eliminates the need to move (reconnect) cables. Automatically re-routes the traffic to the “available” equipment.
- Failsafe: Never becomes a point of failure. Automatically reverts to and reconnects the primary equipment even in power down condition.
- Switching criterion is completely user programmable.
- Automatic Failover Switching criterion includes:
  - Loss of Signal
  - Loss of Link; Loss of end-to-end connectivity with the terminal equipment
  - Heartbeat;
  - Script (Message) based switching
  - User programmed timed switching based upon “Wall-Clock” (Time of Day)
- Manual Failover Switching:
  - Manual Switching through front-panel buttons.

Application Diagrams

VCL-SafeComm-EF-D providing 1+1 Network Protection

1. Provides 1+1 Ethernet Equipment Fail Over Protection
2. **Failsafe:** Never becomes a point of failure. Automatically reverts and connects to the primary equipment even in power down condition.
4. Completely eliminates re-routing of Ethernet cables. Ethernet cables are automatically moved to the available equipment port.
5. Essential for any application that requires 1+1 Terminal / Equipment redundancy such as Sub-Stations, Airports and Air Traffic Control Centers, Railway Signaling Networks and Industrial Installations etc., requiring minimum service interruption due to equipment failure.
6. Disaster Recovery.

VCL-SafeComm-EF-D - Chassis Description:

The VCL-SafeComm-EF-D, Ethernet Failover Switch is available in a small form factor, compact DIN Rail / Desktop version for various applications that provides access to all external interfaces, including User and Network side Ethernet Interfaces, Access and Management ports.

Switching parameters include:

- Network Interface(s) to go down. Loss of signal on the network interface.
- Gateway(s) (Routers) to go down and the routers(s) are unreachable.
- External triggers (such as the closing of an external alarm relay of your either of your routers). The user may use / may not use this option.
- Script assisted switching (and SNMP trap generated by any one of your routers to initiate switching due to router / network failure). The user may use / may not use this option.
- The actual network to become unreachable. This is done by programming a network target IP address in the Safecomm-E-D. The network target IP address is the last point (or an omnipresent point) in a network that can be programmed by the user which can be a Google DNS server (such as 8.8.8.8), or user's corporate server (such as 161.170.140.127), if you are working in protected VPN. If, in the event, the connectivity between Safecomm-EF-D and the user programmed network target IP address is lost through the “primary” network / route, the Safecomm-E-D automatically switches to the “standby” network / route.
- All switching events are time-stamped and logged in Safecomm's non-volatile memory. The logs may be viewed by the network administrator at any time for network quality analysis.
- Recovery / fallback parameters to the primary route / primary network is also user programmable. These can be “automatic recovery to the primary network” upon the restoration of the primary route / primary network, or upon the failure of the standby / alternate network . One note to add here is the Safecomm-EF-D simultaneously tests both active and standby routes so the system is always aware of the status of both networks. Switching to a “dead” route shall never occur under any condition.
Application Diagrams:

To provide 1+1 Terminal / Equipment Failover Protection

Ethernet link is connected to Routers, Servers, Switches, RTUs, Data Terminals (any terminal equipment) etc.

Equipment 1 fails. Ethernet link automatically switches to Routers, Servers, Switches, RTUs, Data Terminals (any terminal equipment) etc.

Equipment 1 recovers - Ethernet link automatically reverts and reconnects to Routers, Servers, Switches, RTUs, Data Terminals (any terminal equipment) etc.
Technical Specifications

Specifications:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Ethernet Interfaces</td>
<td>3</td>
</tr>
<tr>
<td>Interface Type</td>
<td>10/100BaseT</td>
</tr>
<tr>
<td>Conformity</td>
<td>IEEE-802.3</td>
</tr>
</tbody>
</table>

Management and Control Ports:

- Serial Management Port - RS232 COM Port and USB Port
- 10/100 BaseT for remote management

NMS (with Telnet) Specifications:

- OAM Network Interface: RJ-45 Ethernet, 10/100BaseT
- Compatibility: Ethernet Version 2.0 IEEE802.3
- Monitoring and Management: Serial login, Telnet, SSH (with option to disable clear text login for users).

AC Power Supply Specifications:

- Voltage: 100V~240V AC, 50Hz / 60Hz.

DC Power Supply Specifications:

- Input DC voltage: 12V DC (nominal)
- Range of input voltage: 9V to 14V DC Input
- Short circuit protection: Provided

110VDC~220VDC Power Supply Specifications:

- Input DC voltage: 110VDC, or 220VDC (nominal) Dual Input
- Range of input voltage: 85VDC to 290VDC
- Short circuit protection: Provided

Power Supply Options:

- AC power (100 to 240V AC, 50/60 Hz)
- DC Power 12V DC; 110V DC; 220V DC

Power Consumption:

- < 10W at ambient (steady state 24°C)

Local / Remote Management and Monitoring Ports:

- USB
- 10/100BaseT Ethernet RJ45

Local / Remote Communication Options:

- CLI Control Interface (HyperTerminal or Vt100)
- Telnet / SSH (option to disable clear text communication to comply with NERC security requirements)

Security and Protection:

- Password Protection with password strength monitor
- SSH

Environmental (Equipment):

- Operational: 0°C to +50°C (Typical: +25°C)
- Cold start: 0°C
- Storage: -20°C to +70°C
- Humidity: 95% non-condensing
- Cooling: Convention Cooled. No cooling fans are required.

Mechanical Specifications:

- Height: 34 mm
- Width: 154 mm
- Depth: 134 mm
- Weight: 220 g

Command Language:

- English text commands
- Graphical User Interface (GUI) - English

MTBF and Equipment MTBF:

- Never becomes a point of failure
- Per MIL-HDBK-217F: ≥ 17 years @ 24°C
- Per Telcordia SSR 332, Issue 1: ≥ 26 years @ 24°C

Compliance:

- 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.
Ordering Information

Core Unit without PSUs

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Part No.</th>
<th>Product Description</th>
</tr>
</thead>
</table>
| 1      | VCL-SafeComm-E-D-2420-DC012 | Automatic Ethernet Failover Switch  
- Provides 1+1 Automatic Ethernet Failover Protection between two (Main and Standby) Ethernet Switches, Gateways, Terminals, Servers, Routers, RTUs, etc  
- DIN Rail version  
  Supports:  
  - 3 x Ethernet [100Mbps RJ45 (F)] [1 for Network A, 1 for Network B, 1 for User]  
  - 1 x 12V DC Power Supply Input  
  - Management: Telnet (RI45 (F) Port), Serial Port (USB), EMS, Graphical User Interface (GUI)  
  - Installation Kit: System Core Cables, Mounting Hardware, Documentation, User Manual |
| 1      | VCL-EMOD 0423-AC220        | Power Supply (External) AC to DC Converter, DIN Rail Mount,  
- 1 x AC Input [90-240VAC, 50-60Hz]  
- 1 x DC Output [12VDC~2.1A, 25.2W] |
| 2      | VCL-EMOD 0423-DC220        | Power Supply (External) DC to DC Converter, DIN Rail Mount,  
- 1 x DC Input [110-250VDC]  
- 1 x DC Output [12VDC~2.1A, 25.2W] |
| 3      | VCL-EPCB 2892-DC048        | Power Supply (External) DC to DC Converter, DIN Rail Mount,  
- 1 x DC Input [48VDC]  
- 1 x DC Output [12VDC~2.1A, 25.2W] |
| 4      | VCL-EPWA 0004              | Power Supply (External) AC to DC Converter, Portable Adapter Version, PW-024A-1Y120K0,  
- 1 x Universal AC Input [90 ~ 264VAC, 47 - 63Hz]  
- 1 x DC Output [12VDC~2.00A 24W] |
| 5      | VCL-EPWA 0005              | Power Supply (External) AC to DC Converter, Portable Adapter Version, PW-024A-1Y120KZ,  
- 1 x Universal AC Input [90 ~ 264VAC, 47 - 63Hz]  
- 1 x DC Output [12VDC~2.00A 24W]  
  Equipped with interchangeable AC clips |

*Add Power Supply Options*