Product Overview

VCL-SafeComm-EF is a family of Ethernet Failover Switches that provide 1+1 Automatic Ethernet Failover, AB / Fallback Protection solution between an "active" and "standby" equipment that is connected to the network through an Ethernet Interface.

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

VCL-SafeComm-EF provides 1+1 Automatic Ethernet Failover / Fallback Protection between two (Main and Standby) switches RTUs, Terminals, Servers etc. The VCL-SafeComm-EF can be used to provide terminal equipment redundancy for applications which require 99.99% up-time. The VCL-SafeComm-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-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.

VCL-SafeComm-EN provides 1+1 Automatic Ethernet Failover Protection between 2, IP Networks. The VCL- SafeComm-EN can be used to provide protection between two IP networks across diverse domains such as fiber-radio; or fiber-satellite; 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-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.

Applications – VCL-SafeComm-FE:

- Enhances equipment availability and reliability.
- Eliminates equipment downtime by automatically / seamlessly switch to the "backup" / "standby" equipment in the event of total failure of the primary/ active equipment.
- Disaster Recovery. To provide automatic failover protection in mission critical applications.
- To switch between and automatically re-route IP traffic to the "standby" terminal equipment upon the failure of the "primary" terminal equipment.
- VCL-SafeComm-EF may be used to provide automatic fail-over protection and switching between two terminal equipment such as RTUs, SCADA Servers, Railway Signaling Equipment 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.

Features and Benefits:

- **Fail-Safe.** Never becomes a point of failure. Automatically reverts to and reconnects the "primary terminal equipment" / even in a power down condition.
- End-to-End network Link monitoring
- Number of Ethernet Interfaces: 3
    - 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)
- 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 complete log of all logins.
- Script Assisted Switching. Automatically initiates switching upon the receipt of the scripted message / SNMP Trap.
- Switching initiated through external triggers such as "Dry Contact Alarm Relays" of the connected terminal equipment.
- Manual Switching through front-panel buttons with automatic front panel locking to prevent accidental switching.
- The data connection through the Safecomm-EF between the local area network and the WAN is completely transparent. The Safecomm-EF is a simple failover switch and does not provide any data routing between its data ingress and data egress ports.

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)
    - Trigger generated by External Dry Contact Relays of connected equipment
- Manual Failover Switching:
    - Manual Switching through front-panel buttons with automatic panel locking to prevent accidental switching.

VCL-SafeComm-EF providing 1+1 Equipment Failover Protection:

1. Provides 1+1 Ethernet Equipment Fail Over Protection
2. Fast automatic equipment switching upon equipment failure. Eliminates Equipment Downtime.
3. Completely eliminates re-routing of Ethernet cables. Ethernet cables are automatically moved to the available equipment port.
4. 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.
5. Disaster Recovery.

Shelf Description:

The Ethernet Failover Switch is available as a Desktop DIN Rail version and 19-inch rack mount options in 1U shelf that provides access to all external interfaces.
- Option of single and dual (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.

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-EF. 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 and the user programmed network target IP address is lost through the "primary" network / route, the Safecomm-EF 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 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.
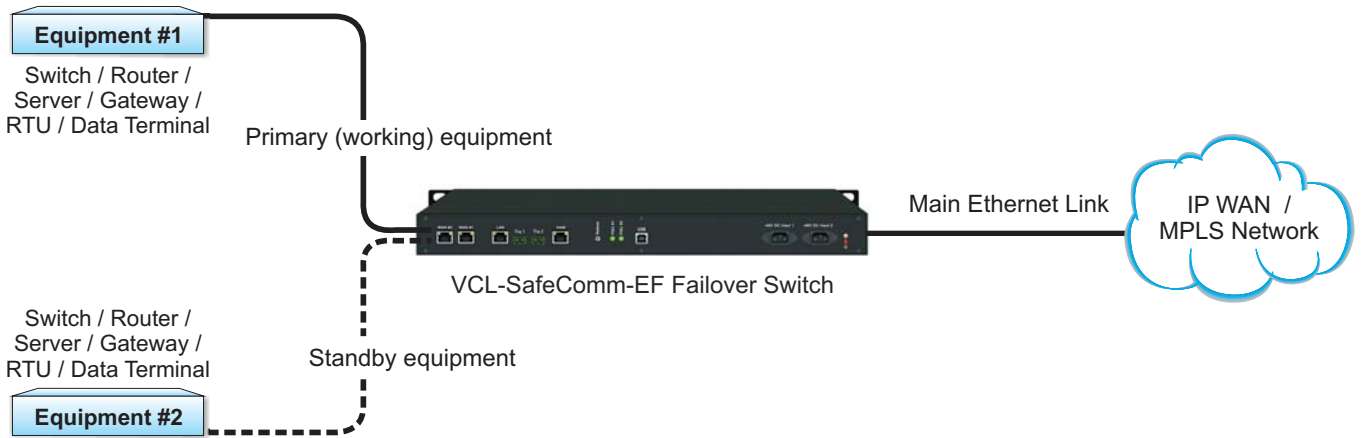
Application: VCL-SafeComm-N providing 1+1 Network Protection

1. Provides 1+1 Network Protection
2. **Failsafe:** Never becomes a point of failure. Automatically reverts to the primary link even in power down condition.
3. Fast automatic network switching upon network failure. Eliminates Network Downtime.
4. Completely eliminates re-routing of Ethernet cables. Ethernet cables are automatically moved to the available network port.
5. Essential for Offices, Banks, ATMs, Industrial Installations requiring minimum service interruption due to network outage.
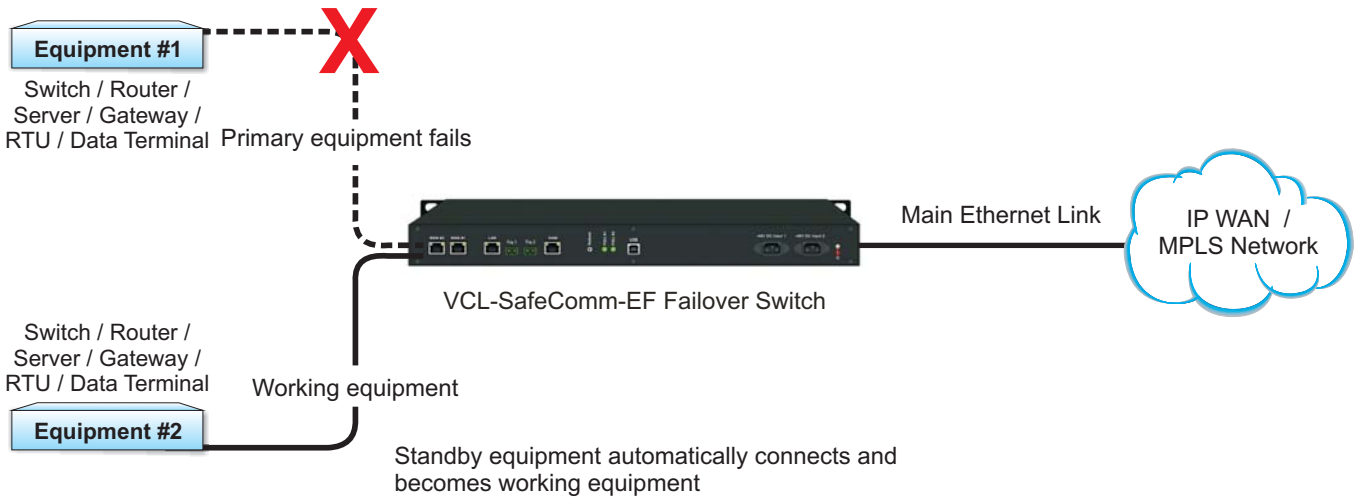6. Disaster Recovery.

Application Diagrams : (Ordering Part#: VCL-2478-SafeComm-EF)

To provide 1+1 Terminal / Equipment Failover Protection - Explained

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

Equipment #1

Switch / Router /
Server / Gateway /
RTU / Data Terminal

Primary (working) equipment

Main Ethernet Link

IP WAN /
MPLS Network

VCL-SafeComm-EF Failover Switch

Switch / Router /
Server / Gateway /
RTU / Data Terminal

Standby equipment

Equipment #2

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

Equipment #1

Switch / Router /
Server / Gateway /
RTU / Data Terminal   Primary equipment fails

Main Ethernet Link

IP WAN /
MPLS Network

VCL-SafeComm-EF Failover Switch

Switch / Router /
Server / Gateway /
RTU / Data Terminal

Equipment #2   Working equipment

Standby equipment automatically connects and
becomes working equipment

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

Equipment #1

Switch / Router /
Server / Gateway /
RTU / Data Terminal   RTU-1 / Server-1 Recovers
Working equipment

Main Ethernet Link

IP WAN /
MPLS Network

VCL-SafeComm-EF Failover Switch

Switch / Router /
Server / Gateway /
RTU / Data Terminal

Standby equipment

Equipment #2

Technical Specifications

Specifications:

Number of Ethernet	3
Interfaces	- 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)
Guaranteed Maximum Data Throughput	100Mbps
Interface Type	10/100BaseT
Conformity	IEEE-802.3

Management and Control Ports:

- Serial Management Port - USB
- 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:

Range of input AC	100V~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
Short circuit protection	Provided

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
Short circuit protection	Provided

Power Supply Options:

- AC power (100 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 Relay Outputs (Dry Contacts)
- 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):

Operational:	-10C to +65C (Typical: +25C)
Cold start	0C
Storage	-20C to +70C
Humidity	95% non-condensing
Cooling	Convention Cooled. No cooling fans are required.

Mechanical Specifications:

Height	44 mm
Width	480 mm (DIN 19-inch)
Depth	225 mm
Weight	3.5 Kg
Rack Mount	19" Rack mounting

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:

- CE, RoHS
- 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

S. No.	Part No.	Product Description
1	VCL-2478-SafeComm-EF	Automatic 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 Ethernet [100Mbps RJ45 (F)] [1 for Network A, 1 for Network B, 1 for User] - Management: SNMP, Telnet (RJ45 (F) Port), Serial Port (USB), EMS, Graphical User Interface (GUI) - Installation Kit: System Core Cables, Mounting Hardware, Documentation, User Manual * Add Power Supply Option from below

*Add Power Supply Options

1	AC220	1 x 100-240V AC Power Supply Input
2	DC048	1 x (-) 48V DC Power Supply Input
3	DC220	1 x 110~220V DC Power Supply Input
4	AC220R	2 x 100-240V AC Power Supply Input [Redundant]
5	DC048R	2 x (-) 48V DC Power Supply Input [Redundant]
6	DC220R	2 x 110~220V DC Power Supply Input [Redundant]

Technical specifications are subject to changes without notice.
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