VCL-SafeComm-GE
1+1 Automatic Ethernet Failover / AB / Fallback Switch
- the alternate network solution

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

VCL-SafeComm-E is available in 2 variants.
1. VCL-SafeComm-GE-EN
2. VCL-SafeComm-GE-EF

**VCL-SafeComm-GE-EN** provides 1+1 Automatic Ethernet Failover Protection between 2, IP Networks. The VCL-SafeComm-GE-EN can be used to provide protection between two IP networks across diverse domains such as fiber-radio; or fiber-satellite (VSAT); or fiber-PSDN (Public Switched Data Network) to provide automatic fail-over protection to the “standby” network in the event of failure of the “primary” network. VCL-SafeComm-GE-EN, Ethernet Network Protection Switch shall automatically switch and reroute all Ethernet traffic to "secondary"/"standby" IP network in the event of the failure of the “active” / “primary” network. This ensures minimum network downtime, which otherwise would have occurred upon the failure of the “primary” network (including associated network components such as routers / gateways etc.), does not occur.

**VCL-SafeComm-GE-EF** provides 1+1 Automatic Ethernet Failover Protection between two (Main and Standby) RTUs, Terminals, Servers etc. The VCL-SafeComm-GE-EF can be used to provide terminal equipment redundancy for applications which require 99.99% up-time. The VCL-SafeComm-GE-EF automatic fail-over protection automatically switches to the “standby” terminal equipment in the event of failure of the “primary” equipment to ensure that the 99.99% up-time requirements are always being met. In the event of failure of the “primary / working” terminal equipment, the VCL-SafeComm-GE-EF, Ethernet Failover Switch shall automatically switch and reroute all cables to "secondary"/ "standby" terminal equipment. This ensures that downtime, which would have otherwise occurred upon the failure of the “primary” terminal equipment without automatic Ethernet failover capability, never occurs.

**Features and Benefits:**
- Fail-Safe. Never becomes a point of failure. Automatically reverts to and reconnects the “primary network” / even in a power down condition.
- End-to-End network Link monitoring
- User configurable link 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 receipt of the scripted message / SNMP Trap.
- Switching initiated through external triggers such as “Dry Contact Alarm Relays”.
- Manual Switching through front-panel buttons automatic front panel locking to prevent accidental switching.
- The data connection through the Safecomm-GE between the local area network and the WAN is completely transparent. The Safecomm-GE is a simple failover switch and does not provide any data routing between its data ingress and data egress ports.
- SNMP, SSH, NMS, Syslog.
Applications:

- Enhances network availability and reliability.
- Eliminates network downtime by automatically / seamlessly switch to the “backup” / “standby” network in the event of the complete and total failure of the primary/active IP network.
- Disaster Recovery. To provide automatic failover protection in mission critical applications requiring minimum downtime.
- To switch between and automatically re-route IP traffic to the “standby” network upon the failure of the “primary” transmission network. Simultaneously for “end-to-end” network availability.
- Alerts the user upon the failure of any one of the two “active”/“primary”, or “secondary”/“standby” IP transmission network.
- Enhances availability and reliability.
- Eliminates network downtime by automatically / seamlessly switch to the “backup” / “standby” equipment / network in the event of the complete and total failure of the primary/active equipment / IP network.
- May also be used in combination with VCL-Firewall to provide firewall redundancy, enhanced security and resilience to hostile such as “DoS” (Denial of Service) and “Hack” attacks.
- VCL-SafeComm-EN may be used to provide automatic fail-over protection and switching across diverse IP domains such as fiber-radio; or fiber-satellite (VSAT); or fiber-PSDN (public switched data network).
- Automatic Link Test Feature. Concurrently tests both “active” and “standby” IP links, for “end-to-end” network availability.
- Alerts the user upon the failure of any one of the two “active”/“primary”, or “secondary”/“standby” IP transmission network.

User programmable criterion for switching between Primary and Standby (Protected) Networks:

- Automatically switches between “active” and “standby” networks upon failure of the “connected” network.
- Completely eliminates the need to move (reconnect) cables. Automatically re-routes the traffic to the “available” network.
- Failsafe: Never becomes a point of failure. Automatically reverts to and reconnects the primary link 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 link connectivity
  - Heartbeat; Script (Message) based switching
  - User programmed timed switching based upon “Wall-Clock” (Time of Day)
  - Triggers generated by External Dry Contact Relays of connected equipment
  - Packet counters (Unicast, Multicast and Broadcast) based switching

Manual Failover Switching:
- Manual Switching through front-panel buttons with automatic front panel locking to prevent accidental switching.
- Manual switching through CLI command.

Shelf Description:

The Ethernet Failover Switch is available as a 19-inch 1U shelf that provides access to all external interfaces.
- 1+1 Redundant power supplies.
- User and Network side Ethernet Interfaces, Access and Management ports (USB and 10/100BaseT Ethernet interfaces), external alarm outputs and external (alarm inputs) trigger connectors.
VCL-SafeComm-EN providing and reliability:

1. Provides 1+1 Network / Link Protection
2. **Failsafe:** Never becomes a point of failure. Automatically reverts to the primary link even in power down condition.
3. End-to-End network Link monitoring
5. Completely eliminates re-routing of Ethernet cables. Ethernet cables are automatically moved to the available network port.
6. Essential for any application that requires 1+1 Network / Link / Path redundancy including small / medium office establishments, PoS (point-of-sale) equipment, banking establishments, hotels, ATMs, smaller Industrial Installations etc., requiring minimum service interruption due to network outage.
7. Disaster Recovery.

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. 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-E and the user programmed network target IP address is lost through the “primary” network / route, the Safecomm-E automatically switches to the “standby” network / route.
- Packet counters (Unicast, Multicast and Broadcasts) based switching.
- 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 route / 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-E 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.
- The data connection through the Safecomm-E between the local area network and the WAN is completely transparent. The Safecomm-E is a simple failover switch and does not provide any data routing between its data ingress and data egress ports.
Technical Specifications

Specifications:

<table>
<thead>
<tr>
<th>Number of Ethernet Interfaces</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guaranteed Maximum Data Throughput</td>
<td>1000 Mbps on 1000 Mbps connection</td>
</tr>
<tr>
<td>Interface Type</td>
<td>10/100/1000 BaseT-X</td>
</tr>
<tr>
<td>Conformity</td>
<td>IEEE-802.3</td>
</tr>
</tbody>
</table>

Management and Control Ports:

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

NMS (with Telnet) Specifications:

<table>
<thead>
<tr>
<th>OAM Network Interface</th>
<th>RJ-45 Ethernet, 10/100BaseT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatibility</td>
<td>Ethernet Version 2.0 IEEE802.3</td>
</tr>
<tr>
<td>Monitoring and Management</td>
<td>Serial login, Telnet, SSH (With option to disable clear text login for users).</td>
</tr>
</tbody>
</table>

AC Power Supply Specifications:

| Range of input AC | 90V~240V AC, 50Hz / 60Hz. Voltage |

48VDC Power Supply Specifications:

| Input DC voltage - Dual Input | 48V DC (nominal) |
| Range of input voltage | 18V to 72V DC |
| Input voltage reversal Protection | Provided in the system |
| Short circuit protection | Provided in the system |

110VDC~220VDC Power Supply Specifications:

| Input DC voltage - Dual Input | 110VDC or 220VDC (nominal) |
| Range of input voltage | 85VDC to 290VDC |
| Input voltage reversal Protection | Provided in the system |
| Short circuit protection | Provided in the system |

Power Supply Options:

- AC power (90 to 240V AC, 50/60 Hz)
- DC Power 24VDC; 48VDC; 110VDC; 220VDC

Power Consumption:

- < 10W at ambient (steady state 24°C)
Local / Remote Management and Monitoring Ports:

- USB
- 10/100BaseT Ethernet, RJ45
- 2 x External Alarm Trigger Inputs (Dry Contacts)

Local / Remote Communication Options:

- Telnet / SSH (option to disable clear text communication to comply with NERC security requirements)
- CLI Control Interface (HyperTerminal or VT100)

Security and Protection:

- Password Protection with password strength monitor
- SSH

Environmental (Equipment):

<table>
<thead>
<tr>
<th>Operational:</th>
<th>-10C to +65C (Typical: +25C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold start</td>
<td>0C</td>
</tr>
<tr>
<td>Storage</td>
<td>-20C to +70C</td>
</tr>
<tr>
<td>Humidity</td>
<td>95% non-condensing</td>
</tr>
<tr>
<td>Cooling</td>
<td>Convention Cooled. No cooling fans are required.</td>
</tr>
</tbody>
</table>

Mechanical Specifications:

<table>
<thead>
<tr>
<th>Height</th>
<th>44 mm (1U)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>480 mm (DIN 19-inch)</td>
</tr>
<tr>
<td>Depth</td>
<td>225 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>3.5 Kg</td>
</tr>
<tr>
<td>Rack Mount</td>
<td>19&quot; Rack mounting</td>
</tr>
</tbody>
</table>

Command Language:

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

MTBF and Equipment MTBF:

- Never becomes a point of failure
- Per MIL-HDBK-217F: ≥ 37 years @ 24C
- Per Telcordia SSR 332, Issue 1: ≥ 42 years @ 24C

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 2.3
Application Diagrams: (Ordering Part#: VCL-2778-SafeComm-EN)

To provide 1+1 Network Protection - Explained

Ethernet link is connected to Network A

Network A fails. Ethernet link automatically switches to Network B

Network A recovers - Ethernet link automatically reverts and reconnects to Network A
Application Block Diagram #1 (monitoring internet connectivity)

Internet

Router 2
Line 2
VCL-SafeComm-EN
Telnet / SSH
SNMP command
Syslog Server

Router 1
Line 1

LAN

Application Block Diagram #2 (monitoring enterprise server)

Company / Bank server

Router 2
Line 2
VCL-SafeComm-EN
Telnet / SSH
SNMP command
Syslog Server

Router 1
Line 1

LAN
Ordering Information: VCL-SafeComm-GE, 1+1 Automatic Gigabit Ethernet Failover / AB / Fallback Switch

Core Unit without PSUs

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Part No.</th>
<th>Product Description</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>VCL-SafeComm-GE-EF-2778</td>
<td>Gigabit Ethernet Failover Switch - Provides 1+1 Automatic Ethernet Failover Protection between two (Main and Standby) Ethernet Switches, Gateways, Terminals, Servers, Routers, RTUs, etc - 19-inch, Rack Mount Supports: - 3 x Gigabit Ethernet [1000Mbps RJ45 (F)] [1 for Network A, 1 for Network B, 1 for User] - Management: SNMP, Telnet (RJ45 (F) Port), Serial Port (USB, DB-9 COM), EMS, Graphical User Interface (GUI) - Installation Kit: System Core Cables, Mounting Hardware, Documentation, User Manual</td>
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<td>2</td>
<td>VCL-SafeComm-GE-EN-2778</td>
<td>Gigabit Ethernet Failover Switch - Provides 1+1 Automatic Ethernet Failover Protection between 2, IP Networks - 19-inch, Rack Mount. - 3 x Gigabit Ethernet [1000Mbps RJ45 (F)] [1 for Network A, 1 for Network B, 1 for User] - Management: SNMP, Telnet (RJ45 (F) Port), Serial Port (USB, DB-9 COM), EMS, Graphical User Interface (GUI) - Installation Kit: System Core Cables, Mounting Hardware, Documentation, User Manual</td>
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*Add Power Supply Option from below

<table>
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<tbody>
<tr>
<td>1 ACDC</td>
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<tr>
<td></td>
</tr>
<tr>
<td>2 AC220R</td>
</tr>
<tr>
<td>3 DC048R</td>
</tr>
<tr>
<td>4 DC220R</td>
</tr>
</tbody>
</table>

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Revision 2.2A – March 12, 2020