Excellence in KVM and Video

Technology briefing

Redundancy in KVM extenders and matrix switches

Features:

- **Redundant option supports full, semi, fallback and point-to-point redundant operation**
- **Automatic switching using linkloss monitoring firmware**
- **Dual-redundant PSUs with load-sharing**
- **Automatic configuration of backup KVM-matrix switch**

Introduction

KVM extenders and matrix switches are widely used to physically separate critical computers from user workstations to provide high levels of system protection and security. These computers are often located in environmentally-controlled equipment rooms alongside other sensitive and crucial equipment that is vital to the operation of a commercial business, government agency or control centre. In mission-critical applications, failure can mean massive loss of revenue, dangerous or threatening situations and in extreme cases, loss of national security. The use of these remote computers by operators located some distance away must, in all events, be maintained.

Various techniques are employed by system managers to ensure totally failure-free systems; including duplication of system components and redundancy techniques, where individual components are supported by spare units that are ready to be called into service should the main unit stop working.

IHSE's latest product introductions include extender models with optional redundant link specifically designed to facilitate the construction and operation of these critical systems. They allow redundancy to be incorporated into the KVM extension connections for both point-to-point and matrix extensions.

Purpose of this document

This Product Briefing describes the philosophy and method of operation of the redundant option that is available in the IHSE Draco vario extender range, describing different ways of achieving any desired level of system redundancy.

It outlines the concept of redundancy and how it operates within the KVM matrix switching and extension network, so that system designers can build networks to meet their specific requirements. It does not provide strategies for redundancy beyond the extension network. Redundancy in source and workstation devices themselves should be considered as part of the total system integration design concept.

Types of Redundancy in IHSE KVM systems

In KVM systems the objective of incorporating redundancy is to ensure that in the event of failure of any component within the transmission chain, another component will take over and ensure that operator workstations continue to access critical source computers with as little interruption as possible. This is achieved by duplicating components and the corresponding interconnecting cable links between the source and display points. Different levels of redundancy are possible, depending upon the amount of protection required, system and network topography and the costs involved in duplicating components.

Fully-redundant systems

In fully-redundant systems all components and communication paths are duplicated. If any component fails, the alternative is used. Automatic detection and instant re-configuration through system monitoring ensures that this process is completed automatically without human intervention.

Semi-redundant systems

It may be acceptable to implement a system in which only part of it continues to operate in the event of component failure. This might, for example, be achieved by splitting the whole network into two parallel systems. In this instance all CPUs will remain available to half of the workstations until the fault is rectified.

Fallback systems

Another approach is to provide dedicated links from critical computers directly to user terminals that are switched on when a failure is detected. The KVM matrix switch will be bypassed, however critical computers will still be available to nominated workstations.

Redundant CPU and CON Units

IHSE Draco vario (Series 474) extender CPU and CON Units are now available with optional redundant data links that simplify the installation and operation of all types of redundancy in mission-critical systems.

These units differ from standard CPU and CON Units by offering a second, backup port. Linkloss firmware within the units continuously monitors the status of the primary connection and automatically switches to the backup connection if it detects a break.

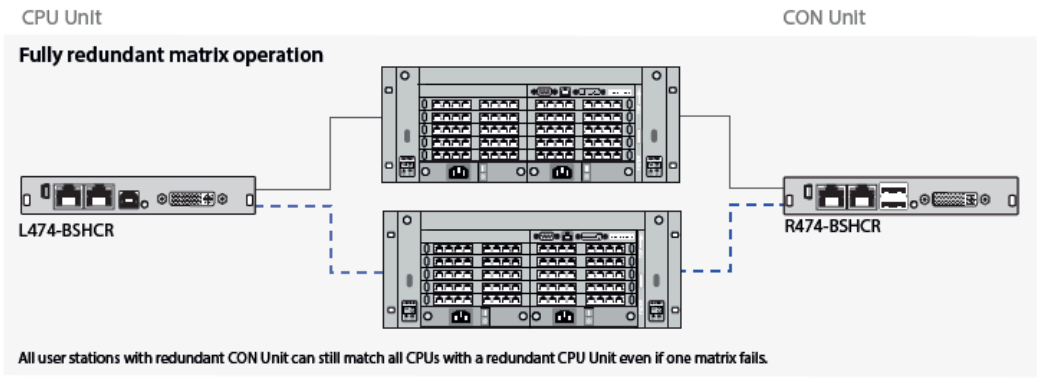
Redundant CPU and CON Units can be connected together as redundant point-to-point KVM extenders or as part of a large redundant KVM matrix installation. In a matrix-based installation the system monitors the connection between each individual unit and the matrix itself. A failure results in rerouting the connection via the redundant matrix.

Draco vario extenders are supplied as modular components for installation in one of a number of frame assemblies capable of holding between 2 and 21 extenders cards. All frames have the facility for dual-redundant power supplies with load sharing, thereby duplicating the power supplies and ensuring continuation of power if one should fail.

Redundancy in KVM matrix switch systems

Fully-redundant KVM matrix switch systems

In fully-redundant KVM matrix switching systems two matrix switches are connected, in parallel, to redundant-variant CPU and CON Units. One KVM matrix switch is designated as the primary unit and used in normal circumstances to provide the required KVM extension system and operation.



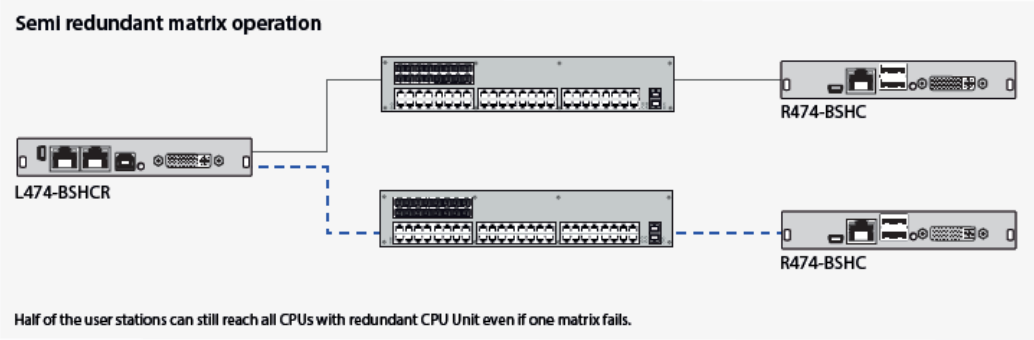
Within each CPU Unit, linkloss firmware continuously monitors the primary routes into the KVM matrix switch. Similarly the link between the KVM matrix output port and CON Unit is also continuously checked. Should a fault occur anywhere in the network, or of the primary matrix switch itself, the backup KVM matrix will be used and all data routes will be transferred from the primary system to the backup system.

This is a fully automatic process that requires no user intervention. Information passed between the two KVM matrix switches ensures that the connection paths are copied so that the users of the system do not experience any irregularities or disturbances during and after changeover. Manual switching is also possible by using Hot Key commands.

Semi-redundant KVM matrix switch systems

In semi-redundant KVM matrix switching systems the installation is split so that two matrix switches are employed, both receiving the same data; each one only serving a bank of workstations. A special feature of the redundant CPU Unit allows the competitive operation by two CON Units, either connected directly to the unit or connected via two matrices.

Typical, actual, applications of semi-redundant installations are in broadcast edit suites where two monitors are located in the same room, giving access to all computers on either workstation in the event that one link fails, and in dual-screen setups split across two paths; in that case one of the pair will continue to operate. In both examples, full access to all computers is maintained.

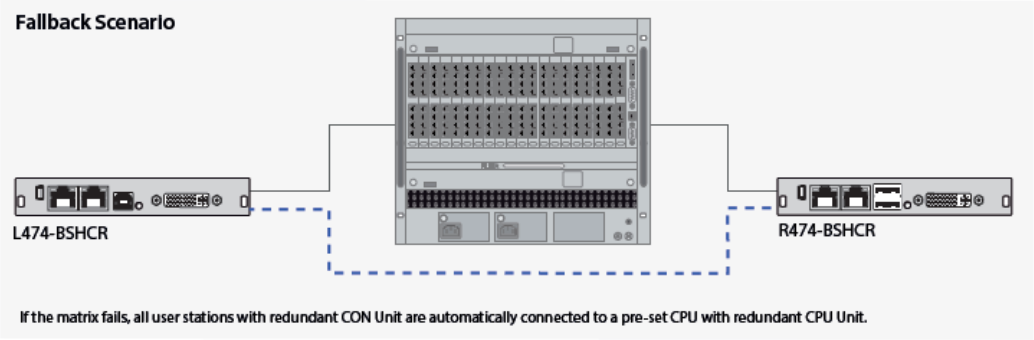


Fallback scenario in KVM matrix switch systems

A fallback scenario can be configured in KVM matrix switching systems in which point-to-point connections from mission-critical CPUs are made to workstations through redundant CON Units. This is a direct link that bypasses the switch and carries the same data as that is fed to the switch from the CPU.

Should the matrix switch or its associated network fail, the CON unit will automatically detect link failure and switch to the direct link.

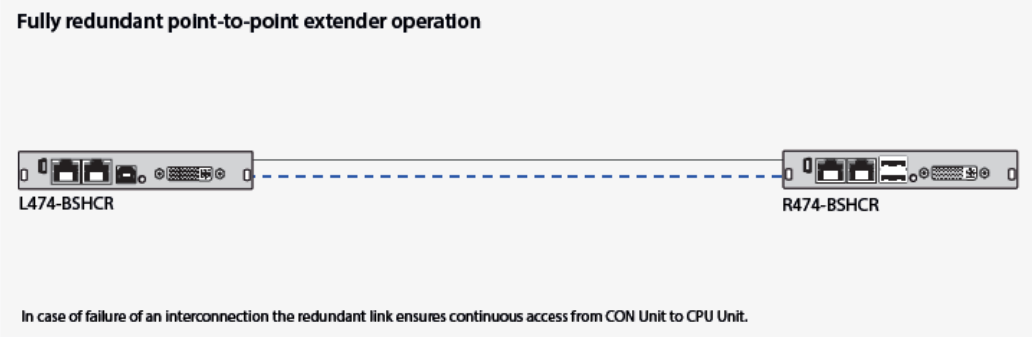
The normal switching capability of the CON unit and workstation to select CPUs is lost in this situation. The workstation is only capable of connecting directly to the CPU with which it has the direct fallback link.



Redundancy in KVM point-to-point systems

Fully-redundant point-to-point systems

In fully-redundant point-to-point KVM extensions, both CPU and CON Units utilise the redundancy option, connecting a single processor to a single workstation. Handshaking communication between the CPU Unit and CON Unit continuously monitors the primary connection and switches automatically to the backup connection in the event of failure.



Error reporting and system management

Because the operation of switching between components in the IHSE system is designed to be automatic, a redundant system will operate without user input. In the case of failure and swapover, only a single path will continue to be available. This situation should be rectified immediately to prevent catastrophic failure in the event that a second fault should occur. In order to avoid the situation that failure and swapover remain un-noticed and un-rectified, operation via backup link can be indicated by a color frame.

To enable IT managers to oversee the activity of the network and identify any problems within it, linkloss can be monitored via SNMP.

Further considerations

The redundant option in Draco vario extenders is designed to protect and backup a data network from the point of generation to the point of display: from the source computer to workstation. It will monitor and switch components that fail in the signal path between these two points, but not beyond them.

For greater protection, network design should also take into consideration the need to duplicate computers and workstations.

Each system will have unique requirements and components and the best method of providing full backup over the entire network should be considered to create the best, most reliable and robust solution.

Further information and downloads

Full details of the installation and setup are provided in the user manual. Please consult individual product brochures for detailed specifications.

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