ihse.

Excellence in KVM and Video

Product Catalog 2015/2016

KVM ▪ Switches ▪ Extenders ▪ Converters

Highlights

- A **world leader** in KVM technology
- Fast development cycles with **in-house manufacturing**
- Solutions designed for the most demanding environments
- Products that perform to the highest standards
- **Personal support** for technical ushers
- Distribution channels around the world
- Ready to serve your **custom requirements**

PRODUCT INNOVATIONS

Draco tera enterprise 576 ports

The KVM matrix switch with 576 ports brings in a new dimension of KVM switching for size and number of ports.

page 18

Draco vario upgrade module with balanced audio

CPU and CON upgrade modules for lossless extension and transmission of balanced audio signals.

page 41

Draco ultra DisplayPort extender

The Draco ultra DisplayPort KVM extender enables the transmission of high definition video and audio data over the cutting-edge DisplayPort interface.

page 54

WHO WE ARE / COMPANY PROFILE

IHSE has more than 30 years of experience in designing and manufacturing high quality extenders and switches for KVM and video signals. We are proud of our history of satisfied customers and continue to expand our technology and industry experience to ensure our customers are provided with superior quality and total satisfaction. IHSE has become a worldwide leader in innovative KVM technology with our products used by renowned companies across the world. Our highly specialized high performance KVM products are manufactured in Germany at our headquarters near Lake Constance.

OUR PRODUCTS / SOLUTIONS

No matter what application, our KVM products are used to create a high quality and productive environment for users of all types. The main purpose of IHSE's KVM products is to extend the reach of a keyboard, mouse and monitor away from the primary sources such as CPUs and Servers. KVM solutions reduce workstation clutter by eliminating the need for multiple keyboards, reduce environmental noise by moving the CPU away from the workstation and reduce the total power consumption required at each workstation.

IHSE products are offered for switching, extending, sharing and converting multiple signal formats over an efficient transport path using either Cat X or fiber cabling. Formats including DVI, HDMI, DisplayPort, VGA, analog audio, digital audio, USB-HID, USB 2.0, USB 3.0, RS232 and RS422 are supported through a wide selection of extender modules.

KVM MATRIX SWITCHING

Our matrix switches enable switching between various sources and remote consoles. Every connected console consisting of display, keyboard, mouse/pointing device, display and other peripherals can access every connected computer within the network. The matrix switching defines the connection between sources and peripherals. Our unique Draco tera switches are known for the fastest KVM switching on the market, providing full computer access without any disturbing delays. Up to 576 ports can be configured dynamically as input or output. In case of re-plugging cables, recognition and mapping of sources and peripherals works automatically without manual re-configuration.

KVM EXTENDERS

With KVM extenders, users can re-locate their computers or CPU servers at longer distances than standard interconnect cables allow. KVM extenders can be interconnected via copper cables (Cat X) or fiber optic cabling up to 10 km; with the use of special fiber SFP modules distances of up to 160 km and beyond are achieved. IHSE extenders provide complete peripheral connections (keyboard, mouse, monitor, USB-HID and USB 2.0) as if they were located directly at the workstation. By relocating CPU devices in separate equipment rooms, it becomes easier to protect critical CPUs and servers from dirt, moisture and unauthorized access. Operators are offered a much more friendly work area without the heat and noise disturbances produced by powerful computer CPUs and servers. This is crucial in environments such as data centers, hospitals, sound studios, financial centers, air traffic control towers and sea-going vessels where equipment space is limited.

VIDEO CONVERTERS

While most of the latest electronic equipment on today's market is digital, budgetary restrictions impose limitations on replacing or converting expensive legacy computer equipment to newer technology. Inevitably companies must contend with the fact that older protocols and computer display technology must work homogeneously with the latest equipment and digital display devices. IHSE's media conversion technology was developed to address these problems and has evolved to become a critical part of our customer's maintenance and service needs. Converter modules allow formats such as CGA, EGA, RGB, S-Video, Component Video, SDI and HD-SDI to be displayed on newer DVI flat panel displays, thus providing extending life for industrial and commercial grade electronic equipment.

Solutions

© BT Sport

BROADCAST / POSTPRODUCTION

State-of-the-art broadcast studios and post production suites depend on resilient KVM technology in their 24/7 workflow. A KVM system provides professional broadcasters with direct access to data and video from their individual workstations. Distribution of content at the highest video resolutions can be achieved with no latency or video artifacts. Centrally-managed access rights allow individual user assignment.

Read more at http://www.ihse.com/solutions/broadcast-postproduction.html

VENUES / ENTERTAINMENT

Interactive integration of visitors is becoming increasingly more important for venues and shows. Touchscreens enable direct visitor feedback while interactive screens with cameras allow viewers to become completely immersed in an event. KVM systems with bidirectional signal transmission provide an instantaneous feedback channel for a wide range of user interfaces and enable human-machine interaction in the cultural industry.

Read more at http://www.ihse.com/solutions/venues-entertainment.html

© Fraport

CONTROL ROOMS / COMMAND CENTERS

Control rooms manage huge amounts of mission-critical information. Operators monitor objects and processes on a bank of displays, analyzing incoming data and coordinating actions. Rapid processing of mission-critical data is crucial. As a result control rooms require resilient and redundant KVM technology delivering 24/7 full and instant access to a great number of locally separated computers and video sources and supporting diverse systems and signal types.

Read more at http://www.ihse.com/solutions/control-rooms.html

EDUCATION / TRAINING

KVM systems enable comprehensive data communication and computer access to students in training and education, wherever they are located. Transmission and sharing of HD video from remotely-located computers to monitors and projectors is easily achieved using KVM technology. Highly visual content and interactive student participation, including instant response to simulated scenarios and other content, lead to enjoyable, cooperative and effective learning.

Read more at http://www.ihse.com/solutions/education-training.html

GOVERNMENT / DEFENCE

Government facilities require highly secure, totally reliable and adaptable information systems. KVM switches are ideally suited to the task of delivering data. TEMPEST-certificated IHSE systems provide a high level of security, including Access Control Lists (e.g. Red/Black separation for security level environment) and enable instant access to hundreds of sources from dedicated output devices.

Read more at http://www.ihse.com/solutions/government-defence.html

BANKING / FINANCIAL INSTITUTIONS

In today's financial world, access to up-to-date information is critical. KVM systems enable immediate individual access to a vast number of computers with multi-monitor displays, controlled by a single mouse and keyboard. Special keyboards, commonly used at traders' workstations, are also supported without any problems. Users can select and gain instant access to data. And, because the computers can be relocated to secure, environmentally controlled data rooms, the financial floors themselves can be 'de-cluttered', saving valuable space and reducing the heat generated in an already hot and stressful environment.

Read more at http://www.ihse.com/solutions/banking.html

AIR TRAFFIC CONTROL / AIRPORTS

Airports operate several different control centers which are manned 24/7 throughout the year and are critical to airport operations. In addition to Air Traffic Control towers, these include control rooms for Apron Control Centers that analyze, process and coordinate central flight information for ground and airport surface traffic control. KVM technology allows operators to perform their tasks at specially designed workstations with high-speed data transmission and full computer access.

Read more at http://www.ihse.com/solutions/air-traffic-control.html

INDUSTRIAL / COMMERCIAL

KVM systems can dramatically improve the effectiveness and efficiency of industrial and commercial organizations. Complex control rooms in factories rely on KVM matrix switches, enabling access to essential data and allowing operators to react instantly to unexpected events. Due to their enormous adaptability, IHSE devices are suitable for the challenging environments presented by the heavy engineering and chemical industries. IHSE KVM systems provide a high level of security, prevent unauthorized access and data abuse.

Read more at http://www.ihse.com/solutions/industrial-commercial.html

MARITIME / OFF SHORE

Maritime applications impose special requirements on IT equipment due to tough environmental conditions at sea. Computers are usually located in a protected, watertight area and separated from peripheral devices by means of ruggedized KVM extenders to give users full control, as though the computers were local to them. KVM matrix switches enable selection and switching between individual computers and users in response to operational conditions, meeting the demands and requirements of ships of all sizes.

Read more at http://www.ihse.com/solutions/maritime-off-shore.html

MEDICAL / HEALTH CARE

A KVM system helps to maximize scarce medical resources and efficiency whilst enhancing data flow and minimizing delays and risk of errors. Medical procedures and diagnosis rely heavily on complex computer applications hosted on dedicated computers. Their results are needed by different specialists, all of whom rely upon being able to access and review correct data without delay. KVM matrix switches facilitate this operation by providing a central point of access and allowing specialists to obtain data held on the dedicated computers and equipment in their own location. Data is transmitted via fiber cabling within milliseconds, even between buildings. Redundant system architecture allows 24/7 error-free access – even in case of component failures.

Read more at http://www.ihse.com/solutions/medical-health-care.html

Case Studies

BT Sport studios achieve centralized, tapeless workflow with Draco tera enterprise KVM matrix switches

The International Broadcast Centre at the Queen Elizabeth Olympic Park in London is the new home of BT Sport with state-of-the-art production facilities for BT's new multi-channel broadcast operations. IHSE's Draco tera KVM matrix switches ensure instant and reliable delivery of critical digital assets throughout the extensive production facility. The system has been made ready to handle 4K/UHD broadcasting formats with no video latency; a parameter that is crucial within the broadcasting industry.

Control center and simulation rooms at Frankfurt Airport deploy Draco tera compact matrix switches

The airport's apron control operations are managed in control centers, which are manned 24/7 throughout the year. One of these essential operations is the Airside Coordination and Data Center (ACDC). This control center comprises analysis, processing and coordination of central flight information for ground and airport surface traffic control. The recent relocation of the control center into another operations building provided an opportunity to revise and upgrade existing operational methods.

Sky Radio Group connects and manages three radio stations with Draco tera compact matrix switches

Sky Radio Group accomplished a complete refurbishment of their radio studios. The aim was to create a fully-interactive studio design incorporating a KVM system to provide direct access to data and video sources from all station workstations. IHSE's flexible KVM system provides highly reliable, near-instantaneous seamless switching. Allocation and access management is easily managed and the system can be programmed to meet any required configuration at the push of a button.

Draco tera KVM switches support seismic exploration activities onboard Petroleum Geo-Services Ramform Titan Class seismic vessels

Petroleum Geo-Services (PGS) is one of the leading oil and gas exploration companies in the world, offering seismic and ocean exploration services. Using Draco tera KVM switches, the computer system architects responsible for the fit-out of two new Ramform Titan Class seismic vessels were able to provide a data distribution mechanism of the highest reliability and robustness in order to ensure continuous operation vital to the survey tasks.

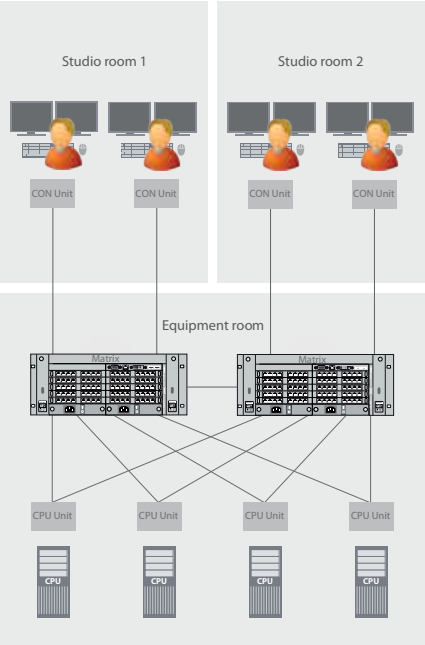
Han Show: A celebration of the essence of the Han culture in Wuhan, China, relies on a Draco tera enterprise matrix switch for each performance

The purpose-built Han Show Theater is a magnificent building, inspired by the "Red Lantern". The KVM switching across the show theater is managed by an IHSE Draco tera enterprise KVM matrix switch providing the desired level of switching capability between the numerous source devices in the CER and user terminals located throughout the building. Its functionality, efficiency and flexibility delivers the highest level of image quality, usability and flexibility.

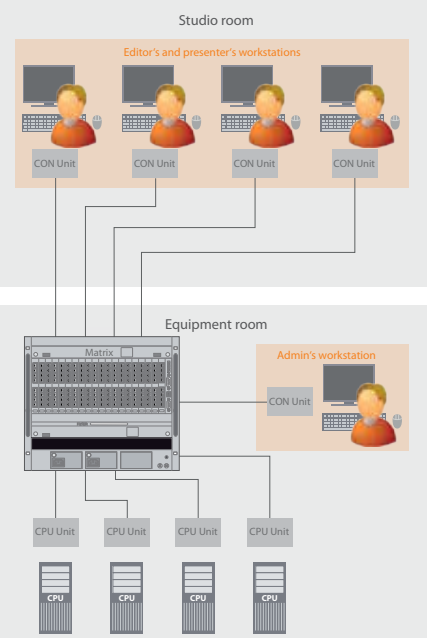
Read more at http://www.ihse.com/solutions/case-studies.html

Functional diagrams of selected installations

KVM in Broadcast

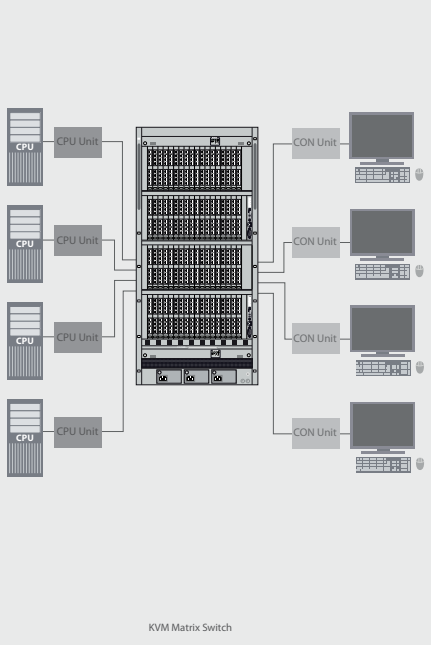


In operation at ZDF
(national German broadcaster)



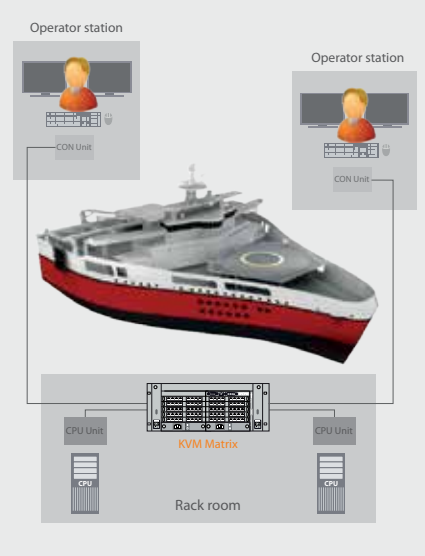
In operation at ORF
(national Austrian broadcaster)

KVM in Data Centers

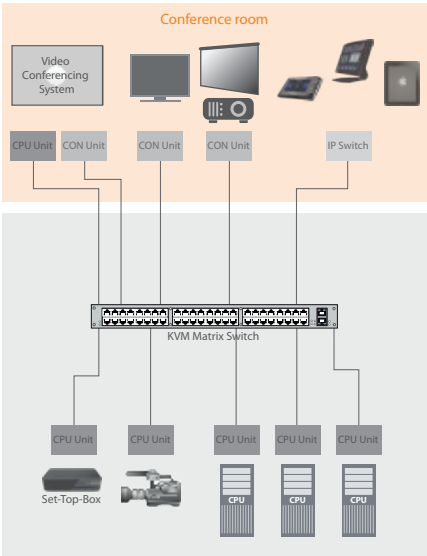


In operation at KGO
(by Siemens)

KVM in Maritime Rescue Coordination Centers

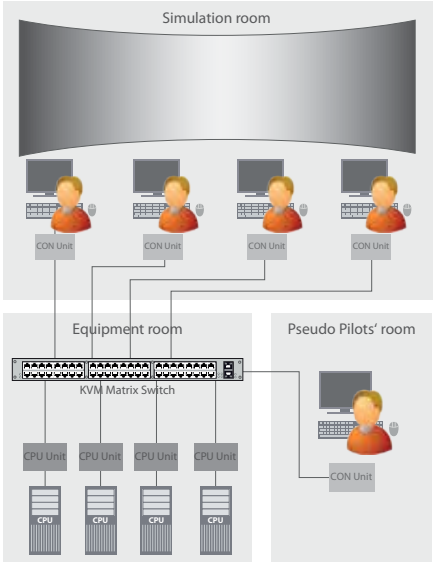


In operation at Petroleum
Geo-Services (PGS), Norway



In operation at Haifa RCC, Israel

KVM in Air Traffic Control



In operation at Frankfurt Airport

Read more at http://www.ihse.com/solutions/case-studies.html

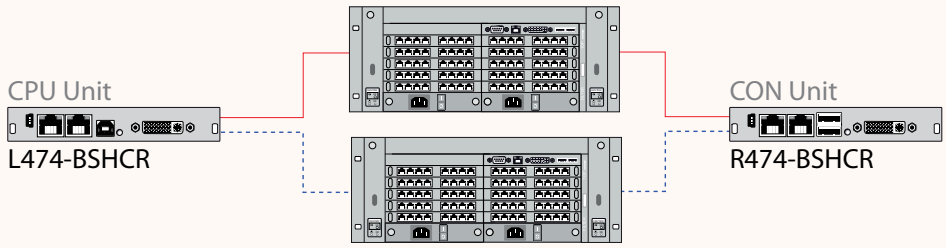
IHSE KVM Redundancy

FULLY REDUNDANT KVM SYSTEM ARCHITECTURE

Redundancy in KVM extenders enables computer-to-workstation extender connections to continue over a secondary link, should the primary link fail.

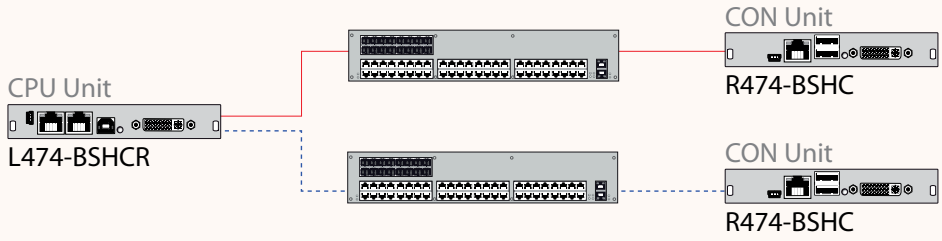
IHSE offers the most comprehensive range of redundant KVM systems. Extenders are available with redundancy at the source (CPU) end, workstation (CON) end, or both. In the case of an interconnection failure the redundant link ensures continuous and uninterrupted communication between the CON Unit and CPU Unit: transmission faults are automatically detected and indicated. Data flow is instantly switched to the secondary transmission link.

Fully redundant matrix operation



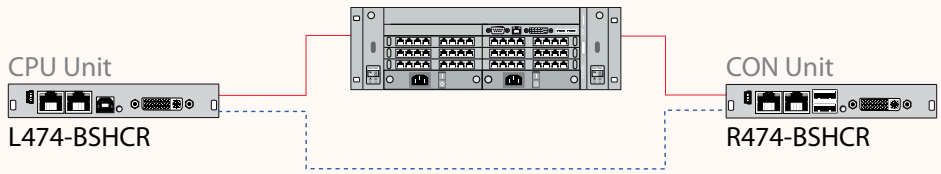
All user stations with dual-port CON Unit can still reach all CPUs with dual-port CPU Unit even if one matrix fails.

Semi redundant matrix operation



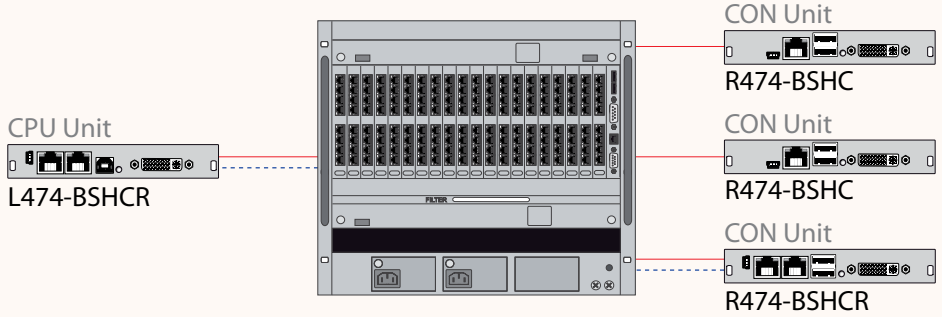
Half of the user stations can still reach all CPUs with dual-port CPU Unit even if one matrix fails.

Fallback Scenario



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

Semi redundant single operation



Single workstations with dual-port CON Units can still reach single CPUs with dual-port CON Units in the case of an interconnection failure.

Fully redundant point-to-point extender operation

If one link is lost, the redundant link ensures continuous access from CON Unit to CPU Unit.

Security in KVM Systems

All business, government and military organisations have a duty to ensure that data they hold and manage is kept secure. The loss of sensitive commercial information can adversely affect the performance of a commercial corporation, whilst leaking of personal information and military intelligence may lead to increased criminal activity or threats to personal or national security.

It is a priority of system managers to ensure that the operational systems they are responsible for are protected to the very highest level against external threats. These may appear from a number of different directions, emanating from both internal and external sources. IHSE products are engineered with security foremost, to maintain complete data integrity and reduce unauthorised access.

Hardware and physical design

The role of a KVM matrix switch is to transmit data and commands over significant distances, often over relatively insecure buildings or terrain. The electronic equipment and signal transmission networks need to be resilient to external, unauthorised access. These include:

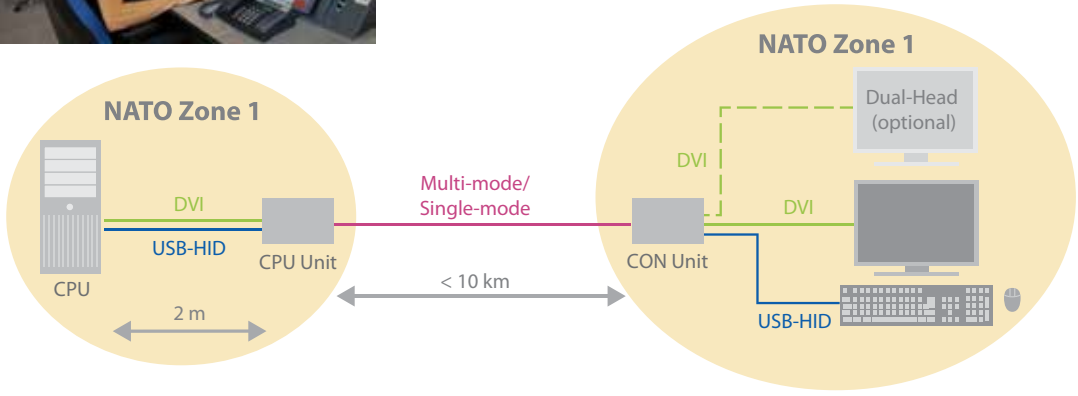
- **Physical attack - including signal interception and eavesdropping:** Attempts to intercept or access data carried on a KVM system are defended through the use of proprietary hardware devices and by preventing access to signals carried on the host network. Fiber connections are superior to copper as they do not radiate electromagnetic fields and require physical interruption in order to break into the signal being carried.
- **RF emanation and signal crosstalk:** IHSE devices are designed to prevent signal detection from RF emissions. A range of products is available with Tempest Level B compliance for the highest level of security. Circuit design eliminates crosstalk between I/O ports and pulses on power lines enabling complete separation of signals and enabling split Red/Black security systems to be built with single switches.

Access security

IHSE KVM systems contain extensive features to prevent access to sensitive data by unauthorised users. Measures are also available to prevent mass copying and injection of data. These include:

- **User access controls:** Multiple system parameters are available to control the access of individual users to sources. Settings are managed at the software level by the system administrator or at a firmware level, as is required for Red/Black installations. Access control lists limit users and workstations to specific CPUs and levels. In addition, IHSE provides monitoring options in case of rights violations.
- **Restricted USB access:** An HID interface provides hardware protection against mass data copy onto remote storage devices and prevents unauthorised and potentially harmful data being injected into the system.
- **Network separation:** Whenever KVM data is transmitted over an IP network, security is severely compromised. Almost any firewall can be overcome by hackers who then get access to both KVM system control and data. A secure KVM architecture should be built on a separate network for signal transmission. Dedicated networks used for IHSE Draco matrix switches are inherently more secure than open data networks of the type used for KVM-over-IP systems. In this case, the advantages of an IP-based KVM solution are largely negated.
- **In-band and out-of-band control:** For greatest security, IHSE system offer in-band control (where switching operations are controlled by keyboard commands and an on-screen selection menu). This eliminates the need for external access and a potential risk from external threats. In situations in which out-of-band control is necessary, the system should be configured so that operations are dynamically controlled or even performed by a central management function using the external switch control.

TEMPEST-certificated IHSE systems meet the criteria of NATO SDIP-27 Level B / Zone 1 in accordance with the Zone short measurement. These systems provide a high level of security, including Access Control Lists (e.g. Red/Black separation for security level environment). Further information regarding the **Compact Secure KVM Extenders** is available on request.



Icon Glossary

DVI-D

HDMI

DisplayPort

VGA

4K resolution @ 30 Hz (4096x2160)

4K resolution @ 60 Hz (4096x2160)

One Dual Link monitor

Two Single Link monitors

Integrated local video access

KVM switch functionality

Cat X

Single-mode

Multi-mode

Fiber XV

SDI

Redundant signal transmission

USB 1.1/1.0

USB 2.0 full-speed (36 Mbit/s)

USB 2.0 flex-speed (36/100 Mbit/s)

USB 2.0 high-speed (480 Mbit/s)

USB 3.0

USB-HID

PS/2 interface

RS232

RS422

Analog audio bidirectional

Digital audio unidirectional

Digital audio bidirectional

Balanced audio

Product Model Numbers

SERIES	PRODUCT NAME	DESCRIPTION	PAGE
Series 238:	Draco Video Converter	Analog video to DVI converter	60
Series 417:	ICRON USB Ranger®	USB 2.0 and 3.0 extender	69
Series 436:	USB to PS/2 and PS/2 to USB Converter	USB - PS/2 converter	68
Series 445:	2x DVI Splitter Cabel	Input and output DVI-D splitter cable	63
Series 469:	DVI / VGA Converter	DVI to VGA converter	63
Series 470:	Draco CWDM	CWDM-MUX/DEMUX	66
Series 474:	Draco vario	DVI KVM extender	44
Series 476:	Draco U-Switch	USB KVM switch	28
Series 477:	Draco compact	DVI KVM Extender in compact chassis	32
Series 480:	Draco tera enterprise	KVM matrix switch	18
Series 480c:	Draco tera compact	Compact KVM switch	22
Series 481:	Draco vario HDMI	HDMI KVM extender	48
Series 482:	Draco vario Dual-Head/Dual Link	Dual-Head/Dual Link DVI KVM extender	50
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Series 484:	Draco CPU Switch	8:1 VGA switch	26
Series 485:	Draco vario Repeater	Extension and format conversion of signals	64
Series 490:	Draco ultra DisplayPort	4K/60 DisplayPort KVM extender	54

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Draco tera compact Fixed matrix switch frames in sizes of 8, 16, 32, 48, 64 or 80 ports	Series 480c	22
Draco CPU Switch Manage 8 CPUs from a single user station	Series 484	26
Draco U-Switch Manage 4 or 8 CPU keyboard/mouse ports from a single keyboard and mouse	Series 476	28

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Draco compact DVI, USB-HID, USB 2.0, RS232, RS422, audio signals extended over Cat X or fiber cabling	Series 477		32
Draco vario for customized configuration DVI-D or DVI-I video and USB-HID signals extended over Cat X or fiber cabling	Customized configuration of the series 474, 481, 482 and 483		34
Chassis for all Draco vario models Chassis models for customized configurations			36
Main Boards Main boards for free configuration of a customized Draco vario system			37
Upgrade Modules Upgrade modules (USB-HID, USB 2.0, PS/2, analog audio, digital audio, RS232, RS422)			41
Draco vario DVI-D- oder DVI-I-Video und USB-HID Signale über Cat X oder Glasfaser	Series 474	Completely assembled	44
Draco vario HDMI HDMI video & audio and USB-HID signals extended over Cat X or fiber cabling	Series 481		48
Draco vario Dual-Head / Dual Link DMS-59 port for 1 x Dual Link or 2 x DVI-D Single Link extended over Cat X or fiber cabling	Series 482		50
Draco vario DisplayPort DisplayPort video & audio and USB-HID signals up to 4K @ 30 Hz	Series 483		52
Draco ultra DisplayPort DisplayPort video & audio and USB-HID signals up to 4K @ 60 Hz	Series 490		54
Order numbers Configuration of order numbers for Draco vario extenders	Series 474, 481, 482, 483, 490		56
Accessories Rack Mount Hardware and Power Supplies	Series 474, 481, 482, 483, 490		57

Converters, Repeaters, CWDM

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Draco Video Converter Converting of analog video signals into DVI signals	Series 238	60
DVI / VGA Converter Converting DVI into VGA	Series 469	63
2 x DVI Splitter Cable Input and output DVI-D splitter cable	Series 445	63
Draco vario Repeater Range extension and format conversion of digital signals	Series 485	64
Draco CWDM Combine and transmit up to 4/8 data streams over one duplex single-mode fiber	Series 470	66
USB to PS/2 & PS/2 to USB Converter Converting USB-HID into PS/2 and PS/2 into USB-HID	Series 436	68

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ICRON USB 3.0 Spectra™ 3022 USB 3.0 signal extension over multi-mode fiber up to 100 m (2 USB ports)	Series 417	70
ICRON USB 2.0 Ranger® 2304 USB 2.0 signal extension over Cat X up to 100 m (4 USB ports)	Series 417	71
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KVM Matrix Switches

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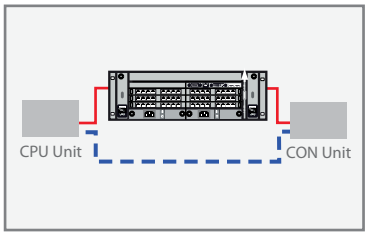
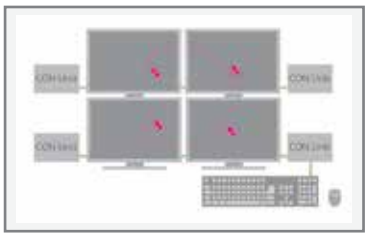




Instant Switching

The Draco tera offers Instant Switching between CPUs. In contrast to IP based solutions that have switching times of up to 10-15 seconds, the Draco tera switches within milliseconds.

Flex-Port Technology

Flex-Port technology offers a totally flexible configuration of all ports. Each port can be used as either a CPU port (connection to a computer) or as a CON port (connection to a console) and it can be switched according to the requirements.

System redundancy

IHSE offers an exceptional fully-redundant KVM system architecture, including redundant interconnections from the CPU (source end) to the matrix switch to the redundant CON Unit (workstation end). In the case of an interconnection failure the redundant link ensures continuous and uninterrupted communication between the CON Unit and CPU Unit: transmission faults are automatically detected and indicated. Data flow is instantly switched to the secondary transmission link.

Multi-Screen control

In applications in which a single operator must access a bank of computers either directly or through dedicated point-to-point extenders, IHSE offers a unique add-on application allowing up to four displays to be managed via software configurations. With an external U-Switch module, up to eight displays can be operated using a single mouse and keyboard.

Comprehensive Control Features

An OSD (On Screen Display), accessible via simple keyboard commands, can be viewed directly from a workstation console. The Draco tera tool is a powerful Java-based software for configuration, control, update, and maintenance of a complete Draco system. The Draco tera tool can be used for system analysis and system status reporting. The Draco tera can also be controlled via an external system, such as Crestron or AMX control interface. An OSD (On Screen Display), accessible via simple keyboard commands, can be viewed directly from a workstation console.

Connections for Cat X / Fiber / Coax

The Draco tera offers the industry first Mix & Match function to allow free-switching between Cat X and fiber optic modules. Switching signals between Cat X devices and fiber optic devices is possible as well – offering proper signal transmission at any time. The universal IO board supports SDI with fiber or coax and USB 3.0 with fiber.

Full line of modular extenders

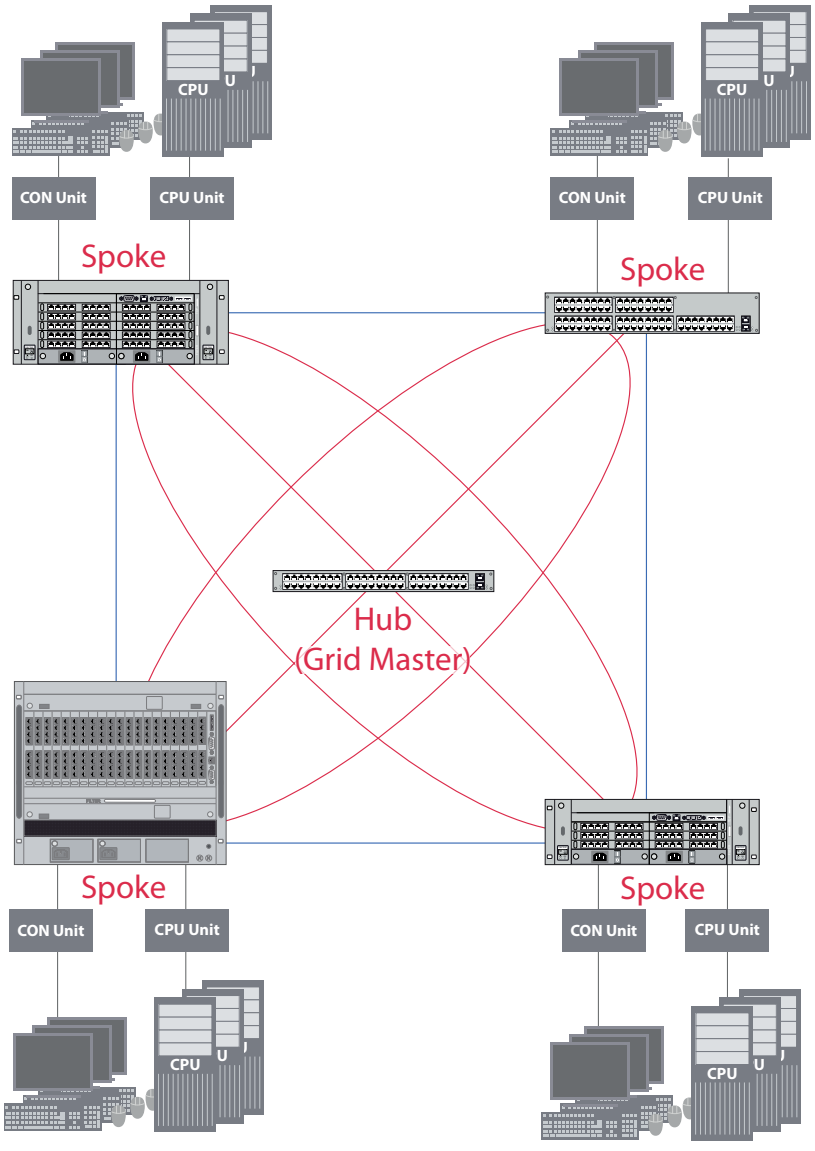
Draco tera extenders combine multiple video encoding technologies, created by IHSE, to deliver the very best picture quality, while a pixel mapping ratio of 1:1 ensures authentic display of the source video. In addition, USB-HID, High Speed USB 2.0, analog or digital audio and serial data signals can be extended to distances up to 10 km. Computer resolutions up to 1920x1200@60Hz, 4096x2160 for 4K and video resolutions for SD/HD/3G-SDI up to 1080p60 are supported.

Matrix Grid Port Expansion

Matrix Grid allows up to 16 individual matrix switches to be managed under a single control management system. Matrix Grid is an interconnection method and software application that transparently connects multiple matrices together to form a single super matrix. It automatically and seamlessly manages the interconnections between users and CPU across multiple locations.

Connecting Draco tera KVM Matrices

- Matrix Grid consisting of up to sixteen matrices in one LAN including one grid master matrix
- Interconnection management by grid master, local switching remains within each matrix
- Single distributed configuration (contains all CPUs, CONs, users, etc.)
- Bidirectional grid lines (smart connect) support video sharing for superior efficiency
- One grid line per connection
- Individual users experience a single matrix switch, unaware of the substructure of the virtual super-matrix



Ring Setup
Hub Spoke Setup
Fully connected Setup

Draco tera enterprise
Series 480

KVM Matrix Switch

Draco

- DVI
- Dual Link DVI
- HDMI
- DisplayPort
- VGA
- SDI
- Digital Audio
- Analog Audio
- USB-HID
- USB 2.0
- USB 3.0
- RS232
- RS422

- 48, 80, 160, 288 or 576 ports
- Instant switching
- In-Band Operation
- Mix & Match (Cat X & fiber)
- Matrix Grid (enhanced cascading)
- Modular architecture
- All software bundles included

Product Information

The Draco tera enterprise is the perfect high performance, modular enterprise routing system for complete **in-band signal distribution** of high definition video, audio, and data over Cat X, multi-mode or single-mode fiber optic cable supporting up to 576 I/O ports in a single frame. Designed with performance and flexibility in mind, Draco tera enterprise offers tremendous scalability with cost effective features. Each port can be user configured as an input or an output scalable from one CPU to multiple workstations or with multiple CPUs managed by a single workstation console.
For **mission-critical** installations Draco tera matrix switches are ideal. The **multi-level redundancy** concept of the Draco tera enterprise offers the **highest level of reliability** for 24/7 operation. Each Draco tera enterprise chassis supports fully-redundant power and hot swappable modules for full service and field upgrades without interrupting signal flow.

Product Features

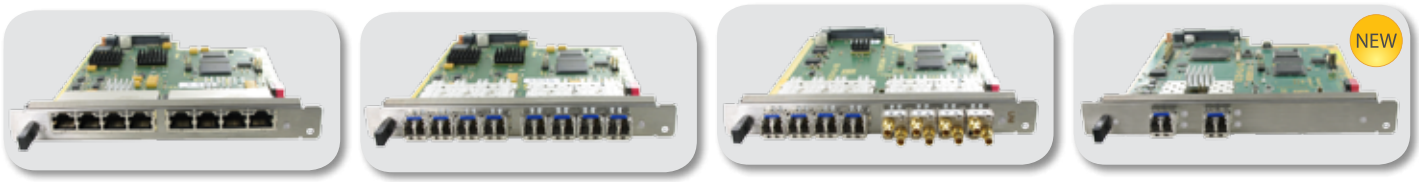
- Scalable and flexible architecture
  - 48 ports in 3 RU
  - 80 ports in 4 RU
  - 160 ports in 9 RU
  - 288 ports in 13 RU
  - 576 ports in 25 RU
- Instant delay-free switching
- Flex-Port technology for dynamic port assignment
- Mix & Match (fiber ports can be switched to Cat-X ports and vice versa)
- Matrix Grid option allows multi-matrix connections through grid lines
- High definition resolutions 1080p, 2560 x 2048 up to 4K DCI / Ultra HD
- Supports SD-, HD- or 3G-SDI
- 24 bit color depth, deep colour ready
- Supports USB-HID, USB 2.0 and 3.0
- Remote extenders can be updated through the matrix
- API Service
- Mult-Screen Control
- SNMP & Syslog
- Redundant power supply
- Fully-redundant system support (CPU Unit – matrix switch – CON Unit)

Technical Data		
KVM		
Power Supply (internal)	90-240VAC / 4-2 A / 50-60 Hz	
Maximum Resolutions	1920 x 1200 @ 60 Hz (24 bit) 2560 x 2048 @ 60 Hz (24 bit) 4K @ 30 Hz 4K @ 60 Hz	
Maximum Cable Distance	Cat X Multi-mode Single-mode	140 m 1 km 10 km
SDI (Video)		
Maximum Resolution	1920 x 1080 (1080p)	
Maximum Cable Distance	Coaxial (RG 59 B/U)	100 m

Operation via

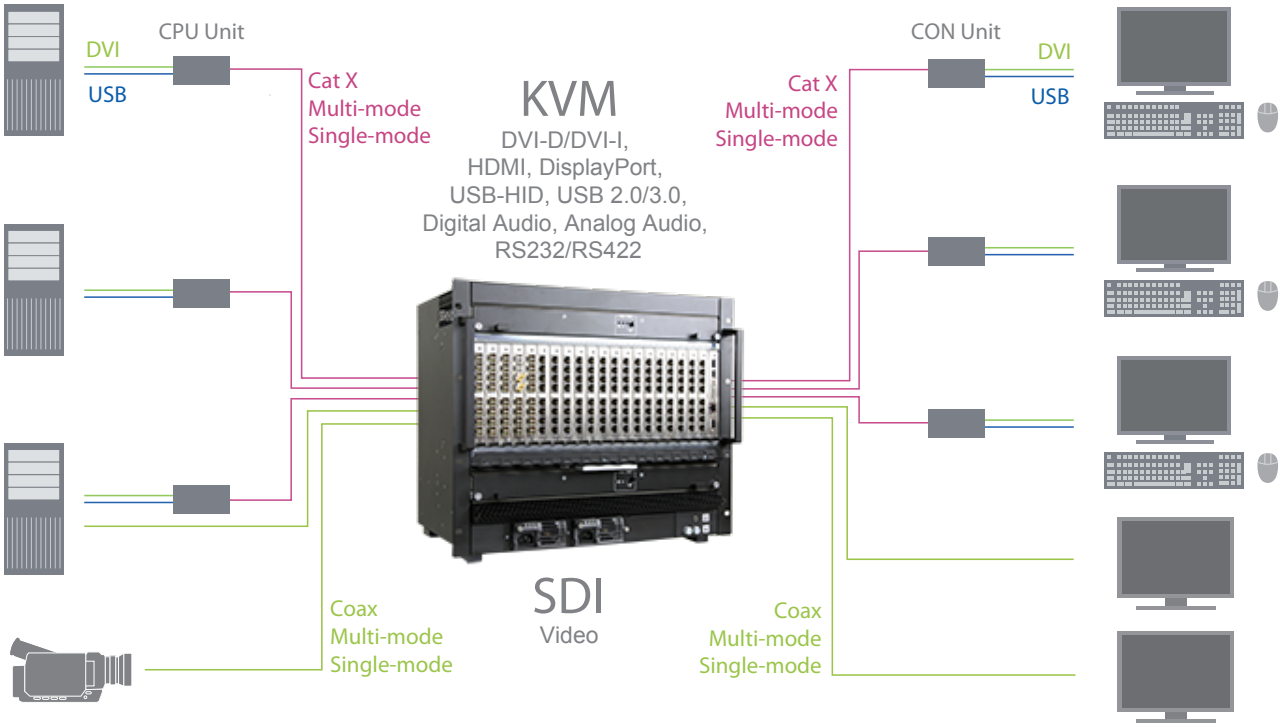
- Keyboard for operation (in-band)
- OSD (On Screen Display) for configuration and operation (in-band)
- Draco tera tool for configuration, operation and maintenance (TCP/IP)
- Ethernet interface for operation (API)
- Serial interface for operation (API)

Draco tera I/O card options



The Draco tera enterprise matrix switch can accomodate a wide range of signal formats. I/O cards can be mixed in the same frame allowing great flexibiltiy for any KVM application.

Functional Diagram



Order Numbers

Device Types

Product	Part No.
Draco tera enterprise with 48 ports (base unit with control board and one power supply unit), 3 RU, free configuration	K480-048
Draco tera enterprise with 80 ports (base unit with control board and one power supply unit), 4 RU, free configuration	K480-080
Draco tera enterprise with 160 ports (base unit with control board and two power supply units), 9 RU, free configuration	K480-160
Draco tera enterprise with 288 ports (base unit with control board and two power supply units), 13 RU, free configuration	K480-288
Draco tera enterprise with 576 ports (base unit with control board and two power supply units), 25 RU, free configuration	K480-576
Draco tera enterprise with 576 ports symmetric (base unit 2 x 288 ports (288 inputs / 288 outputs) with control board and two power supply units), 25 RU, free configuration	K480-576S

The Draco tera base unit includes a CPU board, fan trays, an exchangeable filter pad and depending on the model one or two power supply units. Choose I/O boards and other accessories according to your requirements.

I/O Boards

Product	Data Transmission	Part No.
Draco tera enterprise Cat X I/O board (8 ports)		480-C8
Draco tera enterprise fiber, I/O board (8 ports) (incl. 8 x 459-1S)		480-S8
▸ SFP, single-mode, LC duplex, bidirectional, 1G		459-1S
Draco tera enterprise fiber XV I/O board (incl. 8 x 459-1V)		480-V8
▸ SFP single-mode, LC duplex, bidirectional, 3G XV		459-1V
Draco tera enterprise universal I/O board for USB 3.0 and SDI, empty, free configuration		480-UNI16
▸ SFP multi-mode, LC duplex, bidirectional, für USB 3.0, 6G		459-6M
▸ SFP single-mode, LC duplex, bidirectional, 3G-SDI		459-3FX
▸ SFP, Mini-BNC, 3G-SDI		459-3BX
▸ Adapter cable, Mini-BNC, suitable for 459-3BX		459-BMB
▸ SFP, DIN 1.0/2.3, 3G-SDI		459-3DX
▸ Adapter cable, DIN 1.0/2.3 to 75 Ohm BNC (female), suitable for 459-3DX		459-BMD
Draco tera grid, 8 to 1 port board, fiber (up to 10 km), 1G NEW		480-GRD-S8

SFP modules (small form-factor pluggable) are compact, hot-pluggable connection plugs, serving as optical (fiber) and electronic (coax) transceivers for rapid signal transmission. Depending on the specification of the implemented SFP, IHSE devices allow signal extension up to 160 km over single-mode fiber cables. Standard fiber SFPs have a maximum extension of 10 km. Draco tera enterprise KVM matrix switches and Draco tera compact fiber and UNI versions can be individually customized with the appropriate SFP module according to the application and distance required.

Accessories

Product	Part No.
Draco tera enterprise CPU board (TCP/IP), RS232, DVI, USB	480-CTRL
Fan tray for Draco tera enterprise with 48 ports (spare part)	480-FAN-048
Fan tray for Draco tera enterprise with 80 ports (spare part)	480-FAN-080
Fan tray for Draco tera enterprise with 160 ports (spare part)	480-FAN-160
Fan tray for Draco tera enterprise with 288 ports (spare part)	480-FAN-288
Fan tray for Draco tera enterprise with 576 ports (spare part)	480-FAN-576
Filter pads as consumable supply for Draco tera enterprise with 48 ports (spare part)	480-FLTR-048
Filter pads as consumable supply for Draco tera enterprise with 80 ports (spare part)	480-FLTR-080
Filter pads as consumable supply for Draco tera enterprise with 160 ports (spare part)	480-FLTR-160
Filter pads as consumable supply for Draco tera enterprise with 288 ports (spare part)	480-FLTR-288
Filter pads as consumable supply for Draco tera enterprise with 576 ports (spare part)	480-FLTR-576
Plug-in power supply unit for Draco tera enterprise with 48 ports (spare part or redundancy)	480-RED-048
Plug-in power supply unit for Draco tera enterprise with 80 ports (spare part or redundancy)	480-RED-080
Plug-in power supply unit for Draco tera enterprise with 160 ports (spare part or redundancy)	480-RED-160
Plug-in power supply unit for Draco tera enterprise with 288 ports (spare part or redundancy)	480-RED-288
Plug-in power supply unit for Draco tera enterprise with 576 ports (spare part or redundancy)	480-RED-576

All digital KVM extenders of the Draco vario and Draco compact series are designed to operate with the Draco tera enterprise KVM matrix switches or as individual CON/CPU extenders. Contact our expert team of consultants who will be happy to assist you with any configuration or technical questions.

576 Port KVM Matrix

AVTECHNOLOGY WINNER BEST of SHOW InfoComm 2015

IHSE is proud to announce the Draco tera enterprise Matrix Switch with 576 ports was selected as a “Best of Show” winner by AV Technology during the InfoComm Conference and Exhibition held in Orlando Florida in June 2015.

iabm DESIGN & INNOVATION AWARDS - 2015 FINALIST

The Draco tera enterprise Matrix Switch with 576 ports is announced as finalist for the IABM Design & Innovation Awards. The awards will be casting the spotlight on new solutions or products that bring benefit or create new opportunities to the broadcast and media industry.

Draco tera compact
Series 480c

KVM Matrix Switch

- DVI
- Dual Link DVI
- HDMI
- DisplayPort
- VGA
- SDI
- Digital Audio
- Analog Audio
- USB-HID
- USB 2.0
- USB 3.0
- RS232
- RS422

Draco

- 8, 16, 32, 48, 64 or 80 ports
- Instant switching
- Flex-Port technology
- Resolutions up to 4K
- Compact size with 19“ / 1 RU / 2 RU
- Redundant power supplies

Product Information

The Draco tera compact is specifically designed for smaller to mid-sized KVM requirements using the same technology found in the larger Draco tera enterprise switch systems. Available with 8, 16, 32, 48, 64 or 80 ports, this fixed frame concept is offered in Cat X or Cat X-fiber combinations in a 2 RU chassis for the 64 and 80 port models. This cost-effective, small-footprint cost effective frame can be used with all of the Draco compact extender modules, creating one of the World's widest selection of KVM solutions supporting DVI single link, DVI Dual Link, VGA, HDMI, USB-HID, USB 2.0, audio and serial RS232. Building on the field proven technology found in the Draco tera enterprise, the tera compact series brings a full set of high performance features at an affordable price.

Extenders can be connected with Cat X up to 140 m on either side. With the 64 port (48/16 fiber) and 80 port (48/32 fiber), KVM signals can be extended up to 10 km. Extenders can accommodate a variety of signal formats. Draco tera compact auto-senses individual units connected to ports on the chassis: by simply connected the extender to the chassis, the internal control software will recognize and auto-configure the port as a CPU or console device. This Flex-Port technology provides huge time savings for system installers who normally have to pre-configure ports to specific I/O requirements. With its small footprint and ruggedized chassis design, the Draco tera compact is the perfect KVM space-saving solution for centralized KVM switching. It is especially suited for factory floor automation control systems, board rooms, production studios, OB Vans, and command and control environments.

Product Features

- Compact size 1 RU (2 RU for 64 and 80 port)
- Available in different sizes: 8, 16, 32, 48, 64 or 80 ports
- Instant delay-free switching
- Flex-Port technology for dynamic port assignment
- Mix & Match (fiber ports can be switched to Cat-X ports and vice versa)
- Matrix Grid option allows multi-matrix connections through grid lines
- High definition resolutions 1080p, 2560 x 2048 up to 4K DCI / Ultra HD
- Supports SD-, HD- or 3G-SDI
- 24 bit color depth, deep colour ready
- Supports USB-HID, USB 2.0 and 3.0
- Remote extenders can be updated through the matrix
- API Service
- Multi-Screen Control
- SNMP & Syslog
- Redundant power supply
- Fully-redundant system support (CPU Unit – matrix switch – CON Unit)

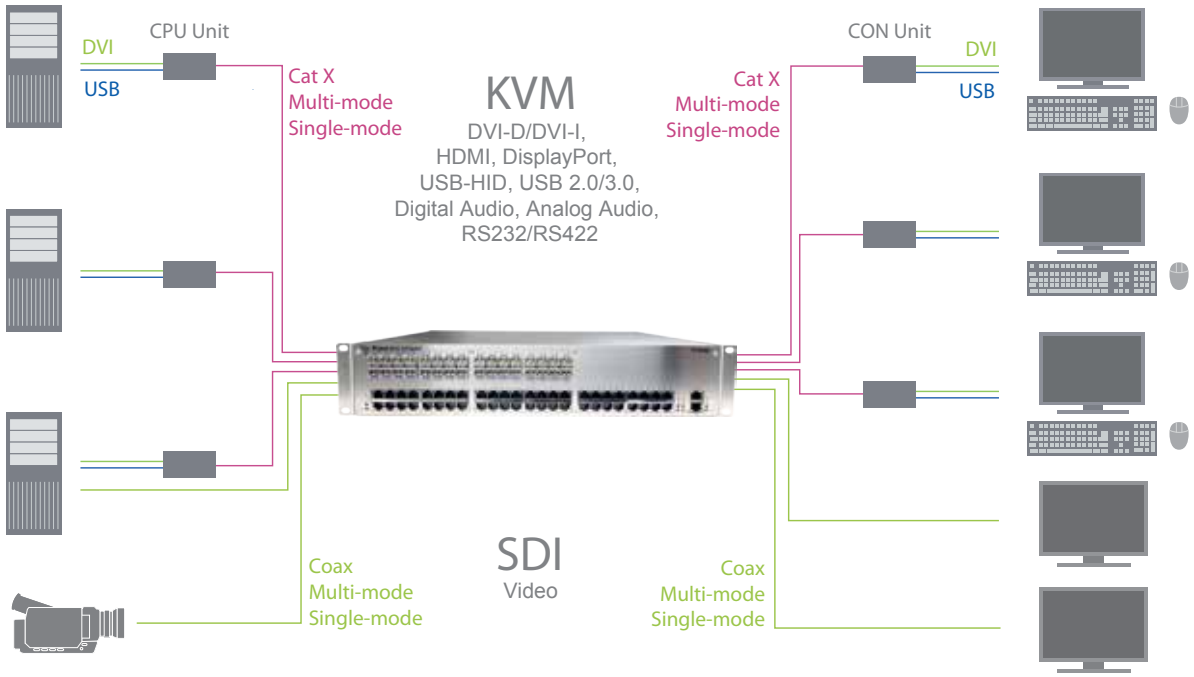
Technical Data		
Power Supply (internal)	90-240VAC / 4-2 A / 50-60 Hz	
Maximum Resolutions	1920 x 1200 @ 60 Hz (24 bit) 2560 x 2048 @ 60 Hz (24 bit) 4K @ 30 Hz 4K @ 60 Hz	
Maximum Cable Distance	Cat X Multi-mode Single-mode	140 m 1 km 10 km

Operation via

- Keyboard for operation (in-band)
- OSD (On Screen Display) for configuration and operation (in-band)
- Draco tera tool for configuration, operation and maintenance (TCP/IP)
- Ethernet interface for operation (API)
- Serial interface for operation (API)

Sized for all applications

Functional Diagram



A Draco tera matrix system consists of a Draco tera matrix and, for KVM applications, of one or more CPU/CON Units. The Draco tera matrix is connected to the CPU/CON Units by interconnect cables or connected directly to the video devices where used as a video matrix. The CPU Units are connected directly to the sources (computer, CPU) by the provided cables. Monitor(s), keyboard and mice are connected to the CON Units. The communication between the Draco tera matrix and the CPU/CON Units takes place over the respective interconnect cables.

Order Numbers

Cat X device models	Data Transmission	Part No.
Draco tera compact 8 ports, Cat X (board version for mounting in Draco vario chassis)		B480-08C
Draco tera compact 8 ports, Cat X (chassis version with integrated power supply)		K480-08C
Draco tera compact 16 ports, Cat X		K480-16C
Draco tera compact 32 ports, Cat X		K480-32C
Draco tera compact 48 ports, Cat X		K480-48C
Draco tera compact 64 ports, Cat X		K480-64C
Draco tera compact 80 ports, Cat X		K480-80C

Fiber device models	Data Transmission	Part No.
Draco tera compact 8 ports, fiber (board version for mounting in Draco vario chassis)		B480-08F
Draco tera compact 8 ports, fiber (chassis version with integrated power supply)		K480-08F
Draco tera compact 16 ports, fiber		K480-16F
Draco tera compact 32 ports, fiber		K480-32F
Draco tera compact 48 ports, fiber		K480-48F
Draco tera compact 64 ports, fiber		K480-64F
Draco tera compact 80 ports, fiber		K480-80F

Fiber XV device models	NEW	Data Transmission	Part No.
Draco tera compact 8 ports, fiber XV (board version for mounting in Draco vario chassis)			B480-08X
Draco tera compact 8 ports, fiber XV (chassis version with integrated power supply)			K480-08X
Draco tera compact 16 ports, fiber XV			K480-16X
Draco tera compact 32 ports, fiber XV			K480-32X
Draco tera compact 48 ports, fiber XV			K480-48X
Draco tera compact 64 ports, fiber XV			K480-64X
Draco tera compact 80 ports, fiber XV			K480-80X

Universal device models	Data Transmission	Part No.
Draco tera compact 8 ports, universal (board version for mounting in Draco vario chassis)		B480-08U
Draco tera compact 8 ports, universal (chassis version with integrated power supply)		K480-08U

Draco tera compact Hybrid Versions

Product	Data Transmission	Part No.
Draco tera compact 64 ports (48 Cat X, 16 fiber)		K480-48C16F
Draco tera compact 80 ports (48 Cat X, 32 fiber)		K480-48C32F
Draco tera compact 64 ports (48 Cat X, 16 universal)		K480-48C16U
Draco tera compact 64 ports (48 fiber, 16 universal)		K480-48F16U
Draco tera compact 80 ports (48 Cat X, 32 universal)		K480-48C32U
Draco tera compact 80 ports (48 fiber, 32 universal)		K480-48F32U

Accessories

Product	Data Transmission	Part No.
SFP, single-mode, LC duplex, bidirectional, 1G		459-1S
SFP single-mode, LC duplex, bidirectional, 3G XV		480-1V
SFP multi-mode, LC duplex, bidirectional, USB 3.0, 6G		459-6M
SFP single-mode, LC duplex, bidirectional, 3G-SDI		459-3FX
SFP, Mini-BNC, 3G-SDI		459-3BX
▸ Adapter cable, Mini-BNC to BNC, suitable for 459-3BX		459-BMB
SFP, DIN 1.0/2.3, 3G-SDI		459-3DX
▸ Adapter cable, DIN 1.0/2.3 auf 75 Ohm BNC (female), suitable for 459-3DX		459-BMD

All digital KVM extenders of the Draco vario and Draco compact series are designed to operate with the Draco tera enterprise KVM Matrix switches or as individual CON/CPU extenders. Contact our expert team of consultants who will be happy to assist you with any configuration or technical questions.

Winner „Best of Show“

IHSE's Draco tera compact Matrix Switch, 80 ports XV, 4K wins „Best of Show“ award from AV Technology and Sound & Video Contractor at InfoComm 2015.

AV TECHNOLOGY WINNER BEST of SHOW InfoComm 2015

SOUND&VIDEO CONTRACTOR WINNER BEST of SHOW InfoComm 2015

Draco CPU Switch
Series 484

VGA/DVI Switch

- Replaces 8 CPU extender units
- VGA/DVI-D conversion
- Version with redundant data links
- Optimized for the use in data centers
- Compatible with all IHSE Draco KVM

8x1 Switch
Share up to 8 VGA, USB, and
Audio Sources through a single DVI output port.

Product Information

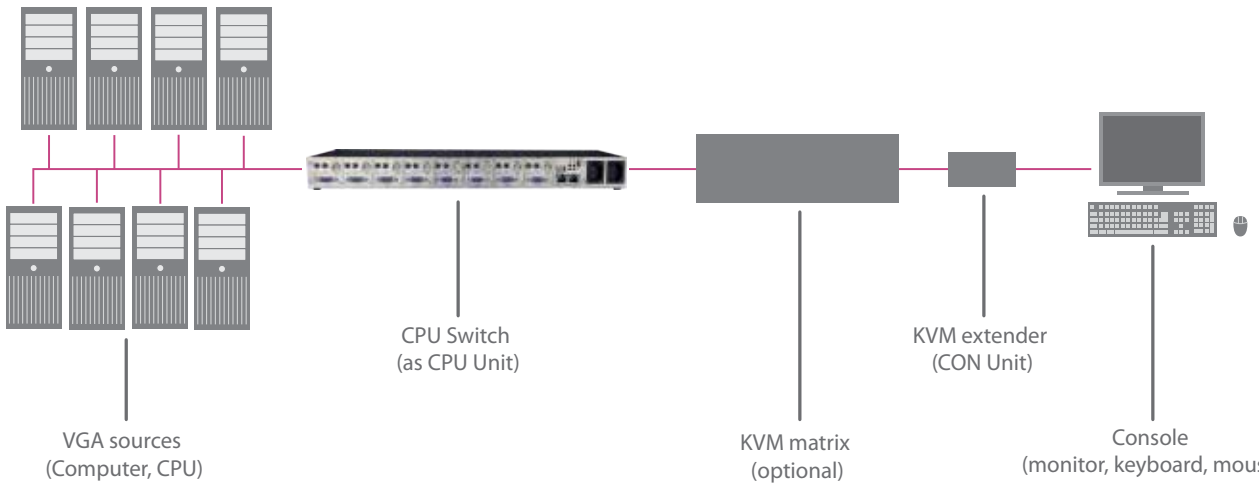
The Draco CPU Switch allows switching between eight VGA computers together with the respective audio and USB signals. The Draco CPU Switch replaces eight traditional KVM extenders: Eight computers are connected by VGA cables to the CPU Unit, which is further connected to a user workstation by one interconnect cable. The operator can access any of the eight connected sources from the console. The extender operates as an 8-input, 1-output KVM switch and includes front-panel LEDs to indicate the active computer. Analog VGA signals are converted to DVI-D within the extender and scaled using Draco vario image scaling, which is ideal for modern, high-resolution monitors. In addition, the Draco CPU Switch comprises eight USB-HID/USB 2.0 embedded (36 Mbit/s) ports, as well as eight bidirectional analog audio ports. A further USB 2.0 port (480 Mbit/s) on the extender allows storage devices to be connected locally. An attached USB device is logged into the active computer making it possible to transmit data (e.g. important system updates) from a single USB device to all computers under control of the workstation.

Product Features

- Includes 8 input ports for VGA, USB and audio
- Output connections to DVI extender or matrix switch port
- Redundant power supply
- Rack mountable in 1 RU
- Switching via hot key commands
- Local USB port selectable to any input source
- Perfect for efficient management of legacy VGA sources
- Ideal for centralized management of host computers integrated to digital KVM matrix systems

Technical Data	
Input	8x VGA, USB-HID, analog audio, 8x USB 2.0 embedded, local USB 2.0 (high-speed)
Output	Cat X, single-mode fiber
Maximum Cable Distance	Cat X up to 140 m Single-mode 9µ up to 10 km
Power Supply (internal)	90-240 VAC / 0.7 A / 50/60 Hz
Maximum Resolutions	1920 x 1200 @ 60 Hz, Full HD (1080p) or 2K (up to 2048 x 1152)
Dimensions	444 x 143 x 43 mm (17.5" x 5.6" x 1.7")

Functional Diagram



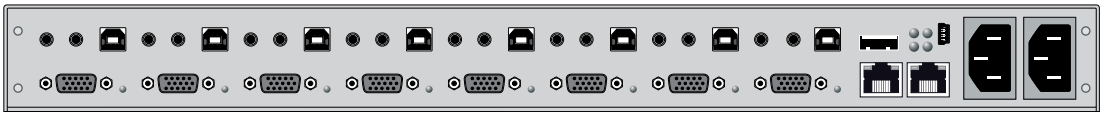
Application

The Draco CPU Switch simplifies operator access to multi-computer installations and is ideal for large data centers and installations requiring centrally managed host computers integrated into a high-end KVM system together with state-of-the-art workstations at low cost. By greatly reducing the number of extenders and cabling, a significant reduction in cost, space and complexity of installation is achieved.

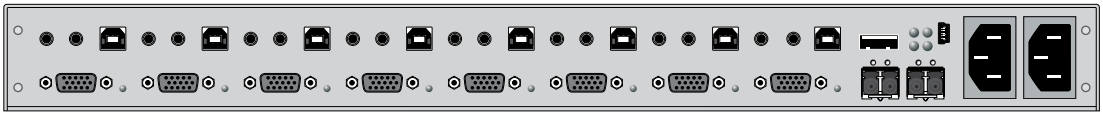
Further, it may be used in conjunction with KVM matrix switches, reducing the number of ports used on the switch. The device features redundant data links and power supplies for maximum reliability and resilience in critical installations. It is designed for 19” rack-mount use.

Order Numbers

Device Types



Product	Data Transmission	Part No.
Draco CPU Switch, 8x VGA, 2x HID, analog audio bidirectional, Cat X, redundant link		L484-8VHCWR
Draco CPU Switch, 8x VGA, 2x HID, analog audio bidirectional, 2x USB 2.0 embedded, Cat X, redundant link		L484-8VECWR



Product	Data Transmission	Part No.
Draco CPU Switch, 8x VGA, 2x HID, analog audio bidirectional, fiber, redundant link		L484-8VHSWR
Draco CPU Switch, 8x VGA, 2x HID, analog audio bidirectional, 2x USB 2.0 embedded, fiber, redundant link		L484-8VESWR

Accessories

Product	Part No.
VGA cable 2.0 m (VGA male to VGA male)	261-6J
USB cable 1.8 m (Type A to B)	247-U1
Stereo jack cable 1.6 m (3.5 mm Stereo)	455-CK
IEC connection cable for power supply, lockable	474-IECLOCK
19“/1U rack mount kit for CPU Switch	474-6RMK

Draco U-Switch
Series 476

USB Switch

- Multi-Screen Control
- Quick and instant switching
- Switching via keyboard
- Optional push-buttons
- LEDs indicators

Product Information

When it is necessary to operate several computers with multiple displays via a single keyboard and mouse, the Draco U-Switch is the ideal solution. A user-friendly interface makes it quick and easy to manage multiple CPU data from a single workstation. The Draco U-Switch is perfect for computer workstations normally found in banking, surveillance and command & control environments where multiple displays connected to different CPUs must be managed simultaneously.

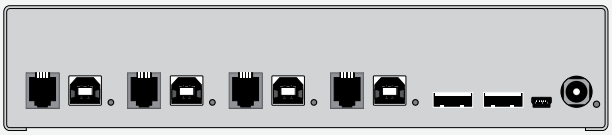
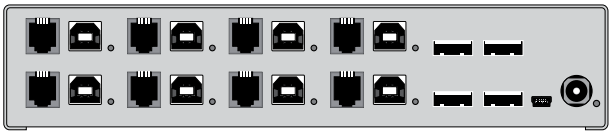
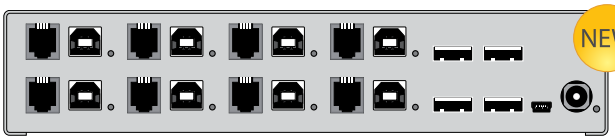
By integrating the Draco U-Switch in the KVM environment users can perform fast and accurate mouse selections across multiple screens without the need to manually change keyboard and mouse connections. It now becomes a seamless and smooth operation to move a mouse across adjacent screen boundaries. Alternatively, changing the mouse and keyboard to another screen can be achieved using simple hotkey commands.
The Draco U-switch can be combined with the Draco tera enterprise and compact matrix switches to enhance the flexibility of multiple CPU management from a single multi-screen workstation. The Draco U-Switch saves valuable workspace, increases productivity, and gives the user real-time switching with seamless mouse movement across multiple displays.

Product Features

- Instant Switching for fast, delay-free switching
- Switching via keyboard or optional push bottons
- Multi-Screen Control (switching via mouse movement)
- Optional LEDs to signify current active monitor
- Compatible with all Draco products
- Compatible with all USB-HID devices
- Rack mountable, up to 2 U-Switches can be installed in 1 RU of rack space

Technical Data	
Power Supply (external)	90-240VAC / 0,5 A / 47-63 Hz 5VDC
Dimensions	209 x 143 x 42 mm

Order Numbers

Product		Part No.
	Draco U-Switch, 4 port USB-Switch (2 USB-HID devices supported)	K476-4U
	Draco U-Switch, 4 port USB-Switch (4 USB-HID devices supported)	K476-4U2
	Draco U-Switch, 8 port USB-Switch (2 USB-HID devices supported)	K476-8U
 NEW	Draco U-Switch, 4 port USB-Switch (4 USB-HID devices supported) with USB 2.0 switching on the upper board	K476-4U4T

Accessories

Product	Part No.
19“ rack mount kit for 1-2 Draco U-Switches	455-8G
Mounting kit to mount by screws	455-4K
Mounting kit to mount by snap-on	455-5K

Functional Diagram

The Draco U-Switch enables operating multiple computers and dedicated monitors with one single console. There are different possibilities for the input connection of the U-Switch: It can be connected directly to computers or to CON Extender Units (diagram 1). Optionally, a matrix can be interconnected (diagram 2).

Diagram 1

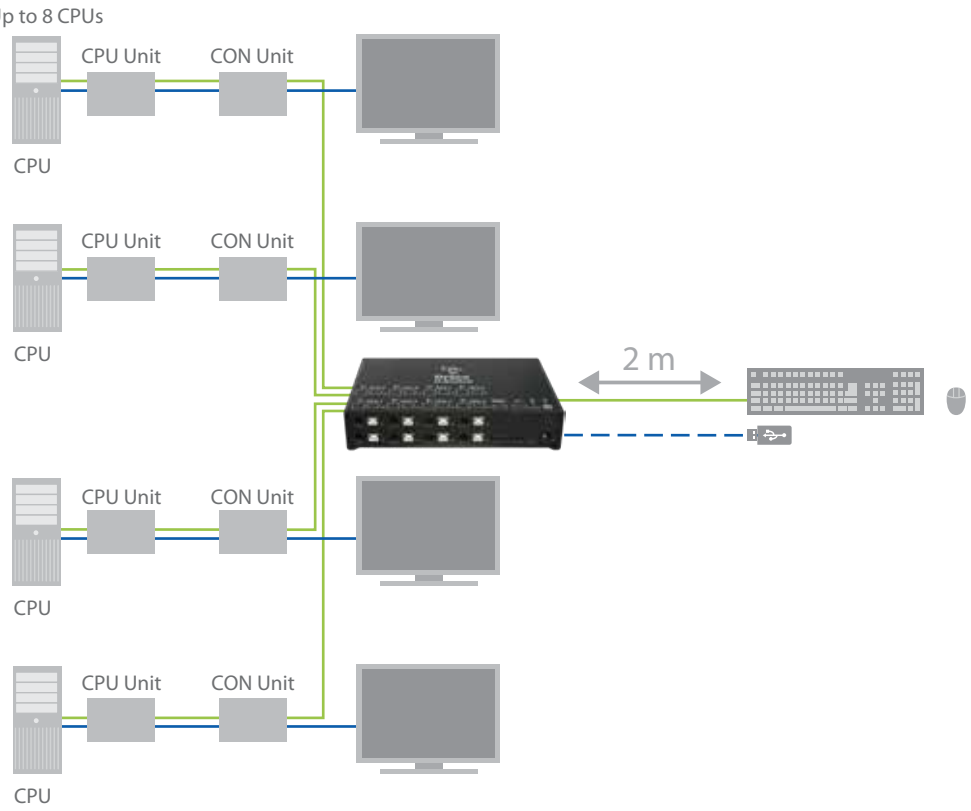
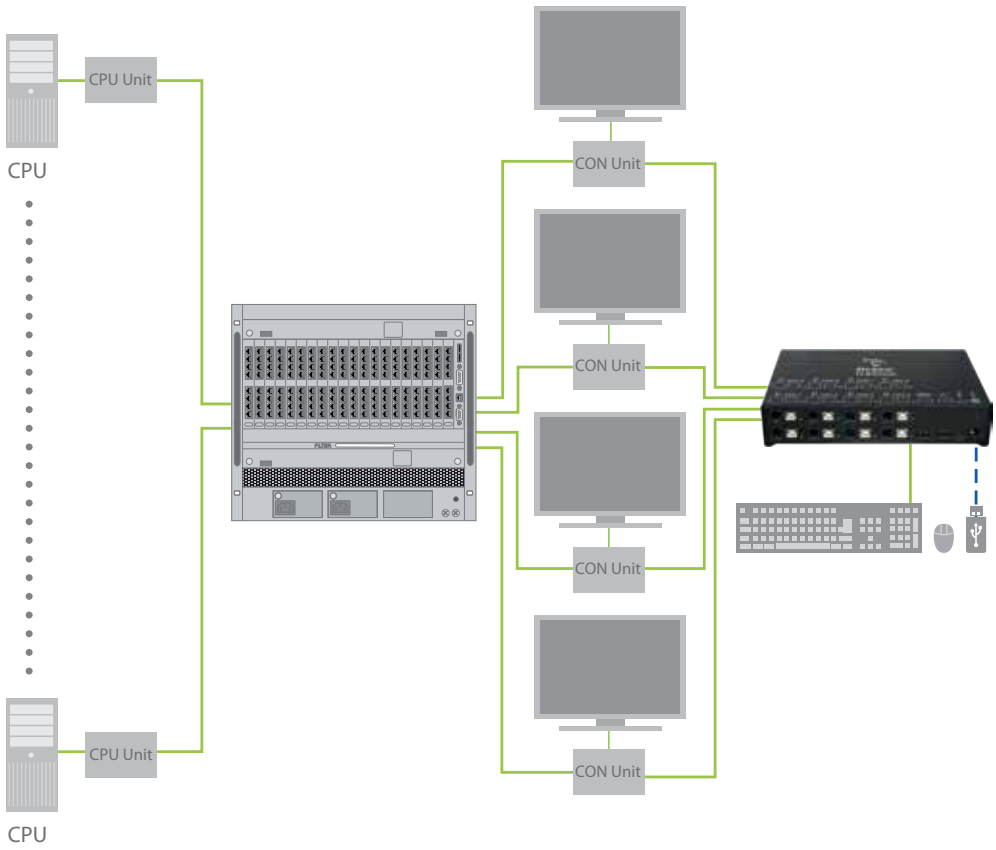
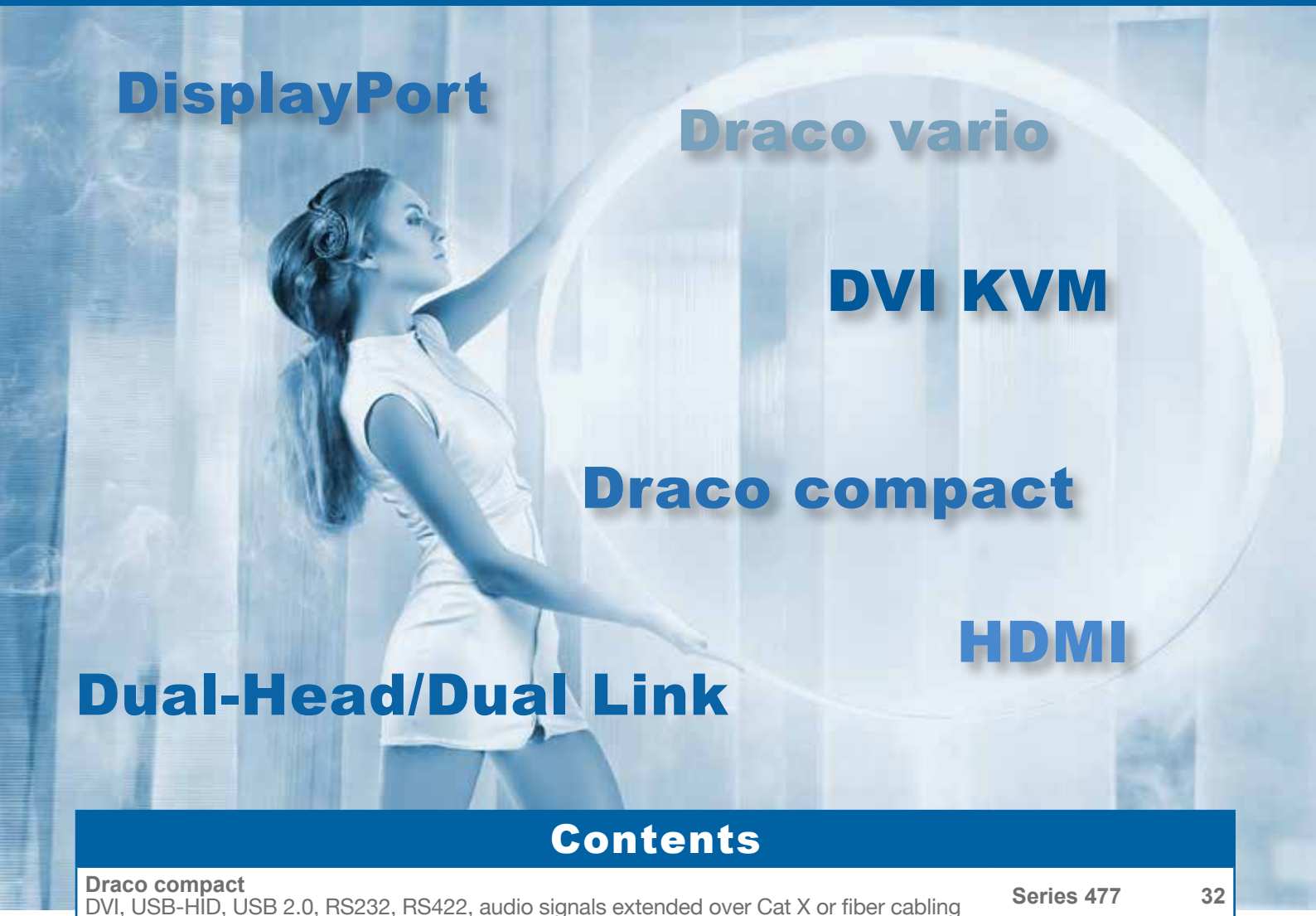


Diagram 2



Notes

Digital KVM Extenders



Contents

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Draco compact
Series 477

DVI Extender

- Resolutions up to 1920 x 1200
- Available with digital audio
- Easy DDC transmission
- All connections on one side
- Compact size

Product Information

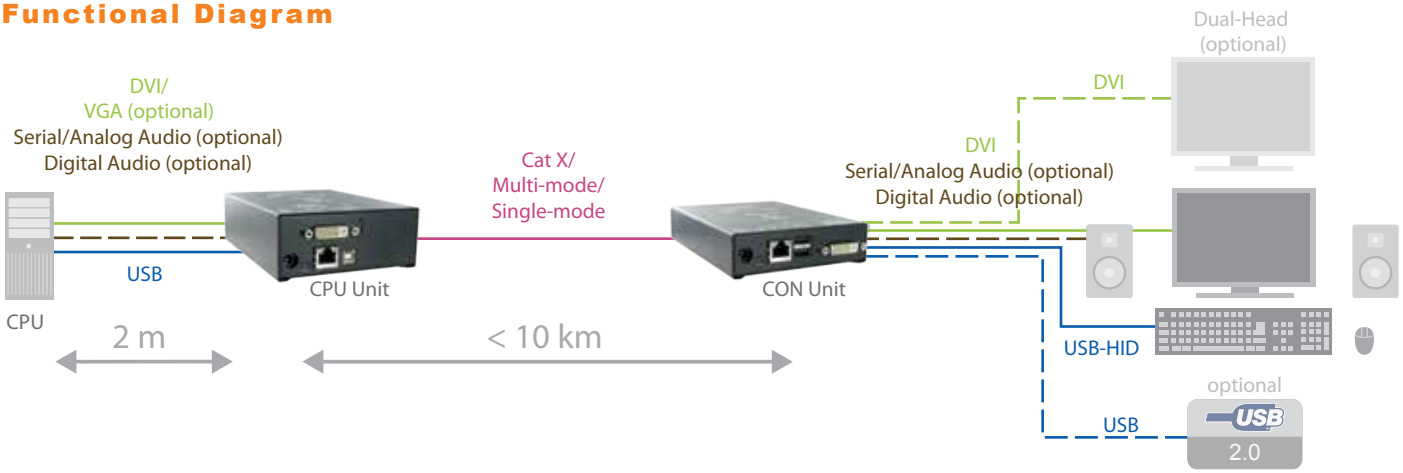
Draco compact extenders are housed in compact units. The small and space-saving chassis of the Draco compact are available in six standard versions, allowing the extension of high-res DVI signals as well as USB 2.0, USB-HID, VGA, analog and digital audio. Due to its compact size, the Draco compact can be located in small spaces. All connections are on the same face for ease of installation, making it ideal for many demanding applications.

Product Features

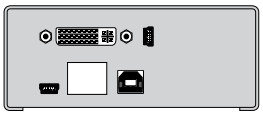
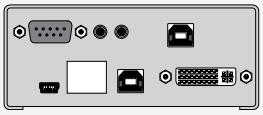
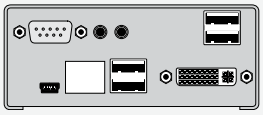
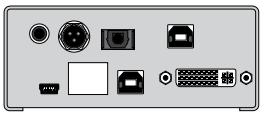
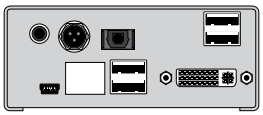
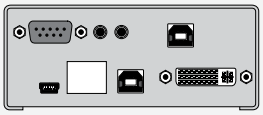
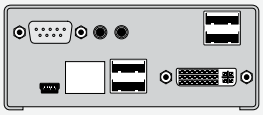
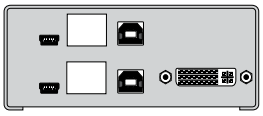
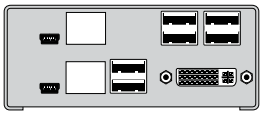
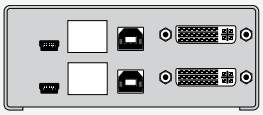
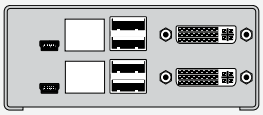
- Excellent image quality in all resolutions
- Single- and Dual-Head device models available
- Wide range of options:
  - 2 USB ports for HID
  - USB 2.0
  - Serial and analog audio
  - Digital audio
  - VGA inputs
- All connections on one side for easy installation
- 19” rack mount kit available - up to four units fit in one RU
- External power supply or optional tray mounted power supply for one RU frame
- DVI-D fiber devices are available as XV models to provide loss-free image transmission in all cases
- Optional available: VESA mounting plate

Technical Data		
Power Supply (external)	90-240VAC / 1 A / 50-60 Hz 5VDC	
Data Rates		
Serial RS232 / RS422	up to 115.200 baud	
Analog audio	Bidirectional stereo audio connections, 24 bit, 38.4 kHz	
Digital audio	Compatible with AES/EBU, S/PDIF, Dolby Digital, DTS, PCM, 32-96 kHz	
Maximum Resolution	DVI Single Link, 1920 x 1200 @ 60 Hz/ 24 bit	
Maximum Cable Distance	Cat X	140 m
	Multi-mode	1 km
	Single-mode	10 km
Dimensions		
with one board	103 x 143 x 29 mm	
with two boards	103 x 143 x 42 mm	

Functional Diagram



Order Numbers

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
DVI, USB HID		L477-1SHC L477-1SHS L477-1SHX		R477-1SHC R477-1SHS R477-1SHX
DVI, USB HID, VGA		L477-1SHCV L477-1SHSV L477-1SHXV		
DVI, USB HID, RS232, Analog Audio bidirectional		L477-1S4CA L477-1S4SA L477-1S4XA		R477-1S4CA R477-1S4SA R477-1S4XA
DVI, USB HID, Digital Audio unidirectional		L477-1S4CD L477-1S4SD L477-1S4XD		R477-1S4CD R477-1S4SD R477-1S4XD
DVI, USB HID, RS232, Analog Audio bidirectional, USB 2.0 Full Speed		L477-1SECA L477-1SESA L477-1SEXA		R477-1SECA R477-1SESA R477-1SEXA
DVI, USB HID, USB 2.0 High Speed		L477-1SUC L477-1SUS L477-1SUX		R477-1SUC R477-1SUS R477-1SUX
DVI, USB HID		L477-2S4C L477-2S4S L477-2S4X		R477-2S4C R477-2S4S R477-2S4X

Rack mount Hardware and Mounting Plates

Product	Part No.
19” rack mount kit for 1-4 Single-Head equipment without additional boards	455-4G
19” rack mount kit for 1-4 devices, for all other Draco compact extender	455-8G
19” power supply for up to 3 devices	455-PS
Mounting plate to mount by screws	455-4K
Mounting plate to mount by snap-on	455-5K

Cables and Optional Accessories

Product	Part No.
VESA mounting plate to mount by screws	477-VESA
Cat 5, S-UTP-Simplex 4 x 2 x AWG24	402-0J
Assembly including 2 Cat 5 connectors and ferrites	402-0D
Multi-mode breakout cable 2G50	433-2M
Assembly includes 2 multi-mode LC connectors	252-2L
Single-mode breakout cable 2E9	433-2S
Assembly includes 2 single-mode LC connectors	252-2L
International power supply 100 - 240VAC/5VDC (spare part for KVM units)	260-5G

Draco vario series

Draco vario extenders let you place a keyboard, monitor, mouse, speakers, microphone and serial devices long distances from your computer or IHSE KVM Switch.

- Multiple product variants
- Four chassis sizes
- Redundant power supply
- Free customization
- Integrated Switch and Extender

IHSE offers a wide range of pre-configured models for the vario line of extenders. Start with the basic 2-bay enclosure, select a part number corresponding to the video format requirement (DVI, HDMI, DisplayPort, DVI-I/VGA), with or without options. Each unit includes USB-HID for keyboard and mouse operations.
Options include analog audio, digital audio, RS232 and USB 2.0. All units are available in either twisted pair (Cat X) or fiber optic interconnects. Units include power supply.

The Draco vario extender family is designed around a modular concept that lets you build an extender system to fit your specific needs. Enclosure frames are available in 2 bay, 4 bay, 6 bay and 21 bay units. Frame options include redundant power and rack mount kits. All Draco vario (474, 481, 482, 483) and Draco ultra (490) models can be fitted to these frame styles. Main board options include DVI, DVI/VGA, HDMI, DisplayPort as well as Dual-Head or Dual Link DVI. Daughter card styles include a wide range of features and flexibility to support practically any combination of video and data transports. Select daughter cards to support USB 2.0, digital audio, analog audio, RS232 or RS422. IHSE offers the Build-Your-Own vario configuration software to make is easy to build the system you need. All main board styles support USB-HID for keyboard and mouse operations and are available in either twisted pair (Cat X) or fiber option interconnects.

Modular units

Custom build assemblies

Select an enclosure style

Select (a) main board style(s)

Select (an) upgrade module style(s)

Base units (from page 44)

Standard part numbers

Draco vario Configurator

IHSE offers a configurator for all Draco vario products. Check out our product site at www.ihse.com and select your preferred chassis.

→ **http://www.ihse.com/products/digital-kvm-extenders/draco-vario-configurator.html**

Equip it with your required boards and modules and simulate your fully loaded frame. The configurator features all regular Draco vario chassis, main boards, upgrade modules and USB 2.0 modules.

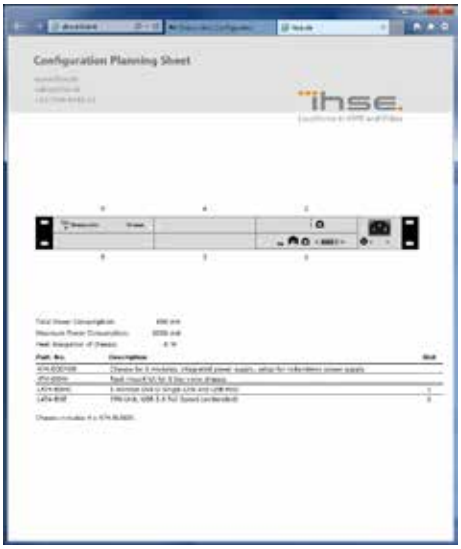
Step 1:
Select a frame type.

Step 2:
Select the chassis accessories.

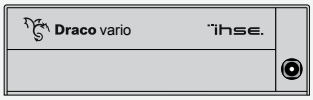
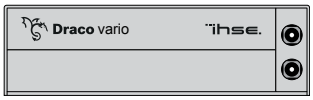
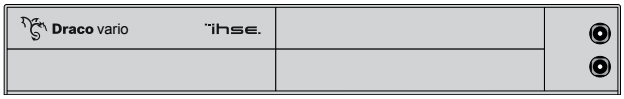
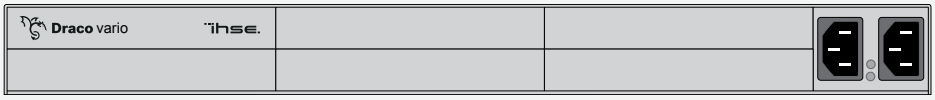
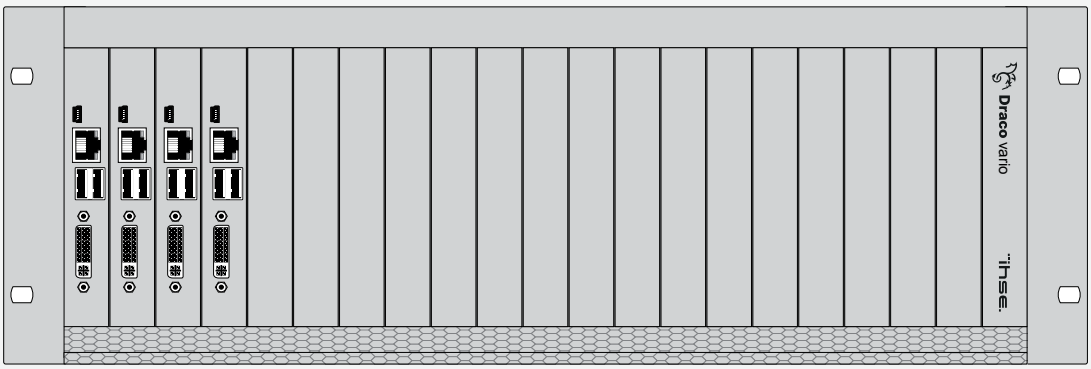
Step 3:
Select a main board style.

Step 4:
Select an upgrade board.

Step 5:
Check Parts List and export as CSV file for reference or direct order placement.

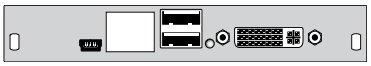
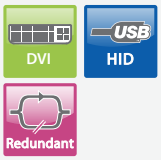
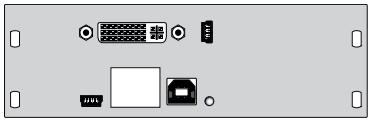


Step 6:
Print out the configuration sheet.

Chassis for free configurations	Part No.
Chassis for 2 modules, external power supply 	474-BODY2
Chassis for 2 modules, external power supply, setup for redundancy power supply 	474-BODY2R
Chassis for 2 modules, integrated power supply, setup for redundancy power supply 	474-BODY2N
Chassis for 2 modules, integrated 12V/24V/48V DC power supply, setup for redundancy power supply 	474-BODY2DC-12 474-BODY2DC-24 474-BODY2DC-48
Chassis for 4 modules, external power supply 	474-BODY4
Chassis for 4 modules, external power supply, setup for redundancy power supply 	474-BODY4R
Chassis for 6 modules, integrated power supply, setup for redundancy power supply 	474-BODY6R
Chassis for 6 modules, backplane with 2 integrated power supply units on back side, hot swappable 	474-BODY6BP Optional: Chassis fan 474-6FAN
Chassis for 6 modules, backplane with 2 integrated power supply units on front side, hot swappable 	474-BODY6BPF Optional: Chassis fan 474-6FAN
Chassis for 6 modules, integrated 12V/24V/48V DC power supply, setup for redundancy power supply 	474-BODY6DC-12 474-BODY6DC-24 474-BODY6DC-48
4 RU / 19“ rack chassis for 21 modules, integrated power supply, setup for redundancy power supply, hot swappable 	474-BODY21/4U

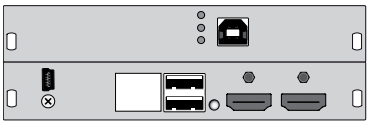
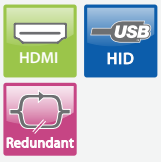
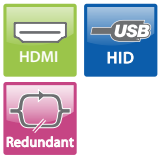
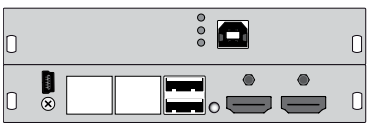
474 Draco vario

Order Numbers

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
1 monitor DVI-D Single Link and USB-HID CPU main board for transmission of 1 x DVI-D Single Link and USB-HID for keyboard and mouse. The main board provides transmission capacity for upgrade modules. Transmission according to the model via Cat X, fiber or fiber XV.		L474-BSHC L474-BSHS L474-BSHX	**1 monitor DVI-D Single Link and USB-HID** CON main board for transmission of 1 x DVI-D Single Link and USB-HID for keyboard and mouse. The main board works in conjunction with DVI-D, DVI-I, DisplayPort and HDMI CPU modules. The main board provides transmission capacity for upgrade modules. Transmission according to the model via Cat X, fiber or fiber XV	 R474-BSHC R474-BSHS R474-BSHX
1 monitor DVI-D Single Link and USB-HID, redundant data transmission CPU and CON main boards for transmission of 1 x DVI-D Single Link and USB-HID for keyboard and mouse. The versions with two data ports enable redundant transmission of computer signals. The main boards provides transmission capacity for upgrade modules. Transmission according to the model via Cat X or fiber. The devices also work in conjunction with HDMI and DisplayPort modules.		L474-BSHCR L474-BSHSR		R474-BSHCR R474-BSHSR
1 monitor DVI-I (VGA) Single Link and USB-HID CPU main board for transmission of 1 x DVI-I Single Link and USB-HID for keyboard and mouse. DVI-I is alternative DVI-D or VGA. Supports upscaling of 1080p and 1920 x 1200. The main board provides transmission capacity for upgrade modules. Transmission according to the model via Cat X or fiber.	Standard conversion VGA to DVI	L474-BVHC L474-BVHS	**1 monitor DVI-I (VGA) Single Link and USB-HID** CON main board supporting 1 x DVI-I Single Link and USB-HID for keyboard and mouse. The main board works in conjunction with DVI-D, DVI-I, HDMI and DisplayPort CPU modules. The main board provides connections for upgrade modules. Transmission depending on the model via Cat X or fiber.	VGA output	R474-BVHC R474-BVHS
1 monitor DVI-I (VGA) Single Link and USB-HID, redundant data transmission CPU main board for redundant transmission of 1 x DVI-I Single Link and USB-HID for keyboard and mouse. The version with two data ports enable redundant transmission of computer signals. DVI-I is alternative DVI-D or VGA. Supports upscaling of 1080p and 1920 x 1200. The main board provides transmission capacity for upgrade modules. Transmission according to the model via Cat X or fiber.	Standard conversion VGA to DVI	L474-BVHCR L474-BVHSR	**1 monitor DVI-I (VGA) Single Link and USB-HID, redundant data transmission** CON main board supporting 1 x DVI-I Single Link and USB-HID for keyboard and mouse. The version with two data ports enables redundant transmission of computer signals. The main board works in conjunction with DVI-D, DVI-I, HDMI and DisplayPort CPU modules. The main board provides connections for upgrade modules. Transmission depending on the model via Cat X or fiber.	VGA output	R474-BVHCR R474-BVHSR
1 monitor DVI-I (VGA) Single Link and USB-HID CPU main board for transmission of 1 x DVI-I Single Link and USB-HID for keyboard and mouse. DVI-I is alternative DVI-D or VGA. This device enables scaling of input resolutions and can also be used as DVI-D scaler. The main board provides transmission capacity for upgrade modules. Transmission according to the model via Cat X, fiber or fiber XV.	 VGA to DVI conversion with scaling	L474-BSHCV L474-BSHSV L474-BSHXV		

Order Numbers

481 Draco vario HDMI

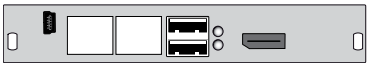
Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
1 monitor HDMI Single Link and USB-HID CPU and CON main boards for transmission of 1 x HDMI (Single Link) and USB-HID for keyboard and mouse. The devices also work in conjunction with DVI and DisplayPort modules. The main board provides transmission capacity for upgrade modules. Transmission according to the model via Cat X or fiber.		L481-BHHC L481-BHHS		R481-BHHC R481-BHHS
1 monitor HDMI Single Link and USB-HID with local HDMI-Out CPU module for transmission of 1 x HDMI (Single Link) and USB-HID for keyboard and mouse. The local monitor access allows a second working station directly at the CPU. The device also works in conjunction with DVI and DisplayPort modules. The main board provides transmission capacity for upgrade modules. Transmission according to the model via Cat X or fiber.		L481-BHHCL L481-BHHSL	**1 monitor HDMI Single Link and USB-HID with KVM Switch** CON module for transmission of 1 x HDMI (Single Link) and USB-HID for keyboard and mouse. The integrated 2 port KVM switch allows switching to a second CPU directly at the console. The device also works in conjunction with DVI and DisplayPort modules. The main board provides transmission capacity for upgrade modules. Transmission according to the model via Cat X or fiber. 	R481-BHHCW R481-BHHSW
1 monitor HDMI Single Link and USB-HID, redundant data transmission CPU and CON module for redundant transmission of 1 x HDMI (Single Link) and USB-HID for keyboard and mouse. The versions with two data ports enable redundant transmission of computer signals. The device also works in conjunction with DVI and DisplayPort modules. The main boards provide transmission capacity for upgrade modules. Transmission according to the model via Cat X or fiber.		L481-BHHCR L481-BHHSR		R481-BHHCR R481-BHHSR
1 monitor HDMI Single Link and USB-HID with local HDMI-Out, redundant data transmission CPU module for redundant transmission of 1 x HDMI (Single Link) and USB-HID for keyboard and mouse. The local monitor access allows a second working station directly at the CPU. The version with two data ports enables redundant transmission of computer signals. The device also works in conjunction with DVI and DisplayPort modules. The main board provides transmission capacity for upgrade modules. Transmission according to the model via Cat X or fiber.		L481-BHHCLR L481-BHHSLR	**1 monitor HDMI Single Link and USB-HID with KVM Switch, redundant data transmission** CON module for redundant transmission of 1 x HDMI (Single Link) and USB-HID for keyboard and mouse. The integrated 2 port KVM switch allows switching to a second CPU directly at the console. The version with two data ports enables redundant transmission of computer signals. The device also works in conjunction with DVI and DisplayPort modules. The main board provides transmission capacity for upgrade modules. Transmission according to the model via Cat X or fiber. 	R481-BHHCWR R481-BHHSWR
1 monitor HDMI Single Link CPU and CON basic modules for transmission of 1x HDMI (Single Link). The devices also work in conjunction with DVI and DisplayPort modules. Transmission according to the model via Cat X or fiber. These modules can not be combined with upgrade modules.		L481-BHXC L481-BHXS		R481-BHXC R481-BHXS

Order Numbers

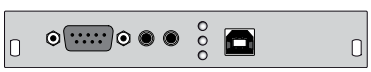
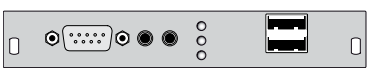
482 Draco vario Dual-Head / Dual Link

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
1 monitor DVI-D Dual Link and USB-HID				
CPU and CON main boards for transmission of 1 x DVI-D Dual Link (up to 2560 x 2048) and USB-HID for keyboard and mouse. The monitor is connected by an adapter cable. The main boards provide transmission capacity for upgrade modules. Transmission according to the model via Cat X, fiber or fiber XV. The devices also work in conjunction with HDMI and DisplayPort modules.				
4K 30Hz ULTRAHD, USB HID		L482-BDHC L482-BDHS L482-BDHX		R482-BDHC R482-BDHS R482-BDHX
1 monitor DVI-D Dual Link and USB-HID, redundant data transmission				
CPU and CON main boards for transmission of 1 x DVI-D Dual Link (up to 2560 x 2048) and USB-HID for keyboard and mouse. The versions with two data ports enable redundant transmission of computer signals. The monitor is connected by an adapter cable. The main boards provide transmission capacity for upgrade modules. Transmission according to the model via Cat X, fiber or fiber XV. The devices also work in conjunction with HDMI and DisplayPort modules.				
4K 30Hz ULTRAHD, USB HID, Redundant		L482-BDHCR L482-BDHSR L482-BDHXR		R482-BDHCR R482-BDHSR R482-BDHXR
2 monitors DVI-D Single Link and USB-HID				
CPU and CON main boards for transmission of 2 x DVI-D Single Link (Dual-Head) and USB-HID for keyboard and mouse. The monitor is connected by an adapter cable. The main boards provide transmission capacity for upgrade modules. Transmission according to the model via Cat X, fiber or fiber XV. The devices also work in conjunction with HDMI and DisplayPort modules.				
USB HID		L482-B2HC L482-B2HS L482-B2HX		R482-B2HC R482-B2HS R482-B2HX
2 monitors DVI-D Single Link and USB-HID, redundant data transmission				
CPU and CON main boards for transmission of 2 x DVI-D Single Link (Dual-Head) and USB-HID for keyboard and mouse. The versions with two data ports enable redundant transmission of computer signals. The monitor is connected by an adapter cable. The main boards provide transmission capacity for upgrade modules. Transmission according to the model via Cat X, fiber or fiber XV. The devices also work in conjunction with HDMI and DisplayPort modules.				
USB HID, Redundant		L482-B2HCR L482-B2HSR L482-B2HXR		R482-B2HCR R482-B2HSR R482-B2HXR

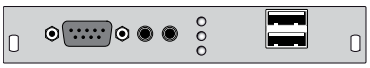
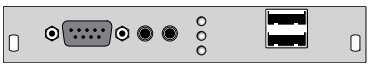
483 Draco vario DisplayPort

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
1 monitor DisplayPort Single Link and USB-HID CPU and CON main boards for transmission of 1 x DisplayPort and USB-HID for keyboard and mouse. The devices also work in conjunction with DVI and HDMI modules. The main board provides transmission capacity for upgrade modules. Transmission according to the model via Cat X, fiber or fiber XV.	 	L483-BPHC L483-BPHS L483-BPHX		R483-BPHC R483-BPHS R483-BPHX
1 monitor DisplayPort Single Link and USB-HID, redundant data transmission CPU and CON module for redundant transmission of 1 x DisplayPort and USB-HID for keyboard and mouse. The versions with two data ports enable redundant transmission of computer signals. The device also works in conjunction with DVI and HDMI modules. The main boards provide transmission capacity for upgrade modules. Transmission according to the model via Cat X, fiber or fiber XV.	 	L483-BPHCR L483-BPHSR L483-BPHXR		R483-BPHCR R483-BPHSR R483-BPHXR

Order Numbers

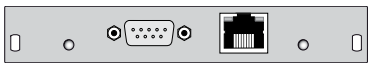
Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
USB 2.0 full-speed (embedded) CPU and CON upgrade modules for transmission of USB 2.0 full-speed (up to 36 Mbit/s). All relevant USB devices are supported, including storage media and audio. Transmission within the data stream of the main board.		L474-BXE		R474-BXE
USB 2.0 flex-speed (embedded) CPU and CON upgrade modules for transmission of USB 2.0 flex-speed (36/100 Mbit/s). Transmission within the data stream of the main board.		L474-BXE2		R474-BXE2
USB-HID CPU and CON upgrade modules for transmission of two additional USB-HID devices. Most USB-HID devices are supported, e.g. keyboads, mice, graphic tablets (WACOM) and many touch screens. Transmission within the data stream of the main board.		L474-BXH		R474-BXH
RS232, analog audio CPU and CON upgrade modules for transmission of RS232 (up to 115.2 kBaud with hardware handshake) and analog, bidirectional stereo audio for loudspeakers and microphone input with line level. Transmission within the data stream of the main board.		L474-BAX		R474-BAX
RS422, analog audio CPU and CON upgrade modules for transmission of RS422 (up to 115.2 kBaud with hardware handshake) and analog, bidirectional stereo audio for loudspeakers and microphone input with line level. Transmission within the data stream of the main board.		L474-BSX		R474-BSX
RS232, analog audio, PS/2 CPU and CON combined upgrade modules for transmission of RS232, analog audio and PS/2 keyboard/mouse. Transmission within the data stream of the main board.		L474-BAP		R474-BAP
Digital audio CPU and CON upgrade modules for transmission of digital, unidirectional audio via coaxial, mini-XLR or optical connector. Compatible to AES/EBU, S/PDIF, EIAJ CP1201, IEC 60958. Transmission of 32-96 kHz @ 24 bit. Transmission within the data stream of the main board. Compatible to HDMI / DisplayPort embedded audio.		L474-BDX		R474-BDX
Balanced audio CPU and CON upgrade modules for transmission of unidirectional 2-channel mono or 1-channel-stereo audio with 2x 6.35 jack sockets. The moduls support 48V phantom power and pre-amplification up to 65 dB. Compatible to digital audio upgrade modules and HDMI / DisplayPort embedded audio.		L474-BBX		R474-BBX
USB-HID, RS232, analog audio CPU and CON combined upgrade modules for transmission of RS232, analog audio and USB-HID. Transmission within the data stream of the main board.		L474-BAH		R474-BAH

Order Numbers

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
USB-HID, RS422, analog audio CPU and CON combined upgrade modules for transmission of RS422, analog audio and USB-HID. Transmission within the data stream of the main board.				
USB HID, RS422, Analog Audio bidirectional		L474-BSH		R474-BSH
USB-HID, digital audio CPU and CON combined upgrade modules for transmission of digital audio and USB-HID. Transmission within the data stream of the main board.				
USB HID, Digital Audio unidirectional		L474-BDH		R474-BDH
USB 2.0 full-speed, digital audio CPU and CON combined upgrade modules for transmission of digital audio and USB 2.0 full-speed (up to 36 Mbit/s). Transmission within the data stream of the main board.				
USB 2.0 Full Speed, Digital Audio unidirectional		L474-BDE		R474-BDE
USB 2.0 full-speed, RS232, analog audio CPU and CON combined upgrade modules for transmission of RS232, analog audio and USB 2.0 full-speed (up to 36 Mbit/s). Transmission within the data stream of the main board.				
USB 2.0 Full Speed, RS232, Analog Audio bidirectional		L474-BAE		R474-BAE
USB 2.0 full-speed, RS422, analog audio CPU and CON combined upgrade modules for transmission of RS422, analog audio and USB 2.0 full-speed (up to 36 Mbit/s). Transmission within the data stream of the main board.				
USB 2.0 Full Speed, RS422, Analog Audio bidirectional		L474-BSE		R474-BSE
Digital audio bidirectional CPU and CON combined upgrade modules for transmission of digital bidirectional audio. Transmission within the data stream of the main board.				
Digital Audio bidirectional		L474-BDD		R474-BDD
RS232, analog audio, digital audio CPU and CON combined upgrade modules for transmission of digital audio and RS232, analog audio. Transmission within the data stream of the main board.				
RS232, Analog Audio bidirectional, Digital Audio unidirectional		L474-BDA		R474-BDA
Push button Upgrade module for CON Units for calling OSD when keyboard is not available.	NEW			474-PUSH

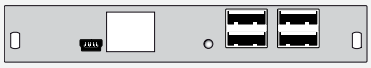
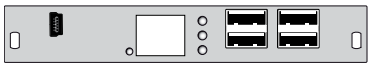
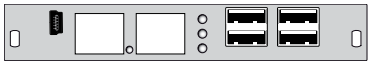
SNMP Monitoring Module

Monitoring module with SNMP (Ethernet + RS232)
Chassis configuration: expansion board suitable for 474-BODY6BP/BPF and 474-BODY21/4U.

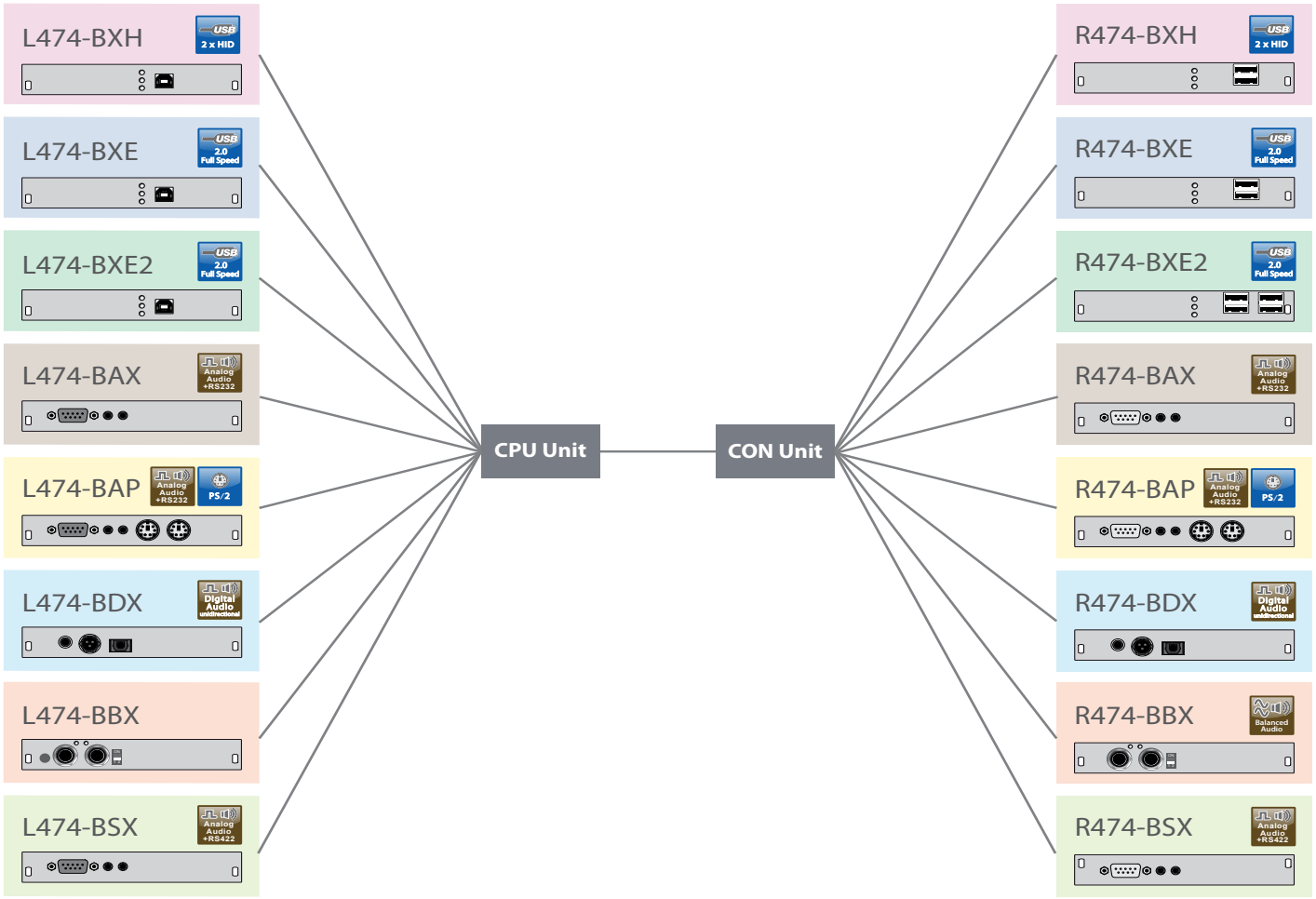


474-SNMP

USB 2.0 Modules (Standalone)

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
USB 2.0 high-speed CPU and CON upgrade modules for transmission of USB 2.0 high-speed (up to 480 Mbit/s). All relevant USB devices are supported, including storage media and audio. Transmission according to the model via Cat X or fiber.				
USB 2.0 High Speed		L474-BXUC L474-BXUS		R474-BXUC R474-BXUS
USB 2.0 high-speed CPU and CON upgrade modules for transmission of USB 2.0 high-speed (up to 480 Mbit/s). All relevant USB devices are supported, including storage media and audio. Transmission according to the model via Cat X or fiber. Plug-and-Play capable. NEW				
USB 2.0 High Speed		L474-BXEC L474-BXES		R474-BXEC R474-BXES
USB 2.0 High Speed, Redundant		L474-BXECR L474-BXESR		R474-BXECR R474-BXESR

Overview of Upgrade Modules for Draco vario Extender (Series 474, 481, 482 and 483)



Draco vario series

- Multiple product variants
- Various chassis sizes
- Redundant power supply
- All connectors on one side
- DVI, USB, RS232, PS/2 signals
- Easy to expand or to add features

Product Information

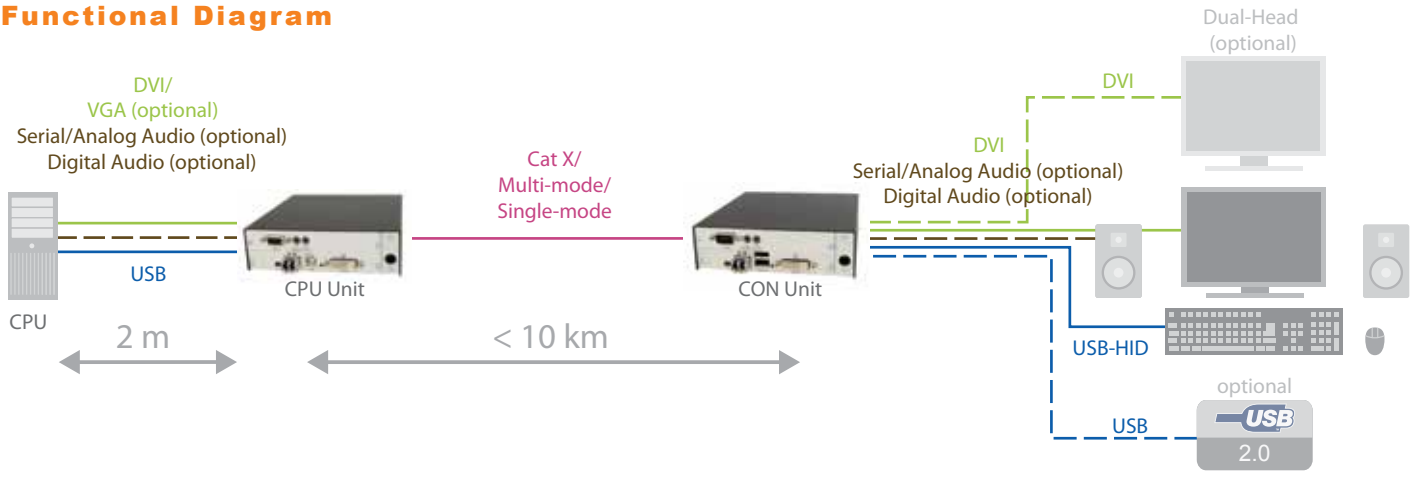
The Draco vario series of extenders and frame packages creates a unique and diverse method of flexible distribution of KVM signals including DVI, DVI-I, USB 2.0, USB-HID, RS232, RS422 as well as analog and digital audio. The Draco vario series is offered in four frame types to support the most demanding needs of long distance KVM signal transmission. Both Cat X and fiber connections are supported and each frame types provide connections for redundant power supporting critical backup requirements. The modular architecture of the Draco vario series increases flexibility by allowing the main chassis to be located in a separate room or operation center. This reduces workspace clutter while eliminating unauthorized access or theft of critical CPU data. Workspace areas are improved with reduced noise and heat pollution associated with local computers and server systems. The frames can be located up to 140 m away using Cat X or up to 10 km using fiber optic connections. All Draco vario extenders are compatible with Draco tera matrix switches.

Product Features

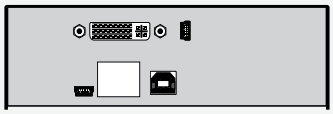
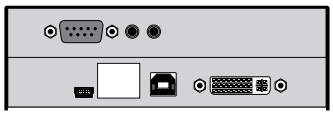
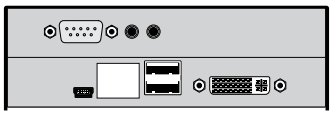
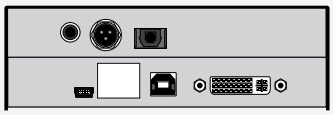
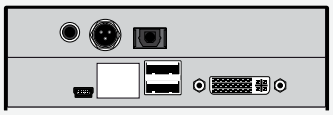
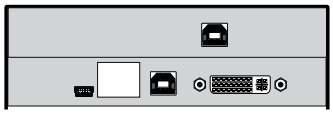
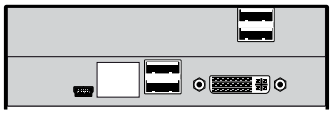
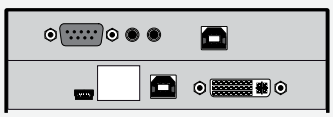
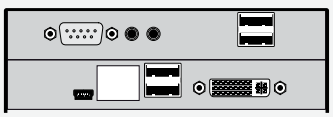
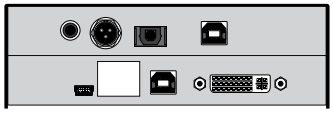
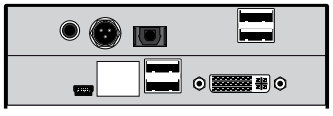
- Superior image quality in all resolutions
- Single- and Multi-Head devices are available (please note that the number of monitors per PC is limited by the number of slots)
- DVI-I / VGA device available
- Wide range of additional options:
  - Two USB ports for HID devices
  - USB 2.0 embedded/full-speed
  - Serial interface (RS232 or RS422)
  - Analog audio
  - Digital audio
- 19” rack mount kit available
- Power supply included
- All devices with redundant power supply (load-sharing) available
- Redundant data link (option)
- DVI-D fiber devices are available as XV models. Due to the increased data transmission rate a loss-free image transmission is in virtually all cases possible.

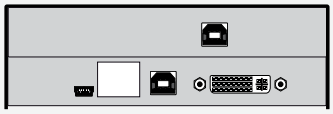
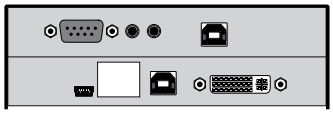
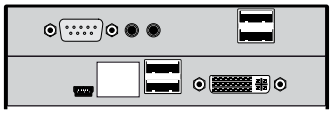
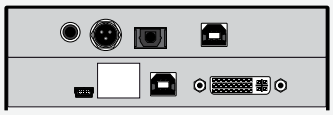
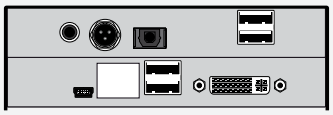
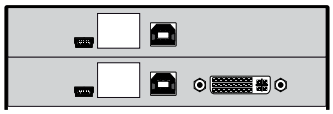
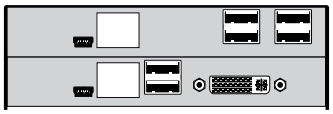
Technical Data		
Input	DVI-D (DVI-I/VGA model available)	
Output	DVI-D (DVI-I/VGA model available)	
Data rates		
Serial RS232 / RS422	Up to 115,200 baud	
Analog audio	Bidirectional stereo audio connection, 24 bit, 38.4 kHz	
Digital audio	Compatible with AES/EBU, S/PDIF, Dolby Digital, DTS, PCM, 32-96 kHz	
USB Data	USB-HID (for keyboard and mouse)	
	USB 2.0 embedded/full-speed up to 36 Mbit/s	
	USB 2.0 high-speed up to 480 Mbit/s	
Maximum Resolution	DVI Single Link: 1920 x 1200 @ 60 Hz / 24 bit 2048 x 1152 @ 60Hz / 24 bit	
Maximum Cable Distance	Cat X	140 m
	Multi-mode	1 km
	Single-mode	10 km

Functional Diagram



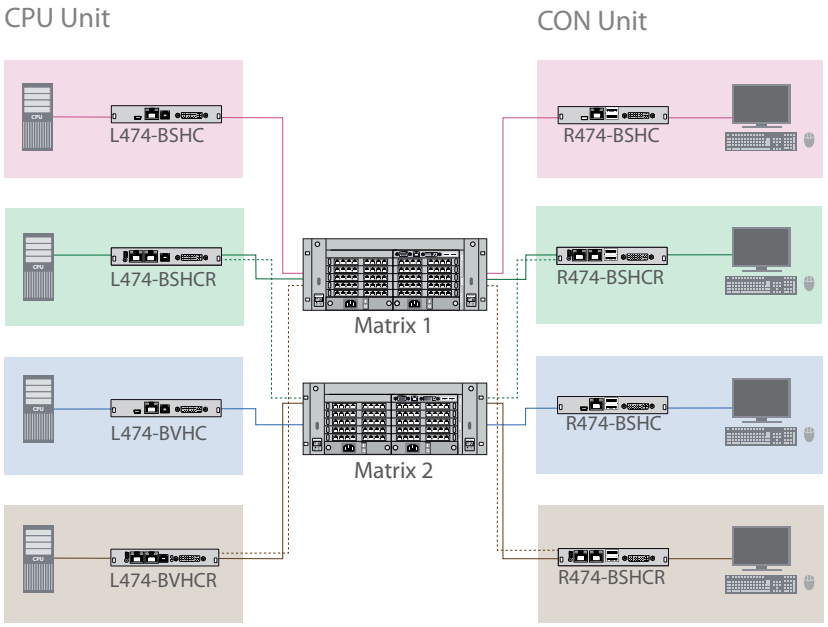
Order Numbers

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
DVI, USB HID		L474-1SHC L474-1SHS L474-1SHX		R474-1SHC R474-1SHS R474-1SHX
DVI, VGA, USB HID		L474-1VHC L474-1VHS		R474-1VHC R474-1VHS
DVI, DVI, VGA, USB HID	 With Scaler	L474-1SHCV L474-1SHSV L474-1SHXV		
DVI, USB HID, Redundant		L474-1SHCR L474-1SHSR		R474-1SHCR R474-1SHSR
DVI, VGA, USB HID, Redundant		L474-1VHCR L474-1VHSR		R474-1VHCR R474-1VHSR
DVI, USB HID, RS232, Analog Audio bidirectional		L474-1SHCA L474-1SHSA L474-1SHXA		R474-1SHCA R474-1SHSA R474-1SHXA
DVI, USB HID, Digital Audio unidirectional		L474-1SHCD L474-1SHSD L474-1SHXD		R474-1SHCD R474-1SHSD R474-1SHXD
DVI, USB HID		L474-1S4C L474-1S4S L474-1S4X		R474-1S4C R474-1S4S R474-1S4X
DVI, USB HID, RS232, Analog Audio bidirectional		L474-1S4CA L474-1S4SA L474-1S4XA		R474-1S4CA R474-1S4SA R474-1S4XA
DVI, USB HID, Digital Audio unidirectional		L474-1S4CD L474-1S4SD L474-1S4XD		R474-1S4CD R474-1S4SD R474-1S4XD

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
DVI, USB HID, USB 2.0 Full Speed		L474-1SEC L474-1SES L474-1SEX		R474-1SEC R474-1SES R474-1SEX
DVI, USB HID, USB 2.0 Full Speed, RS232, Analog Audio bidirectional		L474-1SECA L474-1SESA L474-1SEXA		R474-1SECA R474-1SESA R474-1SEXA
DVI, USB HID, USB 2.0 Full Speed, Digital Audio unidirectional		L474-1SECD L474-1SESD L474-1SEXD		R474-1SECD R474-1SESD R474-1SEXD
DVI, USB HID, USB 2.0 High Speed		L474-1SUC L474-1SUS L474-1SUX		R474-1SUC R474-1SUS R474-1SUX
DVI, USB HID, USB 2.0 High Speed, RS232, Analog Audio bidirectional	CPU Unit			L474-1SUCA L474-1SUSA L474-1SUXA
	CON Unit			R474-1SUCA R474-1SUSA R474-1SUXA
DVI, USB HID, USB 2.0 High Speed, Digital Audio unidirectional	CPU Unit			L474-1SUCD L474-1SUSD L474-1SUXD
	CON Unit			R474-1SUCD R474-1SUSD R474-1SUXD

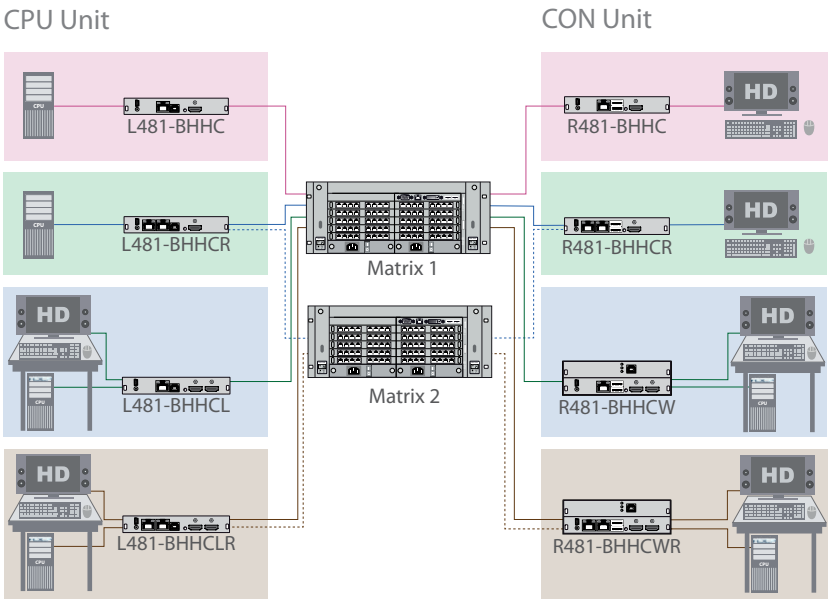
All variants can be assembled as Dual-Head and Quad-Head models.

Draco vario DVI Extender (Series 474)



- Boards also available as fiber versions (single-mode)
- Upgrades available for USB 2.0, RS232, RS422, analog audio, digital audio and PS/2

Draco vario HDMI Extender (Series 481)



- Boards also available as fiber version (single-mode)
- Upgrades available for USB 2.0, RS232, RS422, analog audio, digital audio and PS/2
- HDMI embedded audio support

Draco vario series

- HDMI Interface
- Perfect digital video quality
- Inclusive Full-HD and 2K
- Compatible with all Draco devices
- Optional local output in CPU Unit
- Optional KVM switch in CON Unit

Product Information

The Draco vario HDMI is the perfect extender for high resolution HDMI video signals of the highest quality, including 3D formats and digital audio. Multi-Head applications are achieved using an optional module. The Draco vario HDMI extender is ideal for broadcast applications as well as professional audio and video editing.

Product Features

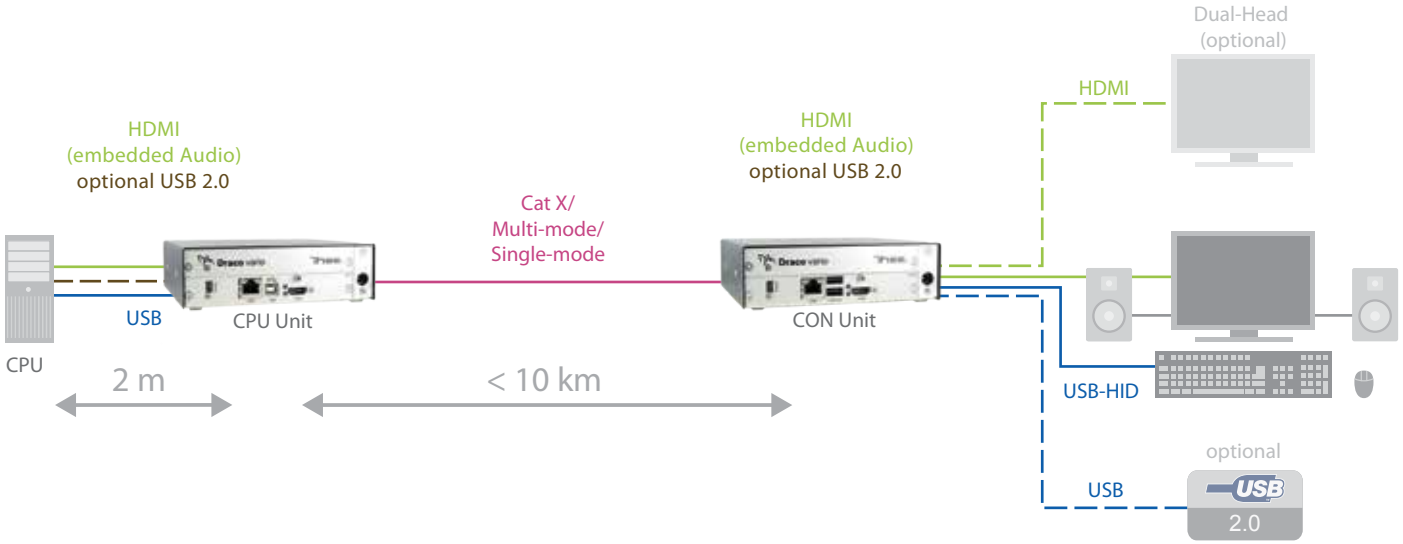
- Compatible with all chassis of the Draco vario extenders
- Compatible with all modules of the Draco vario extenders
- Lockable HDMI port
- High resolution video can be transmitted via HDMI interface
- The interface is compatible with 3D technology.
  Side-by-Side and Top-and-Bottom formats can be transmitted
- Simple keyboard commands (hot keys) for transmission of remotely connected EDID information; including permanent storage in the CPU Unit
- The standard version allows operation of a remote workstation with a HDMI/DVI-D monitor and two USB-HID devices (such as a keyboard and mouse)
- Compatible with all major operating systems
- Compatible with all IHSE Draco KVM switches as well as Draco vario and Draco compact extenders
- HDMI embedded audio is cross compatible with digital audio upgrade modules
- Fits in one 19“/1U rack

Technical Data		
Input	HDMI with embedded audio	
Output	HDMI with embedded audio	
Data rates		
Serial RS232/RS422	Up to 115,200 baud	
Analog audio	Bidirectional stereo audio connection, 24 bit, 38.4 kHz	
Digital audio	Compatible with AES/EBU, S/PDIF, Dolby Digital, DTS, PCM, 32-96 kHz	
USB Data	USB-HID (for keyboard & mouse)	
	USB 2.0 embedded / full-speed up to 36 Mbit/s	
	USB 2.0 high-speed up to 480 Mbit/s	
Maximum Resolution	DVI Single Link	All resolutions up to 1920 x 1200 @ 60Hz / 24 bit
	HDMI	1920 x 1200 @ 60 Hz Full-HD (1080 p) 2K HD (up to 2048 x 1152)
Maximum Cable Distance	Cat X	140 m
	Multi-mode	1 km
	Single-mode	10 km

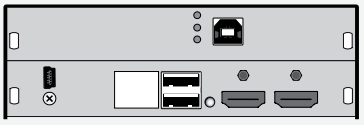
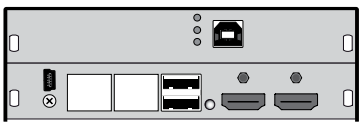
Additional Options

- CPU Unit with local output for connecting an HDMI monitor (Local Access)
- CON Unit with switchable HDMI and USB-HID inputs (KVM switch) for a local source (computer, CPU)
- Optional bi-directional analog audio and RS232, RS422 support or digital audio with cinch/TOSLINK/mini-XLR connectors for professional audio applications
- Transparent USB 2.0 support for USB devices including printers, scanners, hard drives, memory sticks, audio devices, etc.

Functional Diagram



Order Numbers

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
HDMI, HID		L481-1HHC L481-1HHS		R481-1HHC R481-1HHS
HDMI, HID, Redundant		L481-1HHCR L481-1HHSR		R481-1HHCR R481-1HHSR
HDMI, Local HDMI, HID	 With integrated Local-Video-Access	L481-1HHCL L481-1HHSL		
HDMI, Local HDMI, HID, Redundant	 With integrated Local-Video-Access	L481-1HHCLR L481-1HHSLR		
HDMI, KVM Switch, HID			 KVM Switch functionality included	R481-1HHCW R481-1HHSW
HDMI, KVM Switch, HID, Redundant			 KVM Switch functionality included	R481-1HHCWR R481-1HHSWR

Dual-Head/Dual Link Extender

Completely assembled to one system

Draco vario series

- Resolutions up to 2560 x 2048 and 4K
- Dual-Head for two DVI Single Link monitors
- Data transmission via Cat X or fiber
- DMS-59 adapter included
- Option for redundant path interconnects

Product Information

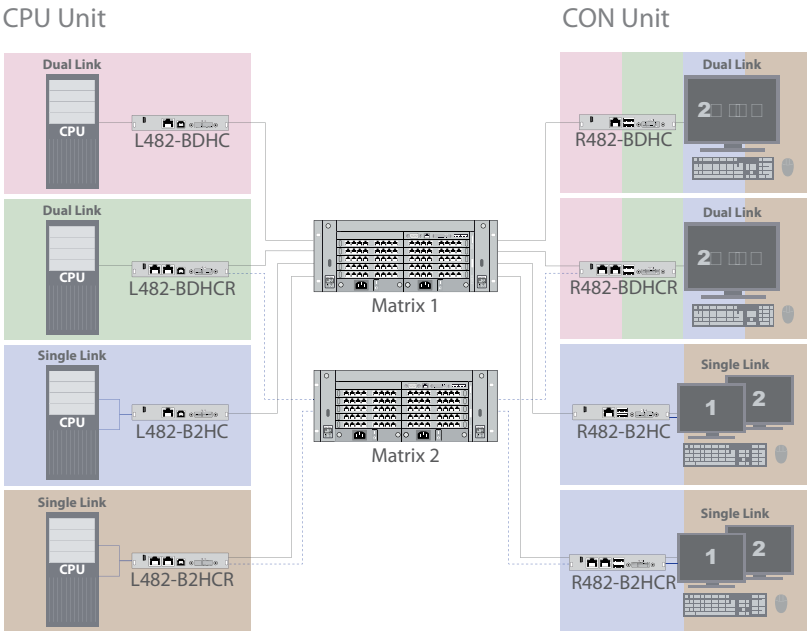
The Draco vario Dual-Head KVM extender enables the connection of two DVI monitors over a single Cat X or fiber cable, saving the expense of a second extender and reducing cabling cost and installation effort. When used in conjunction with KVM matrix systems, the Draco vario Dual-Head KVM extender saves valuable matrix ports. Its sister product, the Draco vario Dual Link KVM extender, enables the transmission of DVI signals to one single monitor up to 4K resolution. Extension of signals requires a single data cable. The extenders are compatible with regular Single-Head/Single extenders: Consoles can access Single-Head/Single Link CPU Units instantaneously. In this situation, signals from Single-Head/Single Link sources are embedded within the Dual Link signal format and can be switched with no discernible switching delay. Single-Head/Single Link images are displayed at their own native resolution within a blanked area on-screen.

Product Features

- Excellent image quality at all resolutions
- Compatible with all major operating systems
- Compatible with all IHSE Draco KVM switches
- Only one KVM matrix port per unit required
- Wide range of additional options:
  - Two USB ports for HID devices
  - USB 2.0 embedded/full-speed
  - Serial interface (RS232 or RS422)
  - Analog audio
  - Digital audio interface
  - DVI-D
- 19” rack mount kit available
- All devices with redundant power supply (load-sharing) available

Technical Data		
Input	DMS-59 (DVI-D Dual-Head/Single Link adapter) DMS-59 (DVI-D Dual Link adapter)	
Output	DMS-59 (DVI-D Dual-Head/Single Link adapter) DMS-59 (DVI-D Dual Link adapter)	
Resolution (max.)	For Draco vario Dual-Head up to 2 x 1920 x 1200 For Draco vario Dual Link up to 2560 x 2048 @ 60Hz or 4K @ 30 Hz	
Data Rate (max.)	2 x 165 MPixel/s (Dual-Head) 330 MPixel/s (Dual Link)	
Distance (max.)	Single-mode fiber (9 µ) Single-mode fiber XV (9 µ) Cat X	10.000 m 5.000 m 140 m
Optional Interfaces	USB 2.0, analog audio with RS232, digital audio, PS/2, etc.	
Keyboard/Mouse	USB-HID	

KVM Operating Modes



Draco vario Dual Link

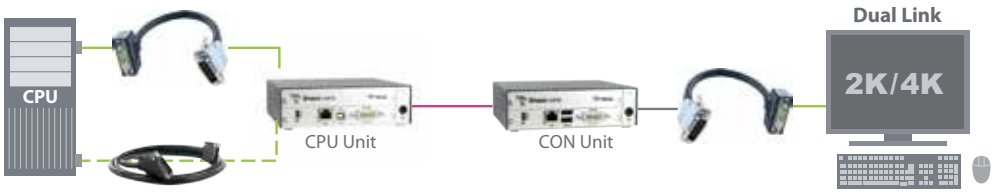
DMS-59 port for 1 x DVI-D Dual Link

Resolutions up to 4096 x 2160 (4K)

Order Numbers

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
4K 30Hz ULTRAHD, USB HID		L482-1DHC L482-1DHS L482-1DHX		R482-1DHC R482-1DHS R482-1DHX
4K 30Hz ULTRAHD, USB HID, Redundant		L482-1DHCR L482-1DHSR L482-1DHXR		R482-1DHCR R482-1DHSR R482-1DHXR

Functional Diagram



Optional cable:
DMS-59 > DMS-59
(see Accessories on page 57)

Draco vario Dual-Head

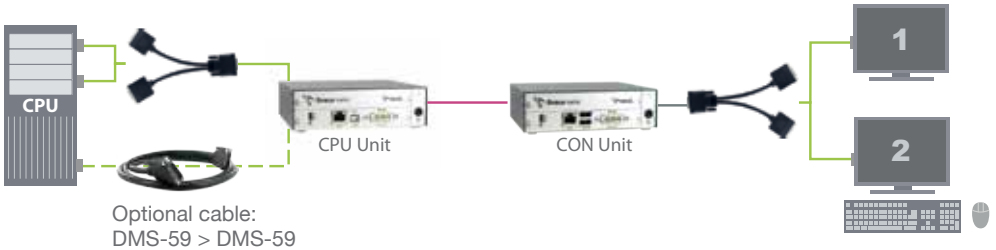
DMS-59 port for 2 x DVI-D Single Link

Resolutions up to 2 x 1920 x 1200

Order Numbers

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
USB HID		L482-2SHC L482-2SHS L482-2SHX		R482-2SHC R482-2SHS R482-2SHX
USB HID, Redundant		L482-2SHCR L482-2SHSR L482-2SHXR		R482-2SHCR R482-2SHSR R482-2SHXR

Functional Diagram



Optional cable:
DMS-59 > DMS-59
(see Accessories on page 57)

Draco vario series

- Resolutions up to 2560 x 2048 and 4K
- Compatible with all Draco devices
- Combined video and audio transmission
- Data transmission via Cat X, fiber or fiber XV
- Redundant power supply

Product Information

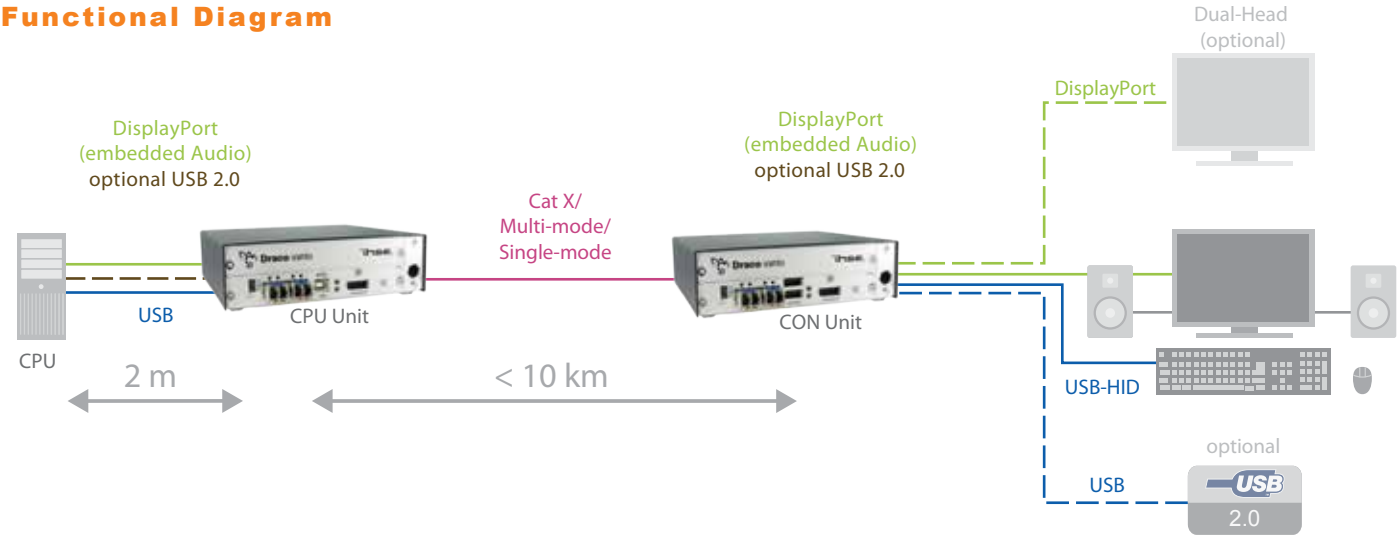
The Draco vario DisplayPort enables the transmission of high definition video and audio data over the cutting-edge DisplayPort interface. They are compatible with Draco tera KVM matrix switches and cross-compatible with the DVI and HDMI extender series for video and USB-HID extension. Transmission of fully-digital video signals (including 3D video in full-HD) is supported in 4K resolutions up to 4096 x 2160 and 3840 x 2160. The DisplayPort extender supports all regular digital audio standards. This eliminates the need for additional audio modules, enabling playback of the audio signal through monitors with integrated loudspeakers. Integration of optional upgrade modules for digital audio input and output is also possible. The DisplayPort extenders are available in single and redundant path variants.

Product Features

- Compatible with all chassis and modules of the Draco vario extenders
- Transmission of fully-digital video signals up to 4K (4096 x 2160)
- The audio format PCM can be transfered with a sample rate up to 96 kHz via the DisplayPort interface
- Other audio formats are available via a firmware update
- Simple keyboard commands (hot keys) for transmission of remotely connected monitors' EDID information
- The standard version allows operation of a remote workstation with a DisplayPort monitor and USB HID devices (such as a keyboard and mouse)
- Compatible with all major operating systems
- Compatible with all IHSE Draco KVM switches as well as Draco vario and Draco compact extenders
- Fits in one 19"/1U rack

Technical Data		
Input	DisplayPort	
Output	DisplayPort	
Resolution (max.)	1920 x 1200 @ 60 Hz 2560 x 2048 @ 60 Hz 3840 x 2160 @ 30 Hz (24 bit) - UHD 4096 x 2160 @ 30 Hz (24 bit) - 4K DCI	
Distance (max.)	Single-mode fiber (9 µ) Single-mode fiber XV (9 µ) Cat X	10.000 m 5.000 m 140 m
Optional Interfaces	USB 2.0, USB transparent, analog audio with RS232, digital audio, PS/2, etc.	
Keyboard / Mouse	USB-HID	

Functional Diagram



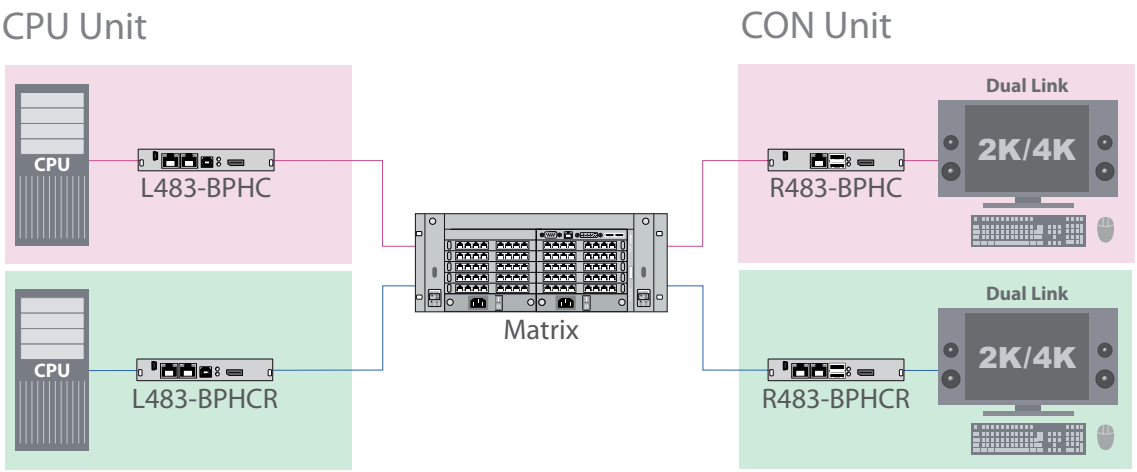
Order Numbers

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
DisplayPort, 4K 30 Hz ULTRAHD, USB HID		L483-1PHC L483-1PHS L483-1PHX		R483-1PHC R483-1PHS R483-1PHX
DisplayPort, 4K 30 Hz ULTRAHD, USB HID, Redundant		L483-1PHCR L483-1PHSR L483-1PHXR		R483-1PHCR R483-1PHSR R483-1PHXR

The Draco vario DisplayPort is designed for the use with Draco tera KVM switches and can be installed in all Draco vario chassis. It is compatible to all Draco vario extenders and optional upgrade modules, allowing completely free configurations.

Draco vario DisplayPort Extender (Series 483)

2K/4K-DisplayPort KVM Extender



- Boards also available as Mix & Match fiber versions (single-mode) and high-speed XV fiber versions
- Upgrades available for USB 2.0, RS232, RS422, analog audio, digital audio, PS/2

Draco ultra DP
Series 490

DisplayPort Extender
Completely assembled to one system

- Resolutions up to 4096 x 2160 @ 60Hz
- 24 bit, 4:4:4, Deep Color ready
- Lossless transmission
- No frame drops
- Data transmission via Cat X, fiber or fiber XV
- Combined video and audio transmission
- All connectors on one side
- Redundant power supply

Product Information

The Draco ultra DP extender enables the operation of CPUs from a remotely located workstation including DisplayPort monitor, keyboard and pointing device over a single fiber connection. Transfer of fully-digital video is supported in 4K resolutions up to 4096 x 2160 and 3840 x 2160 at a real 60-Hz refresh rate and full color depth (24 bit, 4:4:4). The KVM extender also supports audio transmission via the DisplayPort interface. Integration of optional Draco vario upgrade modules for digital audio input and output as well as data signals, such as USB 2.0 and RS232 is also possible.

Product Features

- Operation of CPUs from a remote workstation with a DisplayPort monitor and USB HID devices (such as a keyboard and mouse)
- Transmission of fully-digital video signals up to 4K DCI (4096 x 2160) and UHD (3840 x 2160) up to 60 Hz
- New lossless video codec (visually), no frame drops, full color depth (24 bit (4:4:4), deep color ready)
- PCM audio format can be transferred via the DisplayPort interface (up to 96 kHz)
- Transmission of monitor DDC information by hotkey; including permanent storage on the CPU Unit
- Embedded mode for lower video resolutions allows instant switching via Draco tera
- Optional: Redundant data link for 24/7 availability
- Compatible with:
  - with all major operating systems
  - with all chassis in the Draco vario series
  - with all IHSE Draco KVM matrix switches
  - with all Draco vario upgrade modules for audio and data signals such as USB or RS232 (not compatible with video modules)

Technical Data		
Input	DisplayPort	
Output	DisplayPort	
Resolution (max.)	1920 x 1200 @ 60 Hz 2560 x 2048 @ 60 Hz 3840 x 2160 @ 60 Hz (24 bit) - UHD 4096 x 2160 @ 60 Hz (24 bit) - 4K DCI	
Distance (max.)	Single-mode fiber (9 µ) Single-mode fiber XV (9 µ) Cat X	10.000 m 5.000 m 140 m
Audio (embedded)	Stereo Linear Pulse Code Modulation (LPCM), 2-channel PCM	
Optional Interfaces	USB 2.0 (High-Speed or Full-Speed), analog audio with RS232 or RS422, digital audio, PS/2	
Keyboard/Mouse	USB-HID	

Integration of Fraunhofer IIS's lightweight coding technology into next-generation KVM extenders

The Draco ultra DP is the first ever KVM extender that uses Lici®, Fraunhofer IIS' Lightweight Image Coding technology. Lici® ensures brilliant image quality at the highest video resolutions with outstanding color accuracy.

Lici® (Lightweight Image Coding technology)

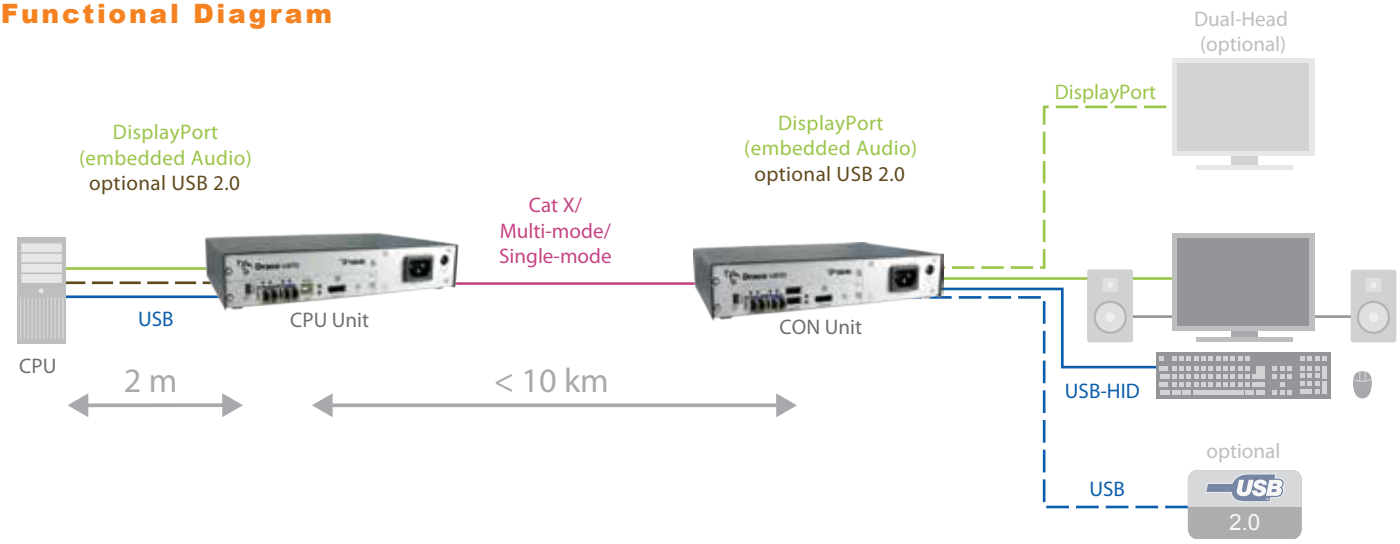
- Mezzanine compression up to mathematically lossless
- RGB/YCbCr or raw data compression
- Up to 32 bit color depth
- 2K/4K/8K possible
- No frame drops
- Low latency

Gefördert durch:

Bundesministerium für Wirtschaft und Technologie

aufgrund eines Beschlusses des Deutschen Bundestages

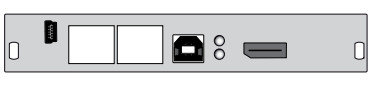
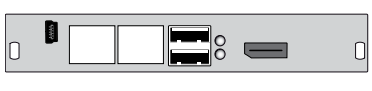
Functional Diagram



Order Numbers

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
DisplayPort, 4K 60 Hz ULTRAHD, USB HID		L490-1PHC L490-1PHS L490-1PHX		R490-1PHC R490-1PHS R490-1PHX
DisplayPort, 4K 60 Hz ULTRAHD, USB HID, Redundant		L490-1PHCR L490-1PHSR L490-1PHXR		R490-1PHCR R490-1PHSR R490-1PHXR

Main Boards

Functions	CPU Unit (Local)	Part No.	CON Unit (Remote)	Part No.
1 monitor DisplayPort Single Link and USB-HID CPU and CON main boards for transmission of 1 x DisplayPort and USB-HID for keyboard and mouse. The main board provides transmission capacity for upgrade modules. Transmission according to the model via Cat X, fiber or fiber XV.				
DisplayPort, 4K 60 Hz ULTRAHD, USB HID		L490-BPHC L490-BPHS L490-BPHX		R490-BPHC R490-BPHS R490-BPHX
1 monitor DisplayPort Single Link and USB-HID, redundant data transmission CPU and CON module for redundant transmission of 1 x DisplayPort and USB-HID for keyboard and mouse. The versions with two data ports enable redundant transmission of computer signals. The main boards provide transmission capacity for upgrade modules. Transmission according to the model via Cat X, fiber or fiber XV.				
DisplayPort, 4K 60 Hz ULTRAHD, USB HID, Redundant		L490-BPHCR L490-BPHSR L490-BPHXR		R490-BPHCR R490-BPHSR R490-BPHXR

Configuration of order numbers for Draco vario extenders

L474 - 1 S H C A V
R474 -

Additional Function (can be omitted)

V	VGA Input / Output
R	Redundant
L	Local video access
W	KVM switch functionality

Audio (can be omitted)

A	Analog audio (bidi) + RS232
D	Digital audio
B	Balanced audio

Cable Type

C	Cat X
S	Single-mode
X	Single-mode XV (3G)

USB Connectors

H	2 x USB-HID
U	4 x USB 2.0 +2 x USB-HID
E	2 x USB 2.0 embedded (full-speed)
E2	4 x USB 2.0 embedded (full-speed)
4	4 x USB-HID
L	Link module (for USB 2.0 standalone)

Resolution

S	Single Link (HD/up to 1920 x 1200)
D	Dual Link (2K/up to 2560 x 2048)
H	HDMI (2K/up to 2048 x 1152)
P	DisplayPort (UHD/up to 3840 x 2160, 4K DCI/up to 4096 x 2160)

Number of monitors or board version

1	Single-Head
2	Dual-Head
B	Board version

Draco vario and Draco ultra series

474	vario DVI
481	vario HDMI
482	vario Dual-Head/Dual Link
483	vario DisplayPort (up to 4K @ 30 Hz)
490	ultra DisplayPort (up to 4K @ 60 Hz)

Device type

L	Local (CPU Unit)
R	Remote (CON Unit)

Draco vario series

Rack Mount Hardware and Power Supplies

Order Numbers

Product	Part No.
VESA mounting plate to mount by screws	477-VESA
Blind plate for all chassis models	474-BLND1
Fastening strips for screw-on mounting	474-VPLATE
Fastening strips for snap-on mounting	474-VSNAP
19”/1 RU rack mount kit for 2 and 4 bay chassis	474-VRMK
Mounting bracket for 2/4/6 bay chassis (L-brackets with screw slots)	474-BRACKET
Rack mount kit for 2 bay vario chassis with internal PSU	474-2NRMK
Rack mount kit for 2 bay vario chassis	474-2RMK
Rack mount kit for 4 bay vario chassis	474-4RMK
Rack mount kit for 6 bay vario chassis	474-6RMK
Power supply for 2 bay chassis (spare part or redundancy)	474-PSU2
Power supply for 4 bay chassis (spare part or redundancy)	474-PSU4
Power supply for 6 bay chassis (spare part or redundancy)	474-PSU6
Power supply for 19” rack (spare part or redundancy)	474-PSU21
Chassis fan for 474-BODY6BP and 474-BODY6BPF	474-6FAN
DMS-59 > DMS-59 connector, 180 cm, Dual-Head, 2x DVI-D Single Link Wiring	436-DMS2
DMS-59 > DMS-59 connector, 100 cm, Dual-Head, 2x DVI-D Single Link Wiring	436-DMS1

Notes

Converters, Repeaters, CWDM

Contents

Draco Video Converter Converting of analog video signals into DVI signals	**Series 238**	**60**
DVI / VGA Converter Converting DVI into VGA	**Series 469**	**63**
2 x DVI Splitter Cable Input and output DVI-D splitter cable	**Series 445**	**63**
Draco vario Repeater Range extension and format conversion of digital signals	**Series 485**	**64**
Draco CWDM Combine and transmit up to 4/8 data streams over a single duplex single-mode fiber	**Series 470**	**66**
USB to PS/2 and PS/2 to USB Converter Converting USB-HID into PS/2 / PS/2 into USB-HID	**Series 436**	**68**

Draco Video
Series 238

Converter

- Suitable input sources
- S-Video, Component-Video, FBAS
- CGA, EGA, MDA, VGA
- SDI, HD-SDI, DVI
- RGB, RGBS, RGBHV
- 160 preinstalled video modes
- Integrated scaler

Product Information

The Draco Video Converter series allows the continued use of legacy equipment through the conversion of RGB/VGA/Media signals to digital DVI signals. Modern digital displays can be connected to analog VGA sources. The converter automatically recognizes all legacy VGA resolutions up to 1920 x 1200. An internal scaler re-scales incoming video to a suitable resolution. The Draco Video Converter reduces time and installation costs by allowing existing analog computers to be operated with digital displays.

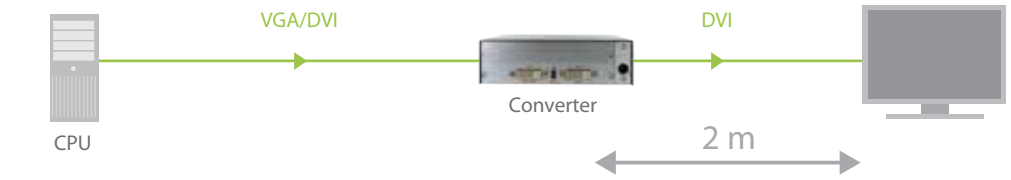
Product Features

- Converting many common and the most special video signals into DVI-D
- User-friendly OSD
- Multiple input formats such as S-Video, Component, Composite, VGA, SDI, HD-SDI, DVI RGB, MDA, CGA, EGA
- Optional: S-Video, Component-Video, MDA, CGA, EGA
- Optional: S-Video, Component-Video, SDI or HD-SDI
- 160 preinstalled Video Modes
- Integrated Scaler
- Scaling Options up to Full HD
- Package contents according to device type:
  - Draco Videoconverter
  - EGA connection cable
  - VGA connection cable
  - Component Video connection cable
  - S-Video connection cable
  - SDI connection cable
  - IR remote control
  - External power supply unit
- Combinable with extenders and chassis of the Draco vario series

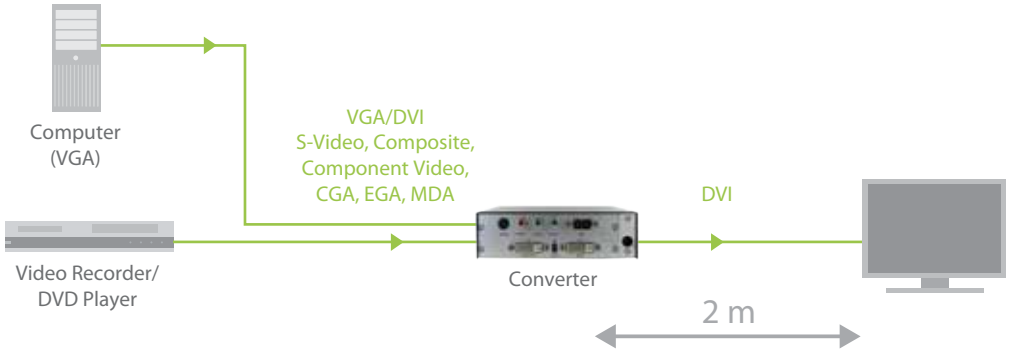
Technical Data	
Power Supply (external)	90-240VAC / 0.5 A / 47-63 Hz 5VDC
Maximum Resolution (output)	DVI-D 1920 x 1200 @ 60Hz
Dimensions	103 x 143 x 29 (42) mm
Video frequency for K238-5FBNC (input)	15-80 kHz horizontal 50-80 Hz vertical

Functional Diagram

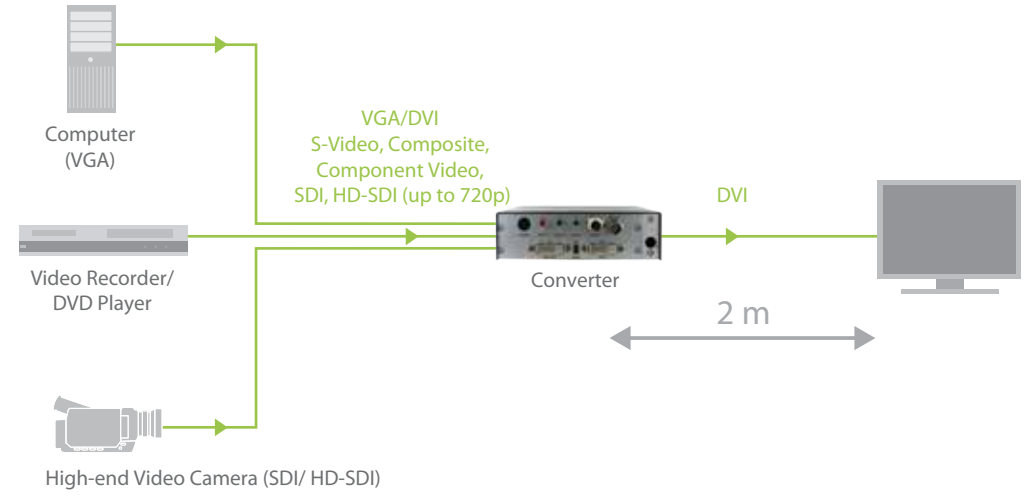
Draco Video Converter (VGA-DVI) / K238-5V



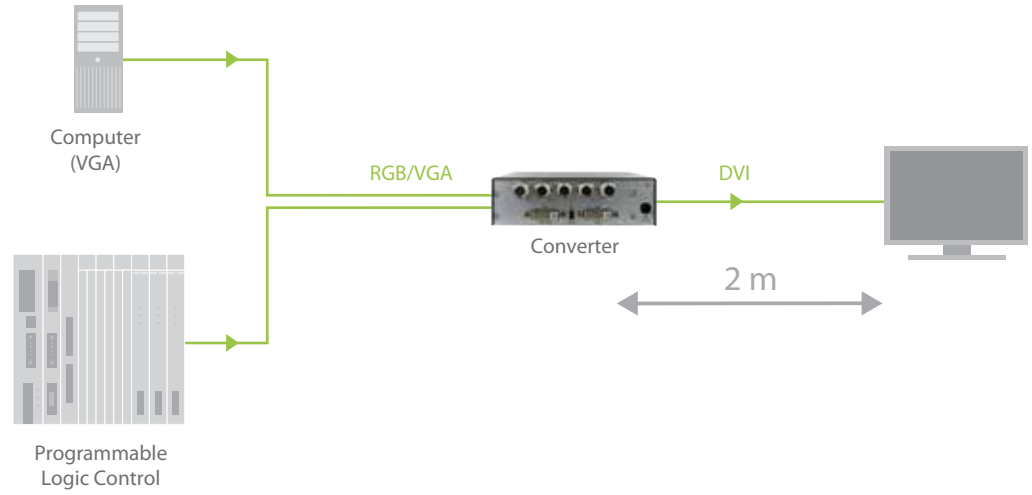
Draco Video Converter (Video) / K238-5VE



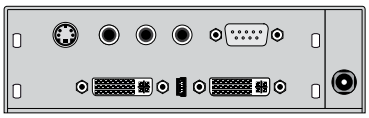
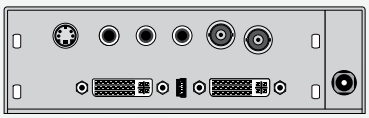
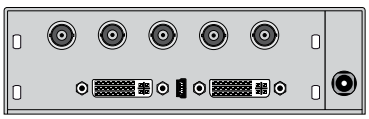
Draco Video Converter (SDI) / K238-5VS



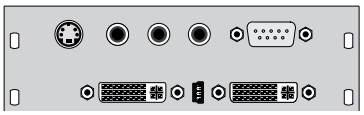
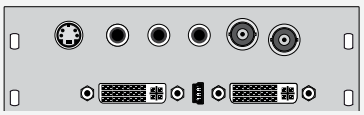
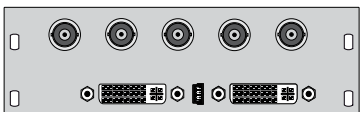
Draco Video Converter (RGB-DVI) / K238-5FBNC



Order Numbers

Products	Functions	CPU Unit (Local)	Part No.
Draco Video Converter VGA-DVI	Converts VGA into DVI		K238-5V
Draco Video Converter Video	Converts VGA, FBAS, Y/C, MDA, CGA or EGA into DVI		K238-5VE
Draco Video Converter SDI	Converts VGA, FBAS, Y/C or (HD-) SDI into DVI		K238-5VS
Draco Video Converter RGB-DVI	Converts VGA or RGB into DVI		K238-5FBNC

Board versions

Products	Functions	CPU Unit (Local)	Part No.
Draco Video Converter module VGA-DVI	Converts VGA into DVI		C474-BVGA
Draco Video Converter module Video	Converts VGA, FBAS, Y/C, MDA, CGA or EGA into DVI		C474-BVID
Draco Video Converter module SDI	Converts VGA, FBAS, Y/C or (HD-) SDI into DVI		C474-BSDI
Draco Video Converter module RGB-DVI	Converts VGA or RGB into DVI		C474-BBNC

Board versions for use in Draco vario chassis chassis (page 36) and mounting accessories for free configuration (page 57).
Our sales team will be happy to provide you with an individual offer and answer your questions.

Rack Mount Hardware and Mounting Brackets

Products	Part No.
19” rack mount kit for one device	474-2RMK
19” rack mount kit for up to three device	474-VRMK
Mounting bracket to mount by screws	474-BRACKET

Cable and Optional Accessories

Products	Part No.
VGA connection cable 1.8 m (VGA to DVI-I)	436-AA
RGB connection cable 2.0 m (5 bay BNC connector)	238-BNC
EGA connection cable 1.8 m (D-Sub 9 socket to D-Sub 9 connector)	238-EGA
Component Video connection cable 1.5 m (3 bay RCA connector)	238-RCA
S-Video connection cable 3.0 m (Mini DIN connector, 4-pole)	238-SV
SDI connection cable 2.0 m (BNC connector to BNC connector)	238-SDI
International power supply 100-240VAC/5VDC (spare part)	260-5G

Converter

DVI / VGA
Series 469

- Easy Installation
- Converts DVI-D into VGA
- DVI Single Link
- Max. 1920 x 1200 / 60 Hz

Product Information

This device converts DVI signals to VGA format. The DVI/VGA Converter can be used with a VGA/KVM switch or to convert a DVI source for a high quality VGA device such as a projector. Received DVI signals are converted 1:1 without modifying the resolution or signal frequency. The receiving device must be able to display the generated signals, e.g. 60 Hz or "reduced blanking" at highest resolutions of up to 1920 x 1200.

Product Features

- Supported input signals: DVI-D up to 1920 x 1200 @ 60 Hz
- Shipping includes:
  - DVI to VGA converter
  - DVI cable to connect to CPU
  - International PSU
- Power supply included as external power supply units

Technical Data	
Power Supply (external)	90-240VAC / 0.5 A / 47-63 Hz 5VDC
Data rates (input)	22-95 kHz horizontal 48-90 Hz vertikal Video range: 170 MHz
Maximum Resolution (output)	VGA input resolutions/ frequencies
Dimensions	51 x 74 x 26 mm

Products	Part No.
DVI to VGA Converter	K469-DV

2-Port DVI Splitter Cable

Series 445

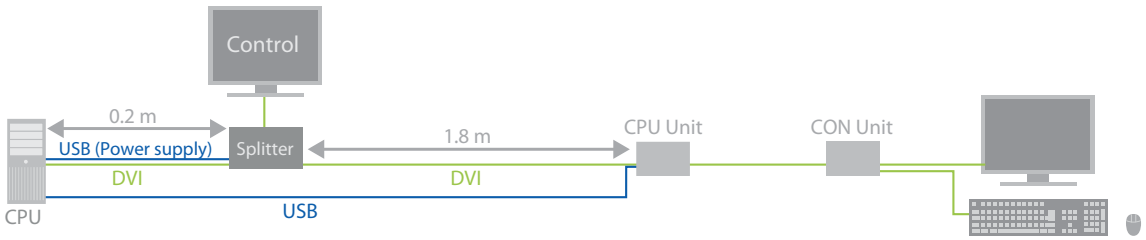
- Easy Installation
- Input / output: DVI-D
- Power supply via USB
- Connections for 2 DVI monitors

Product Features

- DVI signal output for two display units
- Determine which DDC information is transmitted by pressing a button
- Transmission of the DDC information
- DVI connecting cable is fixed / included
- Power supply via USB connection

Technical Data	
Maximum Resolution	DVI Single Link 1920 x 1200 @ 60 Hz / 24 bit
Dimensions	Cable length: 0.2 / 1.8 m 100 x 49 x 23 mm

Functional Diagram



Products	Part No.
2 x DVI splitter cable	445-2H

- Doubling of cable length
- Electrical/optical conversion
- Bidirectional data ports
- No configuration needed
- Compatible with all Draco KVM products

Product Information

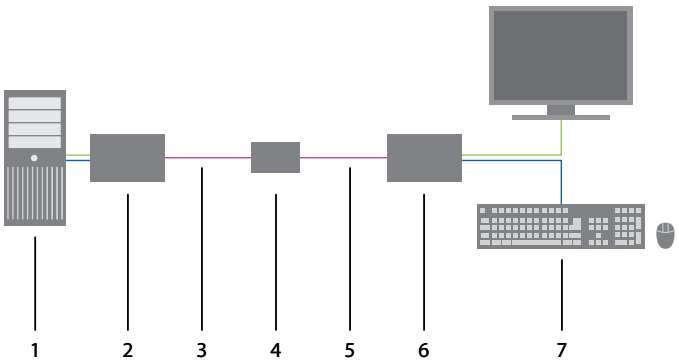
The installation of repeaters at intervals within a signal path extends the distance the signal can be transmitted to further distance via Cat X and fiber cable. The Draco vario repeater also incorporates cross-conversion between Cat X and fiber cables. Signals available on a Cat X network may be converted to fiber for transmission and converted back to Cat X at the receiver (or vice-versa). High-quality signal processing and integral amplification ensure no signal degradation or transmission artifacts. Both device options can be deployed between extenders and between extender and matrix. The devices support our Flex-Port technology. Cat X and fiber ports will automatically configure as input or output according to the connected devices. No additional configuration is required. Please not that the scope of delivery includes only a board (without chassis). Single- and dual-repeater board versions are available for installation in Draco vario frame chassis.

Product Features

- Doubling of cable length
- Electrical/optical conversion
- Bidirectional data ports
- No configuration needed
- Compatible with all Draco KVM products
- Scope of delivery: Board (for mounting in Draco vario chassis)

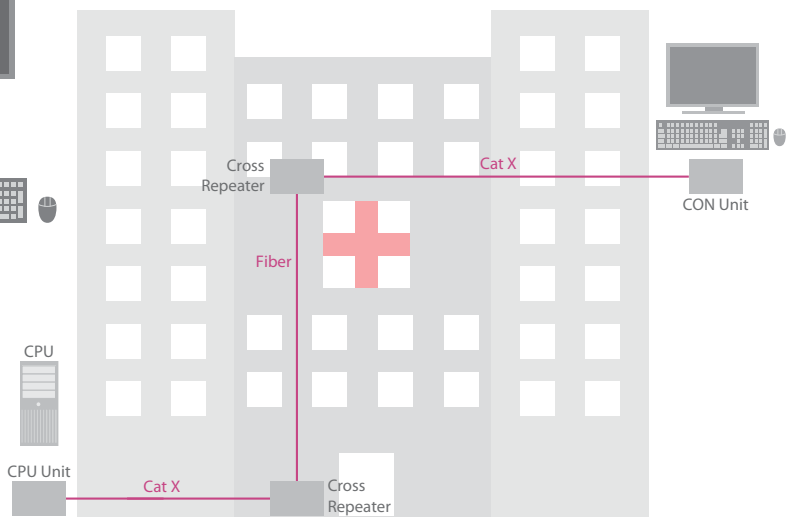
Technical Data	
Distances	max. 2 x 140 m Cat X
	max. 2 x 10 km single-mode fiber (9µ)
Input	Cat X, single-mode fiber
Output	Cat X, single-mode fiber

Functional Diagram



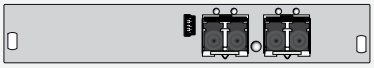
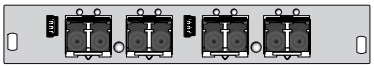
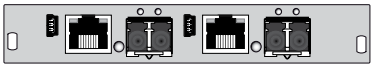
Repeater Function (optional: Media Conversion)

1. Source (computer, CPU)
2. KVM Extender CPU Unit
3. Interconnect cable (Cat X)
4. Draco vario (Cross) Repeater
5. Interconnect cable (Cat X / fiber)
6. KVM Extender CON Unit
7. Console (monitor, keyboard, mouse)



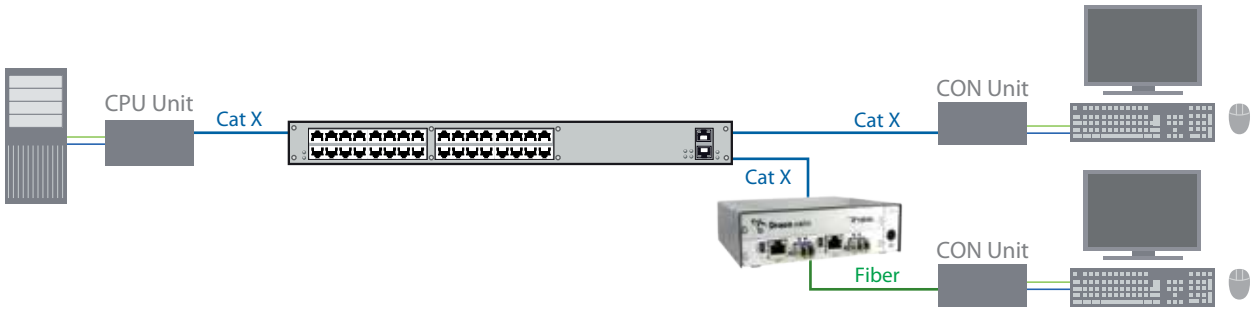
Application: In many large buildings the horizontal cabling is done with Cat X cables and the vertical cabling with fiber cables. If you use Cross Repeaters, this application will be handled perfectly. The Cross Repeater is also very suitable for the connection between two buildings.

Order Numbers

Products		Part No.
Repeater module Cat X		485-BC
Dual repeater module Cat X		485-BCC
Repeater module fiber		485-BS
Dual repeater module fiber		485-BSS
Repeater module Cat X/fiber		485-BX
Dual repeater module Cat X/fiber		485-BXX

The cross repeater works with Draco vario extenders with the redundant option. The cross repeater is installed in a secondary path to provide back-up to the primary KVM matrix switch. In the event of failure, signals are transmitted from the transmitter to the receiver through the cross repeater, bypassing the matrix.

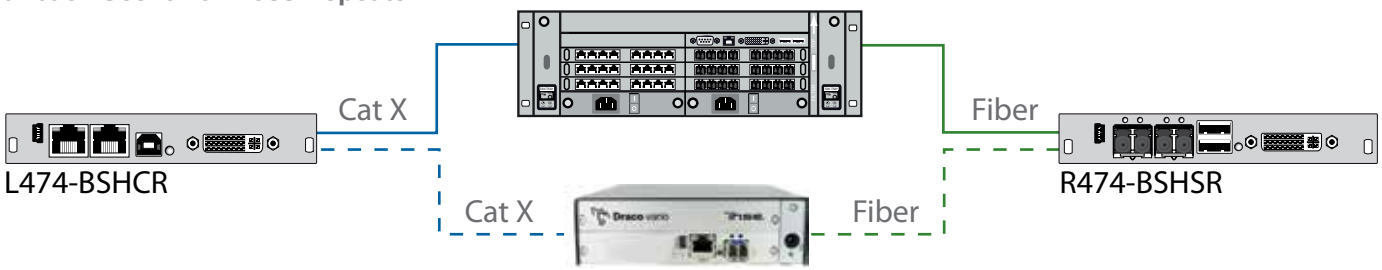
The Draco vario Repeater family features bidirectional data ports: Cat X and fiber ports are individually usable as inputs or outputs. No additional configuration is required. Single- and dual-repeater board versions are available for installation in Draco vario frame chassis.



The cross repeater allows the inter-connection of single fiber consoles to plain Cat X switching systems by cross-conversion between Cat X and fiber signals. This is beneficial in Cat X switching environments in which a small number of workstations need to be connected via fiber cables to achieve long distance capability.

Redundancy Concept

Fallback Scenario Cross Repeater



The cross repeater works with Draco vario extenders with the redundant option. The cross repeater is installed in a secondary path to provide back-up to the primary KVM matrix switch. In the event of failure, signals are transmitted from the transmitter to the receiver through the cross repeater, bypassing the matrix.

Please find suitable boards and chassis models for free configuration from page 34 and mounting accessories on page 57 .

Draco CWDM
Series 470

- 4, 8 or 16 channels over a single fiber connection
- Passive unit requires no power supply
- New design for integration in Draco vario chassis
- Signal type agnostic
- Update for Draco extenders and Draco switches

SFP modules are available in various wavelengths on request.

Product Information

Draco CWDM multiplexers minimize the total number of long interconnection cables and cabling effort. CWDM (Coarse Wavelength-Division Multiplexing) is a technology which multiplexes a number of optical fiber signals onto a single optical fiber by using different wavelengths. Using specific SFP modules (small form-factor pluggable) the bi-directional passive optical pair of multiplexer and demultiplexer allows up to 4, 8 or 16 different wavelengths to pass through a single optical single-mode fiber channel.

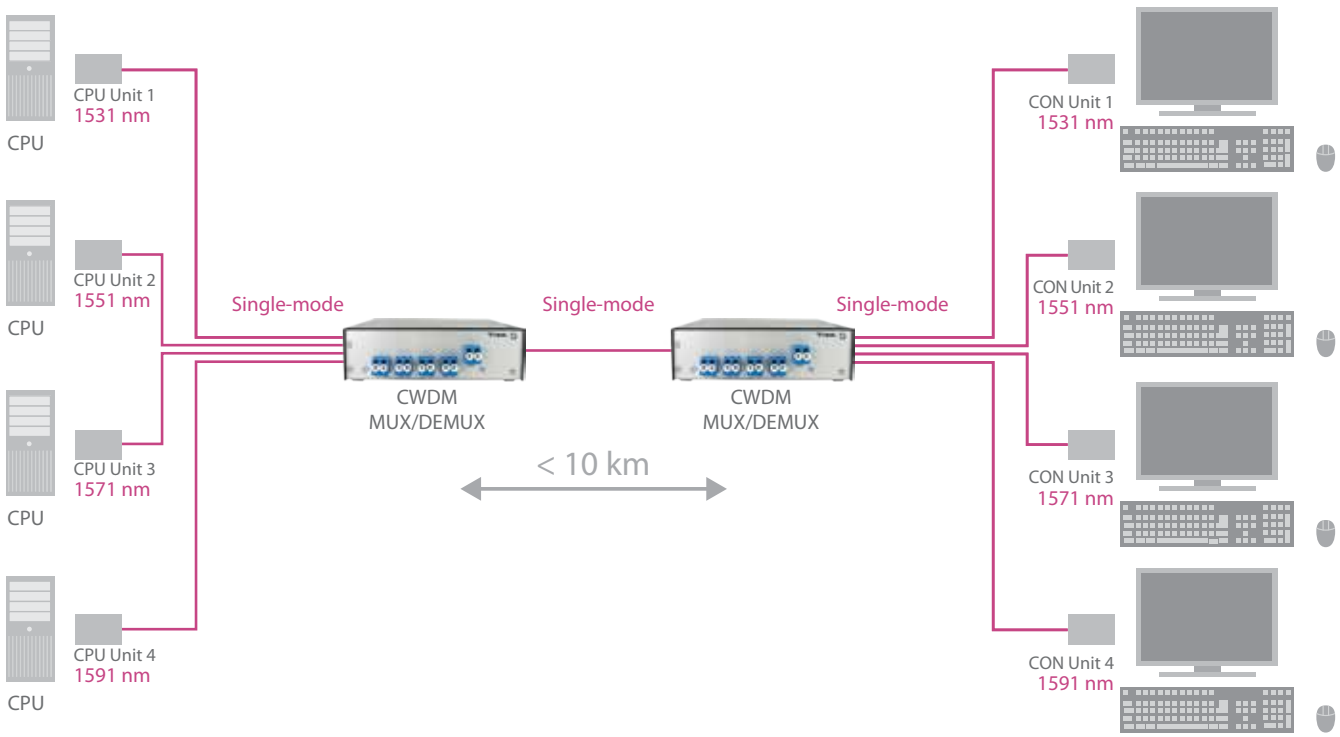
The Draco CWDM multiplexer/demultiplexer kit can be installed in several types of Draco vario chassis and is designed to integrate seamlessly with Draco vario extenders and Draco tera matrix switches. The Draco CWDM is completely agnostic to the signal type being transmitted, allowing DVI, HDMI, DisplayPort, USB, audio and RS232 signals from 4, 8 or 16 different sources to travel up to 10 km over a single transceiver connection.

Product Features

- Compatible with Draco extenders and Draco switches
- Multiplex 4, 8 or 16 extender signals over a single CWDM fiber channel
- Various types of signals supported such as DVI, HDMI, DisplayPort, USB, audio and RS232/RS422
- Passive Draco CWDM optical design in one package
- Minimize cabling cost
- Completely passive – no power supply required
- Scope of supply: Draco CWDM (transmitter and receiver) without SFPs

Technical Data	
Maximum Distance	Up to 10 km (based on SFP type used)
Wavelenghts 4 port	1531, 1551, 1571, 1591
Wavelenghts 8 port	1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611
Wavelenghts 16 port	1311, 1331, 1350, 1370, 1391, 1411, 1431, 1451, 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611
Dimensions	210 x 143 x 44 mm

Functional Diagram



Order Numbers

Products	Part No.
4CH Draco CWDM Multiplexer/Demultiplexer Kit - pair of devices, with SFP modules 1531…1591 nm - up to 4 data links via 1 pair of fibers	K470-4CW-SFP
8CH Draco CWDM Multiplexer/Demultiplexer Kit - pair of devices, with SFP modules 1471…1611 nm - up to 8 data links via 1 pair of fibers	K470-8CW-SFP
16CH Draco CWDM Multiplexer/Demultiplexer Kit - pair of devices, with SFP modules 1311…1611 nm - up to 16 data links via 1 pair of fibers	K470-16CW-SFP
4CH Draco CWDM Multiplexer/Demultiplexer board version - pair of devices, with SFP modules 1531…1591 nm - up to 4 data links via 1 pair of fibers	B470-4CW-SFP
8CH Draco CWDM Multiplexer/Demultiplexer board version - pair of devices, with SFP modules 1471…1611 nm - up to 8 data links via 1 pair of fibers	B470-8CW-SFP

Spare Parts

Products	Part No.
4ch Draco CWDM Multiplexer/Demultiplexer for Draco Extender devices - single device, without SFP modules - up to 4 data links via 1 pair of fiber	470-4CW
8ch Draco CWDM Multiplexer/Demultiplexer for Draco Extender devices - single device, without SFP modules - up to 8 data links via 1 pair of fibers	470-8CW
16ch Draco CWDM Multiplexer/Demultiplexer for Draco Extender devices - single device, without SFP modules - up to 16 data links via 1 pair of fiber	470-16CW

Rack Mount Hardware

Products	Part No.
19” rack mount kit for 1-2 Draco CWDM	474-VRMK
19” rack mount kit for 1 Draco CWDM	474-2NRML
Mounting bracket to mount by screws	474-BRACKET

Please find suitable mounting accessories (as chassis and modules) for free configuration from page 34 onwards.

USB to PS/2

- Plug-and-Play (without drivers)
- No external power supply required
- Converts USB into PS/2

Product Information

This device converts USB into PS/2 signals. It allows PS/2 keyboards and mice to be connected to CPUs without PS2 ports or to connect a PS/2 keyboard/mouse to a USB-KVM extender. This converter does not require any power supply. Please note: it contains components that actively generate the signals. This device is not simply an USB/PS/2 adapter - often supplied with keyboard/mice.

Order Numbers

Products	Part No.
USB to PS/2 Converter	436-UP

PS/2 to USB

- Plug-and-Play (without drivers)
- No external power supply is required
- Converts PS/2 into USB

Product Information

This device converts PS/2 signals to USB signals. It allows USB keyboards and mice to be connected to CPUs without USB ports or connection of USB keyboards and mice to a PS/2-KVM extender. This converter does not require a power supply. Please note: it contains components that actively generate the signal. This device is not simply a PS2/ USB adapter - supplied with many keyboards/mice.

Order Numbers

Products	Part No.
PS/2 to USB Converter	436-PU

USB Extenders

Contents

ICRON USB 3.0 Spectra™ 3022 USB 3.0 signal extension over multi-mode fiber up to 100 m (2 USB ports)	**Series 417**	**70**
ICRON USB 2.0 Ranger® 2304 USB 2.0 signal extension over Cat X up to 100 m (4 USB ports)	**Series 417**	**71**
ICRON USB 2.0 Ranger® 2212 USB 2.0 signal extension over Cat X up to 100 m (2 USB ports)	**Series 417**	**72**
ICRON USB 2.0 Ranger® 2204 USB 2.0 signal extension over Cat X up to 100 m (4 USB ports)	**Series 417**	**73**
ICRON USB 2.0 Ranger® 2224/2244 USB 2.0 signal extension over fiber up to 10 km (2 or 4 USB ports)	**Series 417**	**74**

ICRON USB 3.0 Spectra™ 3022 USB Extender

Series 417

- USB extension up to 100 m
- Delivers speed, isolation and security over multi-mode fiber
- Supports USB 3.0 throughputs of up to 5 Gbit/s
- Works with AIA USB3 Vision™ compliant devices

EXTREME USB®

Product Information

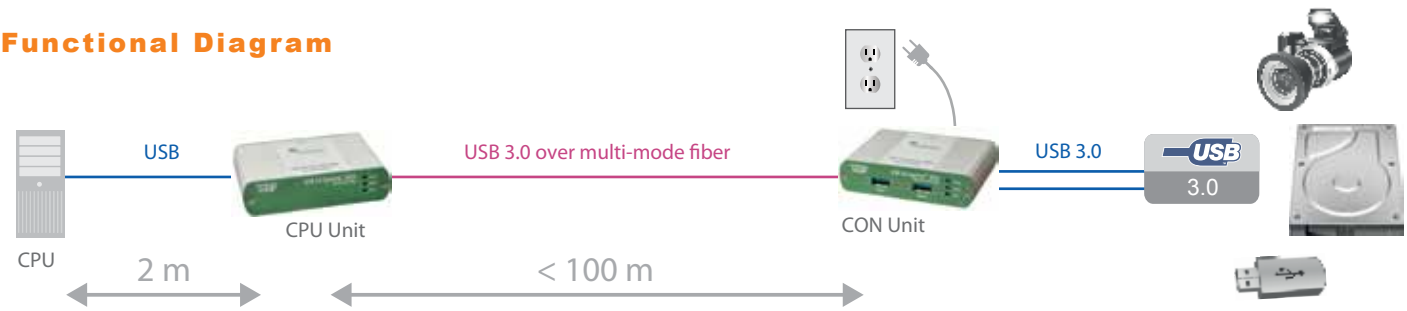
The USB 3.0 Spectra™ 3022 extender allows users to overcome USB 3.0 distance limitation of 3 meters and extend USB 3.0 devices up to 100 meters over multi-mode fiber optic cabling. The USB 3.0 Spectra 3022 supports throughputs of up to 5 Gbit/s and can be used in popular USB 3.0 applications such as machine vision cameras, high throughput read-write devices, post-processing programs and many more. As a true plug-and-play solution, the Spectra 3022 is compatible with all leading operating systems and features two locking USB ports and a locking power connector. Please note that backward compatibility to USB 2.0/1.1 is not supported.

Product Features

- Up to 15 m extension for Microsoft Kinect, up to 50 m for USB 3.0 storage devices and 100 m for USB 3.0 cameras
- Delivers speed, isolation and security over multimedia fiber
- USB 3.0 throughputs of up to 5 Gbit/s
  (Please note: USB 2.0/1.1 is not supported!)
- Integrated 2-port hub suitable for industrial environments
- Rugged locking USB and power connectors
- Enclosures with convenient pre-drilled holes for optional bracket mounting
- Works with AIA USB3 Vision™ compliant devices
- Includes the ExtremeUSB® suite of features:
  - Transparent USB extension
  - True plug and play, no software drivers required
  - Works with all operating systems: Windows®, Mac OS X® and Linux®

Technical Data	
Power Supply for the CON Unit	100-240 VAC, 0.5 A, 50/60 Hz 5VDC
USB Speed	Up to 5 Gbit/s
Maximum Cable Distance	Multi-mode fiber 100 m
Dimensions	100 mm x 76 mm x 26 mm

Functional Diagram



Order Numbers

Please note that the devices are operated in pairs with a CPU Unit at the computer and a CON Unit at the console: the monitor and other peripherals. The product package includes a CPU Unit, a CON Unit and all necessary cables to the CPU and the power supplies.

Product	USB	Data Transmission	Part No.
ICRON USB 3.0 Spectra™ 3022	3.0		K417-6M

ICRON USB 2.0 Ranger® 2304

Series 417

- Extends USB 2.0 up to 100 m at 480 Mbit/s
- Supports up to 31 devices and hubs
- Uses a Cat X cable for easy installation
- Includes the ExtremeUSB® suite of features

EXTREME USB®

Product Information

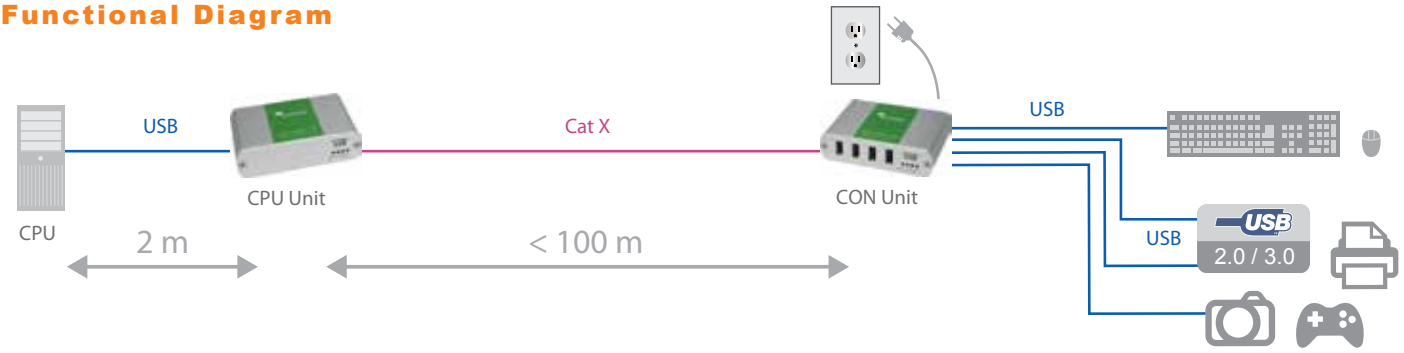
The USB 2.0 Ranger® 2304 provides true USB 2.0 extension at up to 480 Mbit/s over Cat X cabling, without the need of additional software drivers. A true plug-and-play solution, the Ranger 2304 is compatible with all leading operating systems and supports all USB 3.0, 2.0 and 1.1 peripherals such as flash drives, keyboards, mice, webcams and interactive whiteboards across a dedicated Cat X connection. An integrated four port hub allows for extension of up to four USB devices without the need for an additional hub.

Product Features

- Extends USB 3,0, 2.0 and 1.1 devices up to 100 m at 480 Mbit/s
- Operates with USB 3.0, 2.0, and 1.1 hosts
- Supports up to 31 devices and hubs
- Uses a standard Cat X cable for easy installation
- Number of devices can be increased using additional USB hubs
- FCC Class B
- Rugged metal enclosure
- ExtremeUSB® suite of features:
  - Transparent USB extension
  - True plug and play, no software drivers required
  - Works with all operating systems: Windows®, Mac OS X® and Linux®

Technical Data	
Power Supply for the CON Unit	110/240 VAC, 0.5 A, 50/60 Hz 24VDC
USB Speed	High-speed (480 Mbit/s) (USB 2.0, 3.0)
	Full-speed (12 Mbit/s) (USB 2.0 & 1.1)
	Low-speed (1.5 Mbit/s) (USB 2.0 & 1.1)
Maximum Cable Distance	100 m (Cat X)
Dimensions	100 mm x 76 mm x 26 mm

Functional Diagram



Order Numbers

Please note that the devices are operated in pairs with a CPU Unit at the computer and a CON Unit at the console: the monitor and other peripherals. The product package includes a CPU Unit, a CON Unit and all necessary connection cables to the CPU and the power supplies.

Product	USB	Data Transmission		Part No.
Icron Ranger® 2304	2.0 / 1.1		USB cable (1.8 m) included	K417-6D

Cable

Product	Part No.
Cat 5, S-UTP-Simplex 4 x 2 x AWG24	402-0J
Assembly including 2 x Cat 5 connectors	402-0A

ICRON USB 2.0 Ranger® 2212 USB Extender

Series 417

- Extends USB 2.0 up to 100 m at 480 Mbit/s
- Supports all USB device types
- Uses a Cat X cable for easy installation
- Includes the ExtremeUSB® suite of features

EXTREME USB®

Product Information

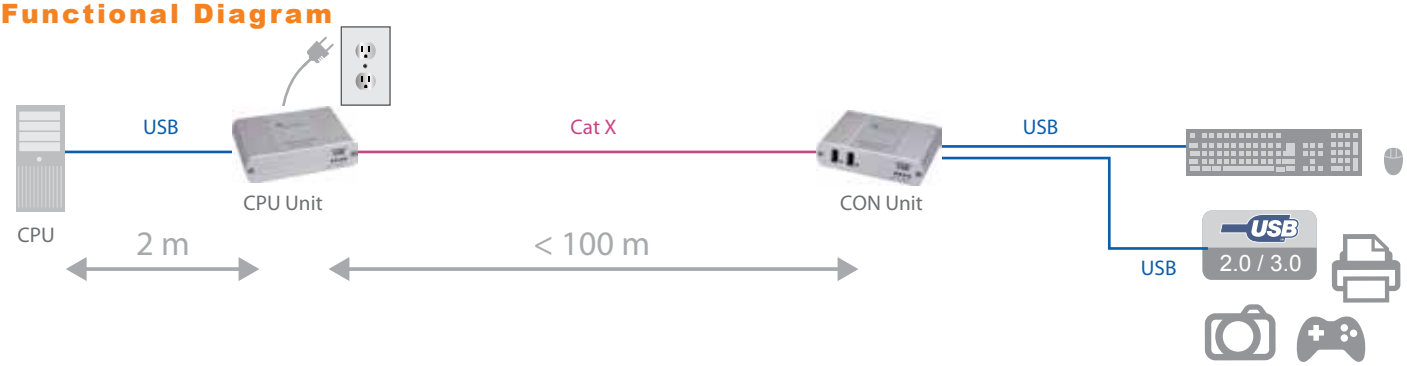
The USB 2.0 Ranger® 2212 provides USB extension up to 100 m at 480 Mbit/s over Cat X cabling. The Ranger 2212 has two USB ports delivering standard 500 mA of power. The Ranger 2212 is a true plug-and-play solution. The extender supports all USB 1.1 and 2.0 devices such as keyboard, mice, hard drives, printers, scanners, audio devices, touch screens, digital cameras and game controllers. The Ranger 2212 is an ideal extension solution for industrial, medical, education and other commercial applications.

Product Features

- Extends USB 2.0 high-speed and USB 1.1 (low-speed, full-speed) devices
- Supports all USB devices up to 480 Mbit/s
- Power Supply: CPU unit with external power supply, CON unit without external power supply
- Uses a standard solid core Cat X cable for easy installation
- ExtremeUSB® suite of features:
  - Transparent USB extension
  - True plug and play; no software drivers required
  - Works with all operating systems: Windows®, Mac OS X®, and Linux®

Technical Data	
Power Supply for CPU Unit	110/240VAC; 0.5 A; 50/60 Hz 24VDC
USB Speed	High-speed: 480 Mbit/s (USB 2.0)
	Full-speed: 12 Mbit/s (USB 2.0 & 1.1)
	Low-speed: 1.5 Mbit/s (USB 2.0 & 1.1)
Maximum Cable Distance	100 m (Cat X)
Dimensions	100 mm x 76 mm x 26 mm

Functional Diagram



Order Numbers

Please note that the devices are operated in pairs with a CPU Unit at the computer and a CON Unit at the console: the monitor and other peripherals. The product package includes a CPU Unit, a CON Unit and all necessary connection cables to the CPU and the power supplies.

Product	USB	Data Transmission		Part No.
ICRON USB 2.0 Ranger® 2212 (2 USB ports)	2.0 / 1.1		USB cable (1.8 m) and 2 port hub included	K417-5R

Cable

Product	Part No.
Cat 5, S-UTP-Simplex 4 x 2 x AWG24	402-0J
Assembly including 2 x Cat 5 connectors	402-0A

ICRON USB 2.0 Ranger® 2204

Series 417

- Extends USB 2.0 up to 100 m at 480 Mbit/s
- Supports all USB device types
- Uses a Cat X cable for easy installation
- Includes the ExtremeUSB® suite of features

EXTREME USB®

Product Information

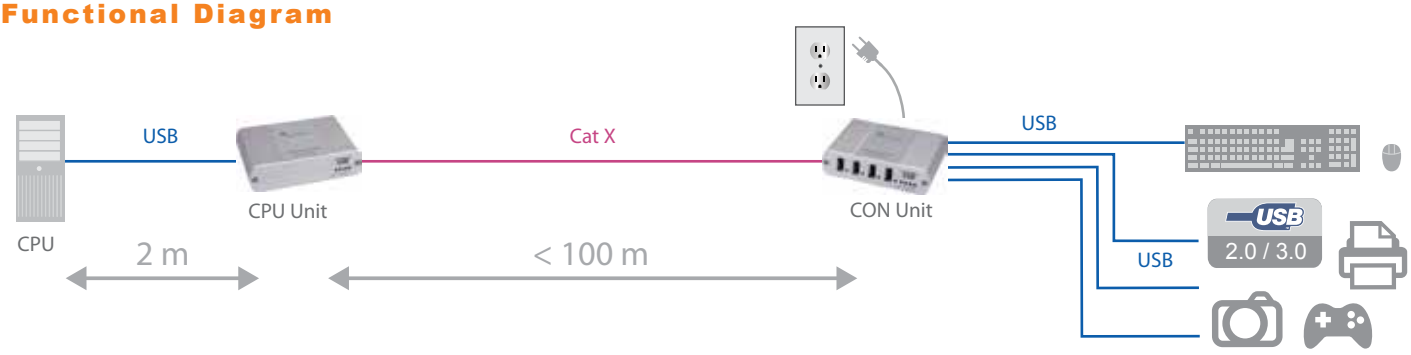
The USB 2.0 Ranger® 2204 provide USB extension up to 100 m at 480 Mbit/s over Cat X cabling. The Ranger 2204 has four USB ports delivering standard 500 mA of power. The Ranger 2204 is a true plug-and-play solution. The extender supports all USB 1.1 and 2.0 devices such as keyboard, mice, hard drives, printers, scanners, audio devices, touch screens, digital cameras and game controllers. The Ranger 2204 is an ideal extension solutions for industrial, medical, education and other commercial applications.

Product Features

- Extends USB 2.0 high-speed and USB 1.1 (low-speed, full-speed) devices
- Supports all USB devices up to 480 Mbit/s
- Power Supply: CON unit with external power supply, CPU unit without external power supply
- Uses a standard solid core Cat X cable for easy installation
- ExtremeUSB® suite of features:
  - Transparent USB extension
  - True plug and play; no software drivers required
  - Works with all operating systems: Windows®, Mac OS X®, and Linux®

Technical Data	
Power Supply for CON Unit	110/240VAC; 0.5 A; 50/60 Hz 5VDC
USB Speed	High-speed: 480 Mbit/s (USB 2.0)
	Full-speed: 12 Mbit/s (USB 2.0 & 1.1)
	Low-speed: 1.5 Mbit/s (USB 2.0 & 1.1)
Maximum Cable Distance	100 m (Cat X)
Dimensions	100 mm x 76 mm x 26 mm

Functional Diagram



Order Numbers

Please note that the devices are operated in pairs with a CPU Unit at the computer and a CON Unit at the console: the monitor and other peripherals. The product package includes a CPU Unit, a CON Unit and all necessary connection cables to the CPU and the power supplies.

Product	USB	Data Transmission		Part No.
ICRON USB 2.0 Ranger® 2204 (4 USB ports)	2.0 / 1.1		USB cable (1.8 m) and 4 port hub included	K417-5D

Cable

Product	Part No.
Cat 5, S-UTP-Simplex 4 x 2 x AWG24	402-0J
Assembly including 2 x Cat 5 connectors	402-0A

ICRON USB 2.0 Ranger® 2224/2244 USB Extender

Series 417

- Extends USB 2.0 up to 10 km at 480 Mbit/s
- Ideal solution for long distance USB extension
- Supports all USB device types
- Includes the ExtremeUSB® suite of features

EXTREME USB®

Product Information

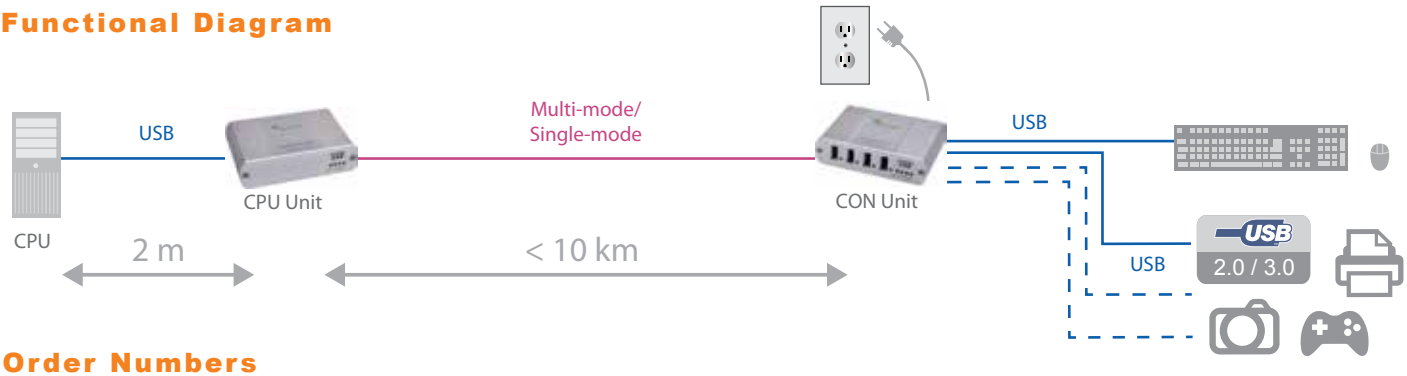
Icron's USB 2.0 Ranger® 2224 and 2244 four port fiber extenders are ideal extension solutions. The Ranger 2224 can extend USB 2.0 up to 500 m over multi-mode fiber optics and the Ranger 2244 provides USB extension up to 10 km over single-mode fiber optics. Both extenders support all USB 1.1 and 2.0 device such as keyboard, mice, hard drives, printers, scanners, audio devices, touch screens and game controllers. The extenders are ideal for industrial, medical and other commercial applications.

Product Features

- Extends USB 2.0 high-speed and USB 1.1 (low-speed, full-speed) devices
- Supports all USB devices up to 480 Mbit/s
- Connection distance:
  - 2224: Up to 500 m over multi-mode fiber optics
  - 2244: Up to 10 km over single-mode fiber optics
- FCC Class B certified
- Rugged metal enclosure
- ExtremeUSB® suite of features:
  - Transparent USB extension
  - True plug and play; no software drivers required
  - Works with all operating systems: Windows®, Mac OS X®, and Linux®

Technical Data	
Power Supply for the CON Unit	110/240VAC; 0.5 A; 50/60 Hz 5VDC
USB Speed	High-speed: 480 Mbit/s (USB 2.0)
	Full-speed: 12 Mbit/s (USB 2.0 & 1.1)
	Low-speed: 1.5 Mbit/s (USB 2.0 & 1.1)
Maximum Cable Distance	2224: 500 m (Multi-Mode)
	2244: 10 km (Single-Mode)
Dimensions	100 mm x 76 mm x 26 mm

Functional Diagram



Order Numbers

Please note that the devices are operated in pairs with a CPU Unit at the computer and a CON Unit at the console: the monitor and other peripherals. The product package includes a CPU Unit, a CON Unit and all necessary connection cables to the CPU and the power supplies.

Product	USB	Data Transmission		Part No.
ICRON Ranger® 2224	2.0 / 1.1		USB cable (1.8 m) included	K417-5M
ICRON Ranger® 2244	2.0 / 1.1		USB cable (1.8 m) included	K417-5S

Cable

Product	Part No.
Multi-mode breakout cable 2G50/125	433-2M
Assembly including two LC multi-mode duplex fiber cables	252-2L
Single-mode breakout cable 2E9/125	433-2S
Assembly including two LC single-mode duplex fiber cables	252-2L

About IHSE

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End-of-Life Products

For all IHSE products, the IHSE EOL notice period is a minimum of 1 year. Thereafter we offer a 5 year service and repair period on original products. Alternative and compatible products are generally available for replacement purposes if required. In addition, longer service and repair services may be offered on some products.

Draco extender and Draco tera matrix series products are currently in full production and are expected to be in continuous production for at least the next 5 years. Thereafter, we intend to have follow-on technology in place which will be backward compatible Draco technology.

This will ensure a minimum of 10 years of service and repair. Our ability to produce and support products is, however, subject to future component availability.

Product	Type	End-of-Life	Replacement product
Draco minor	Matrix-Switch	July 1, 2016	Draco tera compact, 8 Port
Draco major	Matrix-Switch	July 1, 2016	Draco tera compact
DSXi	DVI Extender	July 1, 2016	Draco vario
DDXi	DVI Extender	July 1, 2016	Draco vario
DXXi	DVI Extender	July 1, 2016	Draco vario
VTO/VRO	VGA Extender	July 1, 2016	Draco vario

If you have any questions regarding the platforms, operating systems or IHSE products or need a suitable replacement product, we will be pleased to assist. Call us at +49 (7546) 9248 42 or email sales@ihse.de.

No responsibility is taken for the correctness of this information.

Last update: August 10, 2015

HEADQUARTERS AND SUBSIDIARIES

Please contact us for information about our company, events, products or partners.
We look forward to hearing from you!

We welcome you to visit our headquarters or any subsidiaries around the world to get a one-on-one presentation of any product we offer. Visit our headquarters to get an exclusive tour of our modern production facility. Please contact us to arrange your product demo or facility visit.

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AFTER SALES AND SUPPORT

Our Technical Support Team is highly trained to provide expert technical assistance on all of IHSE products and will be happy to answer technical questions or provide troubleshooting support as needed.

Online Support

The support section of our website includes up-to-date documents in PDF format like quick setup guides and detailed product descriptions, further updates & tools and much more. Take a look at **www.ihse.com** and benefit from our versatile online support and documentation.

Fast processing of your request with the checklist

For your convenience, we offer a quick checklist to assist with basic troubleshooting. You can find these documents on our web site at the following links.

English: **http://www.ihse.com/fileadmin/redakteur/pdf/support/checklist.pdf**
German: **http://www.ihse.de/fileadmin/redakteur/pdf/support/checkliste.pdf**

Please fill out the checklist. You'll need the following information:

- Company, name, phone number, email address
- Type and serial number of the device (please find it on the bottom)
- Date and number of the invoice, if applicable the name of the reseller
- Date of issue of this manual
- Type and serial number of the device (located on the bottom of the device)
- On the problem involved components (eg. graphics source, monitor, USB-HID / USB 2.0 devices, cables)
- Results of all measures

Send the completed checklist with your contact information by email to techsupport@ihse.de. Our expert support team will contact you as soon as possible.

IHSE SUPPORTS INDUSTRY ORGANIZATIONS AND ASSOCIATIONS

IHSE is committed to maintaining a leading edge on the markets we serve and are proud members of the following organizations and associates who lead in their industry segments.

TERMS OF DELIVERY

We supply exclusively according to our terms of delivery and payment to industrial, business and commercial clients. Our terms of delivery and payment are printed at the end of this catalog.

All deliveries are Ex-Works (Incoterms 2010) - usually from our factory in Oberteuringen, Germany. The customer is responsible for payment of all transportation and insurance costs. Shipment is done by our logistics partners. Shipping costs will be determined on the day of dispatch.

Standard parcel service: UPS
Standard freight forwarding: DACHSER

Lead time
The delivery period for standard products is normally ten working days. For volume and special orders the period it is around four weeks.

TERMS OF PAYMENT

All prices in euro, Ex Works (EXW), plus VAT.

Payment: In advance against proforma invoice
Accounting currency: € (euro)

Terms and Conditions

As of: 1 July 2014

1. Scope of Application

1.1 The following terms and conditions shall apply for all contracts between IHSE GmbH and the customer for the supply of hardware and software (Delivery Item) as well as additional services provided by IHSE GmbH. No other terms and conditions shall constitute terms and conditions of the contract even if IHSE GmbH does not expressly object to them.

1.2 IHSE GmbH supplies only entrepreneurs („Unternehmer“) within the meaning of Section 14 German Civil Code (BGB). The following General Terms and Conditions therefore apply only in relation to entrepreneurs („Unternehmer“) within the meaning of Section 14 German Civil Code (BGB).

2. Additional Services

2.1 IHSE GmbH shall, at the customer‘s request, provide additional services in relation to hardware and software acquired by the customer from IHSE GmbH (Delivery Items); including training and technical support by phone and email.

2.2 Additional services shall be provided in return for a separate fee and must in each case be agreed separately by means of an order confirmation. The contract concerning additional services shall take effect when the order is confirmed by IHSE GmbH.

3. Prices

3.1 Unless otherwise agreed, all prices for Delivery Items, additional services (particularly installation) transportation, dispatch, and other services to be provided by IHSE GmbH as well as any supplements for night work, work on Sundays and public holidays are set out in the price list in the version applicable at the time the contract is concluded.

3.2 All prices are net prices. The cost of dispatch, transportation and installation is not included and will be charged in addition in accordance with the price list. Flatrate prices agreed for installation do not include surcharges that become necessary for overtime, night work, work on Sundays and public holidays in the event of any interruptions in the installation, for which IHSE GmbH is not answerable. Said surcharges can be charged in addition in accordance with the price list.

3.3 IHSE GmbH shall be entitled to implement a reasonable price increase if delivery of the contractual products is not to be made within 4 months following conclusion of the contract or is not made within said period at the customer‘s request. The customer shall be entitled to rescind the contract within 2 calendar weeks of receipt of the notification of the price increase by IHSE GmbH if the net price stipulated by IHSE GmbH by way of the price increase exceeds the net price originally agreed by the parties by more than three %. The right to a reasonable price increase does not exclude the right to assert further claims against the customer.

4. Payment Terms and Late Performance („Verzug“)

4.1 IHSE GmbH is under no obligation to render performance in advance.

4.2 If an agreement has been reached with the customer in derogation from Clause 4.1 IHSE GmbH can refuse to render the performance if, after conclusion of the contract, its claim to payment of the agreed remuneration is at risk due to a substantial deterioration in the customer‘s financial circumstances or other lack of solvency on the part of the customer or if such a risk becomes apparent. This does not apply after the agreed remuneration has been paid or security for the agreed remuneration has been furnished. IHSE GmbH can set the customer a reasonable deadline by when the customer must, at its option, either pay the contractual remuneration or furnish security contemporaneously against the rendering of the performance owed by IHSE GmbH. IHSE GmbH may rescind the contract after the deadline has expired to no avail. To safeguard its claims IHSE GmbH, as a matter of principle, obtains information on every new customer from a German credit agency.

4.3 If the customer is late with payment the statutory interest rate shall apply.

5. Delivery and the Passing of Risk

5.1 Unless otherwise agreed in the individual case, the supply of Delivery Items shall be effected „ex works“ (IHSE GmbH). At the customer‘s request IHSE GmbH shall dispatch the Delivery Items to the customer.

5.2 When collected, the risk of accidental loss or of accidental deterioration of Delivery Items shall pass to the customer upon handover of the Delivery Items. In the event that Delivery Items are dispatched at the customer‘s request, the risk of accidental loss or of accidental deterioration shall pass to the customer upon handover of the Delivery Items to the company designated to carry out the dispatch or to the person designated to carry out the dispatch. This shall also apply if IHSE GmbH carries out the dispatch itself provided that IHSE GmbH has not by contractual agreement also assumed responsibility for installing the Delivery Items following on from having carried out the dispatch. In any such case the risk of accidental loss or of accidental deterioration shall pass to the customer in accordance with Clause 11.1 when the installation has been accepted or completed. If collection by, or dispatch to, the customer is delayed because the customer refuses to accept the Delivery Items or fails to perform an act of cooperation that is necessary for the collection or dispatch the risk shall pass to the customer when IHSE GmbH verbally offers to make the handover at the time of collection or dispatch.

6. Rendering Performance

6.1 At the time when additional services, particularly installation services, that are due and are to be carried out by IHSE GmbH begin, the customer must have rendered the acts of cooperation required or agreed by the parties for the additional services, particularly the installation. The same applies to the customer‘s acts of cooperation in the field of information technology that are customary and can reasonably be expected of the customer. The customer must grant the employees of IHSE GmbH access to the localities where the installation services are to be provided. The localities must furthermore allow work to be carried out unhindered and must be supplied with the customary extent of power and light. If the abovementioned requirements are not fulfilled due to circumstances, for which the customer is answerable, the customer shall bear the additional expense incurred as a result in accordance with IHSE GmbH‘s price list that applied at the time the contract was concluded.

6.2 IHSE GmbH shall be entitled to employ third parties to render its services.

7. Special Provisions for the Rendering of Additional Services relating to Hardware

7.1 IHSE GmbH shall be under an obligation to provide additional services relating to such hardware as is in a technically sound condition and is set up at a suitable place of business. The hardware shall be deemed to be technically sound if it has been serviced without interruption in accordance with IHSE GmbH‘s requirements since it was first started up and has been changed or moved to another place of installation only with IHSE GmbH‘s consent. If said conditions are not met, IHSE GmbH can, at its option, make its own performance dependent on the customer either restoring the contractual condition or the customer paying for the extra cost caused by the change in accordance with IHSE GmbH‘s price list as applicable from time to time.

7.2 The customer may not make any unauthorized changes or additions to hardware; IHSE GmbH must be notified in writing and in advance of planned changes to the hardware. The customer shall bear any disadvantages resulting from changes or enhancements, which were not made by IHSE GmbH or by agreement with IHSE GmbH, in particular any impairment of operational safety.
7.3 IHSE GmbH shall be entitled to subsequently demand additional reasonable remuneration for changed or enhanced hardware in accordance with IHSE GmbH‘s price list as applicable from time to time if the changes or enhancements do not significantly interfere with the performance.

8. Training Courses

IHSE GmbH offers the customer‘s employees training courses on use of the hardware used at the customer. A corresponding agreement comes about when IHSE GmbH has accepted a request from the customer by sending an order confirmation. The details are regulated in the order confirmation.

9. Technical Support by Phone and Email

As part of its technical support, especially by phone and email, IHSE GmbH receives and processes questions about Delivery Items. For this, the customer should use the „Checklist for Service and Problem Cases“ provided by IHSE GmbH. The Technical Support may only be used by the customer himself. Moreover, the support is provided on the basis of these General Terms and Conditions.

10. Duties to Check and Report Defects

10.1 The customer shall inspect Delivery Items within eight working days (all calendar days excluding Saturdays, Sundays and public holidays at the customer‘s place of registered office) of delivery. Delivery occurs as soon as the customer has the opportunity to exercise physical control over the Delivery Items. If, in addition to the supply of goods, IHSE GmbH is under an obligation to render additional services which are intended to enable the customer to use the Delivery Items as intended (e.g. installation of the Delivery Items), the Delivery Items shall be deemed to have been delivered only when said additional services have been rendered.
10.2 Any defects discovered when carrying out the inspection under Clause 10.1 or obvious defects must be asserted in writing to IHSE GmbH at the latest within eight working days following expiry of the period allowed for inspection under Clause 10.1. Any defects that cannot be discovered when carrying out the ordinary inspection of the Delivery Items must be asserted in writing to IHSE GmbH within 14 working days following discovery. In the event of any breach of the duty to inspect and report defects under this provision, the Delivery Items shall be deemed to have been approved in respect of the defects concerned.

11. Acceptance

11.1 If IHSE GmbH renders additional services in addition to the supply of Delivery Items such as hardware or software, in particular the installation of hardware or software, the shall be obliged to declare acceptance of said further performances in writing to IHSE GmbH as soon as they have been rendered in accordance with the contract. The acceptance cannot be refused because of minor defects providing that collectively they are not equivalent to a major defect. For performances where acceptance is not possible due to their nature completion shall replace acceptance.
11.2 If the customer is obliged to declare acceptance under Clause 11.1, acceptance shall be deemed to have effect if the customer does not declare acceptance within seven working days following a request by IHSE GmbH. Any defects must be reported to IHSE GmbH without undue delay in writing and in a reconcilable manner.

12. Software Products, Rights of Use

12.1 If it has been agreed that software will be delivered, the delivery shall be effected, at IHSE GmbH‘s option, by sending a data carrier or by making the software available for download. Unless otherwise agreed in the individual case, IHSE GmbH shall not be obliged to install the software or to commission it. Furthermore, unless otherwise agreed, IHSE GmbH is not under any obligation to provide any maintenance or training services.
12.2 When software (firmware, updates etc.) is delivered IHSE GmbH grants the customer a non-exclusive, non-transferable and non-sublicensable right to use the software, which right is unlimited in terms of time and geography. To the extent software supplied by IHSE GmbH has been developed either in whole or in part by third parties, the licence terms and conditions of the developer of the software shall apply thereto provided that IHSE GmbH has advised the customer of the relevant licence terms and conditions at the time when the contract was concluded. In all other respects the application of these Terms and Conditions shall remain unaffected by the licence terms and conditions of the software developer concerned.
12.3 Any changes, additions and improvements to the software, based on a suggestion, instructions or other direct or indirect influence exerted by the customer shall not give rise to any joint copyright of the customer to any extent whatsoever.

13. Intended Use, Warranty Rights and Fault Rectification

13.1 IHSE GmbH does not assume any liability and the customer is not entitled to any warranty rights for deviations of the Delivery Items from the contractually intended quality that are not already present at the passing of risk, of accidental loss or of accidental deterioration, but rather arise as a result of natural wear and tear, use, faulty, improper or excessive use or other circumstances after the passing of risk. The same shall apply mutatis mutandis when additional services are provided.
13.2 Clause 13.1 shall also apply to the absence of any properties of the Delivery Items or additional services that are not part of the contractually intended quality. Unless otherwise agreed with the customer, IHSE GmbH shall in particular not be responsible for the Delivery Items or additional services being suitable for use in safety-related systems and areas, which due to a tendency to cause a high degree of damage require a special degree of stability and reliability (e.g. power stations, hospitals and other health care institutions, aircraft and air traffic control). If the customer uses Delivery Items or additional services provided by IHSE GmbH in such safety-related systems and areas without a corresponding agreement with IHSE GmbH, the customer must itself bear such consequences (e.g. damage, expenses, costs) of any failure or malfunction that are due to the fact that the Delivery Items or additional services do not have the stability and reliability that are customary and necessary in such safety-related systems and areas.
13.3 In the event that a Delivery Item or an additional service has a defect IHSE GmbH shall be obliged to, at its option, rectify it (Nachbesserung) or deliver replacement goods (Nachlieferung) (supplementary performance (Nacherfüllung). The customer may assert further rights of the customer, particularly the right to reduce the contractual remuneration, the right to demand compensation for damage caused by the defect as well as the right to rescind the contract subject to the statutory requirements. Any claims of the customer to damages shall be governed by Clause 14. The customer‘s right to rescind the contract is excluded in a case of minor defects.
13.4 The warranty rights shall lapse if the customer or a third party makes changes to the Delivery Items, to which IHSE GmbH has not previously given its express consent. This case is only different if the customer proves that faults or malfunctions that arise are not due to the changes and that said changes did not make the fault detection and rectification more difficult.

13.5 The Customer is not entitled to remedy defects himself or to demand compensation for the expenses thereby incurred.
13.6 The customer is obliged to describe faults that arise, the sequence of system failures, hardware failures and/or other problems (referred to as „faults“) as precisely as possible and to report them without undue delay in writing or by email. For this, the customer shall use the „Checklist for Service and Problem Cases“ provided by IHSE GmbH. IHSE GmbH shall start to rectify the fault using the possibilities and means available to it without undue delay after a fault has been reported. IHSE GmbH shall endeavor to inform the customer of how and within what time frame it can eliminate the reported fault or, as the case may be, whether and how the customer can bypass the fault.
13.7 The manner in which the fault is rectified is at IHSE GmbH‘s equitable discretion. The fault can also be rectified in the form of IHSE GmbH giving the customer instructions on what to do. The customer must follow said instructions, of what to do unless it is unreasonable to expect the customer to do so. If the fault rectification is more involved than assumed, IHSE GmbH is entitled to provide the customer with a replacement or workaround. If IHSE GmbH provides a workaround the goods/services shall not be deemed to be defective. In this context IHSE GmbH is also entitled to make changes to the configuration of the Delivery Items if and to the extent that the operability of the Delivery Items is not thereby impeded either individually or altogether.
13.8 If the defect occurs in firmware of IHSE GmbH, IHSE GmbH shall carry out the supplementary performance (Nacherfüllung) by providing an update. The update shall, at IHSE GmbH‘s option, be made available for download or shall be delivered by email. There is no failure of the supplementary performance (Nacherfüllung) if the update delivered remedies the defect in principle, but installation of the update by the customer fails although said installation was possible and reasonable for the client taking into account any installation instructions provided by IHSE GmbH. IHSE GmbH does not accept responsibility for its firmware being compatible with other software and hardware used by the customer where said software or hardware is not a Delivery Item and shall therefore not be liable unless the customer has notified IHSE GmbH in advance and in writing of the other software and hardware used and IHSE GmbH, aware of this fact, has given its consent to the use of the firmware.
13.9 Warranty rights regarding IHSE GmbH‘s Delivery Items shall be time-barred within one year from delivery of the Delivery Items. Warranty rights regarding the additional services shall be time-barred within one year from acceptance of the service provision, however no later than one year from termination or expiry of the contract.
13.10 If, contrary to the customer‘s report of a defect, it transpires that the Delivery Item or additional service do not have a defect or that there are no warranty rights because the warranty period has expired or because of other reasons, the customer shall bear the cost caused by its complaint, especially the cost of checking for defects, in accordance with IHSE GmbH‘s price list applicable at the time the contract was concluded.
13.11 If a property of the software delivered by IHSE GmbH, which the customer has assessed to be disadvantageous, does not constitute a defect, IHSE GmbH shall also not be obliged to rectify said property (e.g. under corresponding maintenance agreements with the customer) and if IHSE GmbH nevertheless provides the customer with an update free of charge to improve the functionality of the software IHSE GmbH gives a warranty for said update only to the extent that it has fraudulently concealed any defects in the update. In that case, the customer shall have a claim to compensation for damage that has occurred (if any) in accordance with Clause 11. The same applies to other updates and other software, which IHSE GmbH makes available to the customer free of charge without any obligation to do so.

14. Liability

14.1 IHSE GmbH shall be liable for damage due to breaches of duty in connection with the delivery of software or additional services free of charge without a corresponding obligation on the part of IHSE GmbH only for intent and gross negligence. Clause 10.9 shall remain unaffected.
14.2 IHSE GmbH‘s liability for cases of product liability under the German Product Liability Act (Produkthaftungsgesetz) shall remain unaffected by the provisions of this Clause 14 and shall be governed solely by the German Product Liability Act (Produkthaftungsgesetz).
14.3 In all other respects IHSE GmbH shall be liable for compensation irrespective of the legal ground only to the extent expressly provided in Clauses 14.4 to 14.9.
14.4 IHSE GmbH‘s liability for damage caused intentionally or grossly negligently by statutory representatives, employees or vicarious agents of IHSE GmbH or which is based on a breach of an unlimited guarantee or an injury to life, body or health is unlimited. In cases of limited liability IHSE GmbH‘s liability shall be limited to the guaranteed sum.
14.5 Save as provided in Clause 9.4 IHSE GmbH‘s liability due to negligent breaches of contractual obligations (leicht fahrlässige Verletzungen von Vertragspflichten), the performance of which makes the proper implementation of the contract possible in the first place, and compliance with which the customer lawfully relied and may rely on shall be limited to the foreseeable damage that is typical for the contract.
14.6 Save as provided in Clause 14.4 and Clause 14.5, IHSE GmbH‘s liability for ordinarily negligent breaches of duty (einfach fahrlässige Pflichtverletzungen) shall be limited in quantum to the single amount of the remuneration payable to IHSE GmbH by the customer by reason of the respective delivery or additional service per case of damage and in total to three times the amount of the average remuneration payable by the customer to IHSE GmbH per delivery or additional service by reference to all deliveries or additional services to the customer in a calendar year.
14.7 The limitation period for the customer‘s claims for damages shall be one year as of the end of the year in which the respective claim arose and the customer learned, or without gross negligence should have learned, of the circumstances giving rise to the claim and who the debtor was; unless IHSE GmbH caused the damage intentionally. Clause 13.9 shall remain unaffected.
14.8 If damage is attributable to the negligence of IHSE GmbH as well as to the negligence of the customer, the customer must accept that its contributory negligence is taken into account in any claim for damages within the meaning of Clauses 14.1 to 14.7.
14.9 Insofar as IHSE GmbH‘s liability is excluded or limited under the above Clauses 14.1 to 14.8, this shall also apply for the personal liability of the owner, statutory representatives, employees, workers, staff and vicarious agents of IHSE GmbH.

15. Reservation of Title

15.1 IHSE GmbH reserves title to Delivery Items until all payments owed by the customer together with any costs and interest arising out of the respective contract have been received. The customer is under an obligation to treat the Delivery Items with care so long as title to the Delivery Items has not yet passed to the customer. Unless otherwise agreed with the customer, the customer must carry out any necessary inspection and maintenance work in a timely manner and at its own cost.
15.2 In the event of a breaches of duty by the customer, in particular in the event of late payment, IHSE GmbH shall, after setting a deadline, be entitled to take back the Delivery Items and the customer shall be obliged to surrender them. The assertion of the reservation of title and the seizure of the Delivery Items by IHSE GmbH shall not be deemed to be rescission of the contract.
15.3 The customer shall be entitled to sell the Delivery Items in the normal course of business without passing on the reservation of title provided the customer is not in default of timely satisfaction of IHSE GmbH‘s accounts receivable secured by the reservation of title. The Delivery Items may not be pledged or title thereto transferred as security.

15.4 The customer hereby already assigns the accounts receivable that arise out of the resale of the Delivery Items in the amount of the invoice value of the Delivery Items (purchase price) to IHSE GmbH as security. IHSE GmbH revocably authorizes the customer to collect the accounts receivable assigned to IHSE GmbH in its own name but for the account of IHSE GmbH. IHSE GmbH shall remain entitled to collect the accounts receivable itself. It shall not collect the accounts receivable itself so long as the customer is not late with payment and in particular so long as no petition for the opening of insolvency proceedings over the customer‘s assets has been filed. In the event that a third party attaches the Delivery Items the customer must point out IHSE GmbH‘s title and must inform the latter without undue delay.

15.5 Any adaptation and processing or transformation of the Delivery Items owned by IHSE GmbH by the customer shall always be effected in the name and on behalf of IHSE GmbH. IHSE GmbH shall acquire co-ownership of the intermediate and end products produced in the proportion that results from the proportion which the objective value of the Delivery Items at the time of processing has to the value of the intermediate or end product. If the Delivery Items are processed with other property not owned by IHSE GmbH, IHSE GmbH shall acquire co-ownership of the new goods in the proportion which the objective value of the Delivery Items has to the other processed property at the time of processing. The same shall apply in the event of any mixing. If the goods are mixed in such a way that the customer‘s goods are to be considered as the main goods, the customer shall transfer the co-ownership to IHSE GmbH proportionately and shall keep the co-owned property created in safe custody for IHSE GmbH. In the event of any adaptation, processing or transformation or mixing, the customer‘s contingent right in the Delivery Items shall continue in the goods in which IHSE GmbH acquires co-ownership due to the adaptation, processing, transformation or mixing. If the Delivery Items are joined to a piece of land the customer assigns the claims that accrue to it against a third party by reason of the fact that the Delivery Items are joined to a piece of land to IHSE GmbH by way of security.

15.6 IHSE GmbH shall release the security to which it is entitled under this Clause 15 upon demand by the customer to the extent that its value exceeds the claims to be secured by more than 10 %.

16. Set-Off, Right of Retention

16.1 The customer shall have no right of set-off unless the counterclaim is final and absolute or is undisputed.

16.2 The customer shall have no right to refuse performance and no right of retention unless the claim, upon which the right to refuse performance or the right of retention is based, is final and absolute or undisputed.

17. Governing Law, Place of Jurisdiction, Miscellaneous

17.1 The governing law shall be the law of the Federal Republic of Germany; the application of the United Nations Convention on Contracts for the International Sale of Goods is excluded. The exclusive place of jurisdiction for all disputes arising out of and in connection with this Agreement shall be Überlingen. IHSE GmbH shall remain entitled to also bring an action at the customer‘s general place of jurisdiction.

17.2 IHSE GmbH shall be entitled to affix a company or other mark to the items delivered by it or additional services rendered.

17.3 In the event that individual provisions of these General Terms and Conditions are or become void, the validity of the remaining provisions shall remain unaffected thereby. The void provision should be replaced by a provision, which economically comes closest to the void provision. If these General Terms and Conditions contain a lacuna in the provisions, said lacuna should be filled by a provision which the parties would have agreed had they been aware of the lacuna at the time the contract was concluded.

17.4. Any amendments and additions to these General Terms and Conditions are required to be in writing. This shall also apply to any cancellation of this requirement of writing.

By publishing this catalog, all previous catalogs become invalid. IHSE has made every effort to ensure that all the information and illustrations contained in this manual are accurate and reliable. Furthermore we point out, that we cannot guarantee for misprints, uncompleted data or misinterpretation. We reserve the right to make modifications, for example, to correct errors or to reflect technical progress.

Certifications & Compliance

CERTIFICATIONS

All IHSE devices are CE certified. The required tests are performed and documented in autonomous and certified laboratories. We also comply with the requirements of the EU directive 2011/65/EU for the restriction of hazardous substances (RoHS).

TÜV Süd certificated our products Draco vario extenders and Draco tera switches to the European and North American standards IEC/EN 60950-1 and UL/CSA 60950-1. Our quality assurance procedures were evaluated and approved for proper and consistent processes.

As authorized economic operator (AEO) we enjoy special privileges in global trade. We have been approved on behalf of the national customs administration as complying with supply chain security standards.

The German Federal Ministry of Economics and Technology supported the development of our Draco tera enterprise as a part of support for practical research or development purposes. The Draco tera enterprise has been selected to receive support from state departments for its innovative functions.

Gefördert durch:
Bundesministerium für Wirtschaft und Technologie
aufgrund eines Beschlusses des Deutschen Bundestages

2014 | 2015 INNOVATIV DURCH FORSCHUNG Ausgezeichnet durch den Stifterverband 6027098

COMPLIANCE

IHSE supplies information concerning our conditions for suppliers and restrictions of certain resources and chemicals. The restriction includes substances which are harmful to environmental and health aspects as well as conflict minerals mined in conditions of armed conflict and human rights abuses.

For further information please contact compliance@ihse.de.

1984 Foundation. Focus on software development

1988 First KVM Extenders for EGA graphics and AT keyboard

1990 First KVM extenders for VGA video, AT keyboard and serial mouse

1999 Building and moving to new IHSE facility in Oberteuringen

2001 Focus on hardware development
First digital KVM extenders for VGA video, PS/2 keyboard and mouse
First OEM partners in the USA and Europe lead to strong growth in sales & production

2005 Facility expansion including new premises for production and test
Launch of first DVI extenders (DVXi series)

2008 Introduction of first DVI-KVM crosspoint switch (Draco minor)

2009 Foundation of IHSE USA in New Jersey
First appearances at international trade shows (InfoComm and IBC)
Launch of Draco tera matrix switch series

2010 Facility expansion including offices and training area
R&D cooperation with Fraunhofer Institute

2011 Launch of Draco tera enterprise with up to 288 ports

2012 Launch of Draco tera compact family with 8, 16, 32, 48, 64 and 80 ports
Draco compact extenders and Draco vario extenders with fiber XV

2013 Foundation of IHSE ASIA in Singapore
Global innovation: Matrix Grid for the dynamic coupling of KVM matrices

2014 First DisplayPort and 4K KVM extenders
KVM switching of 3G-SDI and USB 3.0

2015 Global innovation: KVM matrix switch featuring 576 I/O ports

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