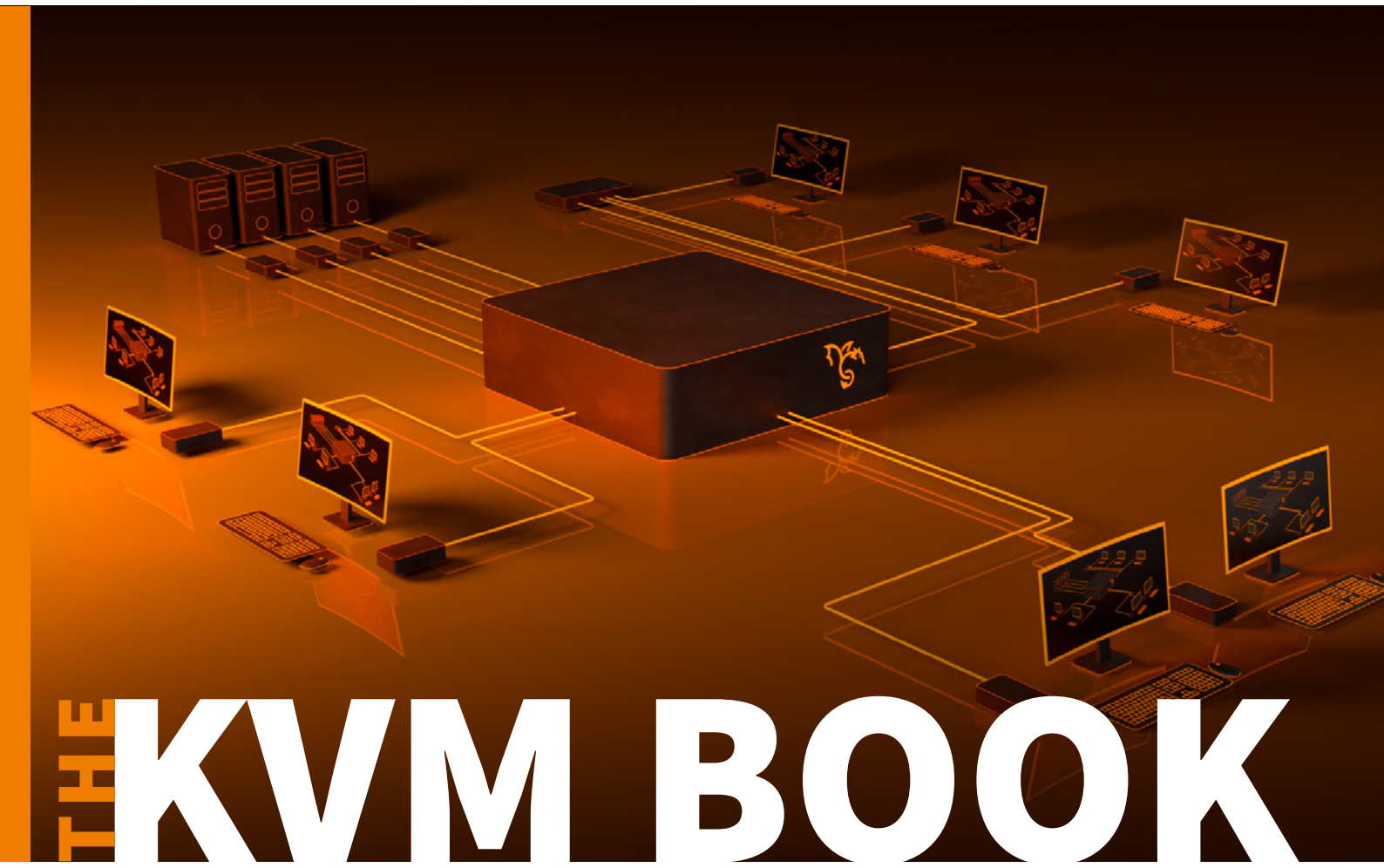
ihse.



THE KVM BOOK 2026

KVM INNOVATORS SINCE 1984

TECHNOLOGY FOR TOMORROW

We are a world leading manufacturer of flexible and highly secure KVM extension and switching solutions for collaboration, resource and access management. We constantly strive to improve and expand our existing portfolio and promote innovation throughout the IHSE group.
Our modular KVM solutions are flexible, future-proof and provide great security of investment.

PRODUCT CERTIFICATES

Our products are made without hazardous materials and exceed REACH and RoHs regulations.
Additionally, we declare conformity with European Union (CE-Label), ensure safety and suitability in industrial, cyber security (ISO 27001:2022), maritime (IEC 60495) and military (Tempest, NIS2 and Common Criteria EAL 4+) applications.

CERTIFICATIONS

We constantly evaluate our processes and undergo regular audits to ensure trustworthiness and sustainability to our customers, partners, employees and environment.
We hold certificates for ISO 9001:2015 (Quality Management System), ISO 14001:2015 (Environmental Management System) and ISO 27001:2022 (Information Security Management System).

OUR DNA

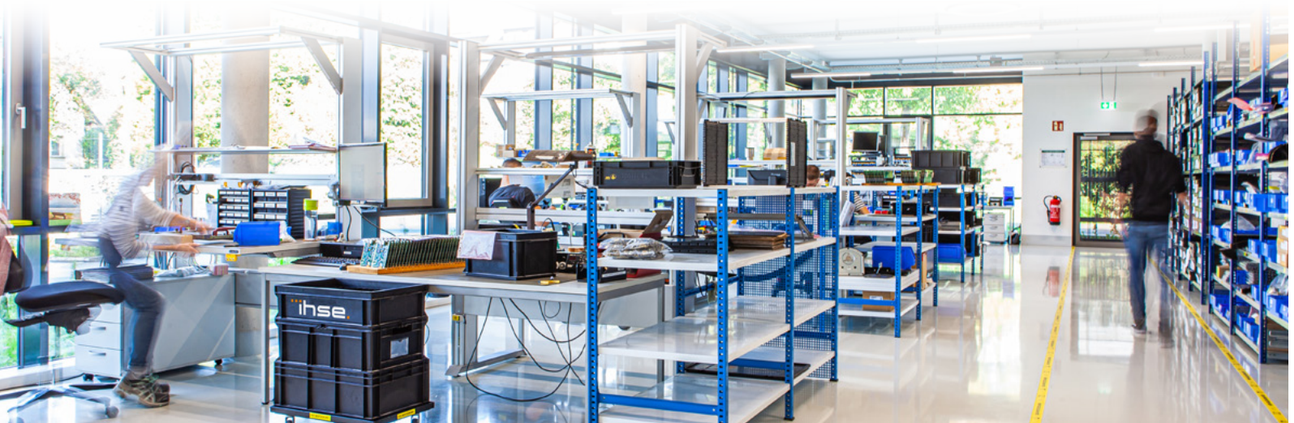
We are proud to work with gifted professionals from all over the world who guide and develop the company internationally.
At IHSE, we have “engineers who listen”. Customers’ needs and challenges are the bedrock for our solutions. Many of our innovative solutions and products originate from the requirements of customers that have become industry staples.

MADE IN GERMANY

Production, research and development of IHSE products are all carried out at our headquarters near beautiful Lake Constance in Oberteuringen, Germany.
As far as possible, we support a local supply chain that helps eliminate production delays and makes our TÜV certified production step by step more sustainable.

GLOBAL MARKET PRESENCE

With IHSE headquarters in Germany and subsidiaries in the United States and Singapore we have created a comprehensive global sales network with round-the-clock support and independent, authorized sales partners all over the world.



SHAPING TOMORROW’S WORKFLOWS

At IHSE Group we actively shape the future of KVM. KVM is so much more than just extending and switching keyboard, video and mouse! The technology is indispensable when it comes to maximum reliability, security, and flexibility — in control rooms for every industry.
IHSE is the world’s leading provider of KVM solutions for both high-security applications and flexible and simple solutions over IP.
Our mission is straightforward: we see ourselves as a driver of innovations, constantly evolving KVM technology. We always take into account what matters most to our customers: reliability, compatibility, easy installation and maintenance, future-proofing, efficient use of hardware and infrastructure, and, last but not least, sustainability.
All of this is our benchmark in development and production. We are proud to manufacture all our products at our modern headquarters, with full control over all stages of production, from the initial idea to the finished product. We adhere to the highest standards in terms of both environmental protection and cyber security. We continuously develop these aspects and undergo regular comprehensive audits so that our customers can be assured of having a reliable and certified partner in IHSE.
Our commitment is to customer satisfaction. It is no coincidence that numerous organizations — where performance and reliability are non-negotiable — rely on our KVM solutions for implementing mission-critical processes. Our applications cover a wide range of industries, including Broadcasting, ProAV, Esports, Banking, Healthcare, Maritime, Air Traffic Control, Government, and many more. In every industry, our technology provides the robust, secure, and low-latency access that professionals need.

With our new product catalog, we invite you to discover how the IHSE Group is pushing the boundaries of KVM technology. Let us help you transform your operations today!

Yours,
Frank Breitenfelder, Managing Director

IHSE CONTACT

SALES

Email: sales@ihse.com
Phone: +49 7546 9248-42

ORDER PROCESSING

Email: order@ihse.com
Phone: +49 7546 9248-41

TECH SUPPORT

Email: techsupport@ihse.com
Phone: +49 7546 9248-43

WHO WE ARE

KVM APPLICATIONS

IHSE EXPLAINS

RELOCATE COMPUTERS

WORKSPACE MANAGEMENT

TRUE COLLABORATION

REMOTE WORK

IHSE TOOLBOX

ABOUT IHSE

For over 40 years, we stand for innovative, technologically and qualitatively superior products, competent consulting and customer proximity.
KVM technology made by IHSE is trusted worldwide by numerous customers from Broadcast and post production, air traffic control/ airports, industry, banking, autonomous driving and government facilities.

40 YEARS OF SUCCESS

1984
Foundation of IHSE GmbH

1988
Introduction of the first KVM extender

2001
First OEM partnership (Europe & USA)

2008
Introduction of the first DVI cross point switch

2009
Foundation of IHSE USA

2010
Introduction of KVM matrix switch Draco tera

2011
Start of cooperation with Fraunhofer Institute

2013
Foundation of IHSE APAC

World's first matrix grid architecture

2015
World's first KVM matrix switch with 576 I/O ports

2016
Brockhaus Private Equity acquires majority shareholding

2019
Relocating to new headquarters building

Introduction of IP-enabled solution

2020
Launch of Draco Multiview 4K60

2023
EAL 4+ certificate for Draco vario Isolated Secure Extender

2024
Release of JPEG XS IP Core in cooperation with Fraunhofer IIS

IHSE GROUP

KVM SPECIALISTS HAVE UNITED FORCES

With subsidiaries in Singapore and the USA, and our globally active partners and distributors, we operate internationally.
Our Lake Constance based headquarters in Oberteuringen, Germany, hosts the modern and highly functional production areas and IHSE management.
We have a large network of regional offices worldwide and rely on valuable relationships with expert partners to provide the best solution to our customers.

IHSE WORLDWIDE

IHSE HEADQUARTERS

IHSE GMBH

Benzstrasse 1
88094 Oberteuringen - Germany

GET IN TOUCH
Phone: +49 7546 9248-0
Email: info@ihse.com

OFFICE HOURS (UTC +1)
Mon - Fri: 9:00 am - 4:00 pm

TECH SUPPORT
Phone: +49 7546 9248-43
Email: techsupport@ihse.com

SALES
Phone: +49 7546 9248-42
Email: sales@ihse.com

IHSE SUBSIDIARIES

IHSE USA LLC

1 Corporate Drive, Suite F
Cranbury, NJ 08512 - United States of America

GET IN TOUCH
Phone: +1 732 738 878 0
Email: info-usa@ihse.com

OFFICE HOURS (UTC -5)
Mon - Fri: 8:30 am - 5:30 pm

TECH SUPPORT
Phone: +1 732 738 878 0
Email: techsupport-usa@ihse.com

SALES
Email: sales-usa@ihse.com

IHSE GMBH ASIA PACIFIC PTE LTD

158 Kallang Way, #07-13A
Singapore 349245

GET IN TOUCH
Phone: +65 6841 470 7
Email: info-apac@ihse.com

OFFICE HOURS (UTC +7)
Mon - Fri: 8:30 am - 5:30 pm

TECH SUPPORT
Phone: +65 6841 470 7
Email: techsupport-apac@ihse.com

SALES
Email: sales-apac@ihse.com

IHSE REGIONAL REPRESENTATIVES

SHOHAM, ISRAEL

Phone: +972 544 320 768
Email: sales@ihse.com

SEOUL, SOUTH KOREA

Phone: +82 103 752 401 3
Email: sales@ihse.com

SUSTAINABILITY AT IHSE

OUR CONTRIBUTION TO CONSERVING GLOBAL RESOURCES

IHSE's headquarters and production site are designed with an absolute focus on sustainability.
The building itselfs meets highest energy-saving standards. This includes energy efficient heating and air conditioning, water saving measures and a large photovoltaic system that can generate enough power to charge our employee's electric vehicles.
Positive steps were taken to ensure that the building contributes to, and enhances, the local vicinity. Our garden has become a great recreation place for all our employees. It features a unique bio system with ponds to collect and use rainwater surrounded by a garden to host exclusively native plants. This enables the system to be managed without fertilizers and pesticides. Various species of birds, dragonflies, frogs, newts and stoats have settled here. Insect hotels host numerous endangered wild bees.

GREEN KVM - SAVING ENERGY AND COST

KVM technology is a green technology by design. It enables to store valuable computers in a safe and environmentally controlled place, prolonging the device's lifespan and therefore reducing electronic waste. We took one step further:
Our KVM extenders have a lower power consumption compared to similar competitive products. Their exceptionally long product life cycle saves money by increasing replacement intervals.
Low power consumption results in less waste heat and less cooling efforts at a more dense mounting in the server room.
Our modular system allows to configure customized devices without unnecessary functionality and interfaces which reduces need for resources. In the unlikely case a module fails, it can be easily replaced without discarding the whole system.
All those features result in a significantly lower carbon oxide emission.
Learn more about Green KVM: www.ihse.com/green-kvm

ACT ENVIRONMENTALLY FRIENDLY

All our products are free of harmful substances which exceeds legal Reach and RoHS regulations. All cleaning agents used in production and housekeeping are purchased from ecological manufacturers.
Our office is driven mainly paperless. Where needed, we use recycled papers. Our packaging concept is also based on recycled materials. Return and recycling of unwanted equipment is carried out through environmentally friendly WEEE registered disposal.
Our company cars are being converted to electric vehicles and for our employees, we offer electric car charging, bike leasing and tickets for public transport.

MEETING INTERNATIONAL STANDARDS

IHSE GmbH is certified by various international quality standards:
- ISO 9001:2015 - Quality Management System
- ISO 14001:2015 - Environmental Management System
- ISO 27001:2022 - Information Security Management System

We have set up conditions for suppliers and restrictions of certain resources and chemicals, including substances which are harmful to environmental and health aspects as well as conflict minerals mined in conditions of armed conflict and human rights abuses.
Learn more about our compliance regulations: www.ihse.com/compliance

LOCAL COMMITMENT

To IHSE, social responsibility is an integral part of our corporate culture. We actively support local social initiatives, including sporting, cultural and artistic activites. We are currently supporting several projects for children and young adults.
Learn more about IHSE's sponsoring activities: www.ihse.com/sponsoring

WHAT IS KVM?

KVM stands for **K**eyboard, **V**ideo and **M**ouse, the input and output devices used to control computers. The technology provides solutions to extend, convert and switch computer signals, including USB and audio. KVM technology works driverless and does not affect data networks and the software and hardware itself.

SCALABLE, FLEXIBLE, SECURE

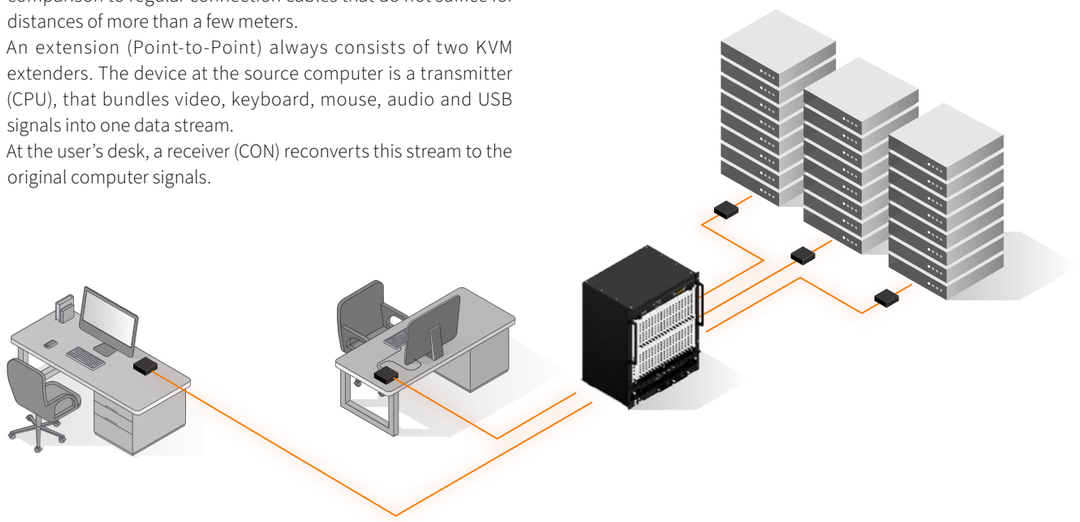
KVM offers a wide range of workspace designs. Computers can be removed from the desktop to a safe area by installing a set of KVM extenders.

KVM EXTENDERS

A KVM extender allows to gap distances of up to 10 kilometers, in comparison to regular connection cables that do not suffice for distances of more than a few meters.
An extension (Point-to-Point) always consists of two KVM extenders. The device at the source computer is a transmitter (CPU), that bundles video, keyboard, mouse, audio and USB signals into one data stream.
At the user's desk, a receiver (CON) reconverts this stream to the original computer signals.

KVM MATRIX SWITCHES

To enable users to access more than one computer with their workstation, multiple KVM extenders can be connected by a KVM switch. A KVM switch distributes bundled computer signals between the connected sources and user consoles. This allows sharing of peripherals as well as resources.



KVM USE CASES

KVM technology is key where total flexibility, reliability and scalability of computer systems is crucial for smooth and secure operation. A typical field of KVM technology driven applications are control rooms. Control rooms are the central point in a system where multiple data sources converge and are processed. Depending on the industry, a control center is equipped in a special way.

KVM technology ensures collaboration without distraction, delays, or downtime of essential systems. IHSE products are trusted worldwide and are found in various 24/7 mission critical applications with zero tolerance for errors. Our commitment:

✓ Flexible ✓ Highly Secure ✓ Fast & Precise ✓ Future Proof ✓ Reliable ✓ Scalable

AIRPORTS
Manage efficient flow of traffic and coordinate aircraft movements to avoid accidents.

BROADCAST
Display and process ultra-high resolutions for playout, in the studio or live at the scene.

DEFENSE
Safeguard confidential information and distribute them to the exact point of operation.

MARITIME
Protect sensitive computers from environmental impacts so that vessels cruise safely.

KVM made by ihse.

HEALTHCARE
Effectively share costly equipment and provide data to doctors to improve treatment.

ECONOMICS
Connect complex systems to work together seamlessly and enable system growth.

IT SECURITY
Isolate sensitive computer systems, mitigate insider threats and prevent data theft.

INDUSTRY
Control workflow and manage supply chains to keep the process running.

HOW DO COMPANIES BENEFIT FROM KVM?

KVM ENHANCES THE WORKPLACE

- **Relocation of computers**
  Removing computers from the workplace to a remote location (i.e. a server room) reduces hardware, noise and heat in the user environment.
- **Improved ergonomics**
  Operation of several computers and monitors by a single set of keyboard and mouse.
- **Easy access to varied resources**
  Convenient and instant access to a wide range of connected sources.

KVM SAVES COSTS

- **Increasing the lifespan of computers and equipment**
  Placing sensitive computer equipment in secure and environmentally-controlled server rooms facilitates support and maintenance.
- **Reducing hardware and software overheads**
  Enabling multi-user sharing of computers and licensed software tools.
- **Efficient use of space and technical resources**
  Flexible reconfiguration of workstations to meet different tasks at the push of a button. Simultaneous access to content enables collaboration and cooperation even between remote teams.

KVM INCREASES IT SECURITY

- **Access control**
  Operational access to source computers is limited to authorized users by a comprehensive rights management that is physically separated from data paths.
- **Restricted physical access to hardware**
  Prevents unauthorized removal of data and injection of malware.
- **Prevention of unauthorized external access**
  The KVM system defends against network attack and guards against electronic eavesdropping.

EXPLORE OUR CYBER SECURITY APPROACH

IHSE has established a complex tool set for maintaining safe and secure computer surroundings. This includes the SecureCore® matrix, certified secure extenders and multiple other precautions.
Learn how a cyber-resilient KVM system protects mission-critical IT systems from digital threats in our Cyber Security Whitepaper.

Find it online for download: www.ihse.com/cyber-security

Draco System Designer

configure your own system

DRACO SYSTEM DESIGNER

CREATE YOUR KVM PROJECTS ONLINE

The Draco System Designer is IHSE's online tool for designing complete KVM projects; from individual extension lines to highly complex matrix applications with accessories. At the same time, it supports the user with system viability checks and prevents incorrect configurations through intuitive iteration and guidance. Customized solutions can be easily put together and documented graphically and on line-by-line part lists. All layout information can be stored, exported and amended at any time as changes are applied.

ADVANTAGES IN DEPLOYMENT AND SETUP

Devices can be assigned with individual names and project-related descriptions. These are used to identify and coordinate deployment and help reduce setup time during installation and in servicing the whole system during its lifetime.

DETAILED INFORMATION

All necessary design information, including interfaces, supported resolutions and protocols, power consumption and dimensions is immediately available. Data sheets are linked to the individual components and are a single click away.

The Draco System Designer is undergoing continuous development and enhancement and will evolve to become even more useful in the future.

Our application engineering team is available to customers, supporting this tool and providing consultancy based on decades of experience in architecting KVM solutions and beyond!

STEP BY STEP CONFIGURATION

Step 1: Create new project.

Step 2: Enter project data.

Step 3: Configure KVM extender.

Step 4: Customize KVM matrix switch.

Step 5: Send request to IHSE sales team and save your configuration locally.

Step 6: Print

NEED HELP?

We offer several resources for easy usage of our DSD, please see our website for tutorials at dsd.ihse.com.
If you have any questions or need assisitance with DSD, call our sales team on +49 7546 9248-42.

RELOCATE COMPUTERS

KVM extenders enable computer access from remotely-located workstations and protect critical CPUs and servers from heat, dirt, moisture and unauthorized access.

WHY USING KVM EXTENDERS

In work areas with limited space, tough environmental conditions or safety concerns, computers should be separated from the workstation. However, when peripheral cables exceed a certain length, signal quality suffers immensely, resulting in visual artefacts, overall distortion, and delay of the signal.
IHSE extenders enable the extension of signals without a compromise in signal quality and full access for the users to remotely located computers just as if the computer were right next to it, without any loss of information, no mouse glitch and no perceivable latency.

REMOTELY LOCATED COMPUTERS

Working areas freed from bulky and noisy computers can significantly improve ergonomics, reduce the risk of distraction and prevent direct malicious access to the hardware, impeding infiltration of malware and data theft.
Furthermore, the use of extenders and KVM systems can help save a lot of money. Be it by improving workflows and team's collaboration or the placement of valuable computers in a safe and climate-controlled server room, protected from dust or accidental contamination.

READY FOR THE MISSION

All IHSE extenders can be customized to best match the job requirements. The modular construction enables our customers to choose the perfect features and functions from a wide and expanding range of modules for the job at hand. This modularity is key for performance, sustainability, and cost efficiency.
With our personalized configuration tool, the Draco System Designer (page 14), and our versatile range of modules (page 36 and 40) customers can customize the optimally suited IHSE KVM system that can easily be expanded at a later date.

BENEFITS OF RELOCATING A COMPUTER

Reasons for remotely locating a computer or a workstation can be manifold and cover a wide range of use cases. From increasing the security and safety for the personnel and the computers, to enhancing workflows and ergonomics - the extension of signals can be the best solution in many use cases going beyond the mere displacement of a CPU or the workstation.

- Protection against dust, moisture and vibrations
- Prevention of theft and unauthorized CPU access
- Simplified maintenance, configuration and administration of multiple user computers at a central point
- Centralized installation of software updates (particularly simple in combination with a KVM switch)
- Storing computers in an environmentally controlled server room increases life cycles and ensures constant performance
- Pleasant working environment by enhancing space and reducing noise and heat pollution caused by powerful computers
- Saving lots of money by minimizing costly outages, minimizing Mean Time To Repair of the computers and by enhancing users' workflows

BASICS – WHAT TO KNOW BEFOREHAND

For general understanding: The KVM extension only affects pure computer signals; no actual data is transferred. It does not require drivers on the computers and has no effects on the processes within the computer itself. Nevertheless, certain circumstances influence the decision as to which KVM extender should be used.

TYPE OF KVM NETWORK

The very first decision to make is to choose a general transmission technology. KVM can be operated within a common computer network (KVM-over-IP) or using a manufacturer specific transmission protocol (proprietary KVM). Both methods offer the same KVM functionality.

KVM OVER IP

- Greater flexibility
- Standardized networks and hardware
- Requires constant management of network

PROPRIETARY KVM

- Better stability of physically separated network
- Plug and Play: easy setup, maintenance and troubleshooting
- No post-setup management required
- Full bandwidth available for KVM system

IHSE EXPLAINS

WHAT IS IP?

IP is a fundamental network protocol and stands for **I**nternet **P**rotocol.
It is the basic communication protocol in computer networks, both in local networks and on the internet.
IP organizes data transport within a computer network. Therefore it defines how all network components (hosts and routers) are adressed and serves as a guide.
IP does not guarantee a connection, it simply sends data without checking their arrival at the target host.

IP defines the following aspects of networking operation:

ADRESSING
Every network device has a unique address, making it identifiable. The IP protocoll regulates those adresses, e.g. IPv4 and IPv6 adresses.

PACKET DELIVERY
IP manages the transport of data packets generated by a previously executed routine or protocol (TCP, UDP, Ethernet, etc.) in the network.

ROUTING
IP organizes the route through the network that packets take.

DISTANCES AND CABLING

Native computer signals can only be transmitted with maximum cable lengths of up to some meters. With KVM technology it is possible to increase the distance between computer and user. Depending on the facility dimensions, those distances can be of up to several hundreds or even thousands of meters. Appropriate cabling needs to be chosen.

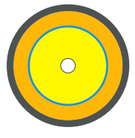
CAT X

- Common use case:
  horizontal intra-building deployments
- Data rates categorized based on performance:
  Cat 5e: up to 1 Gbit/s @ 100 MHz
  Cat 6: up to 10 Gbit/s @ 250 MHz
  Cat 8: up to 100 Gbit/s @ 2000 MHz
- Cheap and widely available
- Distances: up to 140 m

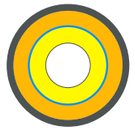
CAT X

FIBER OPTICS

- Common use case:
  secure applications, longer distances
- Data rates depending on cable physics:
  single-mode: single wavelength, more bandwidth + distance
  multi-mode: multiple wavelengths, less bandwidth + distance
- Pricier cabling
- Distances
  multi-mode @ 10 G: up to 400 m
  single-mode @ 10 G: up to 10 km



Fiber single-mode



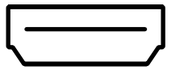
Fiber multi-mode

VIDEO INTERFACES

The most obvious feature of a computer setup is the video interface, both in the computers graphics card (video OUT) and the monitor sitting on the desk (video IN). In the IHSE product portfolio KVM extenders are typically described by the video interface.

INTERFACE TYPES IN IHSE KVM EXTENDERS:

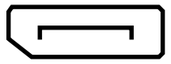
HDMI



High **D**efinition **M**ultimedia **I**nterface enables the transmission of uncompressed multimedia data in almost perfect quality.
High-resolution video data, HDTV and UHDTV are forwarded in combination with audio data without interference and in high quality via the HDMI interface.
HDMI is backward compatible with DVI-D, while dismissing audio.

	HDMI 1.3	HDMI 1.4	HDMI 2.0	HDMI 2.1
Bandwidth	3,96 Gbit/s	8,16 Gbit/s	14,4 Gbit/s	42,67 Gbit/s
Resolution	1920x1200 @ 60Hz	3840x2180 @ 30Hz	3840x2180 @ 60Hz	7680x4320 @ 60Hz

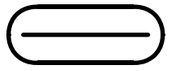
DISPLAY PORT



In addition to visual signals, **D**isplay**P**ort cables can also carry audio, USB, and other forms of data simultaneously. To do so, DisplayPort relies on packetized data transmission, allowing higher resolution using fewer pins.
The interface is backward compatible with other interfaces, such as HDMI and DVI, through the use of either active or passive adapters.
DisplayPort is also capable of carrying bi-directional USB signals and Multi Stream Transport (MST). MST supports the extension of two video streams over a single connection cable. Two monitors can then be supplied by daisy chaining.

	DP 1.1	DP 1.2	DP 1.3	DP 1.4	DP 2.0
Bandwidth	5,97 Gbit/s	17,28 Gbit/s	32,4 Gbit/s	25,92 Gbit/s	77,37 Gbit/s
Resolution	4K30	4K60	7680x4320	3840x2160	7680x4320 @ 60Hz

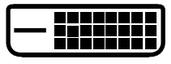
USB TYPE C



Universal **S**erial **B**us Type **C** can be used as port for any data and power. Therefore, is has the potential to replace USB Type A, HDMI, audio jacks and power supply input in a single port. Due to its compactness, the USB-C port can be very fragile and is not ideally suited for permanent connections.
Due to a lack of standardization, USB-C can be equipped with or without power supply.
To avoid confusion and imcompatibilites, IHSE KVM extenders do not deliver power and only transmit video (DisplayPort protocol with embedded audio, USB HID and USB 2.0)

OTHER INTERFACES - AVAILABLE ON REQUEST

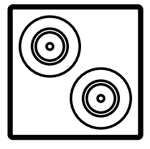
DVI



Digital **V**isual **I**nterface succeeded VGA and transmits uncompressed digital video signals and offers compatibilty to the outdated VGA standard but does not include audio signals.
In KVM applications, audio transmission requires additional modules.
DVI-I standard is backward compatible to the outdated VGA standard. In this case it is not compatible with HDMI, DisplayPort and USB-C.

	DVI SINGLE LINK	DVI DUAL LINK	DUAL HEAD
Bandwidth	4,95 Gbit/s	9,9 Gbit/s	9,9 Gbit/s
Resolution	1920x1200 @ 60Hz	4096x2160 @ 30Hz	2 x 1920 x 1200

SDI



The **S**erial **D**igital **I**nterface (SDI) was a common standard for digital video interfaces and often used for broadcast video where it connects to different pieces of equipment such as recorders, monitors, PCs and vision mixers. It transmits uncompressed and unencrypted digital video signals (optionally including embedded audio and time code).

Transfer rates
SDI enables transfer rates of 1.485 Gbit/s for HDTV applications and up to 2.97 Gbit/s, with SMPTE ST 424:2012.

UNMATCHED APPLICATION VERSATILITY

With KVM extenders, users can not only relocate computers to unclutter their workplace (referred to as “console”). Extenders can be featured with local video, USB-HID interfaces and redundant data links that offer some great use cases to access different sources even without a KVM matrix switch involvement.

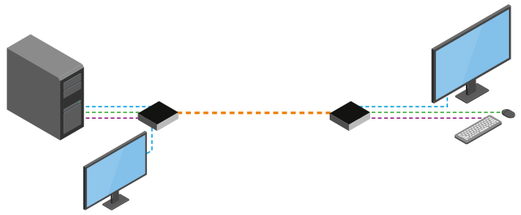
POINT TO POINT I

A transmitter KVM extender (CPU) bundles Keyboard, Video, and Mouse signals and connects to a receiving KVM extender unit (CON).
In the basic setup, one single source (computer) is connected to one single workstation (console) via distances up to 10 km with computers stored in a safe area.

POINT TO POINT II

with local video feed-through at CPU

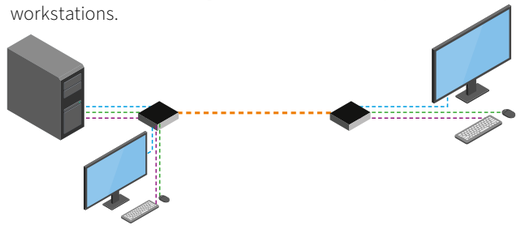
Additionally, video monitoring at the computer’s end is possible by equipping the CPU with local video out.



POINT TO POINT III

with dual access (KVM at CPU)

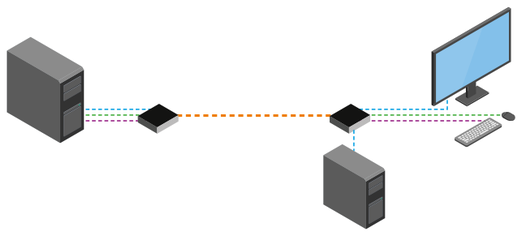
By adding USB-HID, a complete workstation can be added at the computer, enabling to access the computer from two workstations.



POINT TO POINT IV

with PC video IN at CON

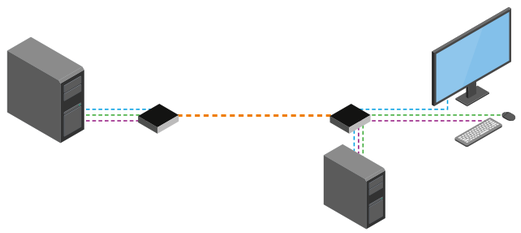
Users can switch between a full KVM source PC and a video only source computer (i.e. surveillance cameras, radar antennas).



POINT TO POINT V

with PC KVM at CON

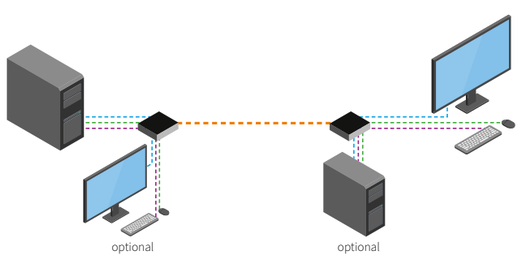
Users can switch between a distant and a stationary PC with full KVM functionality (2:1 remote switch).



POINT TO POINT VI

with local KVM feed-through and 2:1 remote switch

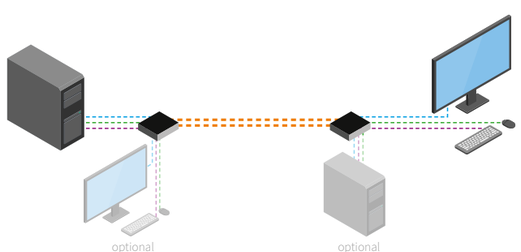
Users can switch between a full KVM source PC and the stationary PC at the console while full KVM access is still possible at the distant computer in the server room.



REDUNDANT POINT TO POINT

with automatic fail over

CPU and CON are connected by two independent data links. In case one line fails, the connection automatically changes to the other. Local feed-throughs are not affected.



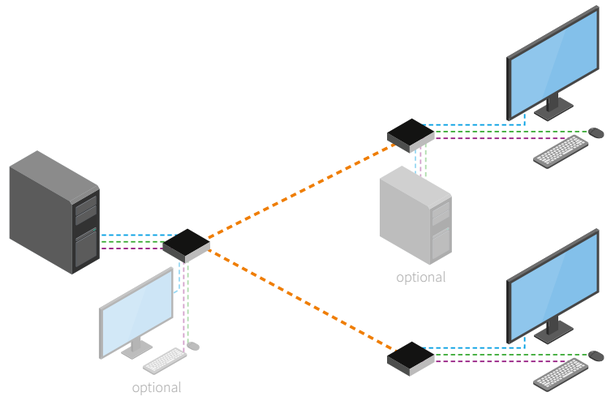
MINI KVM SWITCHING SYSTEMS

For effective collaboration in small applications redundant KVM extenders can be used to create full feature KVM layouts without the need to install a KVM matrix switch.

POINT TO MULTI POINT

with redundant CPU

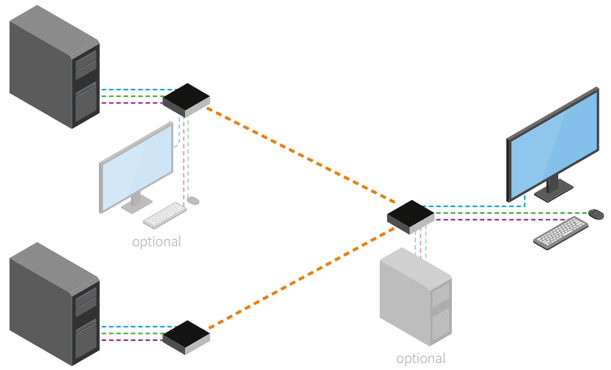
A **redundant CPU** unit allows to connect to two non-redundant CONs.
Users can access one source computer from two separate workstations (i.e. operator backup, 2-man rule). Optional local feed-through can be added according to the setups previously mentioned and does not affect the KVM switching.



REMOTE 2:1 ACCESS

with redundant CON

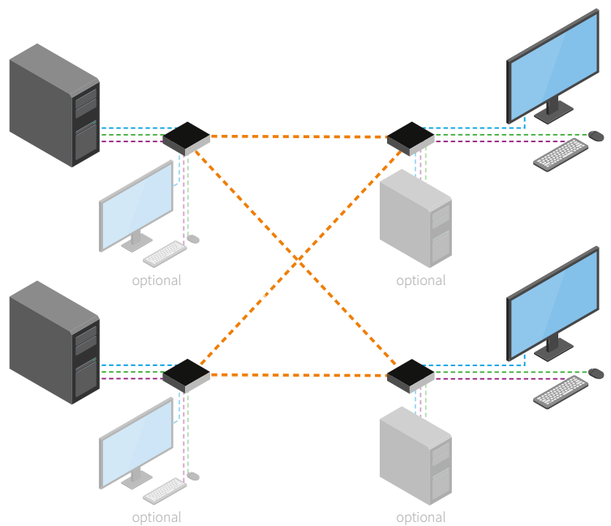
A **redundant CON** unit allows to connect to two non-redundant CPUs.
Users can access two source computers from one workstation (i.e. multi-tasking). Local feed-through options can be added at any point and do not affect the KVM switching.



2 x 2 MINI MATRIX

with redundant CPU and CON

To combine the access options above, a 2:2 access grid can be implemented with **redundant** links in both **CPU and CON** units.
This results in a full KVM switch setup with two sources and two workstations and non-managed full access to all meshed computers. Local feed-through at any end-point can be added and does not affect the KVM network.



THE DRACO VARIO MODULAR CONCEPT

MODULARITY

At IHSE we believe that customers benefit from being able to purchase only what they need.

Our modular approach provides maximum flexibility and saves costly resources with easy configuration and maintenance.

SCALABILITY

The modular concept allows assemblies to be fitted and re-fitted as required and on demand. Still, our space-saving design houses up to six dual head KVM extenders in just one rack unit.

HIGH PERFORMANCE 24/7

REDUNDANCY

All Draco vario chassis are available with power redundancy options for a minimum of downtime. KVM modules offer optional link redundancy with glitch-free manual or automatic fail-over.

RELIABILITY

Slide-in chassis provide hot-swap and hot expansion of individual modules with no downtime.

Draco vario extenders are the ideal partner in mission-critical environments where operational uptime is paramount.

DRACO VARIO CHASSIS

The Draco vario extender series is based on a modular concept. The various video interfaces paired with USB-HID signal transmission found the basis for extender mainboards. Peripheral interfaces such as USB 2.0, RS232, RS422 and different audio formats line up the so-called add-on modules. Customers can pick and configure their own set of extenders by puzzling these modules together, mounted in Draco vario chassis of different size and architecture. They can be obtained with or without power redundancy.

STANDARD OR BUILT-IN CHASSIS

The extender mainboards and add-on modules are pre-assembled at the IHSE manufacturing facility according to clients order specification.

SPACE-SAVING DESIGN

Pre-assembled chassis and extender modules are the most space-saving option. At any point in time they can be modified for expansion or service reason in the field at customers' premises. However, as the modules are permanently mounted, the chassis need to be unmounted and reassembled for such purpose and might cause downtime to all extension components within the chassis.

BACKPLANE OR SLIDE-IN CHASSIS

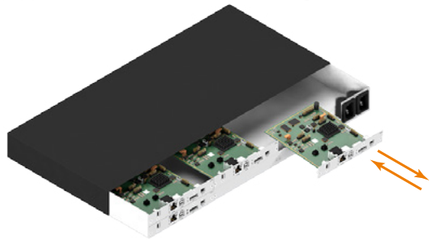
Draco vario slide-in chassis have an internal backplane providing power and a data channel. Modules can easily be slid in place where they tightly connect to the backplane.

HOT-SWAPABILITY

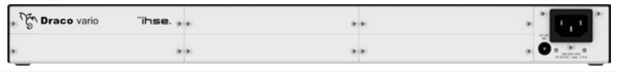
Once in operation, these modules can easily be removed for service or replacement while other extenders within the same chassis continue operations: A massive reduction of MTTR in case of a failure.

IP MANAGEMENT AND CONTROL

Via the data channel on the backplane, slide-in chassis provide the option for monitoring, configuration and API control of the equipped extender modules via IP Management.



BUILT-IN CHASSIS

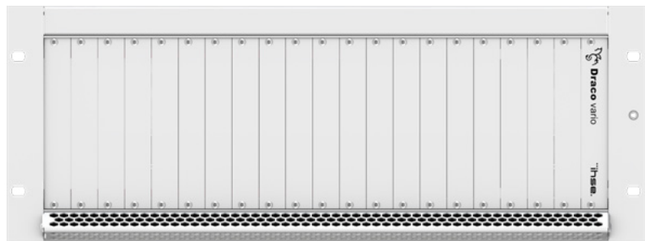
CHASSIS FOR FREE CONFIGURATION	DIMENSIONS	PART NUMBER
Chassis for 2 modules; external power supply 	145 x 147 x 44 mm (5.7 x 5.8 x 1.7 inch)	474-BODY2
Chassis for 2 modules; external power supply; setup for redundant power supply 	145 x 147 x 44 mm (5.7 x 5.8 x 1.7 inch)	474-BODY2R
Chassis for 2 modules; integrated power supply; setup for redundant power supply 	221 x 147 x 44 mm (8.7 x 5.8 x 1.7 inch)	474-BODY2N
Chassis for 2 modules; integrated 12V/24V/48V DC power supply; setup for redundant power supply 	221 x 147 x 44 mm (8.7 x 5.8 x 1.7 inch)	474-BODY2DC-12 474-BODY2DC-24 474-BODY2DC-48
Chassis for 4 modules; external power supply 	239 x 147 x 44 mm (11.5 x 5.8 x 1.7 inch)	474-BODY4
Chassis for 4 modules; external power supply; setup for redundant power supply 	239 x 147 x 44 mm (11.5 x 5.8 x 1.7 inch)	474-BODY4R
Chassis for 6 modules; integrated power supply; setup for redundant power supply 	442 x 147 x 44 mm (17.4 x 5.8 x 1.7 inch)	474-BODY6R-R1
Chassis for 6 modules; integrated 12V/24V/48V DC power supply; setup for redundant power supply 	442 x 147 x 44 mm (17.4 x 5.8 x 1.7 inch)	474-BODY6DC-12 474-BODY6DC-24 474-BODY6DC-48

LEARN MORE

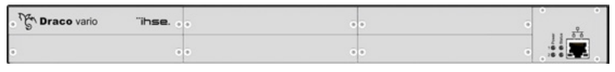
Find suitable accessories for Built-in and Slide-In chassis on page 26.

ADDITIONAL INFORMATION
Find detailed information, data sheets, intallation guides and more online: www.ihse.com/chassis

SLIDE-IN CHASSIS

CHASSIS FOR FREE CONFIGURATION	DIMENSIONS	PART NUMBER
Chassis for 2 modules; integrated backplane power supply; setup for redundant power supply (lockable)	221 x 147 x 44 mm (5.7 x 5.8 x 1.7 inch)	474-BODY2BPF
Chassis for 2 modules; integrated backplane power supply; setup for redundant power supply (lockable); preinstalled silent fan 	221 x 147 x 44 mm (5.7 x 5.8 x 1.7 inch)	474-BODY2BPF-S
Chassis for 6 modules; backplane with 2 integrated power supply units on back side; hot swappable extender modules 	442 x 147 x 44 mm (17.4 x 5.8 x 1.7 inch)	474-BODY6BP
Chassis for 6 modules; backplane with 2 integrated power supply units on front side; hot swappable extender modules	442 x 147 x 44 mm (17.4 x 5.8 x 1.7 inch)	474-BODY6BPF
Chassis for 6 modules; backplane with 2 integrated power supply units on front side; hot swappable extender modules; pre-installed silent fan 	442 x 147 x 44 mm (17.4 x 5.8 x 1.7 inch)	474-BODY6BPF-S
4 RU/19" rack chassis for 21 modules; integrated, removable power supply; setup for redundant power supply; hot swappable extender modules	482 x 462 x 176 mm (19 x 18.2 x 6.9 inch)	474-BODY21/4U-R1
4 RU/19" rack chassis for 21 modules; two integrated, removable power supply units; hot swappable extender modules 	482 x 462 x 176 mm (19 x 18.2 x 6.9 inch)	474-BODY21/4UR-R1

CHASSIS WITH INTEGRATED IP MANAGEMENT FUNCTIONALITY

CHASSIS FOR FREE CONFIGURATION	DIMENSIONS	PART NUMBER
Chassis for 2 modules 	221 x 147 x 44 mm (5.7 x 5.8 x 1.7 inch)	474-BODY2BPF-SNMP (for Draco XStreme: 474-BODY2BPF-SNMP-XS)
Chassis for 6 modules 	442 x 147 x 44 mm (17.4 x 5.8 x 1.7 inch)	474-BODY6BP-SNMP (for Draco XStreme: 474-BODY6BP-SNMP-XS)

MOUNTING KITS

IHSE offers a wide range of suitable chassis accessories for mounting options.

Users can comfortably mount devices where needed and store single extender chassis hidden under desks, mounted to vertical or horizontal surfaces or in standard 19" server racks. This helps to securely store your devices in a tidy manner, even in non-stationary installations like marine vessels, deployable gear or OB vans.

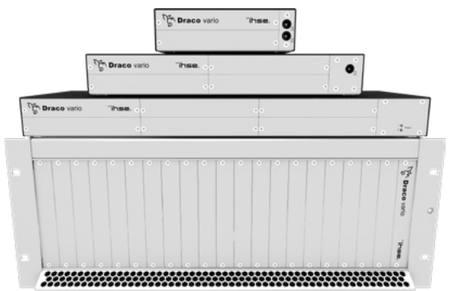
DESCRIPTION	PART NUMBER	SUITABLE FOR
Wall-/table mount L-Brackets for all 2-/4-/6-slot chassis	474-BRACKET	all 2-/4-/6-slot
19" Rack mount ears for Draco vario 2-slot chassis	474-2RMK	474-BODY2
19" Rack mount ears for Draco vario 4-slot chassis	474-4RMK	474-BODY4 474-BODY4R
19" Rack mount ears for Draco vario 6-slot chassis	474-6RMK	474-BODY6R-R1 474-BODY6DC-XX 474-BODY6BP 474-BODY6BPF 474-BODY6BPF-S 474-BODY6BP-SNMP
19" Rack mount ears for Draco vario 2-slot chassis with integrated PSU	474-2NRMK	474-BODY2N 474-BODY2DC-XX 474-BODY2BPF 474-BODY2BPF-S 474-BODY2BP-SNMP
VESA mounting kit for 2-slot-chassis	474-VESA2	474-BODY2
VESA mounting kit for 2-slot-chassis with integrated PSU	474-VESA2N	474-BODY2N
Mounting plate for all 2-/4-/6-slot chassis	474-VPLATE	all 2-/4-/6-Slot
Mounting plate w/ DIN Rail Snap On for 2-slot chassis	474-VSNAP	474-BODY2 474-BODY2N 474-BODY2DC-XX 474-BODY2BPF 474-BODY2BPF-S

DESIGN YOUR OWN MODULAR EXTENDER

Draco System Designer
configure your own system

IHSE offers an online tool for free configuration of your KVM projects. It enables documentation and verification of individual extenders up to complete matrix applications. All KVM switches and extenders are available for selection, including add-on modules, chassis variants and special accessories: dsd.ihse.com

STEP 1: Choose a chassis with accessories



STEP 2: Choose an extender module

STEP 3: Choose an optional add-on module

Final assembly

OPTIONAL PARTS

In certain environmental conditions - like found in industrial facilities - additional cooling can help to maintain lifetime and perfomance.

DESCRIPTION	PART NUMBER	SUITABLE FOR
Optional fan for Draco vario 6-slot chassis with backplane	474-6FAN-S	474BODY2BPF 474-BODY6BP 474-BODY6BPF

POWER SUPPLIES

Additionally, various spare power supply units are available to ensure 24/7 operation by installating redundant power to most chassis.

DESCRIPTION	PART NUMBER	SUITABLE FOR
Spare external PSU for 2-slot chassis	474-PSU2	474-BODY2 474-BODY2R
Spare external PSU for 2-slot chassis with built-in PSU and 4-slot chassis	474-PSU4	474-BODY2N 474-BODY4 474-BODY4R
Spare external PSU for 6-slot chassis with built-in PSU	474-PSU6	474-BODY6R-R1 474-BODY6DC-XX
Spare external PSU for 2-slot chassis with backplane, lockable connector	474-PSU2BPF	474-BODY2BPF 474-BODY2BPF-S 474-BODY2BPF-SNMP
Spare PSU for 21-slot chassis, slide-in, hot swappable	474-PSU21	474-BODY21/4U-R1 474-BODY21/4UR-R1

SERIES XSTREME

Draco XStreme

Draco XStreme DisplayPort Modules

ENTER THE NEXT GENERATION OF KVM

The groundbreaking Draco XStreme series is setting new standards in the world of signal transmission! Built on a revolutionary hardware platform and an innovative product concept, this series brings cutting-edge technology to the market. Supporting resolutions from Full HD to stunning 8K, the Draco XStreme series delivers crystal-clear visuals that surpass all expectations.

FEATURES

- Single Head and Dual Head KVM extender
- Local in/out options in Single Head versions
- Transmission of video signals up to 2x 4K @ 60 Hz
- Crystal clear video with JPEG XS compression
- Supports HDR10 (High Dynamic Range, 10 bpc)
- Device Class Filtering for USB 2.0
- Field-upgradable redundancy

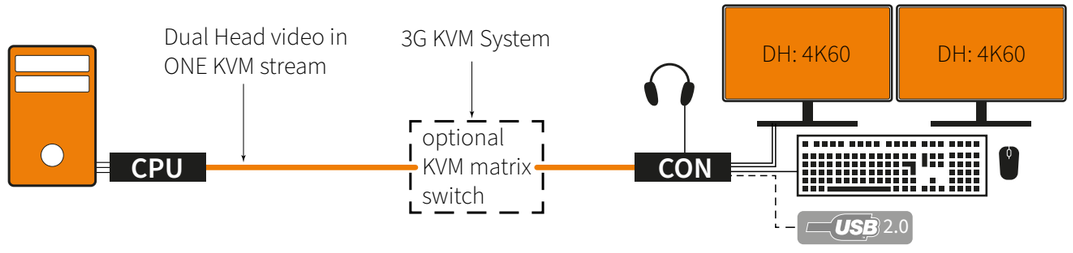
BENEFITS

- Extremely low power consumption
- Allows dense mounting to save space
- Future-proof through state of the art hardware
- Natively included analog and digital audio via 3.5 mm jack
- JPEG XS compression allows transmission of 4K60 Dual Head video signals in 3G system architecture

PROPERTIES

Interface	Mini DisplayPort (1.2)
Number of monitors	Single Head, Dual Head
Max. Resolution	2 x 3840 x 2160 @ 60 Hz
Color Depth	10-bit (4:4:4)
Video Codec	JPEG XS
Local In/Out	optional
USB	HID: ☑ Transparent: optional
Audio	embedded, analog unidirectional
Operation Mode	Point-to-Point: ☑ Matrix: ☑
Transmission Protocol	IHSE proprietary
Assembly	Module for Draco vario chassis

FUNCTIONAL DIAGRAM



PART NUMBERS

Draco XStreme part numbers do not follow the known series number scheme. For more convient identification of product features, Draco XStreme part numbers follow the concept of “speaking part numbers” in which every relevant feature is represented by a character.

LOOKUP TABLES

Find all combinations of links, video interfaces, resolutions and USB and audio in our easy to use lookup tables on page 97.

MEDIA

Learn about Draco XStreme on Youtube:
www.ihse.com/xstreme-video

WEB RESOURCES

Find detailed information here: www.ihse.com/xstreme

WHAT SETS DRACO XSTREME APART?

FUTURE-PROOF PRODUCT CONCEPT

Draco XStreme is focused on state of the art video interfaces and a new hardware platform, built to consume less energy and saving costly resources (bandwidth, space, cooling). With integrated on-board audio the need to purchase additional modules is reduced while still possible for special applications, fitting into the modular concept of Draco vario chassis.

A NEW LEVEL OF DATA SECURITY

With the new KVM extender series we took a step further to harmonize the world of KVM. Draco XStreme seamlessly fits in the proven and reliable IHSE proprietary Draco tera KVM switch technology. It features an advanced security protocol, uplifting data security and reliability to a new level. Therefore, existing Draco tera KVM matrix switches need to be upgraded with a new firmware or need to be purchased accordingly for new system installations. All Draco tera KVM matrix switches with new series number circle of 580 are ready for Draco XStreme. Special application modules and chassis are also available.

READY FOR KVM OVER IP

Draco XStreme uses the IHSE proprietary transmission protocol by default. In the future it can be updated with a new firmware to convert the device into an KVM-over-IP extender, fitting tightly into a standard IP network architecture, using low bandwidths for video transmission of up to 8K over 3G networks. Thus, the advantages of low bandwidth and highly secure IHSE KVM technology can be adapted to open-standard and more vulnerable IP networks. IP integration allows to bring high performance KVM technology with groundbreaking JPEG XS into your existing network landscape.

IHSE EXPLAINS

WHAT IS JPEG XS?

JPEG XS is a modern, standardized (ISO/IEC 21122) image and video codec designed to replace uncompressed video in professional, real-time workflows.

JPEG XS prioritizes three key factors above all else:

Visually lossless quality
The compressed video is visually indistinguishable from the original uncompressed video signal.

Ultra-low latency
Latency is measured in microseconds (fractions of a frame), which is essential for real-time interaction.

Low Complexity
The algorithm is lightweight and efficient, ideal for implementation on simple hardware like FPGAs with low power consumption.

PERFORMANCE

It achieves compression ratio of 2:1 up to 12:1 which allows to transmit one 4K60 video signal in 1 Gbit/s infrastructure, while uncompressed video signals require bandwidths of up to 12 Gbit/s.

COST SAVING

This results in significant cost savings for the infrastructure itself, power consumption of devices and less heat dissipation, requiring less air conditioning and thus allowing higher mounting density in server racks.

JPEG XS AND KVM

The ultra-low latency makes it the ideal video codec for video transmission in KVM applications, where near zero latency and brilliant video quality are mandatory. Both proprietary and KVM-over-IP solutions benefit from the revolutionary JPEG XS!

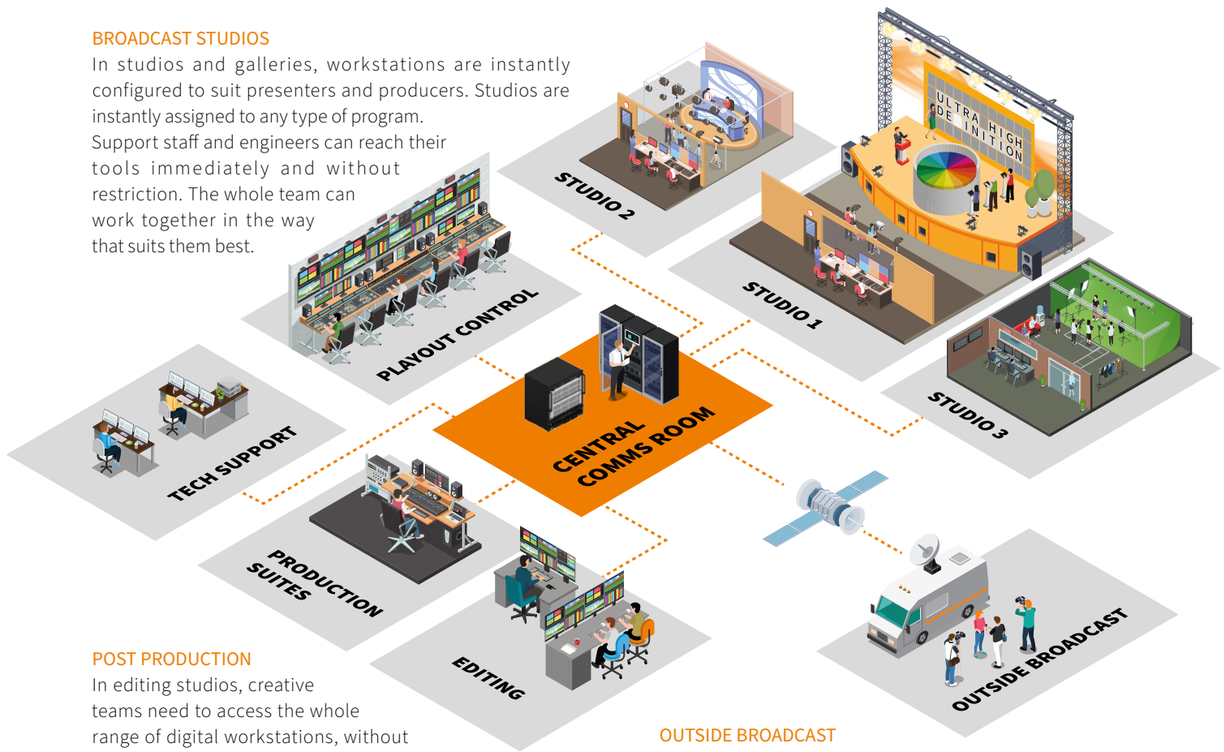
STREAMLINED WORKFLOWS FOR BROADCASTERS

In today's fast-paced broadcast environment, the ability to instantly access essential equipment is crucial to every great transmission.

IHSE's Draco KVM extenders transmit all types of digital and analog video and data including the branch's exclusive high quality SDI video interface for direct management of studio cameras.

Draco tera KVM matrix switches add flexibility to the setup by enabling operators to access any connected source without compromises in speed, quality or reliability.

Broadcast studios, OB vans and post production facilities around the world rely on Draco tera switches to connect and control vital equipment. This great flexibility also allows to service a greater range of assignments and deliver better service to customers.



BROADCAST STUDIOS

In studios and galleries, workstations are instantly configured to suit presenters and producers. Studios are instantly assigned to any type of program. Support staff and engineers can reach their tools immediately and without restriction. The whole team can work together in the way that suits them best.

POST PRODUCTION

In editing studios, creative teams need to access the whole range of digital workstations, without disruption or the need to change location. KVM matrix switches enable single-button control and instant switching between devices and assets, without constraint.

OUTSIDE BROADCAST

In OB vans reporters and editors connect broadcast equipment to their mobile TV studio, and immediately transmit to the home base broadcast studio.

The compact design of Draco KVM extenders and switches with wide range of redundancy options are ideal to combine cameras, microphones and editing tools in trucks with limited space.

TAILOR-MADE FOR BROADCAST PROFESSIONALS

IHSE's Draco KVM systems have proven themselves in numerous installations in radio and television, live broadcasts, OB vans, and production studios. Their compact and energy-efficient design, reliability, and versatility make them the ideal system component for perfect images, latency-free transmission, and flexible working in a stressful, 24/7 environment.

FEATURES & BENEFITS

- Instant connection and switching
- Space and weight saving for high performance and higher equipment density in OB vans
- Near-zero transmission latency
- Artefact-free video and audio
- Support of all digital and audio video formats
- HD-SDI and USB 3.0 parallel switching
- Integration with third-party controllers
- Extensive redundancy and security options
- Modular, expandable and future-proof

PRODUCTS IN FOCUS

Draco tera KVM matrix switch

Draco vario KVM extenders

Draco MultiView 4K60

Draco SIRA CPU **Draco** SIRA CON

IHSE ON AIR

BBC WALES HEADQUARTERS

The newly built BBC Wales HQ in Cardiff hosts TV and radio stations, all collaborating in a perfectly custom-made facility.

A full KVM switching system ties in high-powered HPZ4/8 workstations, servers and equipment that hosts essential services; including Avid, ProTools, BaseLight, Adobe, Vizrt, EVS and other software applications.

IHSE ON THE ROAD

NEP SUPERTRUCKS OB VANS

From the Oscars to the Olympics, NEP provides the technology and know-how to produce the world's biggest live and broadcast events.

Four enormous trucks were equipped with IHSE Draco KVM systems enabling EVS operators, CCU operators, audio controllers and video engineers to access the appropriate tools and computers necessary to complete their jobs most effectively from their own video workstation.

IHSE ON STRAWBERRY FIELDS

ABBEY ROAD STUDIOS

Abbey Road Studios is well known for producing the recordings of famous bands, including The Beatles and Pink Floyd.

The legendary facility in central London combines Avid, Neve and other leading post-production equipmwent with Draco tera switching to create music, dubbing and special effects in a variety of formats, including Atmos and IMAX.

SERIES 481

Draco vario HDMI

Module R481-BHHSLR

FEATURES & BENEFITS

- Single Head KVM extender
- Full HD and 4K versions available
- Allows connection of local monitor
- Optional KVM switch on CON unit
- Video-only modules for Full HD versions
- Multiple add-on modules for RS232, USB and audio integration available
- Compatible with Draco vario DVI-I, HDMI and DisplayPort

PROPERTIES

Interface	HDMI
Number of monitors	Single Head
Max. Resolution	Full HD: 1920 x 1200 @ 60 Hz 4K30: 3840 x 2160 @ 30 Hz
Color Depth	8-bit (4:4:4)
Video Codec	IHSE classic
Local In/Out	Full HD optional, 4K30 featured
USB	HID: ☑ Transparent: add-on module
Audio	embedded, add-on modules available
Operation Mode	Point-to-Point: ☑ Matrix: ☑
Transmission Protocol	IHSE proprietary
Assembly	Module for Draco vario chassis

PART NUMBERS

CPU	FULL HD		4K30	
	Basic	+ Local Out	(Local Out)	Redundant
CAT X	L481-BHHC	L481-BHHCL	L481-BUHCL	[Part-No] + R
Fiber 1G	L481-BHHS	L481-BHHSL	L481-BUHSL	[Part-No] + R
Fiber 3G	--	--	--	--

CON	Basic	Switch feature	(Local In)	Redundant
CAT X	R481-BHHC	R481-BHHCW	R481-BUHCL	[Part-No] + R
Fiber 1G	L481-BHHS	R481-BHHSW	R481-BUHSL	[Part-No] + R
Fiber 3G	--	--	--	--

VIDEO-ONLY	CPU	CON
CAT X	L481-BHXC	R481-BHXC
Fiber 1G	L481-BHXS	R481-BHXS

WEB RESOURCES

Find detailed information here: www.ihse.com/vario-481

SERIES 481 NEW GENERATION

Draco vario HDMI

Module R481-BSHXR-XSO

FEATURES & BENEFITS

- Single Head KVM extender
- 4K30 version: 3840 x 2160 @ 30 Hz
- Full HD version: up to 1920 x 1200 @ 60 Hz
- Allows connection of local monitor
- Compatible to Draco vario extenders and chassis
- New space-saving platform with audio by default
- Future-proof: Upgradable with JPEG XS for full compatibility with Draco XStreme extender series

PROPERTIES

Interface	HDMI, Micro HDMI
Number of monitors	Single Head
Max. Resolution	BHxx: 1920 x 1200 @ 60 Hz BUxx: 3840 x 2160 @ 30 Hz
Color Depth	8-bit (4:4:4)
Video Codec	IHSE classic, ready for JPEG XS
Local In/Out	yes
USB	HID: ☑ transparent: add-on module
Audio	embedded, add-on modules available
Operation Mode	Point-to-Point: ☑ Matrix: ☑
Transmission Protocol	IHSE proprietary
Assembly	Module for Draco vario chassis

PART NUMBERS: LOOKUP-TABLES

The new generation Draco vario 481 series is based on a completely new hardware platform and concept of modularity. This provides a large number of varieties. All part numbers can be found in the appendix on page 98.

WEB RESOURCES

Find detailed information here: www.ihse.com/vario-481-xso

SERIES 483

Draco vario DISPLAYPORT

Module L483-BDHCR

FEATURES & BENEFITS

- Dual Head Full HD and Single Head 4K versions available
- Supports 4K DCI (4096 x 2160) and UHD (3840 x 2160) @ 30 Hz
- Transmission of two video signals via one link
- Compatible with Draco vario series
- Multiple add-Ons available for RS232, USB and audio integration

PROPERTIES

Interface	DisplayPort, Mini DisplayPort
Number of monitors	Single Head, Dual Head
Max. Resolution	Single Head: 1x 4096 x 2160 @ 30 Hz Dual Head: 2x 1920 x 1200 @ 60 Hz
Color Depth	8-bit (4:4:4)
Video Codec	IHSE classic
Local In/Out	no
USB	HID: ☑ Transparent: add-on module
Audio	embedded, add-on modules available
Operation Mode	Point-to-Point: ☑ Matrix: ☑
Transmission Protocol	IHSE proprietary
Assembly	Module for Draco vario chassis

PART NUMBERS

CPU	SH: 1x FULL HD	SH: 1x 4K30 DH: 2x FULL HD	Redundant
CAT X	L483-BSHC	L483-BDHC	[Part-No] + R
Fiber 1G	L483-BSHS	L483-BDHS	[Part-No] + R
Fiber 3G	--	L483-BDHX	[Part-No] + R

CON			Redundant
CAT X	R483-BSHC	R483-BDHC	[Part-No] + R
Fiber 1G	R483-BSHS	R483-BDHS	[Part-No] + R
Fiber 3G	--	R483-BDHX	[Part-No] + R

WEB RESOURCES

Find detailed information here: www.ihse.com/vario-483

SERIES 483 NEW GENERATION

Draco vario DISPLAYPORT

Module L483-BDHASR-XSO

FEATURES & BENEFITS

- Single Head with local in/out and Dual Head versions
- Supports resolution up to 4K30 in Sngle Head operation
- Space-saving design: new platform with audio by default
- USB 2.0 on board: variable configuration (USB-HID or USB 2.0)
- Link redundancy upgradable for maximum fail-safety
- Fully compatible with Draco vario extenders and chassis
- Future-proof: Upgradable with JPEG XS for full compatibility with Draco XStreme extender series

PROPERTIES

Interface	Mini DisplayPort
Number of monitors	Single Head, Dual Head
Max. Resolution	Single Head: 1x 3840 x 2160 @ 30 Hz Dual Head: 2x 1920 x 1200 @ 60 Hz
Color Depth	8-bit (4:4:4)
Video Codec	IHSE classic, ready for JPEG XS
Local In/Out	no
USB	HID: ☑ transparent: add-on module
Audio	embedded, on board, add-on modules
Operation Mode	Point-to-Point: ☑ Matrix: ☑
Transmission Protocol	IHSE proprietary
Assembly	Module for Draco vario chassis

PART NUMBERS: LOOKUP-TABLES

The new generation Draco vario 483 series is based on a completely new hardware platform and concept of modularity. This provides a large number of varieties. All part numbers can be found in the appendix on page 98.

WEB RESOURCES

Find detailed information here: www.ihse.com/vario-483-xso

SERIES 495

Draco vario ultra HDMI

Module R495-BHHXLR-R1

FEATURES & BENEFITS

- Single Head KVM extender
- Video resolution up to 4K60
- With Lici® (Lightweight Image Coding technology) video codec
- Local In and Out featured
- Compatibility with all common operating systems (Linux, Unix, Windows, mac OS) and Draco vario chassis

PROPERTIES

Interface	HDMI, Micro HDMI
Number of monitors	Single Head
Max. Resolution	4096 x 2160 @ 60 Hz
Color Depth	8-bit (4:4:4)
Video Codec	LICI®
Local In/Out	yes
USB	HID: ☑ Transparent: add-on module
Audio	embedded, add-on modules available
Operation Mode	Point-to-Point: ☑ Matrix: ☑
Transmission Protocol	IHSE proprietary
Assembly	Module for Draco vario chassis

PART NUMBERS

CPU	Local Out	Redundant
CAT X 3G	L495-BHHCXL-R1	L495-BHHCXLR-R1
Fiber 1G	--	--
Fiber 3G	L495-BHHXL-R1	L495-BHHXLR-R1

CON	Local In	Redundant
CAT X	R495-BHHCXL-R1	R495-BHHCXLR-R1
Fiber 1G	--	--
Fiber 3G	R495-BHHXL-R1	R495-BHHXLR-R1

WEB RESOURCES

Find detailed information here: www.ihse.com/ultra-495

SERIES 490

Draco vario ultra DISPLAYPORT

Module L490-BPHCXLR

FEATURES & BENEFITS

- Single Head KVM extender
- Video resolution up to 5K60
- Color depth: 10-bit (4:4:4)
- No frame drops, lossless image compression
- Local In and Out options available
- Compatibility with all common operating systems (Linux, Unix, Windows, mac OS) and Draco vario chassis

PROPERTIES

Interface	DisplayPort, Mini DisplayPort
Number of monitors	Single Head
Max. Resolution	5120 x 1440 @ 60 Hz
Color Depth	10-bit (4:4:4)
Video Codec	LICI®
Local In/Out	optional
USB	HID: ☑ Transparent: add-on module
Audio	embedded, add-on modules available
Operation Mode	Point-to-Point: ☑ Matrix: ☑
Transmission Protocol	IHSE proprietary
Assembly	Module for Draco vario chassis

PART NUMBERS

CPU		Redundant
CAT X 3G + Local	L490-BPHCXL-R1	L490-BPHCXLR
Fiber 3G + Local	L490-BPHXL	L490-BPHXLR
Fiber 3G	L490-BPHX	L490-BPHXR

CON		Redundant
CAT X 3G + Local	R490-BPHCXL-R1	R490-BPHCXLR
Fiber 3G + Local	R490-BPHXL	R490-BPHXLR
Fiber 3G	R490-BPHX	R490-BPHXR

WEB RESOURCES

Find detailed information here: www.ihse.com/ultra-490

SERIES 495 XS

Draco vario XS HDMI

Module R495-BHHCLR-XS

FEATURES & BENEFITS

- Transmission of fully digital video signals up to 4K/5K @ 60 Hz via 1G or 3G bandwidth
- JPEG XS: no frame drops, visually lossless video codec, full color depth
- Mix and match HDMI 2.0 with DisplayPort 1.2 input/output
- Local video input/output options
- Compatible with Draco vario classic series up to Full HD

PROPERTIES

Interface	HDMI
Number of monitors	Single Head
Max. Resolution	5120 x 1440 @ 60 Hz
Color Depth	8-bit (4:4:4)
Video Codec	JPEG XS
Local In/Out	yes
USB	HID: ☑ Transparent: add-on module
Audio	embedded, add-on modules available
Operation Mode	Point-to-Point: ☑ Matrix: ☑
Transmission Protocol	IHSE proprietary
Assembly	Module for Draco vario chassis

PART NUMBERS

CPU	+ Local Out	Redundant
CAT X	L495-BHHCL-XS	L495-BHHCLR-XS
Fiber 1G	L495-BHHSL-XS	L495-BHHSLR-XS
Fiber 3G	L495-BHHXL-XS	L495-BHHXLR-XS

CON	+ Local In	Redundant
CAT X	R495-BHHCL-XS	R495-BHHCLR-XS
Fiber 1G	R495-BHHSL-XS	R495-BHHSLR-XS
Fiber 3G	R495-BHHXL-XS	R495-BHHXLR-XS

WEB RESOURCES

Find detailed information here: www.ihse.com/vario-495-xs

SERIES 490 XS

Draco vario XS DISPLAYPORT

Module L490-BPHSLR-XS

FEATURES & BENEFITS

- Resolution of up to 5K @ 60 Hz
- Supports HDR at 4K
- Integrated JPEG XS video codec
- Lossless transmission, no frame drops
- Local DisplayPort 1.2 feedthrough (optional)
- Integrated remote DisplayPort switch (optional)
- Compatible with Draco vario classic series up to Full HD

PROPERTIES

Interface	DisplayPort
Number of monitors	Single Head
Max. Resolution	5120 x 1440 @ 60 Hz
Color Depth	10-bit (4:4:4)
Video Codec	JPEG XS
Local In/Out	optional
USB	HID: ☑ Transparent: add-on module
Audio	embedded, add-on modules available
Operation Mode	Point-to-Point: ☑ Matrix: ☑
Transmission Protocol	IHSE proprietary
Assembly	Module for Draco vario chassis

PART NUMBERS

CPU		+ Local Out	Redundant
CAT X	L490-BPHC-XS	L490-BPHCL-XS	[Part-No] + R-XS
Fiber 1G	L490-BPHS-XS	L490-BPHSL-XS	[Part-No] + R-XS
Fiber 3G	L490-BPHX-XS		[Part-No] + R-XS

CON		+ Local In	Redundant
CAT X	R490-BPHC-XS	R490-BPHCL-XS	[Part-No] + R-XS
Fiber 1G	R490-BPHS-XS	R490-BPHSL-XS	[Part-No] + R-XS
Fiber 3G	R490-BPHX-XS		[Part-No] + R-XS

WEB RESOURCES

Find detailed information here: www.ihse.com/vario-490-xs

SERIES 474

EXTENDER UPGRADE MODULES

FEATURES & BENEFITS

Expand your extenders individually by a multitude of interfaces for audio, video, USB and many other interfaces, without additional wiring. The add-on modules can easily be connected to the main module and installed in all Draco vario chassis.

AUDIO MODULES

Audio modules enable the transmission of analog and digital audio formats. For KVM extenders with DVI or VGA video interfaces the addition of an audio module is mandatory to transmit audio data from the computer to the user.
On top, our audio modules allow to connect various audio devices, matching every possible application.

DESCRIPTION		CPU	CON
Analog Audio (3,5 mm stereo jacks), RS232 up to 19,2 kbit		L474-BAX	R474-BAX
Analog Audio (3,5 mm stereo jacks), RS232 up to 115 kbit		L474-BRX	R474-BRX
Analog Audio (3,5 mm stereo jacks), RS422 up to 115 kbit		L474-BSX	R474-BSX
Symmetrical Audio (6-pin Phoenix socket; 48 VDC Phantom power)		L474-BB2X	R474-BB2X
Symmetrical Audio (6,7 mm stereo jacks; 48 VDC Phantom power)		L474-BBX	R474-BBX
Digital Audio (S/PDIF: optical + coaxial; Mini XLR)		L474-BDX	R474-BDX

USB MODULES

USB modules are used to connect additional pointing devices or to integrate low speed USB 2.0 (transparent) devices to the setup.

DESCRIPTION		CPU	CON
USB-HID (for additional USB HID devices only)		L474-BXH	R474-BXH
USB 2.0 embedded, Flex Speed (max. 50/100 Mbit/s)		L474-BXE2	R474-BXE2

COMBINED MODULES: AUDIO

DESCRIPTION		CPU	CON
Digital Audio + Analog Audio, RS232 (19,2 kbit)		L474-BDA	R474-BDA
Analog Audio, RS422 (115 kbit) + Analog Audio, RS422 (115 kbit)		L474-BSS	R474-BSS
Digital Audio OUT + Digital Audio IN		L474-BDD	R474-BDD

COMBINED MODULES: AUDIO + USB HID

DESCRIPTION		CPU	CON
Analog Audio, RS232 (19,2 kbit) + USB-HID		L474-BAH	R474-BAH
Analog Audio, RS422 (115 kbit) + USB-HID		L474-BSH	R474-BSH
Digital Audio + USB-HID		L474-BDH	R474-BDH

COMBINED MODULES: AUDIO + USB 2.0

DESCRIPTION		CPU	CON
Analog Audio, RS232 (19,2 kbit) + USB 2.0 embedded, Flex Speed (max. 50/100 Mbit/s)		L474-BAE2	R474-BAE2
Analog Audio, RS232 (115 kbit) + USB 2.0 embedded, Flex Speed (max. 50/100 Mbit/s)		L474-BRE2	R474-BRE2
Analog Audio, RS422 (115 kbit) + USB 2.0 embedded, Flex Speed (max. 50/100 Mbit/s)		L474-BSE2	R474-BSE2
Symmetrical Audio (6-pin Phoenix socket) + USB 2.0 embedded, Flex Speed (max. 50/100 Mbit/s)		L474-BB2E2	R474-BB2E2
Digital Audio + USB 2.0 embedded, Flex Speed (max. 50/100 Mbit/s)		L474-BDE2	R474-BDE2

USB STANDALONE MODULES

These modules can be assembled to Draco vario chassis even without a corresponding KVM extender. In this case they serve as a USB-extender to transmit high speed USB 2.0 transparent data such as touch screens, cameras, or mass storage devices. To add transparent USB data to a regular KVM extender, they can be mounted additionally to the regular extension line in the chassis and provide connection to transparent USB devices in combination with USB-HID and video data at the console.

DESCRIPTION		CPU	CON
USB 2.0 Hi-Speed (max 480 Mbit/s), Cat X		L474-BXUC	R474-BXUC
USB 2.0 Hi-Speed (max 480 Mbit/s), Fiber		L474-BXUS	R474-BXUS

PLEASE NOTE:

Transmission ranges for transparent USB when using add-on modules:
When using L474/R474 add-on modules with transparent USB, the binding specifications stated in the data sheets of the add-on modules apply.
Draco vario add-on modules match with the modular concept of all Draco products.
We recommend to use our Draco System Designer to create your ideal product.

WEB RESOURCES

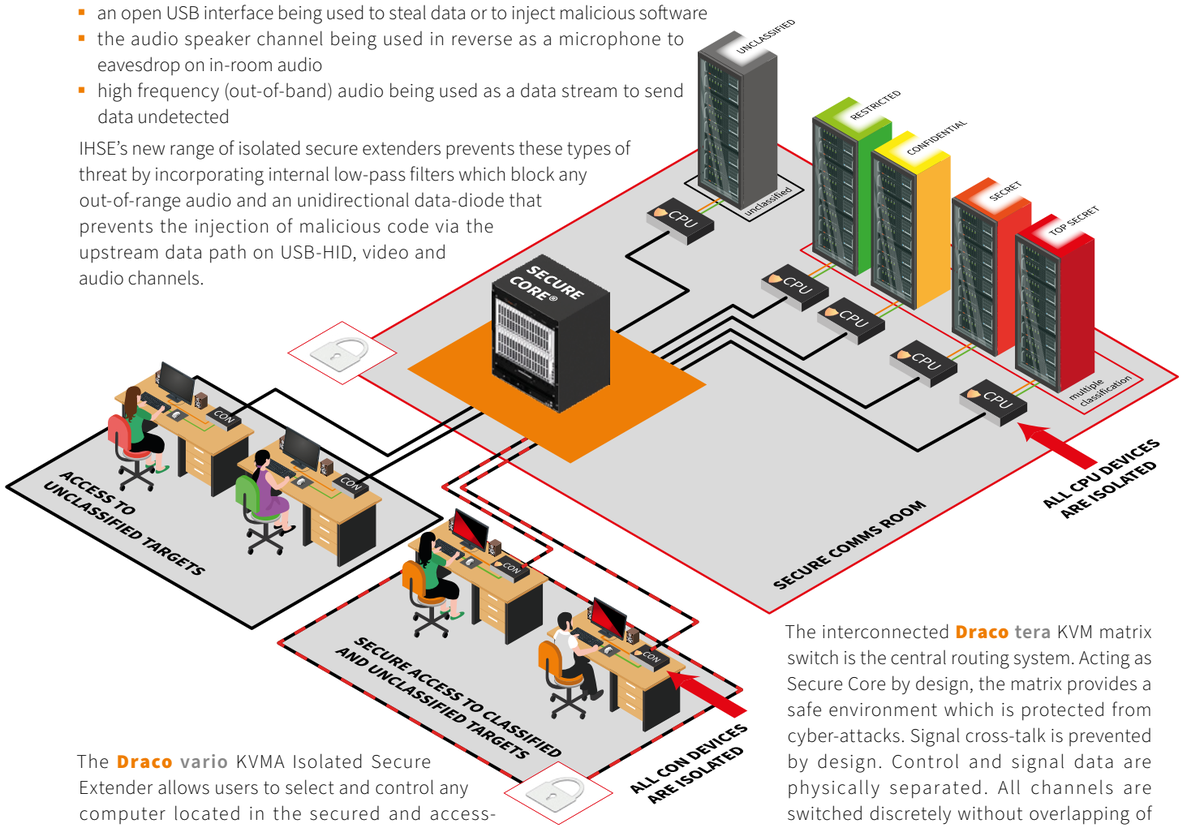
Find detailed information here: www.ihse.com/addon-modules

WHEN UNCOMPROMISING SECURITY IS REQUIRED

The modern IT community is coming under ever increasing and sophisticated computing threats ranging from simple data theft from open USB ports to sophisticated hacking via malicious code or other determined insider activity. Unisolated and 2-way communication via the USB, audio and video interfaces represents a specific hacking opportunity and a hidden risk to defense computer managers.
Examples include:

- an open USB interface being used to steal data or to inject malicious software
- the audio speaker channel being used in reverse as a microphone to eavesdrop on in-room audio
- high frequency (out-of-band) audio being used as a data stream to send data undetected

IHSE's new range of isolated secure extenders prevents these types of threat by incorporating internal low-pass filters which block any out-of-range audio and an unidirectional data-diode that prevents the injection of malicious code via the upstream data path on USB-HID, video and audio channels.



The **Draco vario** KVMA Isolated Secure Extender allows users to select and control any computer located in the secured and access-restricted server room via the KVM matrix.

The interconnected **Draco tera** KVM matrix switch is the central routing system. Acting as Secure Core by design, the matrix provides a safe environment which is protected from cyber-attacks. Signal cross-talk is prevented by design. Control and signal data are physically separated. All channels are switched discretely without overlapping of data paths.

SERIES 487/497

Draco vario KVMA ISOLATED SECURE EXTENDER

Common Criteria

Draco vario KVMA Isolated Secure Extender set

PROPERTIES

Interface	DP/HDMI combo jack
Number of monitors	Single Head
max. Resolution	series 487: 1920 x 1200 @ 60 Hz series 497: 3840 x 2160 @ 30 Hz
Color Depth	8-bit, 4:4:4
Video Codec	IHSE Classic
Local In/Out	no
USB	HID: ☑
Audio	embedded; analog unidirectional
Operation Mode	Point-to-Point: ☑ Matrix: ☑
Transmission Protocol	IHSE proprietary
Assembly	ready to use extender set (CPU+CON, each mounted in 474-BODY2N)

FEATURES & BENEFITS

- High resolution Single Head KVM extender for DisplayPort or HDMI connectors
- Unidirectional data paths
- Signal isolation prevents unwanted data transfer
- Certified for Common Criteria EAL 4+
- Ideal for multi-class network collaboration
- Compatible to Draco vario series and Draco tera series

PART NUMBERS - FULL HD

CPU+CON		Redundant
CAT X	K487-1PHCA-N	K487-1PHCRA-N
Fiber 1G	K487-1PHSA-N	K487-1PHSRA-N

PART NUMBERS - 4K30

CPU+CON		Redundant
CAT X	K497-1PHCA-N	K497-1PHCRA-N
Fiber 1G	K497-1PHSA-N	K497-1PHSRA-N

AVAILABLE OPTIONS

- Anti-tampering seals
- TEMPEST hardening on request

WEB RESOURCES

Find detailed information here: www.ihse.com/secure-extender

IDENTIFY AND ELIMINATE DATA SECURITY THREATS

KEYBOARD & MOUSE

The **Draco vario** KVMA Isolated Secure Extender transmits signals over unidirectional optical data diodes, allowing data to flow only in the direction from the user to the computer. Each port is hardware-based isolated and only allows hard coded HID devices. Tampering is not possible.

MONITORS & DISPLAYS

Data streams flow only from the source to the user due to unidirectional diodes, reverse transmission is impossible. Extended Display Identification Data (EDID) is subjected to an integrity check and Monitor Control Command Sets (MCCS) are blocked. This excludes the injection of additional information such as malware.

USB & AUDIO

Unauthorized USB devices are rejected; transparent USB (e.g. mass storage devices) is not available.
Audio signals can only be transmitted one-way from the source to the user.
A low-pass filter protects against eavesdropping high-frequency signals.

MANIPULATION-PROOF

The circuits are designed to be tamper-proof; data is not buffered and thus cannot be tapped.
The devices' chassis are sealed to indicate hardware tampering.

SERIES 474

SPECIAL MODULES

MODULE FOR IP MANAGEMENT AND MONITORING

FEATURES & BENEFITS

- Installation in Draco vario chassis 474-BODY6BP (slot 5), 474-BODY6BPF (slot 5) and 474-BODY21/4U-R1 (slot 21)
- TCP/IP monitoring of
  - function-critical parts of the chassis and integrated modules
  - point-to-point connection and device status
  - extender parameters
  - supports SNMPV2 and SNMPV3
- MIB file available (description of available status information)
- Unencrypted transmission of traps
- SNMP configuration via Tera Tool including remote firmware update via Tera Tool
- Support of syslog monitoring through Tera Tool or any existing syslog server

DESCRIPTION		PART NUMBER
Module for IP management and monitoring		474-SNMPV3 (for Draco XStreme: 474-SNMPV3-XS)

WEB RESOURCES
Find detailed information here: www.ihse.com/snmp-module

MONITORING SYSTEM HEALTH

Within the Draco eco system, SNMP (Simple Network Monitoring Protocol) can be enabled through specific modules, extender chassis and the matrix switches. SNMP sends vital system information on the status of each device to a central location, enabling an administrator to oversee and manage the entire system. In the event of an equipment fault, an administrator may be notified by an audible alarm or through an email.
A major benefit of SNMP lies in its ability to provide system status information that allows administrators to detect, and attend to issues at an early stage - enabling them to maintain a stable KVM workflow for all users. This helps to achieve 24/7 operation ability.

FAN CARTRIDGE MODULE

FEATURES & BENEFITS

- Adds forced air cooling to all draco vario chassis
- Retro-fit design
- Hot-swap in Draco vario Slide-In chassis

DESCRIPTION		PART NUMBER
Draco vario fan cartridge		474-MODFAN

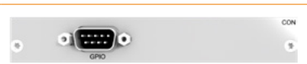
WEB RESOURCES
Find detailed information here: www.ihse.com/fan-module

USER CONVENIENCE

MODULE FOR CONTROL & VISUALIZATION

FEATURES & BENEFITS

- Compatible with Draco vario chassis, Draco vario CON units, and Draco U-Switch Module
- Configurable behavior in switch: 8 GPIO contacts as inputs or outputs
- 5 VDC output to drive e.g. LEDs
- Enhanced KVM features (execution of predefined user or CON macros, favourites or keystrokes)

DESCRIPTION		PART NUMBER
Draco vario CON add-on module with 8x GPIO		R474-BGX

WEB RESOURCES
Find detailed information here: www.ihse.com/gpio-module

SERIES DNX

DNX Full HD

Full HD extender set DNX-SH-C

FEATURES & BENEFITS

- Single Head HDMI extension
- Point-to-Point extension, direct link or via 1G IP networks
- Simple configuration via plug-and-play functionality
- Supports up to 1920 x 1200 @ 60 Hz resolutions
- Passive cooling for fanless and noise-free operation
- Extender options supporting Cat X, multi-mode or single-mode fiber

PROPERTIES

Interface	HDMI
Number of Monitors	Single Head
Max. Resolution	1920 x 1200 @ 60 Hz
Color Depth	8-bit (4:4:4)
Video Codec	DNX
Local In	yes
USB	HID: ☑
Audio	embedded, analog + digital
Operation Mode	Point-to-Point: ☑ Matrix: ☐
Transmission Protocol	IP
Assembly	Box form factor

PART NUMBERS - IP EXTENDER SET (CPU + CON)

Single Head	
CAT X 1G	DNX-SH-C
Fiber single-mode 1G	DNX-SH-S
Fiber multi-mode 1G	DNX-SH-M

WEB RESOURCES
Find detailed information here: www.ihse.com/dnx-fhd

SERIES DNX

DNX 4K

DNX 4K extender set DNX-4KSH-SX

FEATURES & BENEFITS

- Single Head or Dual Head DisplayPort extension
- Supports up 4K/5K @ 60 Hz resolutions
- Simple configuration via plug-and-play functionality
- Peripheral support of stereo audio, RS232 and USB 2.0
- Fanless & space-saving design
- SFP+ based extender with support for Cat 6a/7, multi-mode or single-mode fiber

PROPERTIES

Interface	Mini DisplayPort
Number of monitors	Single Head, Dual Head
Max. Resolution	5120 x 1440 @ 60 Hz
Color Depth	8-bit (4:4:4)
Video Codec	DNX
Local Out	yes
USB	HID: ☑
Audio	embedded, analog + digital
Operation Mode	Point-to-Point: ☑ Matrix: ☐
Transmission Protocol	IP
Assembly	Box form factor

PART NUMBERS IP EXTENDER SET (CPU + CON)

Single Head	
CAT X 10G	DNX-4KSH-CX
Fiber single-mode 10G	DNX-4KSH-SX
Fiber multi-mode 10G	DNX-4KSH-MX

Dual Head	
CAT X	DNX-4KDH-CX
Fiber single-mode 10G	DNX-4KDH-SX
Fiber multi-mode 10G	DNX-4KDH-MX

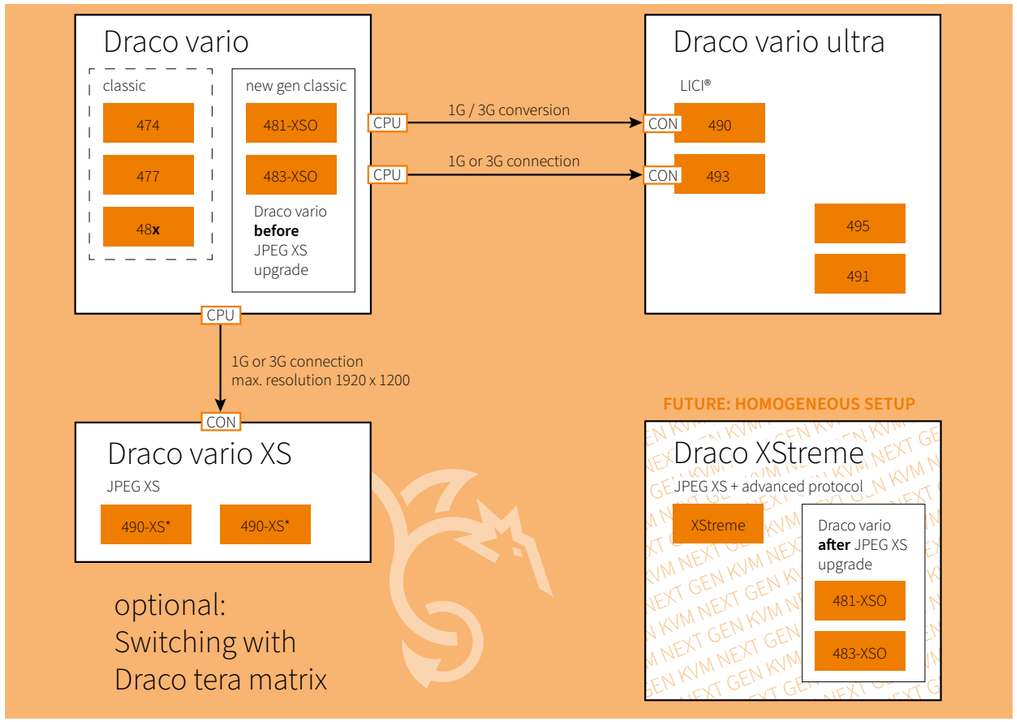
WEB RESOURCES
Find detailed information here: www.ihse.com/dnx-4k

COMPATIBILITY

HOW KVM EXTENDERS WORK TOGETHER

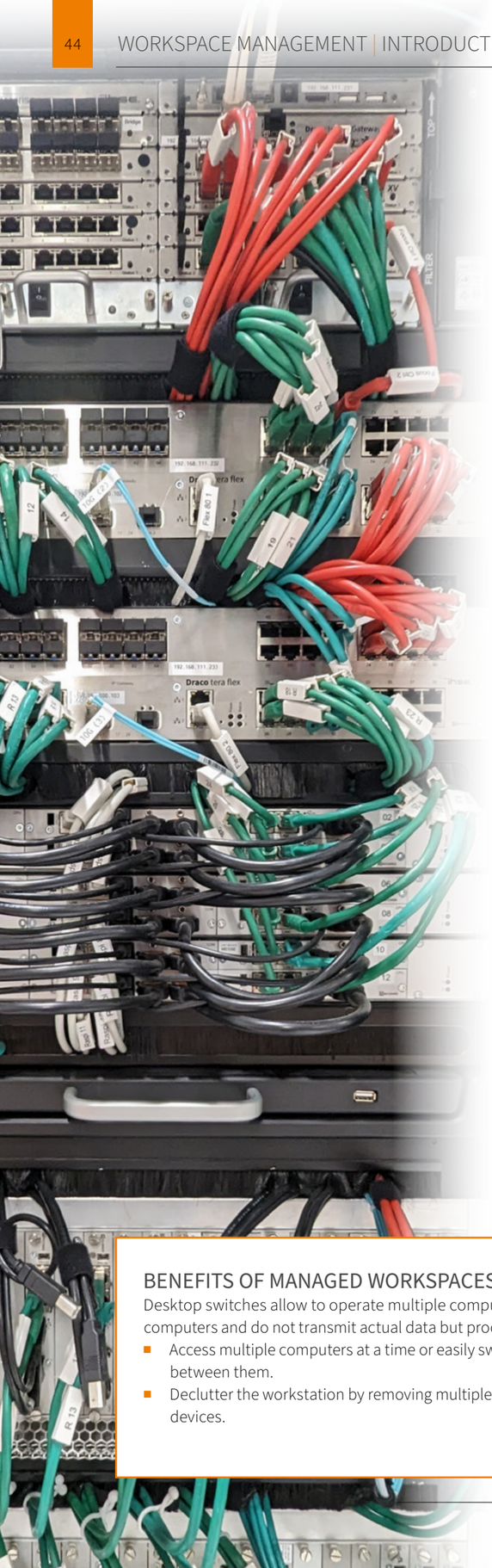
All Draco KVM extenders are designed to operate smoothly within their series family. For more flexibility and future upgrades, some series can interact with each other under certain conditions:

Draco vario and Draco vario ultra can be equipped to be able to interact by installing a dual boot codec.
Draco vario XS allows to add 4K60 sources to an existing setup with Draco vario extenders.



WORKSPACE MANAGEMENT

Single user KVM switches enable access to and management of computers on the workstation, accessing multiple computers with only one set of keyboard, monitor and mouse.
Powerful image processing can help to create personalized screen layouts to boost efficiency and performance.



MANAGE WORKSPACES

KVM desktop switches offer benefits in the simplicity of handling several computers at a single workstation. With only one set of keyboard and mouse and one or multiple monitors, users can operate up to four computers.
The IHSE product range offers devices for USB switching, allowing to share peripherals while operating computers with convenient mouse glide.
Products range from switching up to four computers to one set of monitors, supporting up to five video heads.
IHSE also provides top-notch video processing devices. These combine multiple computer inputs to a single screen. This allows a great variety of display layouts, forming a personal video wall.

TOTAL FLEXIBILITY

All KVM desktop switches process native computer signals and are perfect for single user workstations. However, they provide the opportunity to be integrated into a fully developed KVM matrix switch architecture. This way, highly ergonomic and performant workstations can benefit from the full flexibility of a cross-connected KVM landscape, with the convenience of relocated computers.

FAIL-SAFE AND SECURE

The modular design matching perfectly with the Draco vario concept allows easy integration to greater installations, while offering the full benefits of the multiple redundancy options of Draco vario chassis. The proven manufacturing quality guarantees failure-free and reliable 24/7 operation, especially in mission-critical applications.

BENEFITS OF MANAGED WORKSPACES

Desktop switches allow to operate multiple computers with only one set of peripherals. The devices do not affect the source computers and do not transmit actual data but process the visual, acoustic and input signals.

- Access multiple computers at a time or easily switch between them.
- Declutter the workstation by removing multiple input devices.
- Arrange computer video in individual windows on the monitor with various layout options, providing full operation of the computer within each window.
- Combine multiple devices to even distribute signals to large screens for video walls in control room setups.

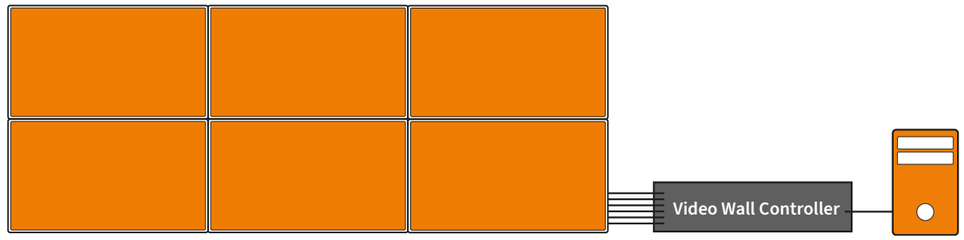
IHSE EXPLAINS

VIDEO WALL CONTROLLER VS. MULTIVIEWER

Although video wall controllers and multiviewers are used in video technology, they have fundamentally different functions.

Video wall controller

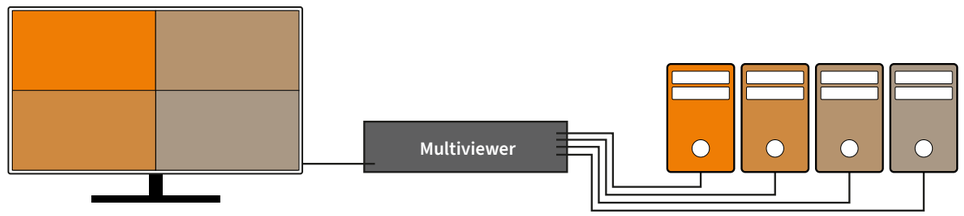
A video wall controller is a device that distributes one video signal onto multiple screens to build a large display surface. The video wall controller splits the video signal and maps it into the visible area while calculating the dimensions and frames of the individual displays. This is called “Tiling”.



A typical field of application is digital signage, found in large advertising installations or to decorate large events.

Multiviewer

A Multiviewer does the exact opposite. It combines multiple video inputs on one or two screens. Every video signal is displayed in an individual „window“. Those windows can be arranged in various modes on the monitor. The advantage is that all windows are a projection of a whole computer interface, providing full computer operation in the window, while the video signals can be scaled, cropped, moved, and zoomed. Therefore, a powerful image processing engine is integrated.



A typical application is to operate multiple computers simultaneously on one large monitor, like it is common in control rooms.

IHSE products

Draco DisplayPort KVM Switch switches up to 4 incoming multi-head computer signals without image processing.

Draco MultiView 4K60 is an image processor to combine up to four incoming computer signals on one or two screens with various layouts.

SERIES 476

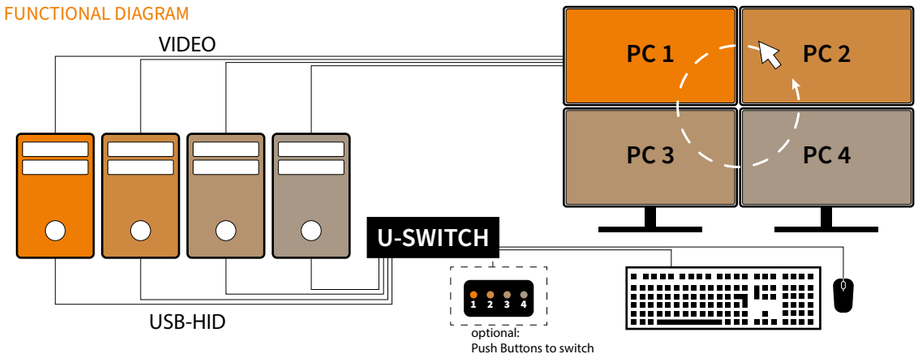
Draco U-Switch

Draco U-Switch K476-8U

FEATURES & BENEFITS

- Multi-Screen Control module with one mouse & keyboard
- Distribute USB-HID and transparent USB 2.0 between up to 8 connected sources
- Modular concept for Draco vario chassis and standalone device
- Compatible to all Draco products and most USB-HID devices
- Easy configuration via Tera Tool software

FUNCTIONAL DIAGRAM



PART NUMBERS

DEVICES		PART NUMBER
	Standalone Draco U-Switch, 4 port USB-switch (2 USB-HID devides supported)	K476-4U
	Standalone Draco U-Switch, 4 port USB-switch (4 USB-HID devides supported)	K476-4U2
	Standalone Draco U-Switch, 4 port USB-switch (2 USB-HID and 2 USB 2.0 (transparent) devices supported with USB 2.0 switching on the upper board)	K476-4U4T
	Standalone Draco U-Switch, 8 port USB-switch (2 USB-HID devides supported)	K476-8U
	Draco U-Switch module (for mounting in Draco vario chassis), 4 port USB-switch (2 USB-HID and 2 USB 2.0 devices supported)	B476-4U4T
Accessory	Push button unit for switching 4-port U-Switch, 4x LED	476-CTRL4

PLEASE NOTE:

Draco U-Switch is used to unclutter workstations by simply using one single set of keyboard and mouse and optional transparent USB 2.0 peripherals with multiple computers. It is also available as a module for Draco vario chassis and is mandatory to be used in Draco desktop switches.

WEB RESOURCES

Find detailed information here: www.ihse.com/u-switch

SERIES DPS41

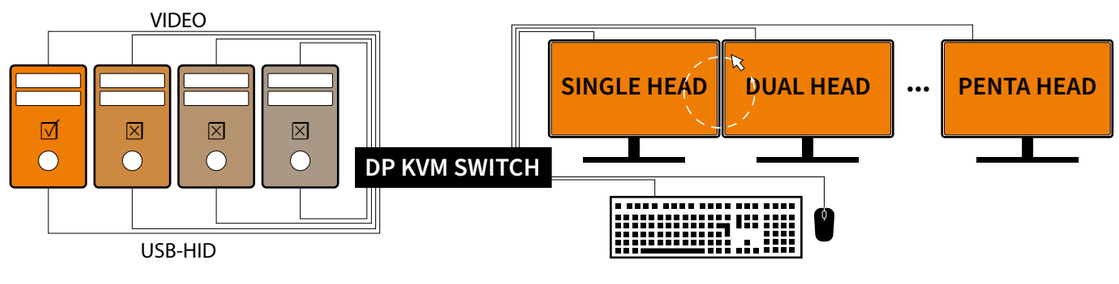
Draco DisplayPort KVM SWITCH

Draco DisplayPort KVM Switch Single Head version in chassis 474-BODY2BPF-SNMP
and Draco DisplayPort KVM Switch Quad Head version with GPIO Module in chassis 474-BODY6BP-SNMP

FEATURES & BENEFITS

- Control up to 4 computers (Single Head up to Penta Head) with one set of keyboard and mouse
- Switch DisplayPort signals up to 4K60
- Modular concept in Draco vario chassis
- Compatible to Draco KVM extenders and Draco tera KVM matrix switches

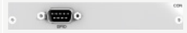
FUNCTIONAL DIAGRAM



PART NUMBERS

SUITABLE CHASSIS		PART NUMBER
	Chassis for 2 modules (Single Head)	474-BODY2BPF-SNMP
	Chassis for 6 modules (up to 5 video Heads)	474-BODY6BP-SNMP

suitable chassis accessories on page 26

MODULES	COMMENT		PART NUMBER
Draco U-Switch module	mandatory		B476-4U4T
DisplayPort KVM Switch board	1 board per video head		DPS41-B
DisplayPort KVM Switch board with audio	1 board per video head		DPS41-A-B
GPIO (see page 40)	optional		R474-BGX

PRODUCT CONFIGURATION

The Draco DisplayPort KVM Switch follows the modular concept of all Draco products and can be designed exactly to match the needed functions.
Use our Draco System Designer to create your ideal product.

Draco System Designer
configure your own system

WEB RESOURCES

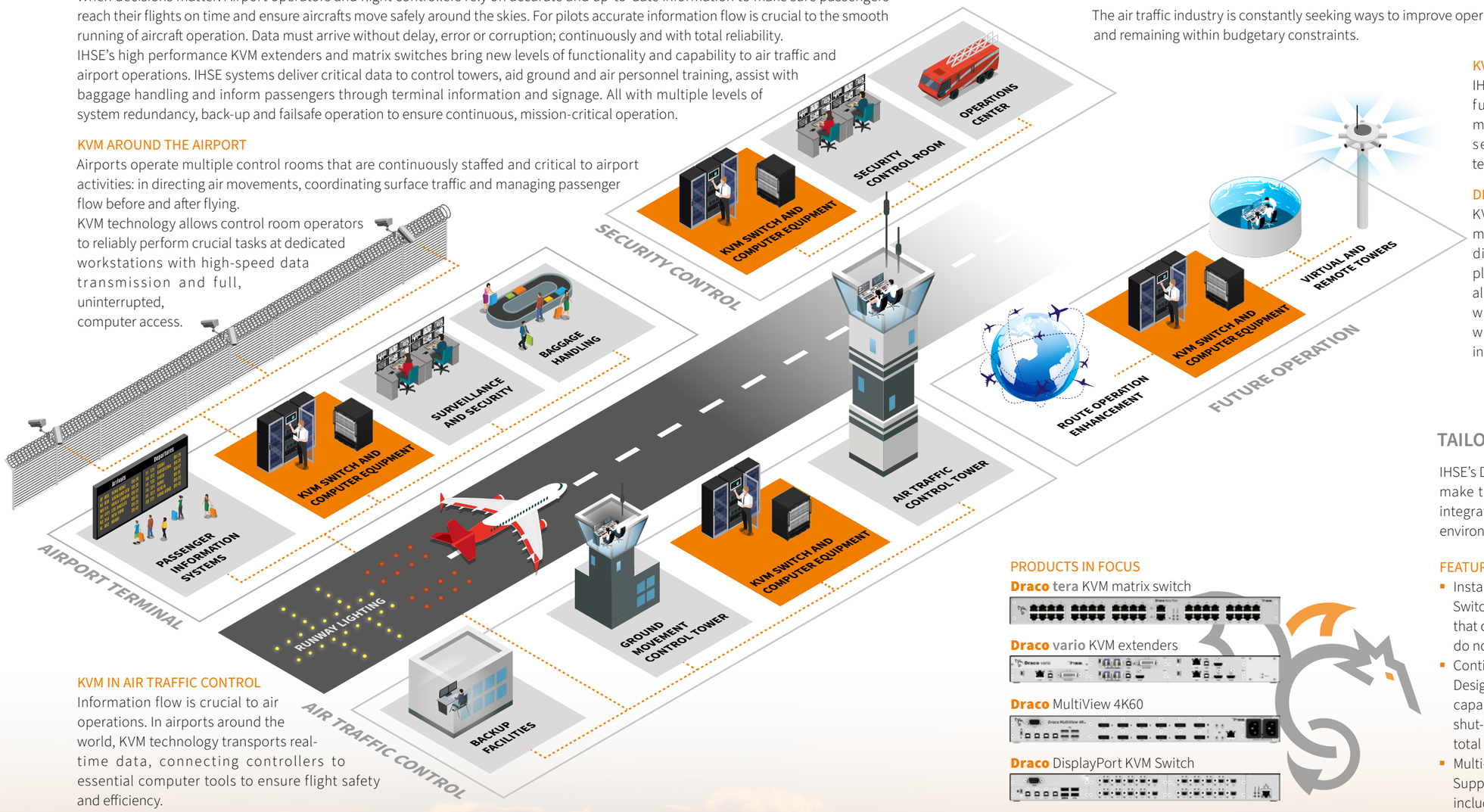
Find detailed information here: www.ihse.com/dp-switch

FAIL-SAFE OPERATION FROM TAKEOFF TO LANDING

When decisions matter: Airport operators and flight controllers rely on accurate and up-to-date information to make sure passengers reach their flights on time and ensure aircrafts move safely around the skies. For pilots accurate information flow is crucial to the smooth running of aircraft operation. Data must arrive without delay, error or corruption; continuously and with total reliability.
IHSE's high performance KVM extenders and matrix switches bring new levels of functionality and capability to air traffic and airport operations. IHSE systems deliver critical data to control towers, aid ground and air personnel training, assist with baggage handling and inform passengers through terminal information and signage. All with multiple levels of system redundancy, back-up and failsafe operation to ensure continuous, mission-critical operation.

KVM AROUND THE AIRPORT

Airports operate multiple control rooms that are continuously staffed and critical to airport activities: in directing air movements, coordinating surface traffic and managing passenger flow before and after flying.
KVM technology allows control room operators to reliably perform crucial tasks at dedicated workstations with high-speed data transmission and full, uninterrupted, computer access.



KVM IN AIR TRAFFIC CONTROL

Information flow is crucial to air operations. In airports around the world, KVM technology transports real-time data, connecting controllers to essential computer tools to ensure flight safety and efficiency.
The multi-level system redundancy ensures a fail-free 24/7 availability to enhance air traffic safety.

AIRPORT OF THE FUTURE

The air traffic industry is constantly seeking ways to improve operational efficiency whilst ensuring total operational safety and remaining within budgetary constraints.

KVM IN REMOTE TOWERS

IHSE's high-performance KVM solutions bring new levels of functionality and capability to air management; maximizing the return on existing assets and enabling seamless incorporation of new techniques and technologies into the operational infrastructure.

DRIVING VIRTUAL TOWERS

KVM is the ideal technology for setting up virtual towers to manage multiple small airfields spread over great distances. KVM connects RADAR signals (for airborne planes and ground movement) and communication. This all feeds into a central ATC center. All aircraft movements within a certain area are then displayed on large video walls. This approach optimizes workforce and infrastructure. Ultimately, it also increases security.

TAILOR-MADE FOR AVIATION

IHSE's Draco KVM systems' reliability and latency-free operation make them the ideal system component for multiple signal integration and working without disruption in a stressful, 24/7 environment - when decisions matter.

PRODUCTS IN FOCUS

Draco tera KVM matrix switch

Draco vario KVM extenders

Draco MultiView 4K60

Draco DisplayPort KVM Switch

FEATURES AND BENEFITS

- Instant switching
  Switching between sources occurs with no latency, ensuring that operators are not faced with blank or frozen screens and do not miss vital information.
- Continuous operation
  Designed for 24/7 continuous operations with hot-swap capability enabling component replacement without system shut-down. Extensive redundancy and security options for total reliability.
- Multi-signal support
  Supporting all current video formats and resolutions, including 4K60 and beyond, alongside audio, keyboard/mouse signals and USB 2.0 and USB 3.0 connection.

IHSE IN ATC AND ATM

AIRPORT BERLIN BRANDENBURG, GERMANY

Berlin International Airport has a capacity of up to 465,000 flights with 50 million passengers per year and is the one of the busiest airports in Germany.
An IHSE KVM solution enables remote computer access and control of various mission-critical control and monitoring systems, including fire protection, APRON control, terminal, baggage handling, all flight movements and ground movements.

SERIES MV42

Draco MultiView 4K60

Draco MultiView 4K60 DisplayPort Dual Head version

FEATURES AND BENEFITS

The Draco MultiView 4K60 extends the functionality of a KVM desktop switch with an image processor, including 4:1 / 4:2 Single Head or Dual Head. It allows visualization scenarios commonly found in air traffic control and control room applications.

Image Processing and USB switching

Draco MultiView 4K60 distributes 4 true 4K60 computer signals to multiple screen layouts, allowing to scale, crop and layer screens at full operatibility. Multi-Screen Control allows to easily move the mouse cursor from one computer to another.

Easy switching

Real-time switching between the video sources is done by keyboard commands. External control options are possible via API to integrated media control systems or the GPIO interface for electrically isolated push buttons.

Don‘t miss any audio alerts

The embedded audio signals can be output to a loudspeaker via a separate audio interface. Either the audio track of the currently active screen can be output or the various audio signals can be combined (amalgamated) so that relevant signal tones can be heard at any time, regardless of the source.

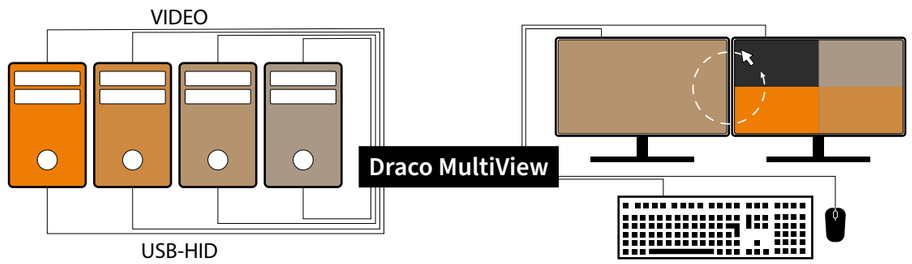
Fail-safe and space-saving

The Draco MultiView 4K60 has redundant power supply and extensive SNMP options for status monitoring (video, PSU and switching status). It is build for 24/7 operation.

Integrate to large Setups

Draco MultiView 4K60 is compatible to all Draco KVM extenders (HDMI and DisplayPort).
It seamlessly integrates with Draco tera KVM matrix switches and thus can be integrated into larger collaboration setups.

FUNCTIONAL DIAGRAM



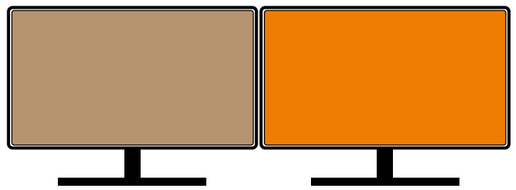
DECISION HELPER: DRACO DISPLAYPORT KVM SWITCH OR DRACO MULTIVIEW 4K60

	DRACO DISPLAYPORT KVM SWITCH	DRACO MULTIVIEW 4K60
Build type	modular	ready to use
Connected Computers	up to 4	up to 4
Video heads	Single Head up to 5 Heads	Single Head and Dual Head versions
Display Modes	no	various predefined and free display modes
Audio	digital stereo, embedded	digital stereo, embedded, amalgamated
Switch USB	yes	yes
Integrate to Draco matrix setup	yes	yes

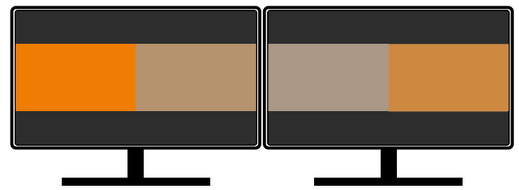
DISPLAY MODES

The individual screens can be arranged freely and displayed in different modes. Presets allow instant switching between the desired layouts. Free modes can be stored in up to 6 individual layouts

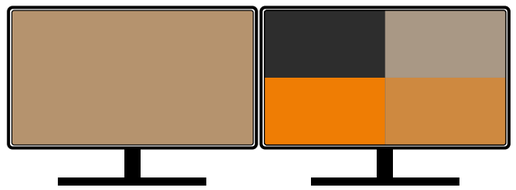
FullScreen Mode



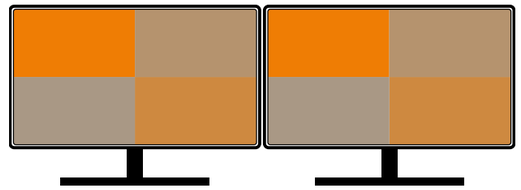
2:2 Mode (Picture-by-Picture)



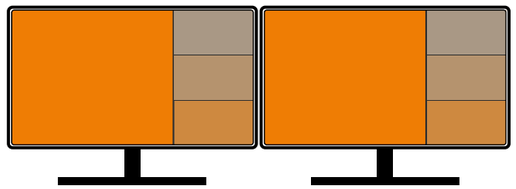
Preview Mode



Quad Mode



PiP Mode (Picture-in-Picture)



Free Mode

PART NUMBERS

DEVICE		PART NUMBER
	Draco MultiView 4K60 DisplayPort 1.2, Single Head	MV42-DPSH
	Draco MultiView 4K60 DisplayPort 1.2, Dual Head	MV42-DPDH
	Draco MultiView 4K60 HDMI 2.0, Single Head	MV42-H2SH
	Draco MultiView 4K60 HDMI 2.0, Dual Head	MV42-H2DH

for table/rack mount: see Mounting Kits for 6-slot chassis on page 26

WEB RESOURCES

Find detailed information here: www.ihse.com/multiview

IHSE EXPLAINS

SINGLE USER VS. MULTI USER SWITCHES

KVM switches can be used in two general ways. Single user switches are signal distributers from multiple sources to one user while multi user switches cross-connect multiple users to multiple sources with complex access rights management.

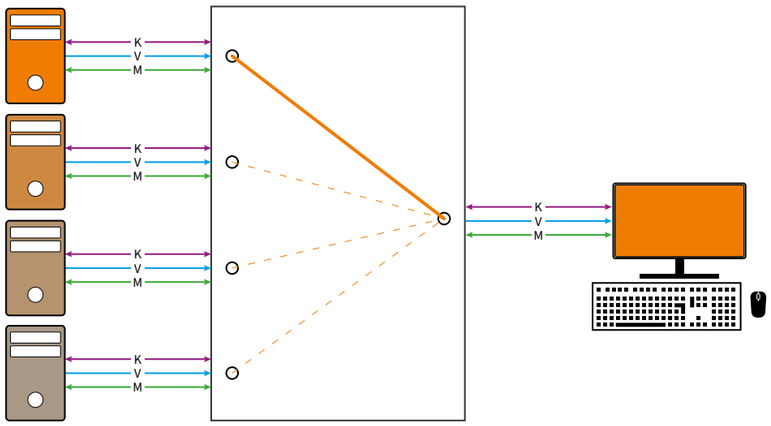
Single User Switch

Desktop versions

- Shares peripherals up to 4 PCs underneath e. g. a desk, or in a test lab/staging lab
- Available in single and multi videohead applications
- Provides high performance but short range connectivity
- Does not neccessarily offer security features or on-screen display functionality
- Native connectors for peripherals (no KVM extenders required)

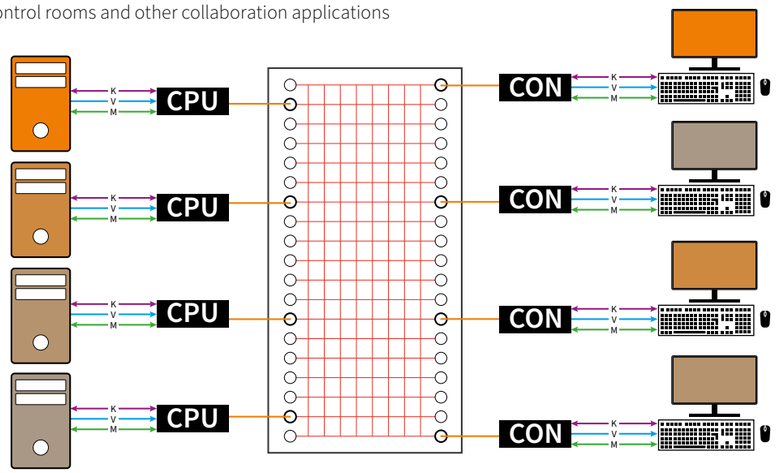
Rackmount Versions:

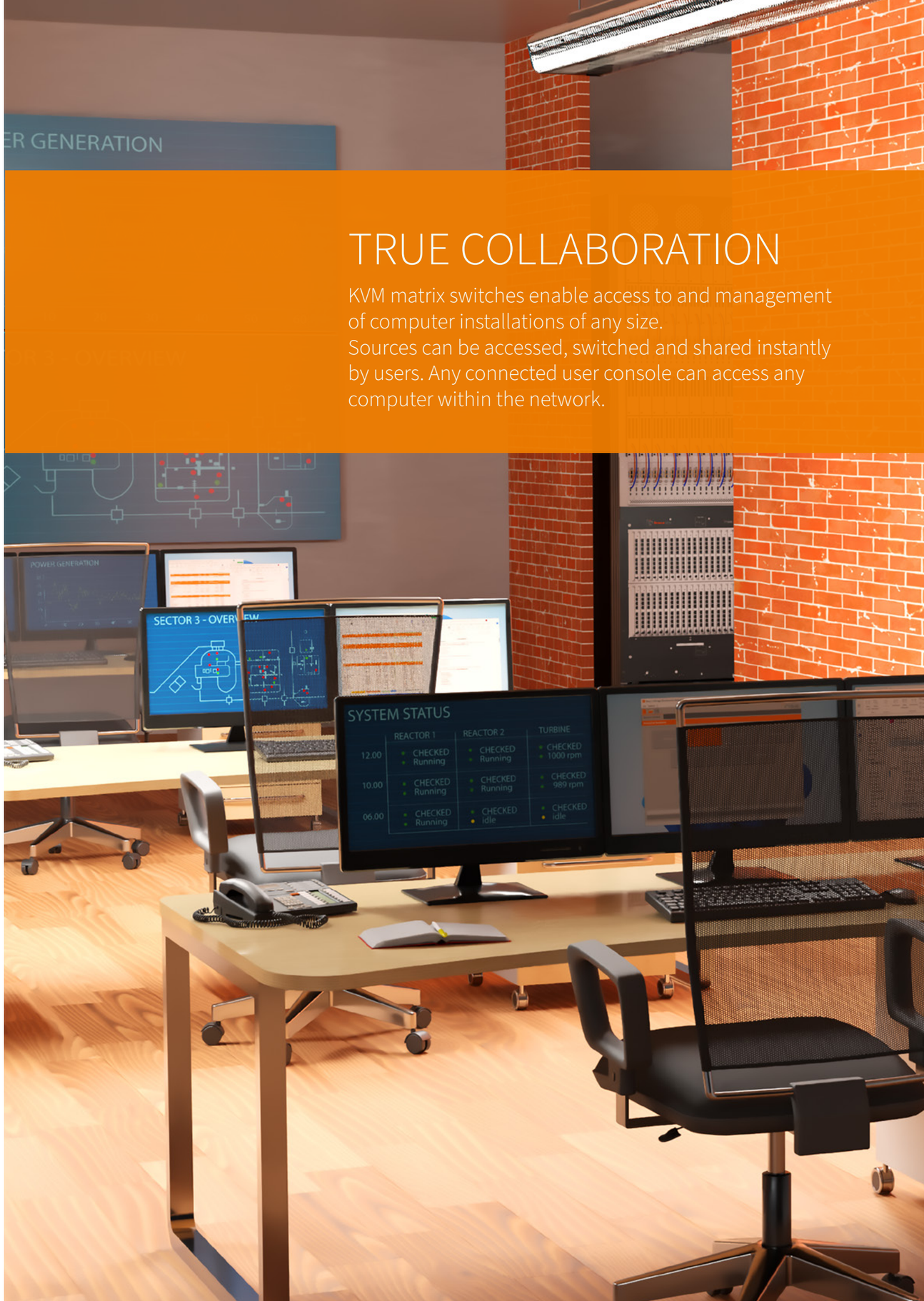
- Mainly intended for local server management of SMBs
- Often integrated in KVM trays for rack level access
- Normally provide security options and OSD functionality
- High density versions work with Cat X connectivity towards the target PCs
- Usually connect to between 8 - 32 targets

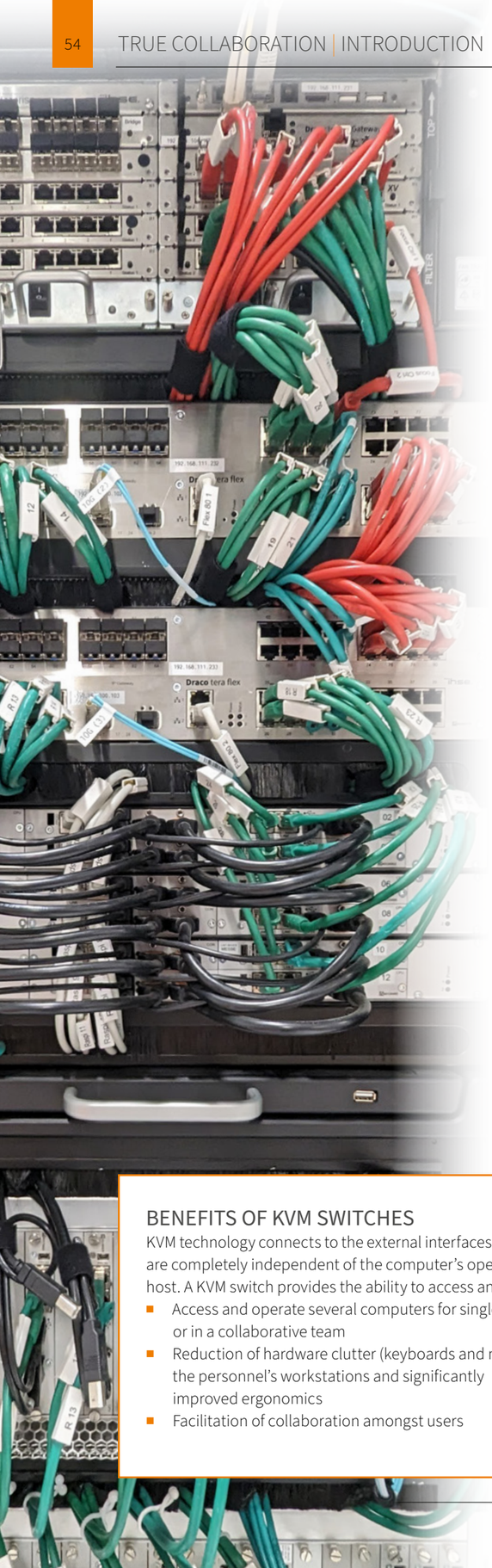


Multi User Switch

- KVM matrix switch
- Requires utilisation of KVM extender sets (CPU and CON)
- Cat X and/or fiber connectivity with larger number of target/user console ports
- Additional management software for configuration and access rights management (online / offline)
- Ideal for control rooms and other collaboration applications







DISCOVER COLLABORATION

KVM matrix switches offer benefits in the simplicity of handling several computers at single or multiple workstations, easy collaboration between users and resilience, through a range of backup scenarios. KVM switches are crucial in optimizing operational workflows and maximising the efficiency of human resources and time by enabling simultaneous management of individual computers displayed on separate screens.

NO DELAY

Using a KVM switch, operators can instantly change between operating scenarios, workflows or information feeds. Quick and easy access to a variety of sources and essential information can radically improve productivity in sectors like broadcasting and production and can make a crucial difference in many demanding scenarios such as air traffic control and security applications.

FAIL-SAFE AND SECURE

KVM switches enhance safety by providing high availability of all crucial devices in a KVM system. A variety of redundancy scenarios can be achieved to match installation objectives. Should a source be compromised, operators can instantly switch to a redundant source.

SCALABLE AND FUTURE-PROOF

KVM switches by IHSE follow the Draco modular concept and can be equipped exactly to match customer's needs. Every IHSE Draco tera KVM matrix switch suppports both Cat X and fiber links and can be equipped with special interfaces.
With Draco tera IP Gateway mutliple Draco tera matrix switches can be connected building fast and secure matrix grids to enable system expansion in the future.

BENEFITS OF KVM SWITCHES

KVM technology connects to the external interfaces of host systems (PCs, servers) and acts like normal peripherals. KVM switches are completely independent of the computer's operating system and do not require additional resources for installation on the host. A KVM switch provides the ability to access and operate several computers by multiple operators at a time.

- Access and operate several computers for single users or in a collaborative team
- Reduction of hardware clutter (keyboards and mice) at the personnel's workstations and significantly improved ergonomics
- Facilitation of collaboration amongst users
- Improved productivity by easily switching between scenarios, workflows or information feeds for operators
- Safety through a range of backup scenarios and redundancies for continuous 24/7 operations
- Switches support efforts in sustainability
- KVM networks with switches can easily be upgraded and expanded

IHSE EXPLAINS

WHAT IS THE FLEX-PORT-TECHNOLOGY?

All IHSE KVM matrix switches recognize connected extenders by their serial number that identifies the device as transmitter (CPU) or receiver (CON). All ports support both CPU and CON units. In case of rearrangement or replacement of I/O modules you can easily connect the extender to another port of the same matrix. The matrix recognizes the serial number and establishes a KVM connection according to predefined access rights.
If the connection has been active when disconnected, it will automatically be restored and does not have to be re-requested by the user.

SERIES 480/580

Draco tera FLEX

Draco tera flex KVM matrix switch family:
from top left to right: Draco tera flex 8-port fiber, 80-port fiber, 80-port Cat X, 132-port fiber with 4x IP Gateway

FEATURES AND BENEFITS

Draco tera flex KVM matrix switches are the perfect match to Draco vario and Draco XStreme extenders enhancing workflow and collaboration based on the built-in any-to-any signal routing and distribution capabilities. And topped by the outstanding authentication and access management options the central management controller brings along.

Space saving design

Draco tera flex offers cross-connectivity for up to 160 KVM or AV endpoints within just four rack units of space. Depending on the size of the application, Draco tera flex offers perfect fit scalability starting with 1 RU chassis up to 40 ports, 2 RU up to 80 ports and 4 RU up to 160 ports. Even flexible arrangements of Cat X and fiber connectivity can be configured easily.

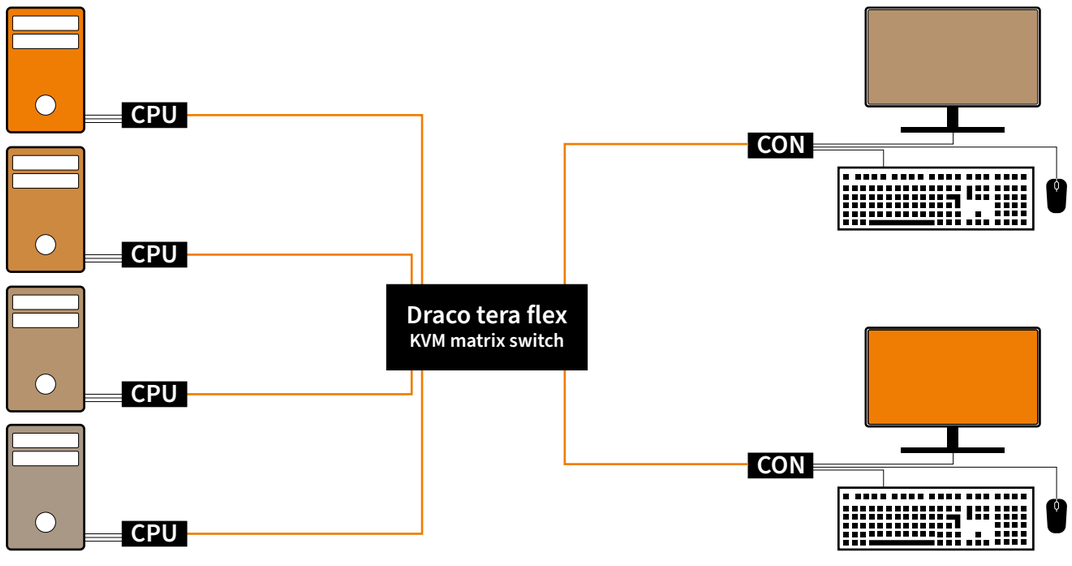
Modularity and custom design

The modular concept additionally offers expansion of the system or complete reconfiguration. Easily expand a setup starting with 24 ports to 40 ports. Starting with a 40 port 4 RU custom design chassis, it expands with applicational needs step by step up to 160 ports. With that Draco tera flex protects initial investments and is future proof.

Management and control

Draco tera flex switches are designed for “simple connectivity”. This starts with auto-recognition of Draco KVM components and continues with an easy to use inband management for signal routing. All connected endpoints can easily be given individual names for identification. Signal routing itself can be performed using the built-in on-screen display (OSD) menu or simply key-strokes on a keyboard (hotkeys). Of course Draco tera flex offers an API interface to tie in with any professional media control system or simple scripting.

FUNCTIONAL DIAGRAM



8-PORT DRACO TERA FLEX

For small desktop applications, the 8-port Draco tera flex KVM switch is available as a preconfigured desktop device (kit) or for combination with extenders in a 2 slot or 6 slot Draco vario chassis (board).

PORTS CAT | FIBER		EXTENDER SERIES COMPATIBILITY	CAT X 1G	CAT X 3G	FIBER 1G	FIBER 3G
Board	8 | 8	classic/ultra/XS	B480-C8	B480-CX8	B480-F8	B480-FX8
		XStreme	B580-C8	B580-CX8	B580-F8	B580-FX8
Kit	8 | 8	classic/ultra/XS	K480-C8	K480-CX8	K480-F8	K480-FX8
		XStreme	K580-C8	K580-CX8	K580-F8	K580-FX8

The 8-port Draco tera flex is a fully functional 8-port KVM matrix switch for fast and easy sharing of resources in conference rooms or office work group setups.

DEFAULT VARIANTS

Draco tera flex KVM matrix switches can be purchased in various preconfigured layouts to meet most application needs, covering a range of port numbers from 16 to 160 ports which are flexible to be used as input or output port. Choose between homogenous Cat X or fiber or mixed (hybrid) configuration, all available for 1G or 3G installations.

PORTS CAT | FIBER | HYBRID		EXTENDER SERIES COMPATIBILITY	CAT X 1G	CAT X 3G	FIBER 1G	FIBER 3G	HYBRID 1G	HYBRID 3G
1 RU	16 | 16 | --:--	classic/ultra/XS	K480-C16	K480-CX16	K480-F16	K480-FX16	--	--
		XStreme	K580-C16	K580-CX16	K580-F16	K580-FX16	--	--
	24 | 24 | --:--	classic/ultra/XS	K480-C24	K480-CX24	K480-F24	K480-FX24	--	--
		XStreme	K580-C24	K580-CX24	K580-F24	K580-FX24	--	--
	32 | 32 | --:--	classic/ultra/XS	K480-C32	K480-CX32	K480-F32	K480-FX32	--	--
		XStreme	K580-C32	K580-CX32	K580-F32	K580-FX32	--	--
	40 | 40 | 24:16	classic/ultra/XS	K480-C40	K480-CX40	K480-F40	K480-FX40	K480-C24F16	K480-CX24FX16
		XStreme	K580-C40	K580-CX40	K580-F40	K580-FX40	K580-C24F16	K580-CX24FX16
2 RU	48 | 48 | --:--	classic/ultra/XS	K480-C48	K480-CX48	K480-F48	K480-FX48	--	--
		XStreme	K580-C48	K580-CX48	K580-F48	K580-FX48	--	--
	64 | 64 | 40:24	classic/ultra/XS	K480-C64	K480-CX64	K480-F64	K480-FX24	K480-C40F24	K480-C40F24
		XStreme	K580-C64	K580-CX64	K580-F64	K580-FX24	K580-C40F24	K580-C40F24
	-- | -- | 24:40	classic/ultra/XS	--	--	--	--	K480-C24F40	K480-CX24-FX40
		XStreme	--	--	--	--	K580-C24F40	K580-CX24-FX40
	80 | 80 | 40:40	classic/ultra/XS	K480-C80	K480-CX80	K480-F80	K480-FX80	K480-C40F40	K480-CX40FX40
		XStreme	K580-C80	K580-CX80	K580-F80	K580-FX80	K580-C40F40	K580-CX40FX40
4 RU	120 | 120 | 80:40	classic/ultra/XS	K480-C120	K480-CX120	K480-F120	K480-FX120	K480-C80F40	K480-CX80FX40
		XStreme	K580-C120	K580-CX120	K580-F120	K580-FX120	K580-C80F40	K580-CX80FX40
	128 | 128 | --:--	classic/ultra/XS	K480-C128	K480-CX128	K480-F128	K480-FX128	--	--
		XStreme	K580-C128	K580-CX128	K580-F128	K580-FX128	--	--
	144 | 144 | --:--	classic/ultra/XS	K480-144	K480-CX144	K480-F144	K480-FX144	--	--
		XStreme	K580-144	K580-CX144	K580-F144	K580-FX144	--	--
	160 | 160 | 120:40	classic/ultra/XS	K480-160	K480-CX60	K480-F160	K480-FX160	K480-C120F40	K480-CX120FX40
		XStreme	K580-160	K580-CX60	K580-F160	K580-FX160	K580-C120F40	K580-CX120FX40
	-- | -- | 80:80	classic/ultra/XS	--	--	--	--	K480-C80F80	K480-CX80FX80
		XStreme	--	--	--	--	K580-C80F80	K580-CX80FX80

GRID FUNCTIONALITY / IP CONNECTIVITY

Additionally, Draco tera flex KVM matrix switches can be equipped with Draco tera IP Gateway. Learn more on page 74.

		EXTENDER SERIES COMPATIBILITY	CAT X	FIBER	HYBRID
1 RU	1x IP Gateway	classic/ultra/XS	K480-C32G	K480-F32G	K480-C16F16G
		XStreme	K580-C32G	K580-F32G	K580-C16F16G
	2x IP Gateway	classic/ultra/XS	K480-C24G2	K480-F24G2	--
		XStreme	K580-C24G2	K580-F24G2	--

WEB RESOURCES

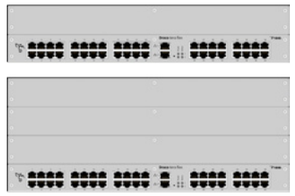
Find detailed information here:
www.ihse.com/flex

SERIES 480/580

Draco tera FLEX

CUSTOM DESIGN - STEP BY STEP GUIDE

Draco tera flex KVM matrix switches can be configured to meet all your needs. All devices are matching standard 19"-rack measurements and are equipped with dual PSU and dual network interface card by default.
For maximum user convenience Draco tera flex chassis are ready for tabletop installation but can also be rack mounted. Thus all Draco tera flex KVM matrix switches are delivered with mounted brackets.



Step 1: Pick your starterkit

Each starterkit consists of a chassis for either 2 (up to 80 ports) or 4 RU (up to 160 ports) and a **Master** Draco tera flex matrix switch with integrated control unit and NIC for configuration and maintenance. Additionally, if needed, the master matrix can be equipped with one or two Draco tera IP Gateways.

2 RU - Port technology

EXTENDER SERIES COMPATIBILITY	CAT X 1G	CAT X 3G	FIBER 1G	FIBER 3G	HYBRID 1G	HYBRID 3G
classic/ultra/XS	K480-C40-2RU	K480-CX40-2RU	K480-F40-2RU	K480-FX40-2RU	K480-C24F16-2RU	K480-CX24FX16-2RU
XStreme	K580-C40-2RU	K580-CX40-2RU	K580-F40-2RU	K580-FX40-2RU	K580-C24F16-2RU	K580-CX24FX16-2RU

2 RU - With IP Gateway

EXTENDER SERIES COMPATIBILITY	CAT X 1G	CAT X 3G	FIBER 1G	FIBER 3G	COMMENT
classic/ultra/XS	K480-C32G-2RU	K480-CX32G-2RU	K480-F32G-2RU	K480-FX32G-2RU	1 x IP Gateway (Fiber 10G, replaces 8 ports)
XStreme	K580-C32G-2RU	K580-CX32G-2RU	K580-F32G-2RU	K580-FX32G-2RU	
classic/ultra/XS	K480-C32G2-2RU	K480-CX32G2-2RU	K480-F32G2-2RU	K480-FX32G2-2RU	2x IP Gateway (Fiber 10G, replaces 16 ports)
XStreme	K580-C32G2-2RU	K580-CX32G2-2RU	K580-F32G2-2RU	K580-FX32G2-2RU	

4 RU - Port Technology

EXTENDER SERIES COMPATIBILITY	CAT X 1G	CAT X 3G	FIBER 1G	FIBER 3G	HYBRID 1G	HYBRID 3G
classic/ultra/XS	K480-C40-4RU	K480-CX40-4RU	K480-F40-4RU	K480-FX40-4RU	K480-C24F16-4RU	K480-CX24FX16-4RU
XStreme	K580-C40-4RU	K580-CX40-4RU	K580-F40-4RU	K580-FX40-4RU	K580-C24F16-4RU	K580-CX24FX16-4RU

4 RU - With IP Gateway

EXTENDER SERIES COMPATIBILITY	CAT X 1G	CAT X 3G	FIBER 1G	FIBER 3G	COMMENT
classic/ultra/XS	K480-C32G-4RU	K480-CX32G-4RU	K480-F32G-4RU	K480-FX32G-4RU	1 x IP Gateway (Fiber 10G, replaces 8 ports)
XStreme	K580-C32G-4RU	K580-CX32G-4RU	K580-F32G-4RU	K580-FX32G-4RU	
classic/ultra/XS	K480-C32G2-4RU	K480-CX32G2-4RU	K480-F32G2-4RU	K480-FX32G2-4RU	2x IP Gateway (Fiber 10G, replaces 16 ports)
XStreme	K580-C32G2-4RU	K580-CX32G2-4RU	K580-F32G2-4RU	K580-FX32G2-4RU	

CUSTOMIZED DRACO TERA FLEX

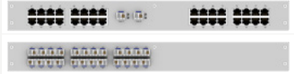
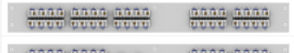
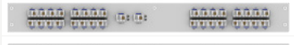
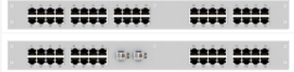
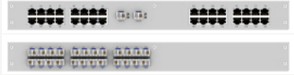
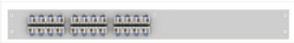
MIX AND MATCH PORTS
Choose your matrix layout from a large variety of homogenous or hybrid link technology configuration.

ADD CONNECTIVITY
By installing Draco tera IP Gateway modules Draco tera flex matrices can be connected with each other or remote access can be established.

SYSTEM GROWTH
All bays can be re-equipped with additional ports at a later time (by authorized service personel).

Step 2: Add front plates with slots for ports

To add more ports select suitable front plates, prepared for Cat X (1G/3G), fiber (1G/3G) or Draco tera IP Gateway (fiber 10G) I/O modules that are added in step 3. The first RU is equipped with a **master** matrix containing NIC and control unit, following RUs are **slave** matrices.

RU	DEVICE	CAT X	FIBER	IP GATEWAY	PORT COUNTS	PART NUMBER
1. RU (Master)		16x (1G/3G)	--	--	1 - 16	F480-C16S1
		--	16x (1G/3G)	--	1 - 16	F480-F16S1
		24x (1G/3G)	--	--	1 - 24	F480-C24S1
		--	24x (1G/3G)	--	1 - 24	F480-F24S1
		32x (1G/3G)	--	--	1 - 32	F480-C32S1
		--	32x (1G/3G)	--	1 - 32	F480-F32S1
		40x (1G/3G)	--	--	1 - 40	F480-C40S1
		--	40x (1G/3G)	--	1 - 40	F480-F40S1
2. RU (Slave)		24x (1G/3G)	--	--	41 - 64	F480-C24S2
		40x (1G/3G)	--	--	41 - 80	F480-C40S2
		32x (1G/3G)	--	1x (10G)	41 - 80	F480-C32GS2
		--	24x (1G/3G)	--	41 - 64	F480-F24S2
		--	40x (1G/3G)	--	41 - 80	F480-F40S2
		--	32x (1G/3G)	1x (10G)	41 - 80	F480-F32GS2
		--	--	5x (10G)	41 - 80	F480-G5S2
3. RU (Slave)		24x (1G/3G)	--	--	81 - 104	F480-C24S3
		40x (1G/3G)	--	--	81 - 120	F480-C40S3
		32x (1G/3G)	--	1x (10G)	81 - 120	F480-C32GS3
		--	24x (1G/3G)	--	81 - 104	F480-F24S3
		--	40x (1G/3G)	--	81 - 120	F480-F40S3
		--	32x (1G/3G)	1x (10G)	81 - 120	F480-F32GS3
		--	--	5x (10G)	81 - 120	F480-G5S3
4. RU (Slave)		24x (1G/3G)	--	--	121 - 144	F480-C24S4
		40x (1G/3G)	--	--	121 - 160	F480-C40S4
		32x (1G/3G)	--	1x (10G)	121 - 160	F480-C32GS4
		--	24x (1G/3G)	--	121 - 144	F480-F24S4
		--	40x (1G/3G)	--	121 - 160	F480-F40S4
		--	32x (1G/3G)	1x (10G)	121 - 160	F480-F32GS4
		--	--	5x (10G)	121 - 160	F480-G5S4

Step 3: Equip slots with I/O Modules

To finally assemble the complete matrix, all frontplates need to be equipped with matching I/O modules, each consisting of 8 ports.

EXTENDER SERIES COMPATIBILITY	CAT X 1G	CAT X 3G	FIBER 1G	FIBER 3G	IP GATEWAY
					
classic/ultra/XS	F480-C8	F480-CX8	F480-F8	F480-FX8	F480-G
XStreme	F580-C8	F580-CX8	F580-F8	F580-FX8	F580-G

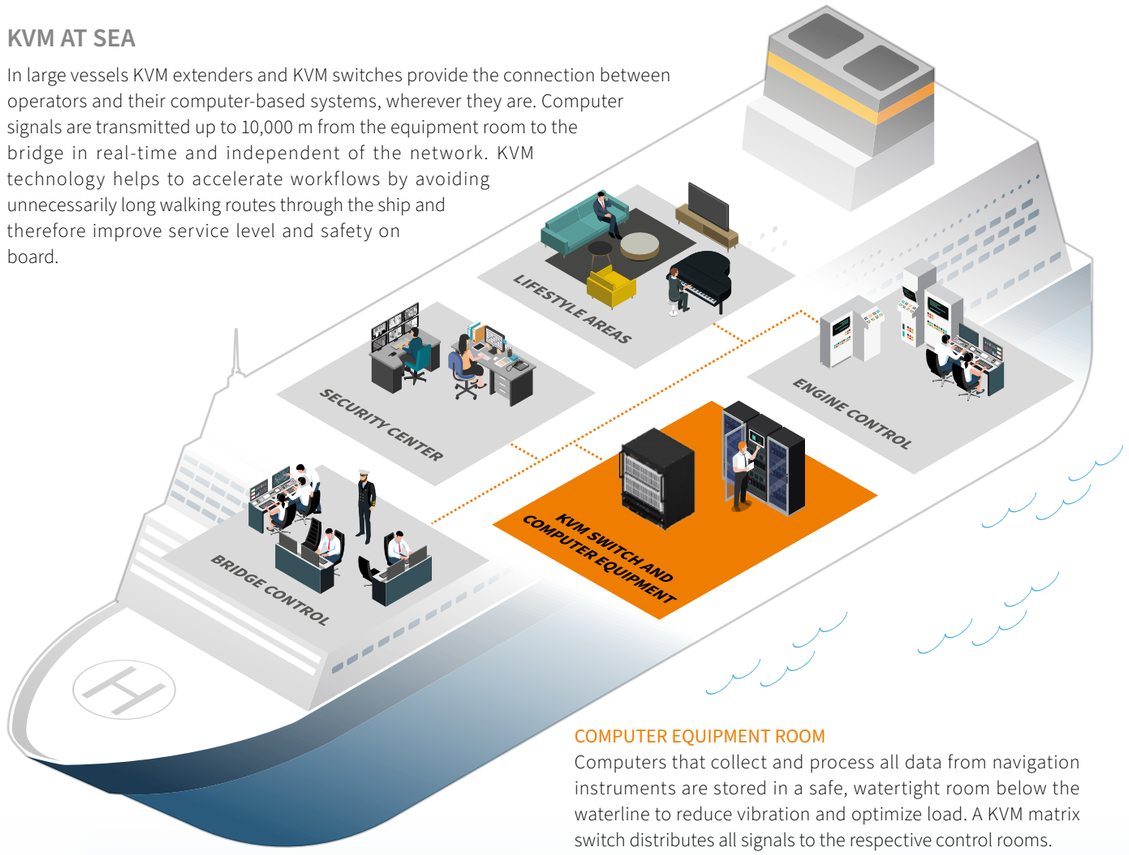
We recommend to use Draco System Designer to automatically equip front plates with suitable I/O modules.

CHALLENGING CONDITIONS AT THE HIGH SEAS

Tough environmental conditions like exposition to salt water, vibrations, high air humidity, and extreme temperature differences impose special requirements on IT equipment. Essential equipment must continue to operate without failure or special attention whilst at sea on long voyages. Rugged reliability and failsafe operation is crucial in systems that operators depend upon: day-in, day-out.

KVM AT SEA

In large vessels KVM extenders and KVM switches provide the connection between operators and their computer-based systems, wherever they are. Computer signals are transmitted up to 10,000 m from the equipment room to the bridge in real-time and independent of the network. KVM technology helps to accelerate workflows by avoiding unnecessarily long walking routes through the ship and therefore improve service level and safety on board.



BRIDGE CONTROL

KVM extenders are integrated to bridge workstations and provide all data from radar, sensors, communication and other essential information the crew needs for save navigation and overall control of nautic systems

ENGINE CONTROL

KVM improves the ergonomics in the engine control room by removing bulky and noisy computers to a save area and integrating all computer signals into the operator workstation.

COMPUTER EQUIPMENT ROOM

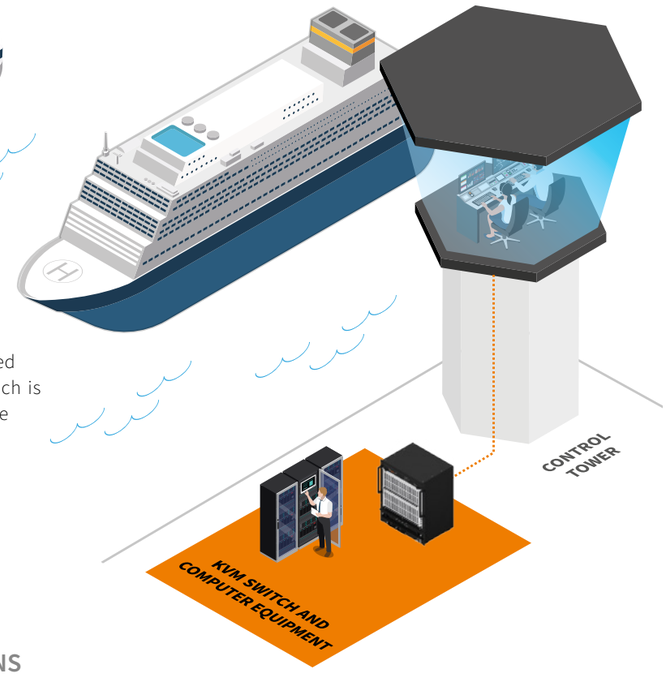
Computers that collect and process all data from navigation instruments are stored in a safe, watertight room below the waterline to reduce vibration and optimize load. A KVM matrix switch distributes all signals to the respective control rooms.

DEPARTMENT CONTROL CENTERS

Any department on a cruise ship can be equipped with a control center for immediate access to relevant information or playout to entertainment areas and information terminals for passengers. This includes navy specific control centers as well.

KVM IN PORT CONTROL

In the port, KVM is key to integrate multiple computer information centralized in the port control tower, comparable to Air Traffic control centers. Operators can instantly switch between computers, share screens, access distant systems and integrate communication devices. In this way, ships can be guided safely to ensure smooth operations in the port which is essential for pleasant voyage and efficient just-in-time logistics.



TAILOR-MADE FOR MARITIME CONDITIONS

IHSE Draco KVM systems include KVM extenders, add-on Modules and KVM matrix switches exclusively tested and approved to be used in maritime applications. Nemko certified our Draco MAR-series according to IEC 60945.

FEATURES & BENEFITS

- Instant connection and switching
- Near-zero transmission latency
- Artefact-free video and audio
- Support of all digital and audio video formats
- USB 3.0 parallel switching
- Integration with third-party controllers
- Extensive redundancy and security options

FURTHER INFORMATION

Please contact our Sales team for maritime certified equipment and maritime approvals.

Email: sales@ihse.com Phone: +49 7546 9248-42

PRODUCTS IN FOCUS

Draco tera KVM matrix switch

Draco vario KVM extenders

IEC 60945 Certified

IHSE AT SEA

ROYAL CARIBBEAN CRUISE LINE

IHSE KVM systems are installed on Royal Caribbean Cruise Lines' largest and most prestigious cruise ships. The KVM solutions enable the crew to quickly and easily access important data from workstations around the ships.
The cruise company Royal Caribbean Cruise Line recently expanded its fleet to include the two largest passenger ships in the world: Harmony of the Seas and Symphony of the Seas, each capable of carrying 6,750 passengers, along with 2,100 crew members.

SERIES 480/580

Draco tera ENTERPRISE

Draco tera enterprise KVM matrix switch family: from left to right 160 ports, 80 ports, 288 ports, 576 ports, 48 ports

FEATURES AND BENEFITS

Draco tera enterprise KVM matrix switches route and distribute KVM and peripheral signals, such as audio and USB data. They enhance workflow and collaboration based on built-in, any signal to any signal, routing and distribution capabilities.

Compatibility

Draco tera enterprise KVM matrix switches interconnect with all Draco KVM extenders. All extenders are immediately recognised. Additionally, they are fully compatible with all Draco tera flex matrix switches.

Modular concept: Scalability

The enterprise series offers a fully modular design that allows expansion of the system to 576 ports in increments of 8-ports. For future expansion and grid function, multiple matrices from the Draco tera matrix familiy can be connected via IP Gateway's grid function.

Availability: Redundancy options

The switches support controller-redundancy with auto-failover for continuous operation (except 160-port version). All active system components can be added or replaced while the system is up and running. This hot-swap ability is a key feature for mission critical environments.

Signal Integrity and Performance

Draco tera matrix switches route each signal on individual signal paths, guaranteeing full bandwidth and full signal performance. Routing of signals is latency free as no overhead protocol is required; it only takes a few nanoseconds for the signals to pass through the switch.

Versatility of Signal Routing

The Draco tera enterprise line is primarily designed to route KVM signals (Full HD up to 4K60). It also offers switching of USB 3.x signals with up to 5 Gbit/s bandwidth using the universal I/O-card and native SDI signals.

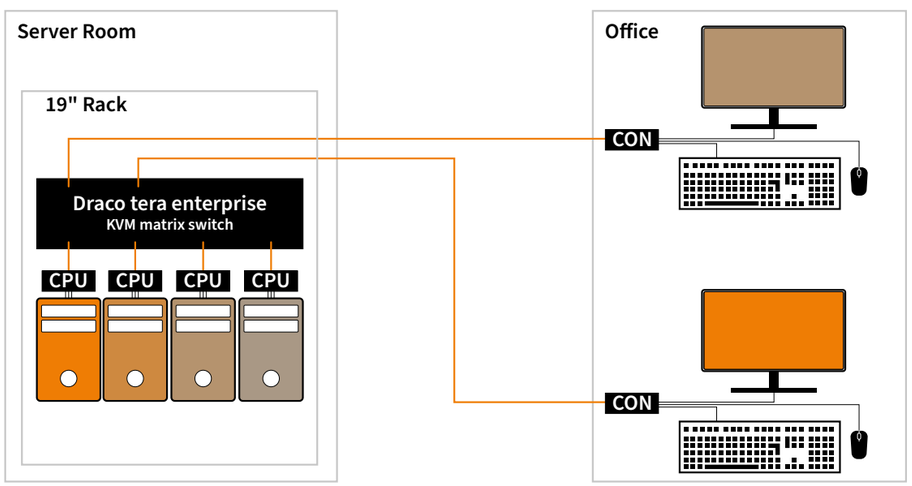
Security

The configuration software "Tera Tool" provides outstanding authentication and access management options and convenient management functions.

Management and Control

Draco tera switches are designed for ease of operation with comprehensive in-band management of signal routing.
Signal routing itself can be performed using the on-screen display (OSD) menu or simple keyboard keystrokes (hotkeys). Draco tera offers an API interface to interact with any professional media control system or simple scripting.

FUNCTIONAL DIAGRAM



DECISION HELPER: DRACO TERA FLEX OR DRACO TERA ENTERPRISE

	DRACO TERA FLEX	DRACO TERA ENTERPRISE
		
Build type	Ready to use with various design layouts	Modular for free configuration
Mounting options	Table-top with rack mount options	Rack mount
Ports (in/out)	8 - 160	48 - 576
Flex-Port	yes	yes
Port technologies	Cat X, Fiber SM, Fiber MM	Cat X, Fiber SM, Fiber MM
Supported signals	VGA, DVI, HDMI, DP, SDI, Audio (analog, digital), serial (RS232, RS422)	VGA, DVI, HDMI, DP, SDI, Audio (analog, digital), serial (RS232, RS422), USB
USB	USB-HID, USB 2.0	USB-HID, USB 2.0, USB 3.0
Power redundancy	2 PSUs by default	additional PSUs hot-plugable
Controller board redundancy	no	optional
Hot-Swap components	no	yes
Configuration	Tera Tool	Tera Tool
API for media controls	yes	yes
Extender series compatibility	Series 480: Draco vario classic, Draco vario ultra, Draco vario XS Series 580: Draco XStreme	Series 480: Draco vario classic, Draco vario ultra, Draco vario XS Series 580: Draco XStreme

IHSE EXPLAINS

WHAT IS SECURE CORE®?

IHSE is dedicated to provide not only high performance, failure-free KVM to the operator in the control room, but also to satisfy security demands of system owners in general.

The solution

IHSE Secure Core® is a technology to safeguard sensitive information within KVM matrix switches and to prevent attacks that aim to steal data or even bring the whole system to a halt.

Access rights management

The matrix recognizes any sender (CPU) and receiver unit (CON) automatically and provides connection instantly. This is of great user-friendliness but might open loopholes for intruders. To manage access rights (full access, video-only or private), an out-of-band control tool with multi-factor authentication stores the configuration to the controller unit of the matrix. After configuration, the tool can be physically disconnected, and no network-operated management software is required to control the system.

Physically isolated controller module

The controller module is physically isolated from the data streams transported within the matrix itself and thus cannot be tempered with to access the KVM data.

Intrinsic security of the matrix

Within the matrix, every data stream follows its own, discrete path which is only available when a connection is requested. All data paths are isolated from each other to avoid crosstalk. The IHSE proprietary protocol bundles keyboard, video, mouse, and USB signals to a data stream that cannot be read by external devices.

Safe grids

Even when connecting multiple KVM matrix switches over IP networks, the IP data stream still contains proprietary KVM signal data. To connect multiple matrices, Draco tera IP Gateway provides secure and electrically isolated protocol conversion. Attacks via IP networks will simply end at the Gateway and cannot affect internal processes in the KVM system.

SERIES 480/580

Draco tera ENTERPRISE

MODULAR CONCEPT - STEP BY STEP GUIDE

Draco tera enterprise KVM matrix switches follow a fully modular approach and can be tailor-made for every exact application without limitations in size or used input device. Repairs, expansions or change of link technology can be easily implemented even during operation. Essential components of the system (i.e. controllers, fans, PSU etc.) can be designed redundantly at the customer's request in order to increase reliability.

Step 1: Choose your chassis

All Draco tera enterprise chassis are designed to fit in standardized 19" server racks and be located in climate controlled server rooms. Thus Draco tera enterprise is not suitable for table top operation.

PORTS	PARAMETERS		REDUNDANCY OPTIONS	PART NUMBERS FOR CLASSIC/ULTRA/XS	XSTREME
≤ 48	1x controller module, 1x PSU	3 RU	2nd PSU 2nd controller module	K480-048-R1	K580-048-R1
≤ 80	1x controller module, 1x PSU	4 RU	2nd PSU 2nd controller module	K480-080-R1	K580-080-R1
≤ 152	1x controller module, 2x PSU	9 RU	3rd PSU 2nd controller module	K480-152-R2	K580-152-R2
≤ 160	1x controller module, 2x PSU	9 RU	3rd PSU **Note: No redundant controller module possible**	K480-160-R2	K580-160-R2
≤ 288	1x controller module, 2x PSU	13 RU	3rd PSU 2nd controller module	K480-288-R2	K580-288-R2
≤ 576	2x controller module, 2x PSU	25 RU	3rd/4th PSU **Note: controller module redundant by default**	K480-576-R2	K580-576-R2
≤ 576	288 x 288 symmetric ports, 2x controller module, 2x PSU	25 RU	3rd/4th PSU **Note: controller module redundant by default**	K480-576S-R2	K580-576S-R2

Step 1a: For mission-critical environments and higher resilience please choose

Matrix built-in redundancy options ensure failure-free operation. All Draco tera enterprise chassis are equipped with redundant fans to ensure appropriate cooling at all times. For even further increase of reliability, controller modules and power supply units can be added. See table above.
All parts can be replaced while the matrix switch is in operation (hot swap).
In case a component fails, its redundant counter part automatically takes over without interruption (auto fail-over).

AUTO FAIL-OVER CONTROLLER MODULE		PART NUMBERS FOR CLASSIC/ULTRA/XS	XSTREME
Draco tera enterprise controller module (incl. Dual TCP/IP, HDMI, USB-HID, RS232)		480-CTRL2	580-CTRL2

POWER SUPPLY UNITS FOR HOT FAIL-OVER REDUNDANCY	PART NUMBER
Plug-in power supply unit for Draco tera enterprise 48 ports and 80 ports	480-RED-48
Plug-in power supply unit for Draco tera enterprise > 80 ports	480-RED-152-576-R2

Step 2: Add I/O modules

The Draco tera enterprise KVM matrix switch can accommodate a wide range of signal formats. I/O cards can be mixed in the same frame, allowing maximum flexibility for any switch and routing application.
Draco tera enterprise I/O modules can be hot swapped during operation. Unlike in Draco tera flex matrix switches the integrated backplane enables operators to freely rearrange or replace I/O cards for expansion or restructuring reasons.

I/O MODULES		PART NUMBERS FOR CLASSIC/ULTRA/XS	XSTREME
I/O module (incl. 8 ports) Cat X (1G)		480-C8R1	580-C8R1
I/O module (incl. 8 ports) Cat X (3G)		480-C8X	580-C8X
I/O module (incl. 8 ports) Cat X (1G ⇔ 3G)		480-C8BDG	580-C8BDG
I/O module (incl. 8x SFP) Fiber (1G)		480-S8R1	580-S8R1
I/O module (incl. 8x SFP) Fiber (3G)		480-S8X	580-S8X
I/O module (incl. 8x SFP) Fiber (1G ⇔ 3G)		480-S8BDG	580-S8BDG
Draco tera IP Gateway (Grid function / IP connector)		480-IPG	580-IPG
I/O module (8 ports) for USB 3.0 and SDI, empty port bays, free configuration		480-UNI16	580-UNI16

Step 2a: Choose options for Draco tera enterprise universal I/O module 480-UNI16

SFPs	PART NUMBER
SFP copper, RJ-45 connector, 1G, MSA	459-1C
SFP single-mode, LC duplex, 1G, MSA	459-1S
SFP multi-mode, LC duplex, for USB 3.0, 6G, MSA	459-6M
SFP single-mode, LC duplex, 10G, MSA	459-10X

ACCESSORIES

BLIND PLATES (for empty slots)	PART NUMBER
Draco tera blind plate for 1 slot	480-BLND1
Draco tera blind plate for 2 slots	480-BLND2
Draco tera blind plate for 4 slots	480-BLND4
Draco tera blind plate for 8 slots	480-BLND8

CONSUMABLES

FILTER PADS	PART NUMBER
for 480-FAN-048	480-FLTR-048
for 480-FAN-080	480-FLTR-080
for 480-FAN-160, 480-FAN-288	480-FLTR-160
for 480-FAN-576	480-FLTR-576

SPARE PARTS

FAN TRAYS	PART NUMBER
for 48 ports chassis	480-FAN-048
for 80 ports chassis	480-FAN-080
for 152/160 ports chassis	480-FAN-160
for 288 ports chassis	480-FAN-288
for 576 ports chassis	480-FAN-576

PRODUCT CONFIGURATION

The Draco tera enterprise KVM matrix switch follows the modular concept of all Draco products and can be designed exactly to match the needed functions.
Use our Draco System Designer to create your ideal product.

WEB RESOURCES

Find detailed information here: www.ihse.com/enterprise

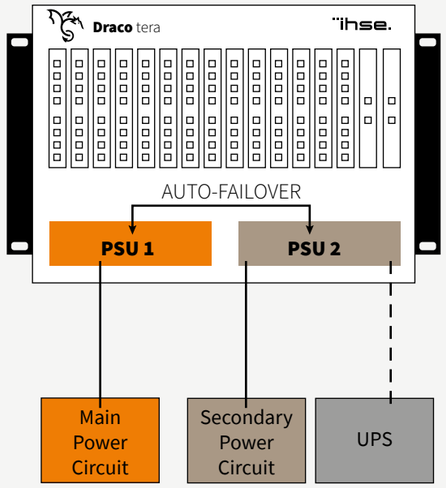
MULTI-LEVEL REDUNDANCY FOR FAIL-SAFE OPERATION

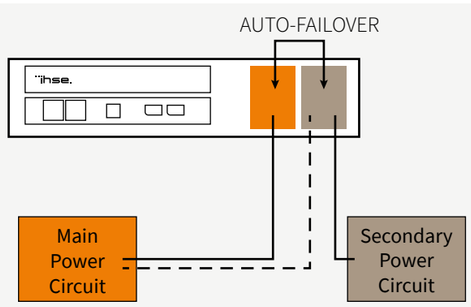
In applications where maximum fail-safety is required, a KVM system must also be absolutely reliable. IHSE KVM devices are designed for continuous operation under full load and, thanks to our in-house production, we can ensure the perfect quality of the components at all times. However, even the best KVM system can only function within ideal operating conditions. In order to guarantee this, we supplement our modular approach with a comprehensive redundancy concept to intercept external sources of error.

REDUNDANCY ON DEVICE LEVEL

POWER SUPPLY

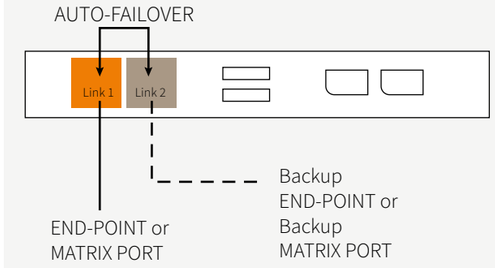
One level is the redundant design of the power supply unit. All IHSE devices can be equipped with redundant power supply units. This means that in the event of a power failure, the system can automatically switch to a connected uninterruptible power supply (UPS) or, if an integrated power supply unit (PSU) fails, the device can still be supplied with power via the additional power supply unit without the system being brought to a halt.





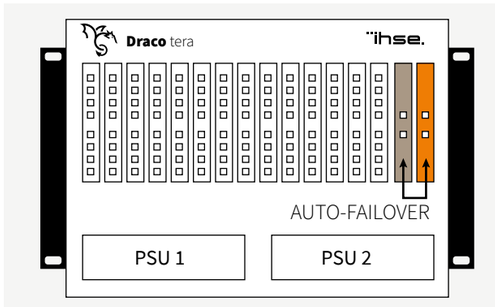
LINK REDUNDANCY

Each extender can be equipped with a double data link so that if one connection fails or is disconnected by accident, the device automatically switches to the other line without loss of the transmitted signals and without the user's interaction.
Additionally, extenders with redundant links can be used to create very small 2:1 or 2:2 KVM switch setups without matrix involvement.



REDUNDANT CONTROLLER MODULES

Our KVM matrix switches are operated without a connected management software but all controls are executed by an integrated controller module.
Draco tera enterprise KVM matrix switches can be equipped with a redundant controller module to ensure permanent operation even if the controller board fails or is accidentally disconnected. Please refer to Draco tera enterprise product specifications for more information on page 64.



IHSE EXPLAINS

WHAT IS AUTO-FAILOVER?

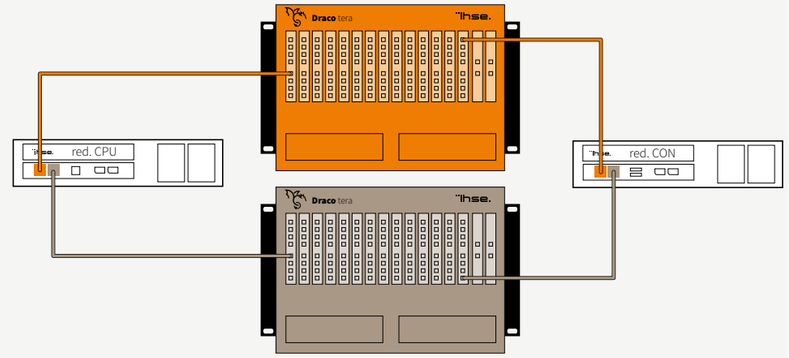
Redundant power lines or data links help to ensure continuous operation even if one connection is lost.
Therefore, both non-hierachic connections are operated simultaneously. In case one connection is separated, both data and power are still available by the secondary line without need to restart the system.

REDUNDANCY ON SYSTEM LEVEL

Finally, the entire system can also be set up redundantly, whereby four possible scenarios are conceivable.

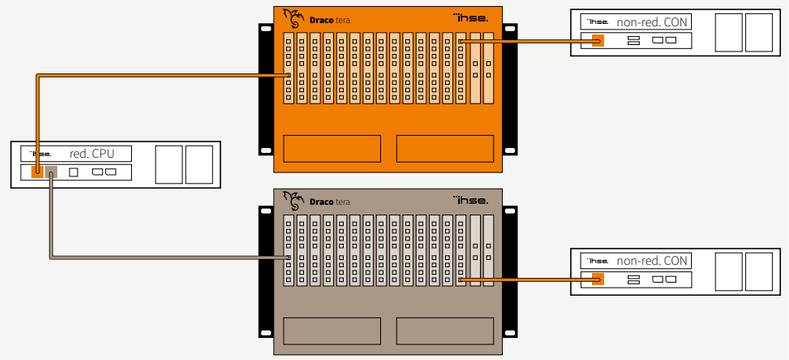
FULLY REDUNDANT MATRIX OPERATION

The most reliable setup can be created with two KVM matrix switches and the utilization of redundant KVM extenders.
In this setup, all potential vulnerable points are secured against disruption by a redundant design: All user stations can still reach all computers even if one matrix or one connection cable fails.



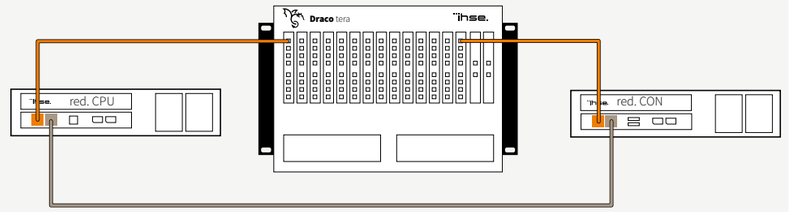
SEMI-REDUNDANT MATRIX OPERATION

Half of the user stations (with non-redundant CON units) can still reach all redundant CPU units even if one matrix, matrix port or one connetion cable or link socket on the CPU unit fails.



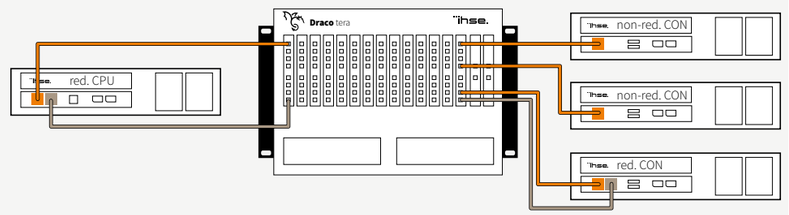
FALLBACK SCENARIO

If the matrix fails, all user stations with redundant CON units are automatically connected point-to-point to a redundant CPU unit for an emergency setup.



SEMI-REDUNDANT SINGLE OPERATION

Redundant and non-redundant CON units can access redundant CPU units. The redundant CON units can still access the CPU units even in case of losing the primary link.



INTEGRATED DESIGN AND AUTOMATED MANUFACTURE IN THE FACTORY OF THE FUTURE

With the so-called fourth revolution, the focus in industry is on networking, information transparency, and technical assistance in order to be able to jointly design, control, and analyze processes, from the initial idea to delivery to the customer. To do so, it requires a collaborative approach – one that demands tools to link the teams, to enable information to flow, to produce effectively at scale and aid in the control of the whole production environment.

KVM can connect all departments efficiently. Enabling research and development, rapid prototyping, systematic testing and final production design to be achieved speedily through enhanced collaboration.

INTEGRATED DESIGN

Products may be developed, demonstrated and tested totally within a computer system; allowing fine tuning of the design instantaneously – on-screen at any size – giving everyone a sense of a real product before the first prototype has been built.

SEAMLESS COLLABORATION

With a KVM matrix switch, multiple screens and sources of information can be accessed using a single keyboard and mouse to minimize desktop clutter and simplify the control rooms tasks in a stressful and demanding environment. Data can be shared effortlessly between operators and displayed on common videowalls using simple and fast switching routines to ensure that everyone has the information they need right in front of them.

CONNECTIVITY

Industrial sites can be of vast dimensions, making KVM the right choice to gap large distances. Operated in its own network, it provides physical separation from data networks, reduces loading time and this way increases production stability.
Remote access for staff working from home or other remote places can be implemented easily. Multiple factory units can be connected and be controlled by one central control room.

SECURITY AND AVAILABILTY

Our systems provide a high level of security, prevent unauthorized access and data abuse. This makes them essential in creating future-proof control rooms.

KVM is the ideal technology to implement industrial security standards with site segmentation and access control.
Our essay on the ISA IEC 62443 Standard contains detailed information.

Find it online for download:
www.ihse.com/industrial-security

TAILOR-MADE FOR FACTORIES

IHSE's Draco KVM systems enable computer access all over the factory site. Built for 24/7 operation, their modular design facilitates easy upgrade or expansion of the installation in less than a minute, while offering the full convenience of improved ergonomics in the workspace.

FEATURES & BENEFITS

- Near-zero transmission latency without artefacts
- Extensive redundancy and security options
- 24/7 operation, exceptionally long MTBF and ultra-low MTTR with less than a minute by chosing modular slide-in chassis
- Low energy consumption
- Modular, expandable, future-proof
- Central decision making and problem-solving
- Safer and cleaner environments
- Reduced downtime
- Fewer production bottlenecks and delays

PRODUCTS IN FOCUS

Draco tera KVM matrix switch

Draco vario KVM extenders

Draco MultiView 4K60

Draco SIRA CPU

Draco SIRA CON

SUITABLE FOR ALL APPLICATIONS

Due to their enormous adaptability, our KVM solutions are suitable for every situation. The fanless design provides maximum convenience at the workstation, even in clean rooms.

For heat exposed environments, our modular approach allows to add forced cooling with our fan cartridge module.

DESCRIPTION		PART NO.
Add-on Module for Draco vario chassis		474-MODFAN

KVM IN R&D

24/7 TESTING FOR DRILLING TOOLS

Specialized high-pressure pumps for drilling tools undergo continuous endurance testing in the laboratory. The necessary measurement and control systems, along with high-performance simulation computers, are integrated via KVM extenders and switches, allowing for comfortable operation from a central location outside the hazardous area. Additionally, test results and real-time observations can be transmitted directly to presentation rooms.

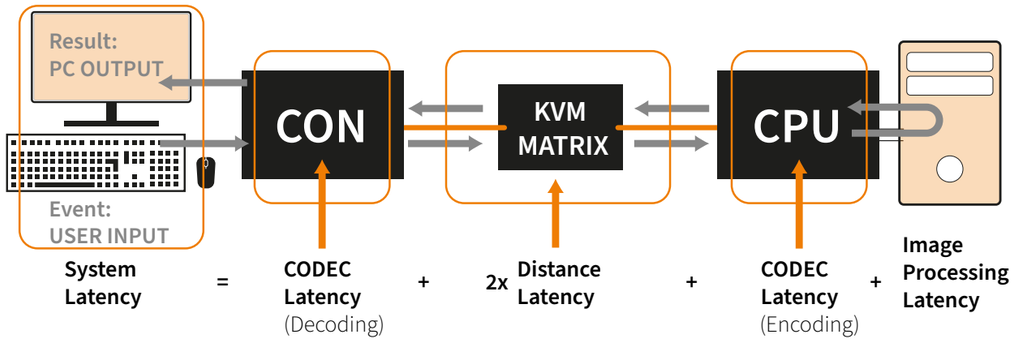
IHSE EXPLAINS

WHAT IS LATENCY?

Every process causes latency; it is not an error, but a natural characteristic. Humans are able to perceive latencies of around 13 ms, which are still absolutely tolerable. Latency is only noticeable when the user has a reference point like it is the case in a bidirectional KVM system. Latency interferes with hand-eye coordination when operating machines with a mouse or stylus. Real-time applications usually operate with a latency of up to 2 frames. In some control room environments, up to 100 ms are acceptable, although this is not ideal. Other applications, such as certain simulations or VR, require latencies of less than 5 ms.

Latency in KVM systems

In KVM systems, latency can occure in several components. These individual latencies add up to a total latency, which can then affect the user experience negatively.



CODEC latency

Bundling and compressing incoming signals and decoding vice versa requires computing time, which can have a *significant* impact on latency depending on the image resolution and performance of the hardware and video codec used.
A video codec alone can include prioritization and specified latencies, but since it always runs on a hardware platform, it does not make sense to consider the codec in isolation. In the IHSE universe, three video compression algorithms are available on the classic, ultra, and XS platforms.

Comparison of latency in the extender at a frame rate of 60 Hz:

KVM EXTENDER SERIES		Draco vario classic (474, 477, 48x)	Draco vario ultra (49x)	Draco vario XS (49x-XS), Draco XStreme
VIDEO CODEC		IHSE Classic	LICI	JPEG XS
DELAY		1/refreshrate	1/4xrefreshrate	line-based (sub-frame)
COMPENSATION METHOD		Drop frames	Increase Compression rate	Increase Compression rate
LATENCY	normal operation	16,66 ms – 33 ms	16,66ms (@60Hz)	16,66 ms (@60Hz)
	Low latency mode	--	4,2 ms (@60Hz)	<1 ms (@60Hz)*

* future option

Distance latency

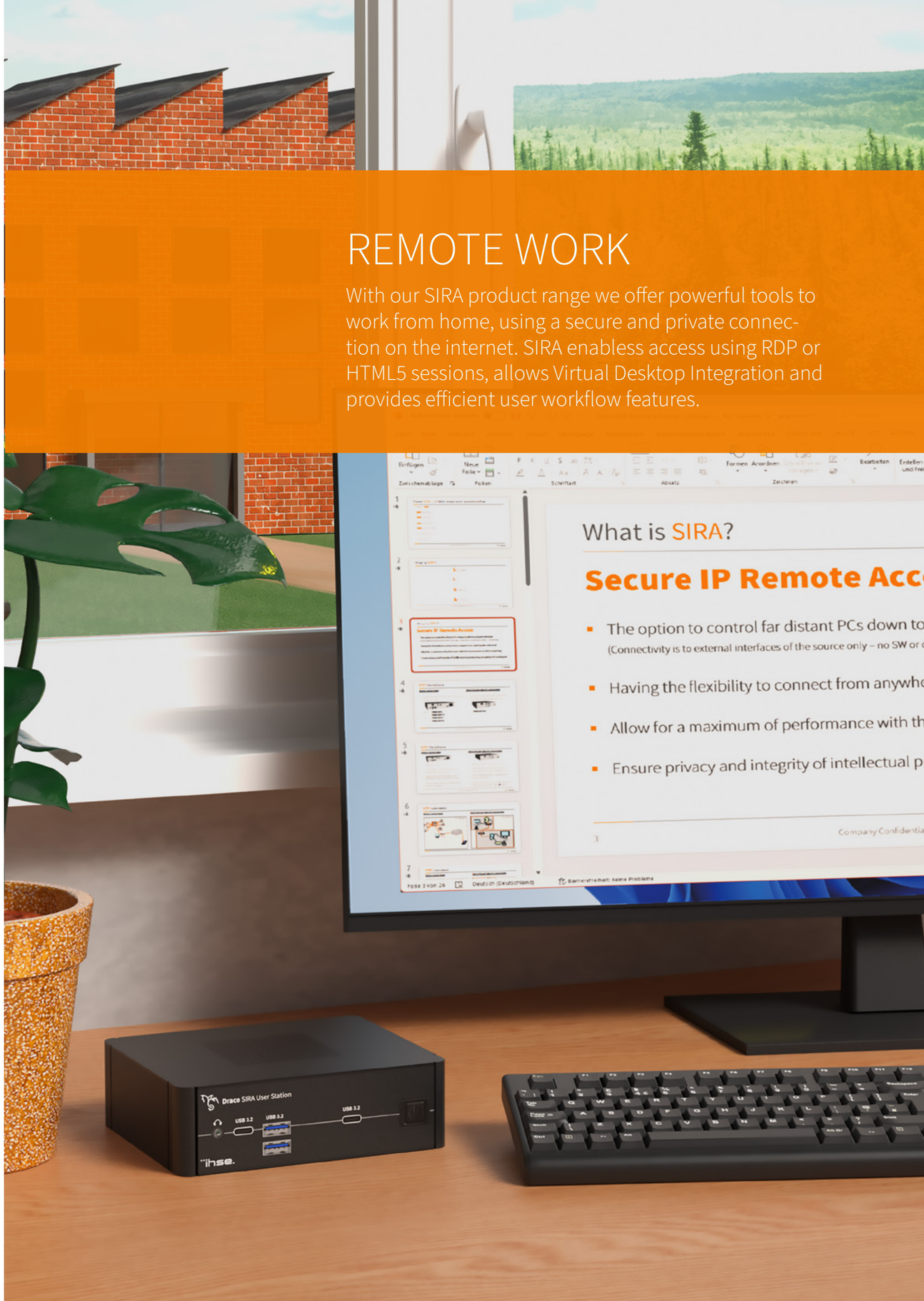
Electrical or optical signals are transmitted in copper or fiber optics at specific speeds, regardless of bandwidth.
In fiber optics, the signal is transmitted at an average speed of 200,000,000 m/s, i.e., with a latency of 5 ns per meter of cable length. This only results in a latency of 5 ms at a cable length of 1000 kilometers or more. Such dimensions are not usually reached in KVM installations and can therefore be *neglected.*
The same applies to Cat-X cables, where latencies are similar, but due to cable attenuation, cable lengths are limited to distances of less than 100 - 140 meters anyway, and therefore any latencies that occur are also *insignificant*.

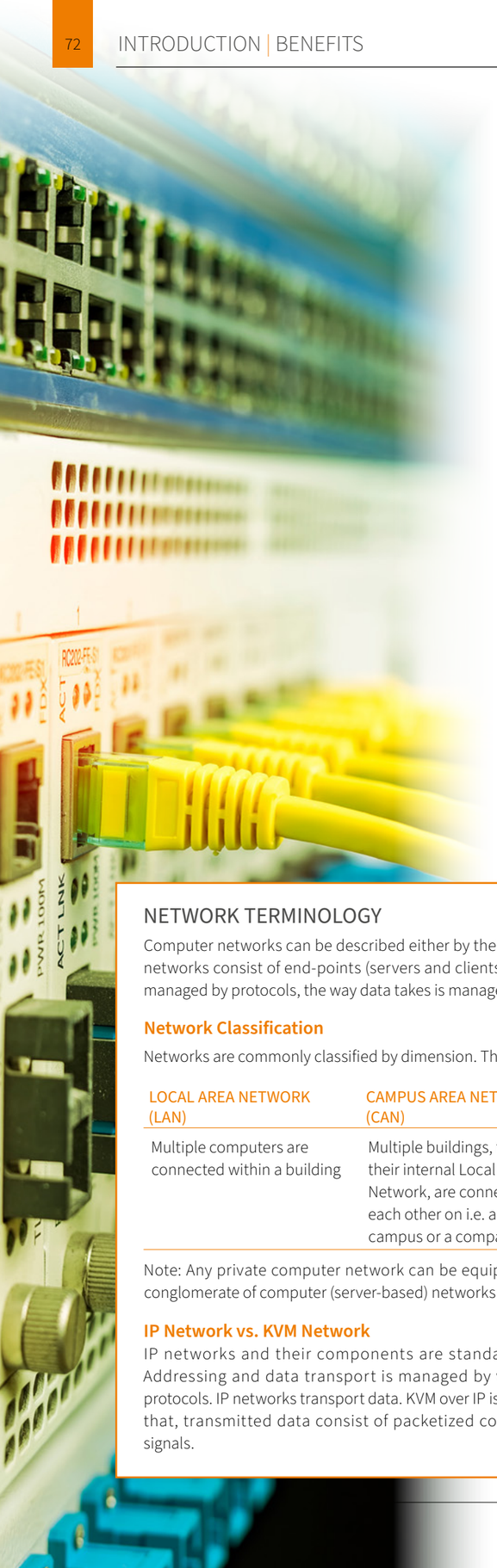
Switching

If a KVM stream is to be switched, latencies can also occur within the KVM matrix switch.
Extensive testing has determined that within IHSE Draco tera KVM matrix switches, a latency of <10 ns occurs between two remote ports within the comparably large 288-port enterprise. This latency is also *negligible.*

Not related to KVM: Image processing latency

Displays or monitors need to be considered just like converters and/or scalers and therefore add a significant amount of latency to the overall image latency. This latency varies in tens of milliseconds between manufacturers, product series, and the use cases of the monitors. Especially larger displays with picture-in-picture functionality add latency when using this feature.





KVM MEETS IP

Like many communication services such as TV or radio broadcasting, telephony or online conferencing, KVM can be transmitted using IP based networks.
A particular advantage of IHSE KVM is the bidirectional interaction capability provided to the operator to access a remotely-connected host.
When designing IP-based systems, system application objectives must be considered. Within the technology there is a differentiation of real-time KVM (high-performance KVM) and remote access KVM (administrative server management).

SECURITY

Security is one of the highest priorities on IP networks as unauthorized access attempts and attacks increase. Every endpoint on a network is a potential vulnerable point of entry for breaches of security. It is a key requirement of IP KVM systems to fully protect against attempts and to remain immune, particularly when the network is used to host controlling devices in mission-critical environments.
As part of the security control, KVM systems are best set up and operated in separate networks, with isolation from corporate and other networks.

RESILIENCE

The bus architecture of IP networks is a challenge to IP KVM systems with reliance on proof of delivery and its effect on packetized transmission and delay. However, a properly configured and dimensioned network will support IP KVM distribution. Maintaining an IP KVM system over its lifetime requires parallel maintenance of the network infrastructure to ensure correct interaction between the two.

NETWORK TERMINOLOGY

Computer networks can be described either by their layout (network topology) or, more common, by dimension. All computer networks consist of end-points (servers and clients), connectors (cables or WiFi) and nodes (hubs and switches). Data flow is managed by protocols, the way data takes is managed by routers.

Network Classification

Networks are commonly classified by dimension. These networks describe private networks.

LOCAL AREA NETWORK (LAN)	CAMPUS AREA NETWORK (CAN)	WIDE AREA NETWORK (WAN)	GLOBAL AREA NETWORK (GAN)
Multiple computers are connected within a building	Multiple buildings, that have their internal Local Area Network, are connected with each other on i.e. a university campus or a company site	By connecting sites, Wide Area Networks can spread on larger scale, i.e. intercity networks	Global networks connect networks worldwide (and beyond). Good examples are GPS, or telephone networks

Note: Any private computer network can be equipped with a gateway to the internet, which is a public and decentralized conglomerate of computer (server-based) networks with special routers of global dimension. The Internet is a GAN.

IP Network vs. KVM Network

IP networks and their components are standardized. Addressing and data transport is managed by various protocols. IP networks transport data. KVM over IP is exactly that, transmitted data consist of packetized computer signals.

On the contrary, proprietary KVM utilizes non-standardized transmission protocols and adressing technologies. KVM matrix switches are single-purpose distributors of computer signals, that are not neccessarily packetized. In general, the network is usually simpler and faster.

REAL-TIME ACCESS

High-performance IP based KVM applies to the solution that extends and routes KVM signals without any perceivable latency or degradation of video, audio and keyboard and mouse. This is a key requirement for continuous interactive operation. To guarantee real-time operation, stable, sufficient, low-latency network bandwidth is a prerequisite as well as fast and efficient codecs.

Typically this infrastructure is found in LAN and CAN, and in some in cases WAN, connections.
For single extension links high-performance connection can be achieved over shared networks. Large scale matrix applications and IP-based KVM should ideally be run on a dedicated and separate network. The minimum requirement is a dedicated VLAN.

REMOTE ACCESS

Remote access over IP usually utilizes an existing TCP/IP network, like the ones found in almost every company's or organization's facilities. The objective for this technology is the access of equipment located anywhere by users situated anywhere.
Remote IP KVM performance has evolved to the point at which modern systems achieve a performance level sufficient to provide control room operations when appropriate low latency bandwidth is available.

This includes LAN/CAN and WAN, although since these generally offer lower bandwidth and higher latency, the KVM technology must adapt with more efficient codec techniques to manage higher-latency networks. In many cases lossy compression and loss of real-time operation must be expected as both codecs and networks add more latency.
Remote access IP KVM systems are mainly used for sporadic, short-term operation rather than continuous applications.

BENEFITS OF IP INTEGRATION

Connecting IHSE KVM systems to IP-based networks allows for easy expansion of existing installations, combining secure, high-performance proprietary KVM systems with the flexibility and standardization of IP systems. The existing IP data network architecture is used as the transmission medium between the individual proprietary systems.

- Individual matrix systems can be networked with each other, and individual workstations can be connected directly to the matrix. Both hardware and software solutions are available for this purpose.
- With the Draco SIRA CPU, virtualized computers can also be connected to a KVM matrix system for KVM access to virtual machines using various protocols.
- Draco SIRA CON and Draco Sira Stand-Alone are powerful devices for secure remote access, even via public networks such as the Internet.
- SIRA Client allows secure access to the entire KVM system from a remote workstation. Draco SIRA User Station adds multiviewing functionality as a personal workspace controller.

SERIES 480/580

Draco tera IP GATEWAY

Draco tera IP Gateway module for Draco tera enterprise

FEATURES & BENEFITS

- IP Gateway module for Draco tera KVM matrix switches
- Bundles up to 8 bidirectional KVM cross-connections per module in a 10G stream
- Homogeneous matrix interconnection via 10G IP networks
- Connect individual Draco vario IP Gateway CONs
- Backward compatibility to existing matrix grid technology

MATRIX GRIDS

With Draco tera IP Gateway, multiple self-sufficient KVM matrix systems can be interconnected via standardized IP networks. It replaces the end-of-life matrix grid card and seamlessly ties in existing Draco tera grid landscapes. Any regular network topology is possible.
Draco tera IP Gateway acts as a firewall to block attacks that are executed in the IP network. It is electrically isolated and thus simply ends any attack at the port, all KVM streams within the matrix cannot be accessed via IP.

GATEWAY FOR IP BASED KVM CONSOLES

By simply connecting hardware and software IP CON units to the IP network, a real-time access to the entire KVM architecture offers flexible and cost-effective extension of the whole grid.

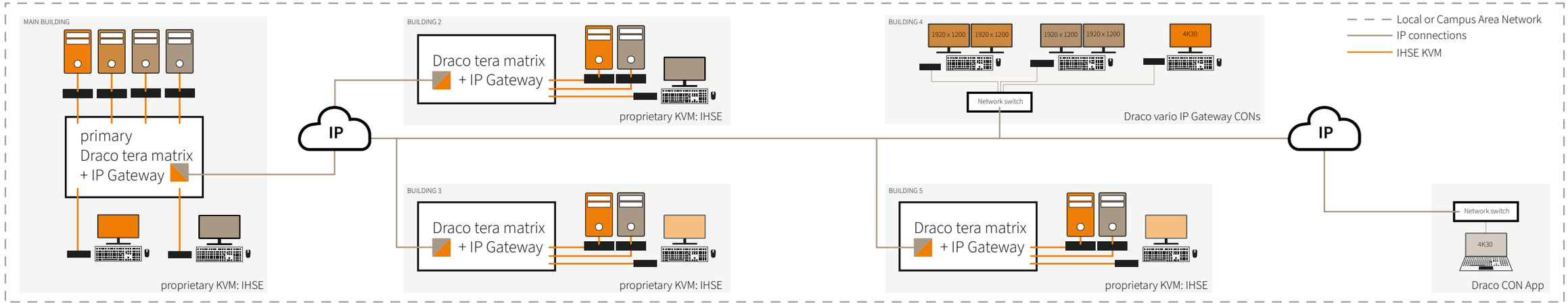
PLEASE NOTE:

Draco tera IP Gateway is mandatory for integration of
- Draco vario IP Gateway CON
- Draco CON App

KEY ASPECTS

- **Extension of existing KVM systems**
  Existing IHSE infrastructures can be expanded quickly and easily using standard IT infrastructure comprising active network components, switches, routers, layer 3 protocols etc.
- **Flexible planning**
  Initial direct KVM systems can be further expanded as user requirements evolve to include direct and IP connected endpoints, providing future-proof flexibility and assurance to administrators and system designers.
- **Real-time operation**
  Instant switching and connection between sources and users with negligible latency and artefacts for real-time performance.
- **Security and reliability**
  Operation with total security and reliability for 24/7, mission-critical systems, over direct and IP links.

FUNCTIONAL DIAGRAM



PART NUMBERS

DEVICES	CLASSIC/ULTRA/XS	XSTREME
Draco tera IP Gateway for Draco tera enterprise	480-IPG	580-IPG
Draco tera IP Gateway for Draco tera flex	F480-G	F580-G

WEB RESOURCES

Find detailed information here:
www.ihse.com/tera-ipg

SERIES IP-481 & SERIES IP-483

Draco vario IP GATEWAY CON

Module IP-R481-BUHC

FEATURES & BENEFITS

- Real-time KVM access via 1G IP network
- Draco tera IP Gateway mandatory
- Single Head 4K30 or Dual Head 1920x1200 @ 60 Hz video
- HDMI version with local In, DP version with Dual Head
- Compatible with Draco vario classic extenders
- Matches Draco vario chassis

PROPERTIES

Interface	HDMI	DisplayPort
Number of monitors	Single Head	Dual Head
Max. Resolution	4K30	2x Full HD, 1 x 4K30
Color Depth	8-bit (4:4:4)	
Video Codec	IHSE Classic	
Local In	yes	no
USB	HID: ☑	transparent: add-on module
Audio	embedded, add-on modules available	
Operation Mode	Point-to-Point: ☐	Matrix: ☑
Transmission Protocol	IP	
Assembly	Module for Draco vario chassis	

FUNCTIONAL DIAGRAM

PART NUMBERS

CON	HDMI + Local	DP + Dual Head
CAT X	IP-R481-BUHCL	IP-R483-B2HC
Fiber 1G	IP-R481-BUHSL	IP-R483-B2HS

Draco CON APP

FEATURES & BENEFITS

- Software client for flexible access to KVM systems
- Real-time KVM access via 1G IP network
- Single Head 4K30 and Dual Head 1920 x 1200 @ 60 Hz
- Up- and downscaling
- License model

PROPERTIES

OS	Windows® v. 10+, Linux	
Number of monitors	Single Head	Dual Head
max. Resolution	4K30	2x Full HD, 1 x 4K30
Color Depth	8-bit (4:4:4)	
Supported KVM	Draco tera KVM, Switching Manager	
Local In	n/a	
USB	HID: ☑	
Audio	embedded	
Operation Mode	Point-to-Point: ☐	Matrix: ☑
Transmission Protocol	IP	
Assembly	Software client	

PART NUMBERS

Draco CON App
CONAPP-L1 (per KVM Stream)

WEB RESOURCES

Draco vario IP Gateway CON:
www.ihse.com/ip-con

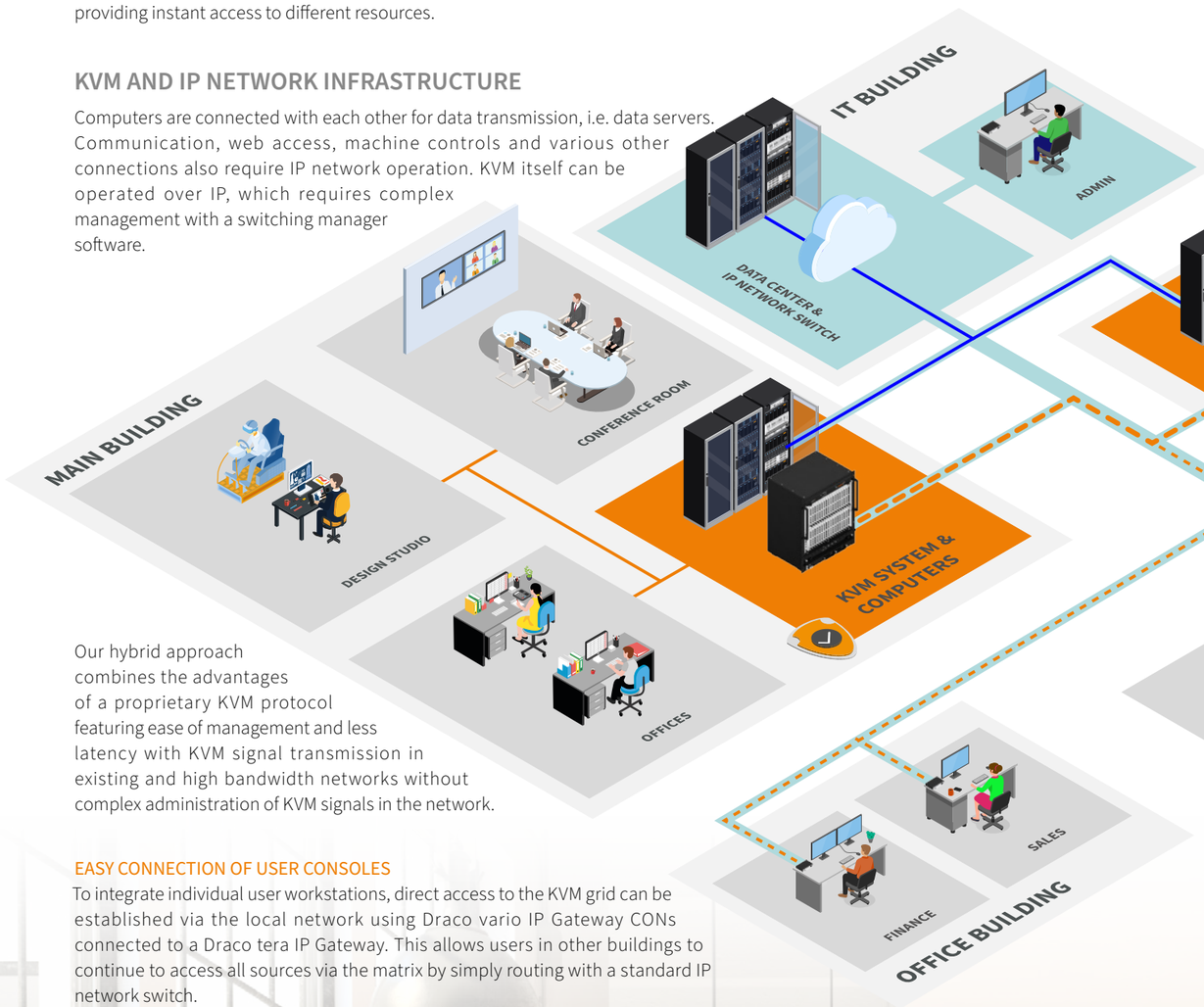
Draco CON App:
www.ihse.com/con-app

EFFICIENT USE OF INFRASTRUCTURE AND SECURE DATA HANDLING IN COMPANIES

Within a company, KVM can connect all departments efficiently and securely, safeguarding data by separating users from hardware and providing instant access to different resources.

KVM AND IP NETWORK INFRASTRUCTURE

Computers are connected with each other for data transmission, i.e. data servers. Communication, web access, machine controls and various other connections also require IP network operation. KVM itself can be operated over IP, which requires complex management with a switching manager software.



Our hybrid approach combines the advantages of a proprietary KVM protocol featuring ease of management and less latency with KVM signal transmission in existing and high bandwidth networks without complex administration of KVM signals in the network.

EASY CONNECTION OF USER CONSOLES

To integrate individual user workstations, direct access to the KVM grid can be established via the local network using Draco vario IP Gateway CONs connected to a Draco tera IP Gateway. This allows users in other buildings to continue to access all sources via the matrix by simply routing with a standard IP network switch.

KVM GRIDS

To interconnect multiple self-sufficient KVM systems like they may be installed in different buildings spread on a campus, Draco tera IP Gateway enables to establish all common grid layouts. It is a protocol converter and uses the local IP infrastructure to packetize and transmit native KVM data at full performance and in real-time. Draco tera IP Gateway is a module card for Draco tera KVM matrix switches and serves as a grid module and also as a connector to Draco vario IP Gateway CONs and Draco CON App.

REMOTE WORK

Secure and high performance remote connections are crucial according to data protection purposes and employee's wishes to flexibly working from home.

SIRA product range is designed to provide safe Virtual Desktop Integration, low-latency access via internet connections and powerful KVM features for the user like multiscreen operation and multiviewing - at home!

MOBILE KVM

Draco CON App is a software KVM extender, installed on a laptop or computer and provides full KVM functionality without the need to set up a hardware-based KVM extender. This enables i.e. service personnel to access the KVM system roaming freely over the campus, just where their help is needed.

PRODUCTS IN FOCUS

Draco tera KVM matrix switch + Draco tera IP Gateway

Draco vario IP Gateway CON

Draco SIRA Product Range

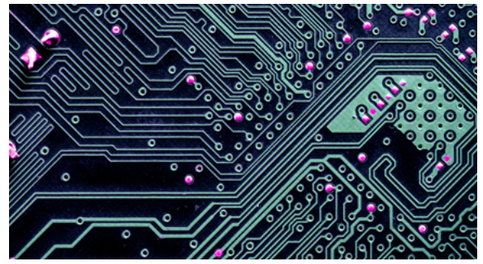
KVM IN HYBRID SETUPS

IHSE SHOWROOM

Discover the endless possibilities of a meshed KVM architecture in an IP network, completely free of delays and artifacts.

Book an appointment for a comprehensive introduction to the world of Hybrid KVM in our showroom at our headquarters.

Or watch our IHSE Explains: Hybrid KVM Video on YouTube.



SERIES 488

Draco SIRA CPU

Draco SIRA CPU module L488-BIPS-R1

FEATURES & BENEFITS

- KVM access to Virtual Machines
- Sharing of 8 parallel RDP sessions via KVM
- Supports keyboard, video, mouse and audio
- RDP, RFX, VNC, SSH, HTML5, PCoiP, VMWare Blast
- Resolution: Single Head 4K30, Dual Head up to 2x 1920 x 1200
- Fully compatible with Draco vario concept

CONNECTIVITY

Draco SIRA CPU provides seamless KVM connectivity to an IP infrastructure. It supports RDP, RemoteFX, SSH, VNC, VMWare Blast, and HTML5 (kiosk mode) protocols. Other remote access protocols are available on request.
A single IP CPU can host up to 8 simultaneous sessions.

RDP AND THE BENEFITS OF KVM

The KVM infrastructure adds extensive flexibility to an RDP session. RDP sessions can now be shared amongst multiple users, delivering better collaboration and control room solutions.

IMMEDIATE ACCESS

Immediate access to real PCs and virtual machines is achieved through permanent connection.
Switching between the two types occurs instantaneously, with no disruption or inconvenience to the users.

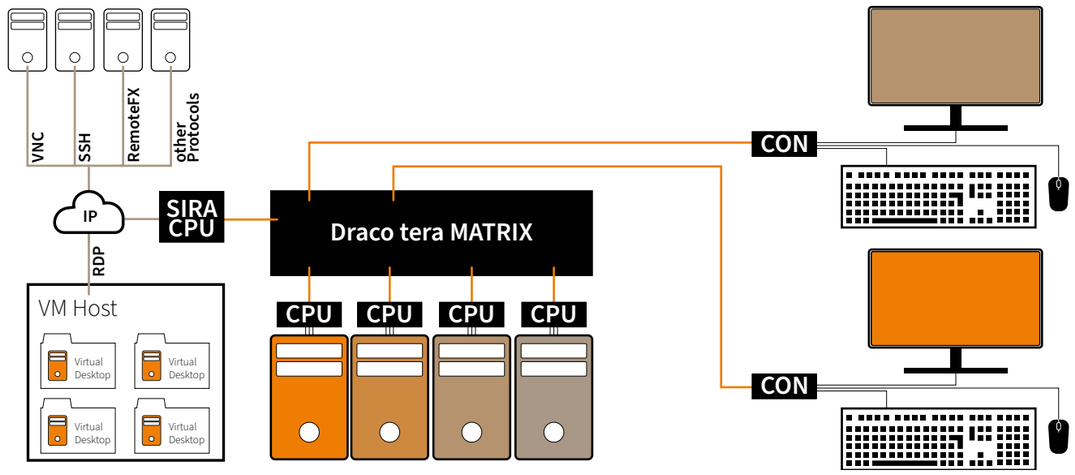
SECURITY

The Draco tera KVM matrix system enables the parallel operations of several Draco SIRA CPUs - even with different network connections. It isolates the networks from each other like a firewall and thus allows secure access to „private cloud“ and „public cloud“ systems from one workstation.

SINGLE SIGN-ON

For ease of operation, the system can be configured to support Single Sign-On. Single stage user identification is all that is required, either locally or via an associated Active Directory. User credentials are stored for future connection setups.

FUNCTIONAL DIAGRAM



PART NUMBERS

DEVICES	DRACO SIRA	REDUNDANT
CAT X	L488-BIPC-R1	L488-BIPCR-R1
Fiber 1G	L488-BIPS-R1	L488-BIPSR-R1

WEB RESOURCES

Find detailed information here: www.ihse.com/sira-cpu

IHSE EXPLAINS

WHAT IS DESKTOP VIRTUALIZATION?

Virtual Desktop Integration (VDI) solutions allow each user to be assigned their own virtual computer on a central server in the data center.
To prevent mutual interference, the operating system and applications run in an isolated virtual machine (VM). Virtual machines are encaspuled operation systems with their own dedicated simulated hardware. To illustrate the principle: A server hosts numerous VMs with its own Operating System and grants CPU, RAM and storage capacity.

ADMINISTRATION

The infrastructure is centralized, which simplifies the provision, maintenance and protection of desktops. A so-called “connection broker” coordinates the remote access of users to the correct virtual machines.

ADVANTAGES

- Cost reduction:
  Reduced hardware purchases (e.g. thin clients) and simplified IT administration.
- Security:
  Sensitive data remains centrally on the servers and is not stored on the end devices.
- Flexibility:
  Enables users to access their desktop from anywhere in the network.
- Efficiency:
  Faster response to business requirements, higher employee productivity and better service levels thanks to a more flexible IT infrastructure.

REMOTE ACCESS AND VIRTUALIZATION DISPLAY PROTOCOLS

Draco SIRA products offer a wide range of protocols for secure and highly performant remote access. By supporting multiple remote access and virtualization display protocols, any chosen IT architecture and application can be integrated with IHSE KVM matrix setups. By default, SIRA CPU supports the following protocols:

PROTOCOL / TECHNOLOGY	PURPOSE	KEY FEATURES	TYPICAL USE CASE
RDP (Remote Desktop Protocol)	Remote control of Windows desktops	Encrypted sessions, printer/ clipboard/audio redirection	IT support, remote work in Windows environments
RFX (RemoteFX)	Enhanced RDP (graphics & performance)	GPU acceleration, USB redirection, better video compression	Multimedia apps over RDP (deprecated now)
VNC (Virtual Network Computing)	Platform-independent remote desktop access	Image-based screen sharing, RFB protocol	Cross-platform remote access (e.g. Linux, macOS)
SSH (Secure Shell)	Secure command-line access to remote systems	Strong encryption, port forwarding, file transfer via SCP/SFTP	Admin access to Linux/Unix servers
HTML5 (as a remote interface)	Browser-based remote desktop without client software	Access via web browser, cross-platform, no installation needed	simple remote access via web portals
PCoIP (PC over IP)	High-performance remote desktop delivery	Pixel-level compression, good for 3D/graphics, low latency	Virtual desktops (VDI), especially with VMware
VMware Blast	Modern display protocol for virtual desktops	Uses H.264, bandwidth-efficient, mobile-optimized	Default in VMware Horizon, alternative to PCoIP

DRACO SIRA CPU AND VDI

Draco SIRA CPU is the connection from a virtualized computer to a KVM workspace. KVM extenders connect peripherals such as input devices (keyboard and mouse) and output devices (video and audio). Virtual machines do not have those physical interfaces. Draco SIRA CPU can access the virtual machines and distribute user inputs and computer outputs to a Draco KVM extender.

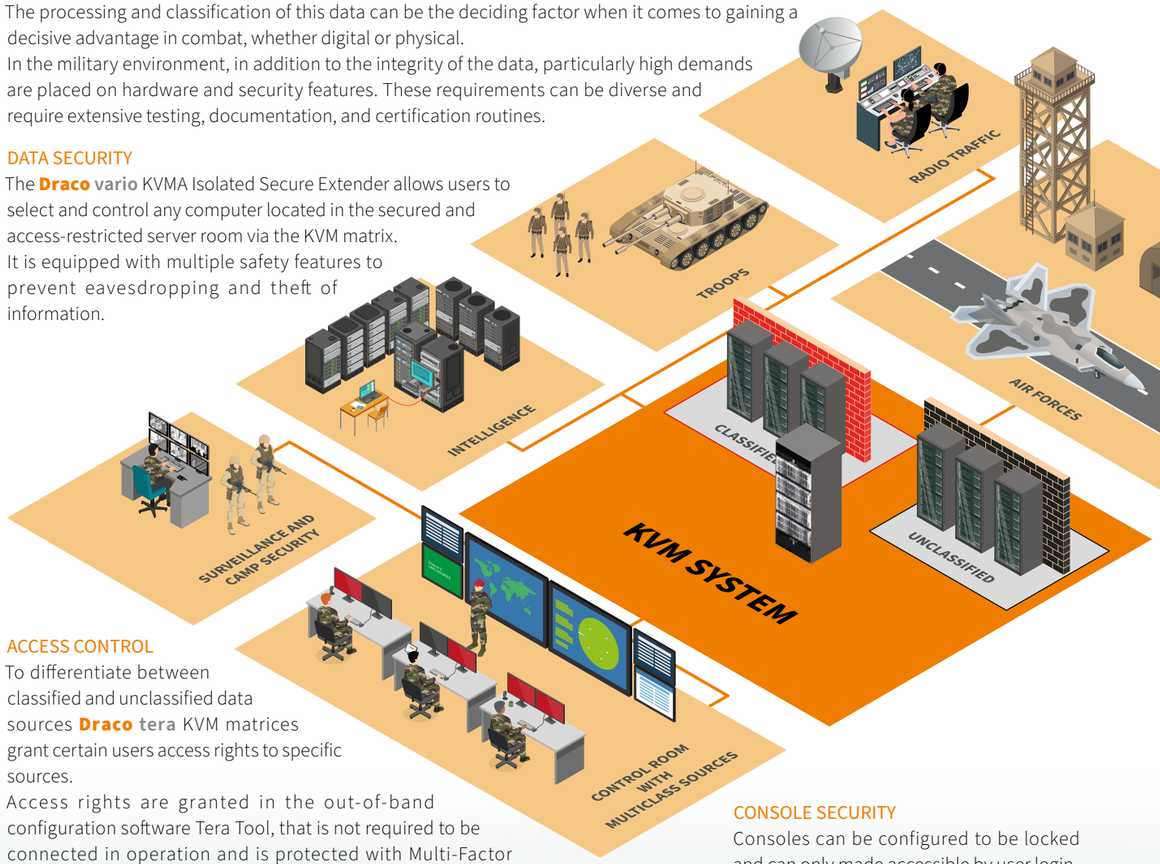
Draco SIRA CPU is designed to work in a KVM matrix environment. This results in seamless integration of virtualized computers with physical high performance computers and multiple users who benefit from the simplicity and flexibility of KVM.
For full performance, Draco SIRA CPU supports multiple virtualization display protocols and manages up to 8 sessions per module.

CONNECTIVITY IN CRITICAL OPERATIONS

Battles are no longer fought solely on the field; decision-makers are increasingly exposed to digital attacks. The growing volume of data from diverse sources requires to create a usable situational overview, as well as its monitoring, securing, and classification, places increasingly complex demands on people and hardware.
The processing and classification of this data can be the deciding factor when it comes to gaining a decisive advantage in combat, whether digital or physical.
In the military environment, in addition to the integrity of the data, particularly high demands are placed on hardware and security features. These requirements can be diverse and require extensive testing, documentation, and certification routines.

DATA SECURITY

The **Draco vario** KVMA Isolated Secure Extender allows users to select and control any computer located in the secured and access-restricted server room via the KVM matrix.
It is equipped with multiple safety features to prevent eavesdropping and theft of information.



ACCESS CONTROL

To differentiate between classified and unclassified data sources **Draco tera** KVM matrices grant certain users access rights to specific sources.
Access rights are granted in the out-of-band configuration software Tera Tool, that is not required to be connected in operation and is protected with Multi-Factor Authentication.

CONSOLE SECURITY

Consoles can be configured to be locked and can only made accessible by user login.

SAFEGUARDING INFORMATION CONFIDENTIALITY, INTEGRITY AND AVAILABILITY

The KVM system's security features make them the ideal component of a Cyber Security Concept by eliminating potential inside threats. The **Draco vario** KVMA Isolated Secure Extender is compatible with all other IHSE KVM matrices and extenders, enabling operators to work smoothly with the known performance and reliability. The space-saving design and low power consumption make them the ideal equipment for deployable gear.

CERTIFIED SOLUTIONS

Draco vario KVMA Isolated Secure Extender series was developed in cooperation with HighSecLabs and received certification to meet security standards defined in EAL 4+.

FURTHER INFORMATION

Please contact our Sales team for information on certified equipment and customized setups for high security applications.

Email: sales@ihse.com
Phone: +49 7546 9248-42

FEATURES AND BENEFITS

- Instant connection and switching
- Near-zero transmission latency
- Artefact-free video and audio
- Extensive redundancy and security options
- Tamper-proof design
- Prevention of data theft and malware injection

PRODUCTS IN FOCUS

Draco tera KVM matrix switch

Draco vario KVMA Isolated Secure Extender

TAILOR-MADE FOR TOUGH ENVIRONMENTS

KVM technology enables to store computers that react sensitively to environmental influences in a safe area and access them using KVM extenders. The extenders themselves can be equipped in such a way that they are ruggedised against various environmental influences. Intensive testing and certification processes ensure failure-free operation, no matter what happens around the base:

PHYSICAL	CLIMATE	CHEMICAL & BIOLOGICAL	EMC
IHSE KVM extenders are made to last, can be replaced easily, and offer multiple mounting options for table top and rack use, even in deployable gear. They do not contain any moving parts by default. All data and power connectors can be configured to be lockable to prevent cables detaching. Test routines (shaker test) ensure that there is no loss of function even under heavy vibrations.	With comprehensive testing we guarantee full functionality of our KVM products even under challenging and unusual environmental conditions such as extreme temperatures, high air humidity, salt and water exposition, and high altitude (low air pressure).	Our devices are housed in rustproof aluminum chassis, resisting most everyday chemicals and cleaning agents. On request conformal coating can be applied to the extender modules themselves. In special test procedures, safety against splash water ('liquids'), grease and further colonisation with fungi ('mushroom') and bacteria can also be verified and certified.	Electromagnetic compatibility in maritime or air traffic environments can be verified using suitable test routines. Interference radiation of the devices themselves can also be identified and appropriate countermeasures taken. On request, our KVM extenders can be TEMPEST certified in accordance with NATO SDIP-27 Level B / Zone 1 or BSI Tempest Zone 2.

IHSE IN LAW ENFORCEMENT

ANTWERP POLICE TRUCK, BELGIUM

Antwerp police was equipped with a mobile command vehicle, providing 24/7 access to live footage from all police-operated cameras in the city.

The police can view and control the images of all urban cameras and intervene quickly in emergencies. The truck can be used for various applications, such as threats, disasters, events and coordinated actions. The possibilities greatly expanded within as well as outside the command truck, thanks to the addition of IHSE KVM equipment.

SERIES 488

Draco SIRA CON

Module R488-BIPS

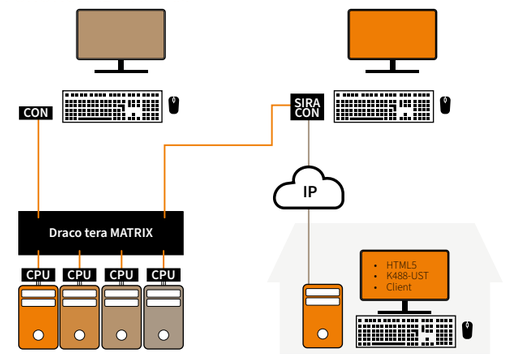
FEATURES & BENEFITS

- Remote Access Gateway to a local CON
- WAN access (i.e. Internet) for service personnel
- Real-Time access within a Local Area Network
- Access via HTML5 browser session, software client or Draco SIRA User Station
- Security features: encryption and IP isolation from the Secure Core® matrix
- Compatible to Draco vario series and Draco tera series

PROPERTIES

Interface	HDMI
Number of monitors	Single Head
Max. Resolution	3840 x 2160 @ 30 Hz
Color Depth	8-bit
Video Codec	IHSE Classic
Local In/Out	no
USB	HID: ☑
Audio	embedded
Operation Mode	Point-to-Point: ☐ Matrix: ☑
Transmission Protocol	IHSE proprietary / IP
Assembly	Module for Draco vario chassis

FUNCTIONAL DIAGRAM



PART NUMBERS

CON		Redundant
CAT X	R488-BIPC	R488-BIPCR
Fiber 1G	R488-BIPS	R488-BIPSR

WEB RESOURCES

Find detailed information here: www.ihse.com/sira-con

SERIES 488

Draco SIRA STAND-ALONE

Module R488-BIPPHL

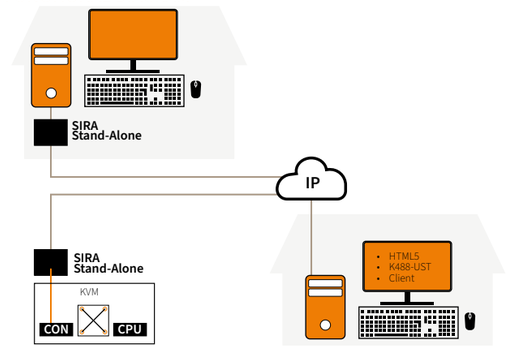
FEATURES & BENEFITS

- Connects directly to PC or KVM extender (IHSE or third-party)
- Remote access to the connected computer via WAN/LAN
- Access via HTML5 browser session, software client or Draco SIRA User Station
- Security features: SSL encryption; SNMPv3, LDAPS
- Virtual Media Support for file transfer to target PC
- Compatible to Draco vario chassis

PROPERTIES

Interface	HDMI
Number of monitors	Single Head
Max. Resolution	3840 x 2160 @ 30 Hz
Color Depth	8-bit
Video Codec	n/a
Local In/Out	yes, native PC interfaces
USB	HID: ☑
Audio	embedded
Operation Mode	Point-to-Point: ☑ Matrix: ☑
Transmission Protocol	TCP/IP
Assembly	Module for Draco vario chassis

FUNCTIONAL DIAGRAM



PART NUMBERS

Device	
Draco SIRA Stand-Alone	R488-BIPHHL

WEB RESOURCES

Find detailed information here: www.ihse.com/sira-alone

SERIES 488

Draco SIRA USER STATION

Draco SIRA User Station

FEATURES & BENEFITS

- Secure access from remote location
- Increases flexibility in accessing KVM systems via LAN/WAN
- Multiviewing capabilities with free layouts
- Up to four 4K monitors forming a personal video wall
- Adjusts video sensing and color calibration settings
- Connects or disconnects a virtual media drive or a smart card reader from target if the target supports virtual media
- USB 3.2 integration

CONNECTIVITY

The Draco SIRA User Station integrates with the Draco tera matrix system via IP connection to the Draco SIRA CON, allowing KVM access to sources within the KVM system or individual PCs and servers via Draco SIRA Stand-Alone.

SECURITY

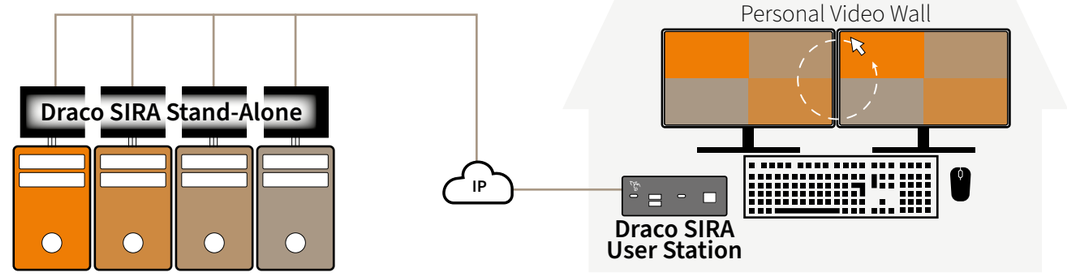
The Draco SIRA User Station provides flexible remote access to all servers and devices connected to a Draco tera matrix. The TCP/IP protocol is isolated from the matrix by the use of native interfaces.

PERSONAL WORKSPACE CONROLLER

One Draco SIRA User Station manages up to four individual KVM streams and displays, showing several display options, such as scaled video (picture-in-picture modes), full-screen mode. Additionally, up to five SIRA User Stations can be synchronized to one homogeneous multi-screen setup.
Draco SIRA User Station can be used as a personal workspace controller both with individual computers (using Draco SIRA Stand-Alone) or KVM matrix cross-connected (using Draco SIRA CON) sources.

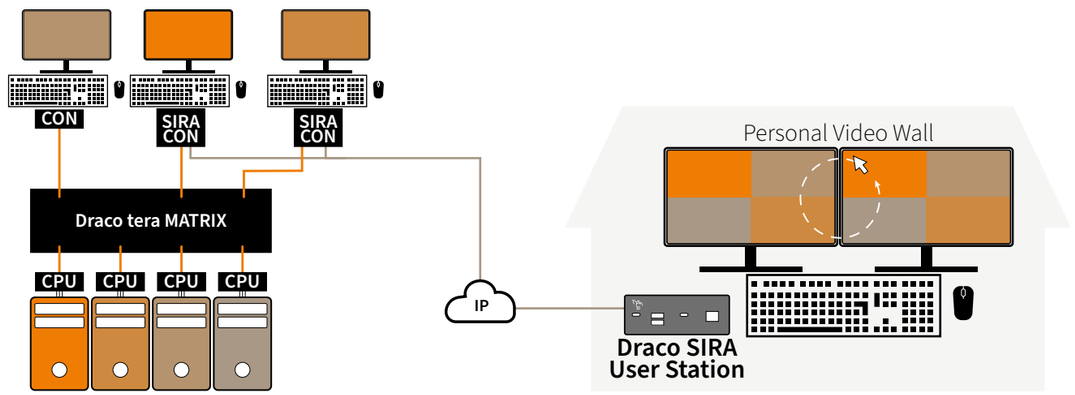
FUNCTIONAL DIAGRAM

Centralized management of decentralized sources via IP network



FUNCTIONAL DIAGRAM

Centralized monitoring and control in a KVM matrix setup



PART NUMBERS

Device	
Draco SIRA User Station	K488-UST-R1

WEB RESOURCES

Find detailed information here: www.ihse.com/sira-user-station

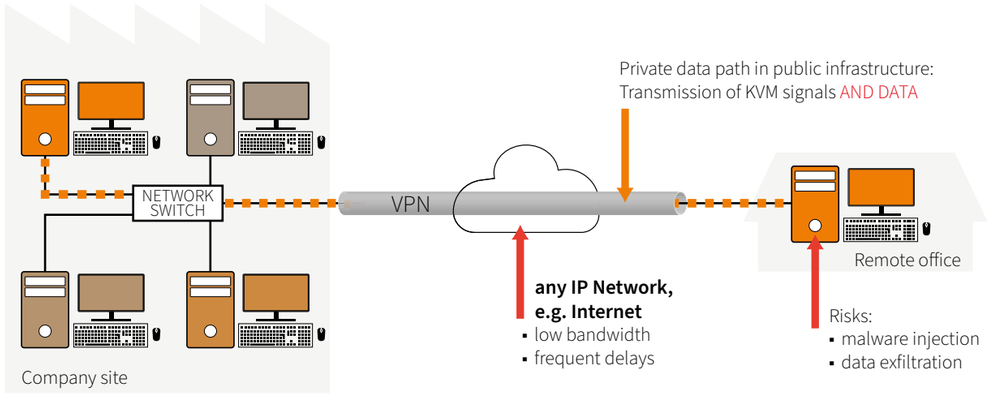
IHSE EXPLAINS

REMOTE WORK AT A NEW LEVEL OF PERFORMANCE

Today remote work is not an exception but daily business routine. One could even say that employees today expect the option of working from home, making this a decisive factor when choosing an employer. Numerous solutions for easy and secure remote access enable employees to work from anywhere, only requiring an internet connection with sufficient bandwidth.

Remote Access Technologies

A widespread method to establish remote access is to set up a Virtual Private Network (VPN) which is basically a secure tunnel from the home-based workstation to the company-based computer. This offers great flexibility but also has some limitations that are resolved with the hardware-based Draco SIRA solution.



Data Security Threats

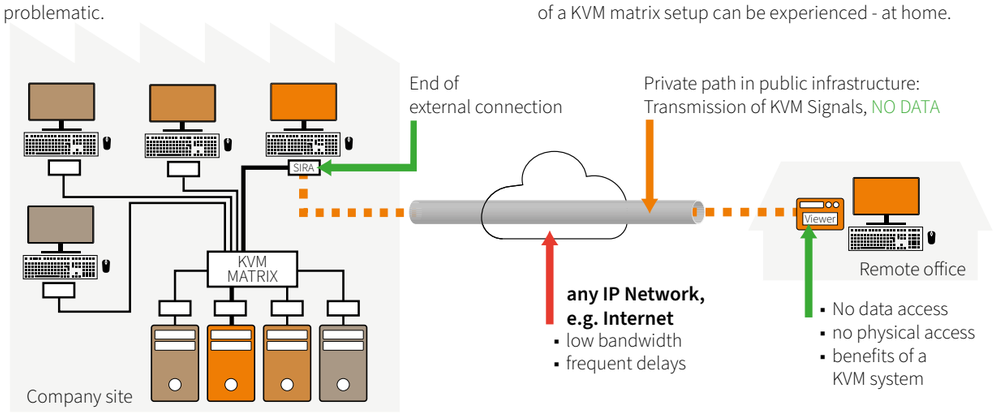
The VPN protects the connection to the corporate network, but not the user's end device. If the employee's work from home computer is infected with malware, it can access the corporate network via the VPN tunnel. With **Draco SIRA**, corporate data and programs remain secure in the company data center. The work from home computer merely serves as a "window" through which control is exercised.

With a VPN, employees work directly on their devices and can download sensitive company data to their local storage. With a hardware-based solution such as **Draco SIRA**, this is not possible because all data remains on the company's servers. This eliminates the risk of accidental or intentional data exfiltration.

Performance

VPN connections can cause latency issues depending on bandwidth and server load. It is sufficient for standard office tasks such as email and word processing. When using graphic-intensive applications such as video editing, 3D modeling, or CAD design the poor performance is getting problematic.

Draco SIRA products are specially designed for latency-free transmission of high-resolution video and offer performance that matches on-site work which a VPN connection cannot guarantee.
Additionally, with **Draco SIRA** products the full performance of a KVM matrix setup can be experienced - at home.



IHSE TOOLBOX

IHSE is continuously evolving to improve the user's KVM experience. With our easy-to-use tools, the performance of your KVM landscapes reaches new levels.
Additionally, IHSE Academy helps you to become a KVM expert!

THE IHSE „TOOLBOX“

IHSE offers a wide range of accessories and other special equipment for KVM signal transmission, extension and conversion.

USER CONVENIENCE

Although IHSE KVM systems operate smoothly and reliably, using KVM technology may take some getting used to.
Especially when working with systems that integrate a large number of sources and allow for various switching and display scenarios, things can quickly become confusing.
This can be remedied, for example, by integrating media controls via an API interface. It is also possible to assign frequently used keyboard shortcuts to keyboards.

ADMIN‘S LITTLE HELPERS

For the initial setup, expansion and maintenance of the IHSE KVM system, administrators have access to a wide range of accessories such as repeaters and converters.

CUSTOMER CARE

Our products are built to last. However, in demanding and mission-critical applications, nothing can be left to chance. To ensure our customers are always on the safe side, we offer a variety of Service Level Agreements.

IHSE ACADEMY

We want you to get the best out of your KVM setup! Learn everything you need to know about your KVM, no matter you are a user, admin or system integrator!

LEARN MORE

Do you know our YouTube Channel?
Find quick tutorials for operating KVM extenders and matrices, learn about KVM and know what’s going on at the most recent trade shows!

USER CONVENIENCE

ADMIN‘S LITTLE HELPERS

CUSTOMER CARE

IHSE ACADEMY

IHSE EXPLAINS

HOW DO OUR PRODUCTS PROVIDE MAXIMUM SECURITY?

Physical attack →	Restrict physical access to hardware
Signal interception →	Protect signal transmission against interception
Signal leakage →	Protect on-board signals against crosstalk
Human error →	Restrict user access to the “need to know” level
Hardware failure →	Provide redundant system architecture; provide resilient system components
IP-based systems →	Provide IP connectivity with secure separation of core matrix and TCP/IP networks as an effective countermeasure to potential cyber attacks
External control →	In-band control vs. out-of-band control

SERIES 480

Tera Web CONTROL

FEATURES & BENEFITS

- Easy control of KVM setups
- Secure and real time access
- No programming skills required
- Seamlessly ties in with Draco tera without third-party devices
- Uses standard web browser (Kiosk mode)
- Web-based access for desktop or mobile devices

EASY OPERATION OF KVM SYSTEMS

Tera Web Control is a web-based control application to instantly switch between different layouts scenearios, especially useful on large video walls or multi-screen workstations in a control center.
Tera Web Control serves as a media control device and replaces costly third-party devices. It runs in a standard web browser on any mobile device.
Operators can choose from predefined layout schemes by simply clicking on the requested layout.

SYSTEM REQUIREMENTS

Tera Web Control runs on the matrix controller board and is connected to the matrix configuration software Tera Tool. Is is compatible with all Draco tera KVM matrix switches, while not supporting matrix grids and auto-failover.
Each simultaneously active workstation requires a license and, of course, a PC, control panel or mobile device (e.g tablet) with a network connection to access the browser-based application.
We recommend using one of the common browsers: Chrome, Edge, Safari.

DRAG & DROP CONFIGURATION

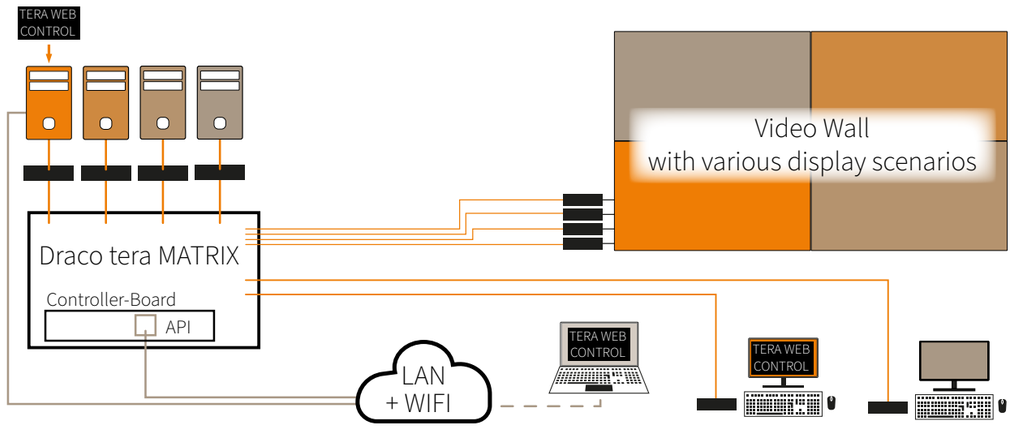
The configuration requires not programming skills. Tera Web Control designer guides through the process.

- Select CON units and drag & drop on canvas (the overall video area)
- Arrange as needed, automatic aligning and snap helps to keep the area tidy
- Scaling, arranging and rotating screens
- Assign users
- Store, export and import layouts

LICENSE MODEL

Tera Web Control is a separate software module which is delivered together with the matrix firmware package. It requires a license-based activation, tied to the hosting matrix, before becoming visible within Tera Tool for further configuration and use. License keys can be obtained for single or multiple Web UI access (per seat).

FUNCTIONAL DIAGRAM



PART NUMBERS

Device	1 Session/ Matrix	5 Sessions/ Matrix	10 Sessions/ Matrix
Tera Web Control	TWC-L1	TWC-L5	TWC-L10

WEB RESOURCES

Find detailed information here: www.ihse.com/twc

SERIES 444

PROGRAMMABLE KEYBOARD AND KEYPAD

FEATURES & BENEFITS

- USB hub to connect all HID-devices via one cable
- Ergonomic and rugged design
- Dual Layer programmable keypad
- Completely programmable for individual purposes
- Customized key print available for keypad

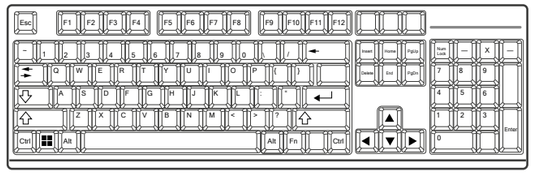
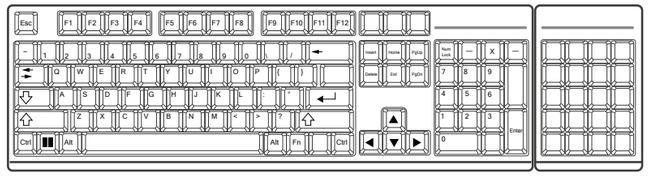
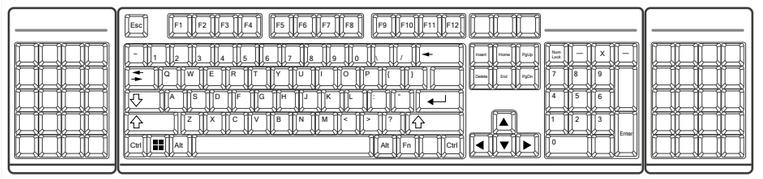
PROGRAMMABLE KEYBOARD

The programmable keyboard allows clutter-free PC connectivity on an operator's desk. With just a single cable the keyboard connects directly to PCs or KVM equipment.
The keyboard itself is completely programmable so each key can be mapped to individual characters or command strings.
The built in USB hub allows further connectivity for a mouse or the custom programmable 25-key keypad.

PROGRAMMABLE KEYBOARD

Keypads can be connected to the keyboard either via cable or direct docking into the side of keyboard providing up to 50 programmable keys or 100 freely programmable command stacks.
The keypad can also be used as standalone device independent of the keyboard and can be linked in between a KVM system and a standard keyboard to provide programmable features as described above.

UTILIZATION

DESCRIPTION	GRAPHIC
Keyboard only	
Keyboard with one keypad (25/50 macro keys)	
Keyboard with two Keypads (25/50 macro keys)	

PART NUMBERS

DEVICE	PART NO.
Keyboard, 105 keys, German layout	444-KDE
Keyboard, 105 keys, US layout	444-KUS
Keypad, 25 keys, no print layout	444-K25
Customized printing for keypad caps	444-K25P

WEB RESOURCES

Find detailed information here: www.ihse.com/keyboard

SERIES 417

ICRON USB 2.0 RANGER™ 2304

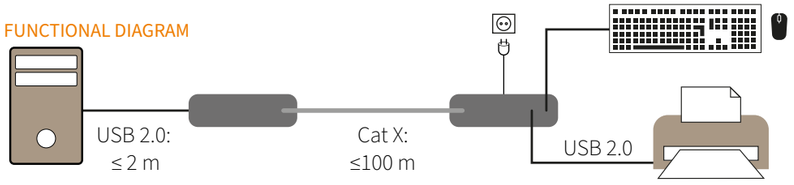
FEATURES & BENEFITS

- Extension of USB 2.0 up to 100 m at 480 Mbit/s via single Cat X cable
- Connects peripherals (flash drives, keyboards, mice, webcams, etc.) to a remote computer
- Up to 31 devices and hubs
- True plug and play; no software drivers required
- Platform independent
- Receiver unit supplies up to 600 mA to each USB port

TRANSPARENT USB EXTENSION

The ICRON USB 2.0 Ranger™ extends transparent and USB-HID signals over a single Cat X cable, allowing to connect high performance USB devices that are located at the workstation to a remotely located computer of a distance up to 100 m. Typical applications are remote storage, professional audio-video devices, printers, security cameras, or gaming controllers.

FUNCTIONAL DIAGRAM



WEB RESOURCES

Find detailed information here:
www.ihse.com/usb-2

SERIES 417

ICRON USB 3-2-1 RAVEN™ 3104, 3124

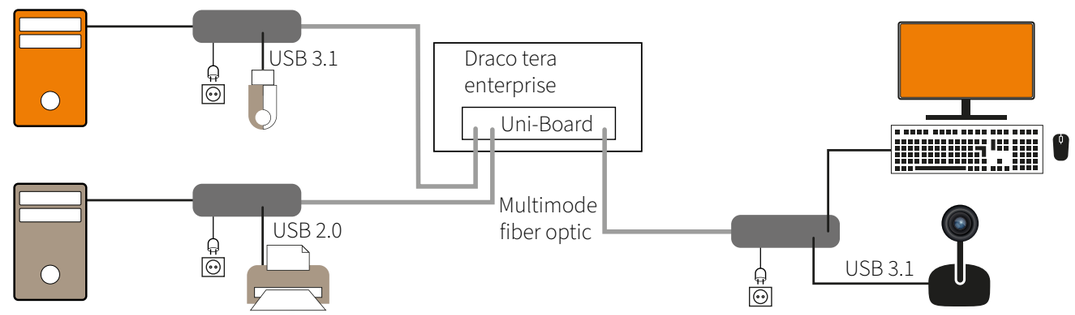
FEATURES & BENEFITS

- Extension of USB 3.1 Gen 1, up to 5 Gbit/s
- Supports all USB 3.1, 2.0, 1.1 devices
- True plug and play, platform independent
- 100/1000 Mbit/s Ethernet Channel, LAN pass-through
- Supplies up to 1.2 A (6 W) per USB port
- Point-to-Point and matrix switching (Fiber version only)

TRANSPARENT USB EXTENSION

The ICRON USB 3-2-1 Raven™ extends Gen 1 USB 3.1 signals over Cat X or multi-mode fiber. This makes it the ideal solution to connect conference room cameras and due its downwards compatilities all other USB devices can be connected as well. The multi-mode fiber version even allows matrix switching, simply by eqipping the matrix with UNI-16 boards and corresponding fiber optic SFPs.

FUNCTIONAL DIAGRAM



PART NUMBERS

	USB 2.0	USB 3.1
CAT X	K417-6D	K417-7C
Fiber MM	--	K417-7M

MATRIX CONFIG

DEVICES	PART NO.
8-port I/O module for USB 3.0 & SDI, empty, free configuration	480-UNI16
SFP multi-mode, LC duplex, bi-di, for USB 3.1, 6G, MSA	459-6M

WEB RESOURCES

Find detailed information here:
www.ihse.com/usb-3

SERIES 477

TFT ADMIN CONSOLE

FEATURES & BENEFITS

- 1 RU monitor keyboard drawer for 19" rack mounting
- Interchangeable compact keyboard with touchpad
- Integrate wide range power supply (100-240 V AC) with IEC 320 plug
- High quality torque hinges keep the monitor in any position
- USB connection for keyboard and mouse
- Options with integrated KVM extension / matrix connectivity available

MATRIX CONFIGURATION DIRECTLY IN THE RACK

The Draco TFT Admin Console is an integrated KVM console unit with monitor, keyboard and touchpad for installation in server racks or computer cabinets.
It provides convenient access to the Draco tera enterprise KVM matrix for supervisory management and control. For administration tasks no matrix data port is required.
System checks and troubleshooting can be performed locally without the need of connecting and cabling hardware. The console may optionally be connected through an extender allowing real-time access to all connected servers for system administrators.

IMPROVED ERGONOMICS IN THE SERVER ROOM

The TFT Admin Console is the ideal solution for space saving administration of individual servers or a connected matrix. The edge-free design provides ergonomic access and control even in harsh environments.
For transparent USB connectivity such as flash drive sticks, the USB port is easily accessible at the front of the tray.

PROPERTIES

FEATURES	ADMIN	REMOTE ADMIN	REMOTE ADMIN+
Video	17" TFT Wide LCD Display	17" TFT Wide LCD Display	17" TFT Wide LCD Display
Resolution:	1920 x 1200	1920 x 1200	1920 x 1200
Brightness	typically 400 cd/m²	typically 400 cd/m²	typically 400 cd/m²
Contrast ratio	typically 600:1	typically 600:1	typically 600:1
On-Screen Menu	yes	yes	yes
Authorizations	CE, FCC, EN 60950-1:2006	CE, FCC, EN 60950-1:2006	CE, FCC, EN 60950-1:2006
KVM unit (CON unit)	--	DVI, 2x HID, Cat X, 1 monitor, S-Link	DVI, 2x HID, Cat X, 1 monitor, S-Link + transparent USB 2.0 interface on front panel
Operation with matrix family	☑ Draco tera enterprise	☑ Draco tera flex ☑ Draco tera enterprise	☑ Draco tera flex ☑ Draco tera enterprise

PART NUMBERS

ADMIN	REMOTE ADMIN	REMOTE ADMIN+
477-KVM-R1	R477-KVSHC-R1	R477-KVSEC-R1

WEB RESOURCES

Find detailed information here: www.ihse.com/admin-tft

SERIES 485

Draco vario REPEATERS

Module 485-BCC

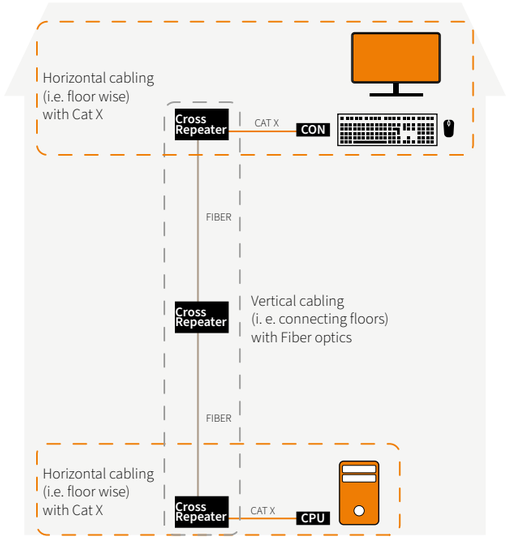
FEATURES & BENEFITS

- Doubling of cable length
- Electrical / optical conversion
- Bidirectional data ports
- No configuration needed
- Compatible with all Draco KVM products
- Cost-effective solution for individual hybrid matrix connections (Cat X ↔ Fiber)

PROPERTIES

Operation Mode	Point-to-Point: ☑	Matrix: ☑
Assembly	Module for Draco vario chassis	

FUNCTIONAL DIAGRAM



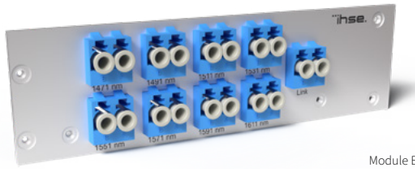
PART NUMBERS

LINK TYPE			PART NO.
1x	Cat X ↔	Cat X	485-BC
2x	Cat X ↔	Cat X	485-BCC
1x	Cat X ↔	Fiber	485-BX
2x	Cat X ↔	Fiber	485-BXX
1x	Fiber ↔	Fiber	485-BS
2x	Fiber ↔	Fiber	485-BSS

WEB RESOURCES
Find more information here:
www.ihse.com/repeater

SERIES 470

Draco CWDM



Module B470-CW8

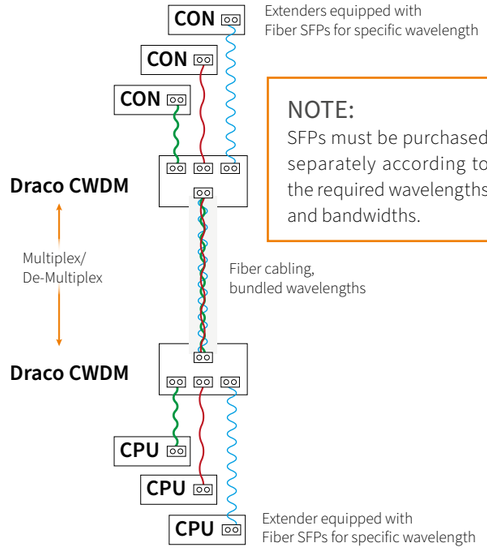
FEATURES & BENEFITS

- Multiplex and De-Multiplex 4, 8 or 18 extender signals over a single CWDM fiber channel
- Minimize cabling cost
- Completely passive, no power supply required
- Ideal for long haul connections with reduced amount of fiber cables
- Compatible with Draco extenders and Draco matrices
- Module and stand-alone versions

PROPERTIES

Operation Mode	Point-to-Point: ☑	Matrix: ☑
Assembly	Module for Draco vario chassis	

FUNCTIONAL DIAGRAM



NOTE:
SFPs must be purchased separately according to the required wavelengths and bandwidths.

PART NUMBERS

ASSEMBLY	PART NO.
Module: 4 Ch MUX/DEMUX	B470-CW4
Module: 8 Ch MUX/DEMUX	B470-CW8
Kit: 4 Ch MUX/DEMUX	K470-CW4
Kit: 8 Ch MUX/DEMUX	K470-CW8
Kit: 16 Ch MUX/DEMUX	K470-CW18
Rack Mount accessories: See page 26	

WEB RESOURCES
Find information here:
www.ihse.com/cwdm

SERVICE LEVEL AGREEMENTS

PRODUCT SERVICE & AVAILABILITY

To ensure optimal operation of KVM systems, we offer the option of assembling a package of various service modules that is perfectly suited to the individual requirements of the specific installation.

SLA MODULES

By combining different service modules, a comprehensive service contract can be assembled. Find etailed information of the module contents online: www.ihse.com/sla

TECH SUPPORT

In case of product failure and for troubleshooting due to configuration issues, our tech support team will help either per e-mail or via telephone.
This module contains different levels of availability (business days, 24/7 support).

WARRANTY EXTENSION

Warranty extension commences after the standard 2-year manufacturer warranty. Warranty extension can be purchased at the initial equipment purchase or at a later time, even with some gap years of not covering warranty.

STOCK HOLDING

Replacement devices are held in stock and can be called upon in the event of a fault and are dispatched by the same day and typically delivered on the next business day.

ON-SITE SERVICE

With its on-site service, IHSE GmbH assures that, in the event of failure, an IHSE service technician will be on-site to solve the problem if necessary.
This module can be further customized in regard to answering time and holiday availability.

PROACTIVE MAINTENANCE

In on-site proactive maintenance, devices and installation are checked and active components are cleaned, if necessary. Alternatively, the proactive maintenance of the system can be carried out remotely

FIRMWARE UPDATES

After the standard warranty expires, IHSE offers firmware updates for a charge, including bug fixes and features for extenders and matrices.
In extended warranty firmware updates are included.

SUPPORT CONTACTS

Depending on your region, in case of technical issues please contact our global tech support team.

GERMANY/EUROPE

Call: +49 (7546) 9248-43
mail: techsupport@ihse.com
web: ihse.com/support/tech-support/

USA

Call: +1 732 738 878 0
mail: techsupport-usa@ihse.com
web: ihse.com/us/support/tech-support/

ASIA

Call: +65 6841 470 7
mail: techsupport-apac@ihse.com
web: ihse.com/apac/support/tech-support/

BECOME A KVM EXPERT

We would like to invite you to join our revised and improved IHSE Academy for specific and profound training on our KVM solutions with our experienced experts at IHSE.

INDIVIDUAL TRAININGS, WORKSHOPS AND KNOWLEDGE EXCHANGE

Exploit the full potential of IHSE KVM solutions! Knowledgeable and skilled operators achieve more from the KVM systems they use. To help gain that expertise, we offer regular training courses to customers, integrators and partners.
These courses provide training in the initial commission, use and ongoing maintenance of IHSE Draco tera systems, allowing organizations to set up the best possible solution for their business. They also provide a comprehensive understanding of KVM products and their interrelationships so that they can be better integrated into work processes.

TARGET GROUP-ORIENTED TRAINING

A range of courses is available, each specifically created to address the needs of individual groups:

USER

The objective of this course is to provide an understanding of the ways in which a KVM system can be configured to meet user requirements and then operated effectively to gain the best from the investment in KVM extenders and matrix switches. Simple methods for troubleshooting common problems are also covered.

SYSTEM INTEGRATOR

This course focuses on the commissioning of a KVM system. It includes detailed information and tips on building KVM matrix switch systems; from connecting the first extender to taking a large installation live.

ADMINISTRATOR

This course focuses particularly on the management and maintenance of an existing KVM system. It includes procedures to allow changes to the system configuration and assignment of user rights. Monitoring of components as procedures to update hardware is also covered. In addition, advanced troubleshooting techniques are introduced and explained.

PARTNER

This is an informative course for partners, aimed at providing sufficient understanding and knowledge of IHSE systems to enable valued partners to present our products accurately and win sales.

TRAINING DATES

TECHNICAL & SALES TRAINING

We offer Basic and Advanced training levels, containing hardware & configuration training of matrices and extenders.

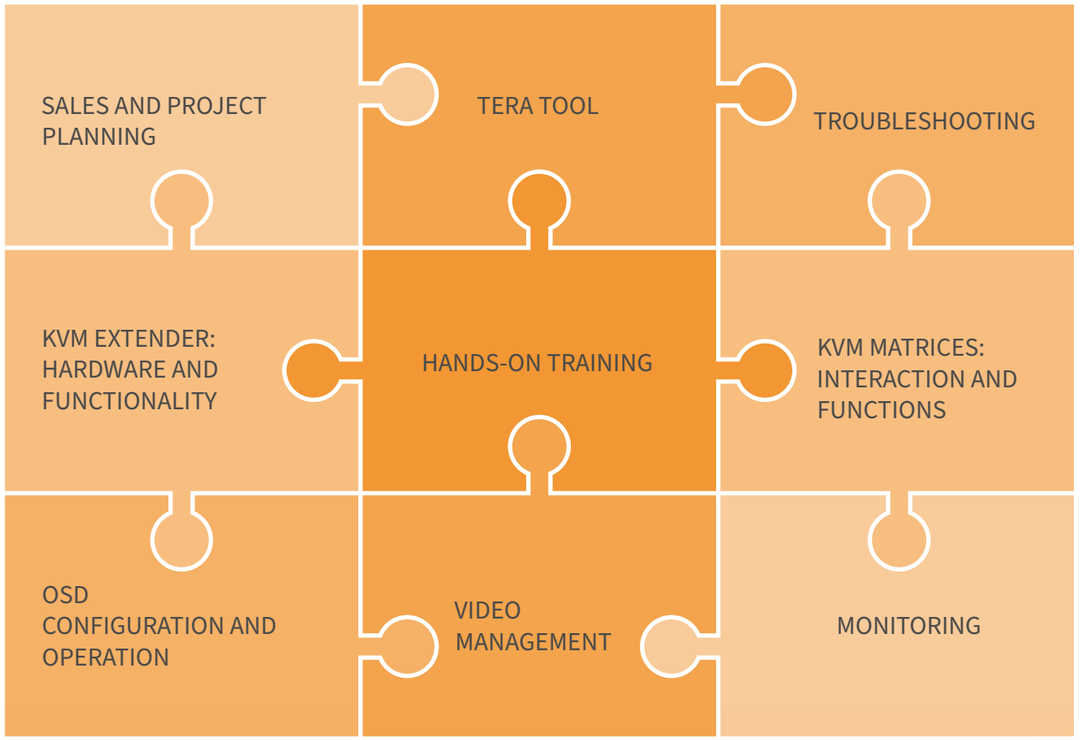
German Training
Monthly, On Request
Duration: 2 days
Training location: IHSE Headquaters Oberteuringen
Germany

English Training
Monthly, On Request
Duration: 2 days
Training location: IHSE Headquaters Oberteuringen
Germany

TRAINING MODULES

To cope with the extremely wide range of possible applications for our products, training courses have a modular structure. They can be adapted to the requirements of participants.

THE FOLLOWING MODULES ARE AVAILABLE:



HANDS-ON TRAINING APPROACH

In addition to delivering a theoretical understanding of the operation of IHSE technology, the courses provide practical, hands-on, training. Attendees perform a range of simple through to advanced system configuration exercises under the guidance of experienced trainers.
Hands-on training provides long-lasting learning and allows users to put their expertise to good use immediately after completing the course.

IHSE ACADEMY

VISIT OUR LAKE CONSTANCE BASED HEADQUARTERS TO LEARN ALL ABOUT KVM

For a reservation or further questions about the training courses, please contact:

Sabrina Müller
Sabrina.Mueller@ihse.com
Phone: +49 (7546) 9248-74

If you would like to attend, please use the following registration form link:

FIND YOUR PART NUMBER

With more complex variants of devices we developed a new system of part numbers to describe a device with “speaking part numbers”.
This allows to intuitively understand a device’s features.

DRACO XSTREME

Draco XStreme will discard the series number system that is linked to the video interface like it is found in Draco vario, Draco vario ultra and Draco vario XS series.
Instead, the new system will directly address the key features interface, Single Head or Dual Head, resolution, USB, link technology and link redundancy.

QUICK FINDER

CONFIGURE YOUR KVM SETUP

WITH DRACO SYSTEM DESIGNER

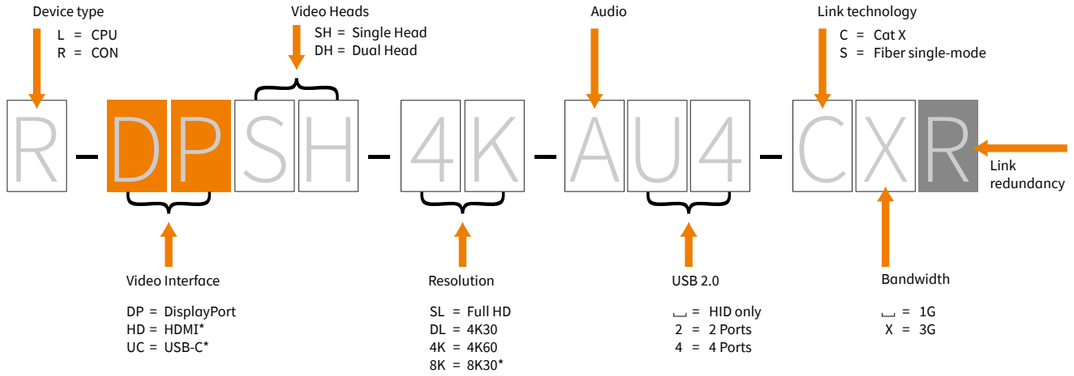
IHSE offers an online tool for free configuration of your KVM projects. It enables documentation and verification of individual extenders up to complete matrix applications. All KVM switches and extenders are available for selection, including add-on modules, chassis variants and special accessories: dsd.ihse.com

Draco System Designer
configure your own system

DRACO XSTREME - PART NUMBERS

All Draco XStreme KVM extenders are described by a set of technical parameters which allow to directly find the specifics of a device. This allows to construct part numbers by choosing the requested parameters.

PART NUMBER SCHEME



PART NUMBER LOOK UP TABLES

By applying the part number scheme above, all part numbers for the numerous product variants can be generated. All tables below can be read for DisplayPort, HDMI and USB-C video interfaces by simply replacing the variable parameter marked by an orange box. Redundant links are resembled by the placeholder marked by a grey box at the end of each part number.

CAT X VERSIONS

DESCRIPTION			CPU MODULES		CON MODULES		
			USB Type B		USB type A		
			USB-HID	+ USB 2.0	USB-HID	2x USB 2.0	4x USB 2.0
SH	FHD	1G	L-▮▮SH-SL-C▮	L-▮▮SH-SL-U2-C▮	R-▮▮SH-SL-A-C▮	R-▮▮SH-SL-AU2-C▮	R-▮▮SH-SL-AU4-C▮
SH	4K30	1G	L-▮▮SH-DL-C▮	L-▮▮SH-DL-U2-C▮	R-▮▮SH-DL-A-C▮	R-▮▮SH-DL-AU2-C▮	R-▮▮SH-DL-AU4-C▮
SH	4K60	1G	L-▮▮SH-4K-C▮	L-▮▮SH-4K-U2-C▮	R-▮▮SH-4K-A-C▮	R-▮▮SH-4K-AU2-C▮	R-▮▮SH-4K-AU4-C▮
SH	4K60	3G	L-▮▮SH-4K-CX▮	L-▮▮SH-4K-U2-CX▮	R-▮▮SH-4K-A-CX▮	R-▮▮SH-4K-AU2-CX▮	R-▮▮SH-4K-AU4-CX▮
SH*	8K30	3G	L-▮▮SH-8K-CX▮	L-▮▮SH-8K-U2-CX▮	R-▮▮SH-8K-A-CX▮	R-▮▮SH-8K-AU2-CX▮	R-▮▮SH-8K-AU4-CX▮
DH	4K30/2x FHD	1G	L-▮▮DH-DL-C▮	L-▮▮DH-DL-U2-C▮	R-▮▮DH-DL-A-C▮	R-▮▮DH-DL-AU2-C▮	R-▮▮DH-DL-AU4-C▮
DH	4K60/2x 4K30	3G	L-▮▮DH-4K-C▮	L-▮▮DH-4K-U2-C▮	R-▮▮DH-4K-A-C▮	R-▮▮DH-4K-AU2-C▮	R-▮▮DH-4K-AU4-C▮
DH*	8K30/2x 4K60	3G	L-▮▮DH-8K-CX▮	L-▮▮DH-8K-U2-CX▮	R-▮▮DH-8K-A-CX▮	R-▮▮DH-8K-AU2-CX▮	R-▮▮DH-8K-AU4-CX▮

FIBER SINGLE-MODE VERSIONS

DESCRIPTION			CPU MODULES		CON MODULES		
			USB Type B		USB type A		
			USB-HID	+ USB 2.0	USB-HID	2x USB 2.0	4x USB 2.0
SH	FHD	1G	L-▮▮SH-SL-S▮	L-▮▮SH-SL-U2-S▮	R-▮▮SH-SL-A-S▮	R-▮▮SH-SL-AU2-S▮	R-▮▮SH-SL-AU4-S▮
SH	4K30	1G	L-▮▮SH-DL-S▮	L-▮▮SH-DL-U2-S▮	R-▮▮SH-DL-A-S▮	R-▮▮SH-DL-AU2-S▮	R-▮▮SH-DL-AU4-S▮
SH	4K60	1G	L-▮▮SH-4K-S▮	L-▮▮SH-4K-U2-S▮	R-▮▮SH-4K-A-S▮	R-▮▮SH-4K-AU2-S▮	R-▮▮SH-4K-AU4-S▮
SH	4K60	3G	L-▮▮SH-4K-SX▮	L-▮▮SH-4K-U2-SX▮	R-▮▮SH-4K-A-SX▮	R-▮▮SH-4K-AU2-SX▮	R-▮▮SH-4K-AU4-SX▮
SH*	8K30	3G	L-▮▮SH-8K-SX▮	L-▮▮SH-8K-U2-SX▮	R-▮▮SH-8K-A-SX▮	R-▮▮SH-8K-AU2-SX▮	R-▮▮SH-8K-AU4-SX▮
DH	4K30/2x FHD	1G	L-▮▮DH-DL-S▮	L-▮▮DH-DL-U2-S▮	R-▮▮DH-DL-A-S▮	R-▮▮DH-DL-AU2-S▮	R-▮▮DH-DL-AU4-S▮
DH	4K60/2x 4K30	3G	L-▮▮DH-4K-S▮	L-▮▮DH-4K-U2-S▮	R-▮▮DH-4K-A-S▮	R-▮▮DH-4K-AU2-S▮	R-▮▮DH-4K-AU4-S▮
DH*	8K30/2x 4K60	3G	L-▮▮DH-8K-SX▮	L-▮▮DH-8K-U2-SX▮	R-▮▮DH-8K-A-SX▮	R-▮▮DH-8K-AU2-SX▮	R-▮▮DH-8K-AU4-SX▮

* Note: Draco XStreme series with HDMI and USB-C are scheduled for release in the second half of 2026. Availability of Draco XStreme series with 8K resolutions will be announced.

NEW GENERATION DRACO VARIO - PART NUMBERS

Draco vario with upgrade option for JPEG XS video codec extend the existing Draco vario part number with native audio, optional USB 2.0 embedded an link redundancy options. This leads to a variety of part numbers.

PART NUMBER LOOKUP TABLES

SERIES 481-HDMI

		CPU		CON		
		no USB 2.0	1x Type B	no USB 2.0	2x Type A	4x Type A
Cat X	SH FHD	L481-BHHAC-XSO	L481-BHHAE2C-XSO	R481-BHHAC-XSO	R481-BHHAE2C-XSO	R481-BHHAE4C-XSO
	SH 4K30	L481-BUHAC-XSO	L481-BUHAE2C-XSO	R481-BUHAC-XSO	R481-BUHAE2C-XSO	R481-BUHAE4C-XSO
	DH FHD	L481-BDHAC-XSO	L481-BDHAE2C-XSO	R481-BDHAC-XSO	R481-BDHAE2C-XSO	R481-BDHAE4C-XSO
Cat X red.	SH FHD	L481-BHHACR-XSO	L481-BHHAE2CR-XSO	R481-BHHACR-XSO	R481-BHHAE2CR-XSO	R481-BHHAE4CR-XSO
	SH 4K30	L481-BUHACR-XSO	L481-BUHAE2CR-XSO	R481-BUHACR-XSO	R481-BUHAE2CR-XSO	R481-BUHAE4CR-XSO
	DH FHD	L481-BDHACR-XSO	L481-BDHAE2CR-XSO	R481-BDHACR-XSO	R481-BDHAE2CR-XSO	R481-BDHAE4CR-XSO
Fiber	SH FHD	L481-BHHAS-XSO	L481-BHHAE2S-XSO	R481-BHHAS-XSO	R481-BHHAE2S-XSO	R481-BHHAE4S-XSO
	SH 4K30	L481-BUHAS-XSO	L481-BUHAE2S-XSO	R481-BUHAS-XSO	R481-BUHAE2S-XSO	R481-BUHAE4S-XSO
	DH FHD	L481-BDHAS-XSO	L481-BDHAE2S-XSO	R481-BDHAS-XSO	R481-BDHAE2S-XSO	R481-BDHAE4S-XSO
Fiber red.	SH FHD	L481-BHHASR-XSO	L481-BHHAE2SR-XSO	R481-BHHASR-XSO	R481-BHHAE2SR-XSO	R481-BHHAE4SR-XSO
	SH 4K30	L481-BUHASR-XSO	L481-BUHAE2SR-XSO	R481-BUHASR-XSO	R481-BUHAE2SR-XSO	R481-BUHAE4SR-XSO
	DH FHD	L481-BDHASR-XSO	L481-BDHAE2SR-XSO	R481-BDHASR-XSO	R481-BDHAE2SR-XSO	R481-BDHAE4SR-XSO

SERIES 483-DISPLAYPORT

		CPU		CON		
		no USB 2.0	1x Type B	no USB 2.0	2x Type A	4x Type A
Cat X	SH FHD	L483-BSHAC-XSO	L483-BSAE2C-XSO	R483-BSHAC-XSO	R483-BSAE2C-XSO	R483-BSAE4C-XSO
	SH 4K30	L483-BPHAC-XSO	L483-BPAE2C-XSO	R483-BPHAC-XSO	R483-BPAE2C-XSO	R483-BPAE4C-XSO
	DH FHD	L483-BDHAC-XSO	L483-BDHAE2C-XSO	R483-BDHAC-XSO	R483-BDHAE2C-XSO	R483-BDHAE4C-XSO
Cat X red.	SH FHD	L483-BSHACR-XSO	L483-BSAE2CR-XSO	R483-BSHACR-XSO	R483-BSAE2CR-XSO	R483-BSAE4CR-XSO
	SH 4K30	L483-BPHACR-XSO	L483-BPAE2CR-XSO	R483-BPHACR-XSO	R483-BPAE2CR-XSO	R483-BPAE4CR-XSO
	DH FHD	L483-BDHACR-XSO	L483-BDHAE2CR-XSO	R483-BDHACR-XSO	R483-BDHAE2CR-XSO	R483-BDHAE4CR-XSO
Fiber	SH FHD	L483-BSHAS-XSO	L483-BSAE2S-XSO	R483-BSHAS-XSO	R483-BSAE2S-XSO	R483-BSAE4S-XSO
	SH 4K30	L483-BPHAS-XSO	L483-BPAE2S-XSO	R483-BPHAS-XSO	R483-BPAE2S-XSO	R483-BPAE4S-XSO
	DH FHD	L483-BDHAS-XSO	L483-BDHAE2S-XSO	R483-BDHAS-XSO	R483-BDHAE2S-XSO	R483-BDHAE4S-XSO
Fiber red.	SH FHD	L483-BSHASR-XSO	L483-BSAE2SR-XSO	R483-BSHASR-XSO	R483-BSAE2SR-XSO	R483-BSAE4SR-XSO
	SH 4K30	L483-BPHASR-XSO	L483-BPAE2SR-XSO	R483-BPHASR-XSO	R483-BPAE2SR-XSO	R483-BPAE4SR-XSO
	DH FHD	L483-BDHASR-XSO	L483-BDHAE2SR-XSO	R483-BDHASR-XSO	R483-BDHAE2SR-XSO	R483-BDHAE4SR-XSO

LINK REDUNDANCY OPTIONS

Both series are available with preequippd redundancy (i.e. R/L-48_-Bxxx_[**R**]-XSO). Those versions without preequipped redundant link can be upgraded with a redundancy functionality. Chose accordingly to your existing extender module.

LINK TYPE	BANDWIDTH	PART NUMBER
Cat X	1G	CL-REDUPG-C
Fiber single-mode	1G	CL-REDUPG-SX

IMPRINT

PUBLISHER
IHSE GmbH
Benzstrasse 1
88094 Oberteuringen
Germany

CONTACTS
Phone: +49 7546 9248-0
Email: info@ihse.com
Web: www.ihse.com

BUSINESS INFORMATION
www.ihse.com/imprint

TERMS & CONDITIONS
www.ihse.com/terms-and-conditions

RESPONSIBILITIES
Technical: Product Management
Editorial: Marketing

IMAGES
IHSE GmbH:
pages 1, 2, 3, 4-5, 10-11, 14, 15, 16, 43, 44, 53, 54, 71, 85
Adobe Stock/Fotolia:
pages 6-7, 30-31, 38-39, 48-49, 60-61, 68-69, 72, 76-77, 80-81, 86, 94-95, 96
Courtesy of:
page 31: BBC Wales HQ, NEP Australia , Abbey Road Studios
page 49: Flughafen Berlin Brandenburg GmbH / Günter Wicker
page 61: Royal Caribbean Cruise Line
page 69: Baker Hughes
page 81: Antwerp police, Belgium

DISCLAIMER
Technical information correct at the time of publication, subject to errors and changes.

INFORMATION GRAPHICS
IHSE GmbH

DATE OF LAST EDIT
23. January 2026

PRODUCT RENDERINGS / IMAGES
IHSE GmbH

FOR UP TO DATE INFORMATION VISIT OUR WEBSITE

KVM SOLUTIONS - MADE IN GERMANY

IHSE GMBH
Benzstrasse 1
88094 Oberteuringen
Germany

Phone: +49 7546 9248-0
Email: info@ihse.com
Web: www.ihse.com