

# Audio-/Video-Extender up to 10km for FBAS- or Y/C-Video with digital (analog) Audio- support and serial (RS232) Interface

Dear Customer,

congratulations to purchase the **DAVX- Digital Audio Video EXtender**. This product correspond to the ultimate requisitions for quality and technics. If you still have problems with your device, please refer to your sales office.

The DAVX-Extender allows you to remotely position your Video-, Stereo-Audio- and V24- devices up to 10km. Different devices use different cabelling (Cat5 or fiber) or support differnt features (unidirectional or bidirectional transmission, digital or analogue Audio, ...)

Please read this manual before installing and operating the units. Please record the serial number, the date of purchase and your sales office. The serial number is located on the backside of the units. These data would be important, if you ever need to repair one of the parts.

## **DAVX- Digital Audio Video Extender**

unidirectional transmission over Cat5, digital Audio, +RS232 .....	K452-1S
unidirectional transmission over Cat5, analog Audio, +RS232 .....	K452-2S
unidirectional transmission over Multimode, digital Audio, +RS232 .....	K450-1S
bidirectional transmission over Multimode, digital Audio, +RS232 .....	K450-1D
unidirectional transmission over Multimode, analog Audio, +RS232 .....	K450-2S
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unidirectional transmission over Singlemode, analog Audio, +RS232 .....	K451-2S
bidirectional transmission over Singlemode, analog Audio, +RS232 .....	K451-2D



You have purchased a valuable device, which should meet best all requirements. To do this, it is necessary, to get an overview of behavior of the device, its functions and the different setup possibilities and options.

Please read this manual carefully. Please record the serial number and the date of purchase inside of this manual. The serial number is located on the backside of the units. These data would be important, if you ever need to repair one of the parts. For competent users, we suggest, to read at least the part 'Quick Startup'.

If you have any question to the product, or if you need aid at installation time, please do not hesitate to contact your dealer. He will like to support you.

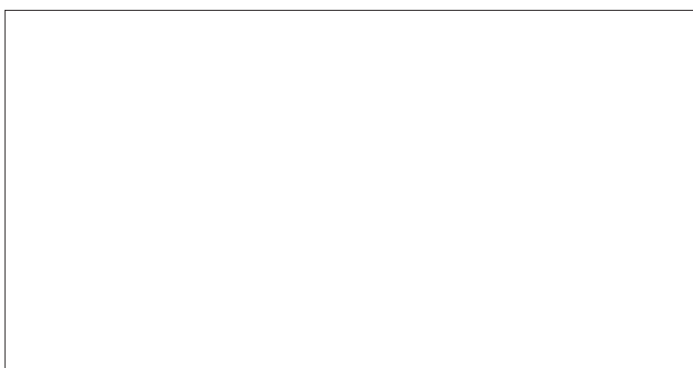
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Serial Number

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date of purchase

Your dealer



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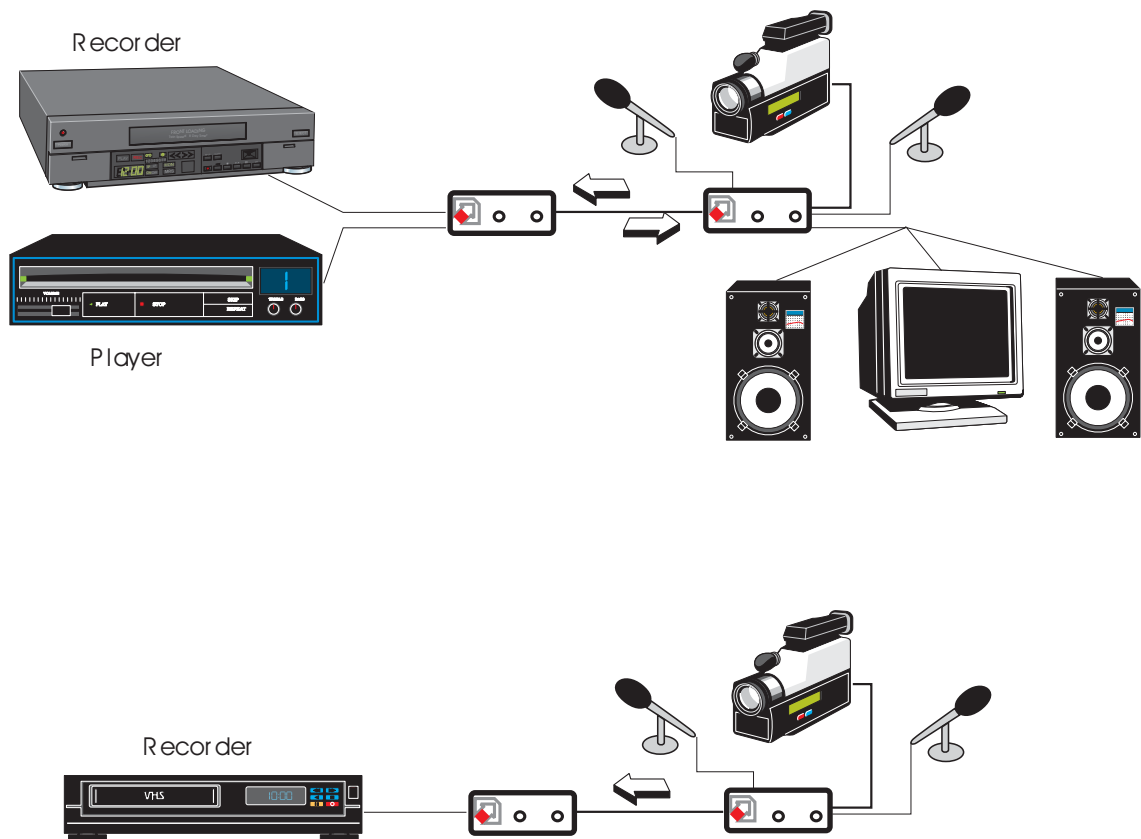
## Introduction

### Features

This product has a number of unique features that allow transparent remote operation of your Video-/Audio- Equipment.

- Transfer your Audio-/Video-Signal in digital Quality over Cat5 up to a distance of 100m, You need only a single CAT 5 twisted pair cable. Please use installation cables (with solid wires) - patch cables (with stranded wires) are not useful for bridging distances. The RS232-Interface allows, to remotely control your devices e.g. your camera.
- Transfer your Audio-/Video-Signal in digital Quality over Multimode Fibre Cables up to a distance of 400m, You need only a single fibre pair. The RS232-Interface allows, to remotely control your devices e.g. your camera. The bidirectional devices allow simultaneous transmissions in both directions.
- Transfer your Audio-/Video-Signal in digital Quality over Singlemode Fibre Cables up to a distance of 10,000m (=10km!). Other features like Multimode
- Using an Infrared Remote Control, you can select the input video format (PAL/NTSC), the video source (FBAS or Y/C) and adjust brightness or contrast. Prssing a single key, you can recall the factory settings or set brightness and contrast to default values.

### Mounting arrangement



## Technical data

### power supply

local unit	:	international power supply unit 90..240VAC-0,5A-47..63Hz/6VDC-2000 mA
remote unit	:	international power supply unit 90..240VAC-0,5A-47..63Hz/6VDC-2000 mA

### Interfaces

Video (main)	:	Input Level 0,7Vpp, 1vpp (-3dB) Input Impedance 75 Ohm Input Capacity max 10pF Output Voltage 0...1,4V Output Current app. 17mA @ 37,5 Ohm
Video FBAS	:	PAL/NTSC, format independant Video Bandwidth 7MHz
Video Y/C (SVHS)	:	PAL/NTSC, format independant Video Bandwidth 7MHz
Audio digital	:	over S/P-DIF up to 6MHz Sampling Rate format independant (96kHz with 64Bit) NRZ Code Transmission Length 0,2...10m POF Plastic Fibre (970/1000µ) pulse width distortion +/- 20ns optical power -21dB ... -15dB Wavelength 660nm
Audio analog	:	bidirectional near CD Quality, 38,4kHz, 16Bit
serial (RS232)	:	fully transparent with Handshake up to 19200 Baud

### Interconnect Cable

	:	(not in schedule of parts)
Cat5/5e/6/7	:	100m (Installation cable 4x2xAWG24 or AWG23)
Cat5/5e/6/7	:	60m (Patchcable 4x2xAWG26)
62,5µ/50 µ Multimode	:	200m (@62,5µ) / 400m (@ 50µ)
9µ Singlemode	:	10km

### Dimensions

Weight	:	app. : 3,0 kg (Kit, 0,5kg per unit)
Length/Width/Height	:	maximal: 170 x133x44mm
Temperature	:	Operation app. 10°C ... 45°C

## Compatibility

To operate in various environments and with hardware from many manufacturers, this product has a number of specific features, and has been tested with a wide variety of hardware. However, it is impossible to guarantee correct operation with every Video-/Audio-Device currently on the market.


### Features:

- Supports PAL + NTSC
- Supports FBAS and Y/C Signale with 7MHz, digital Transmission w/o Compression (ref. CCIR 656)
- Supports (depending on device) digital Audio over optical S/P-DIF-Interface with 6MHz Bandwith (up to 96kHz @ 64Bit Data), format transparent!
- Supports (depending on device) analogue Audio over 3.5mm stereo jack sockets (38,4kHz @ 16Bit), optional Microphon Support
- Format transparent RS232-Interface up to 19200 BAUD. Supported: RxD, TxD, RTS, CTS, DSR und DTR. Normally four of these signals are used for hardware handshaking (in addition to TX & RX). However, because each handshaking line can support signals up to 19,200 Baud it is possible to configure the serial interface to handle up to three simple 2-wire (Tx/Rx only) serial links. (XON/XOFF-Handshake)
- System-Setup with Infrared Remote Control

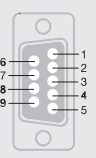
### Connectors/Cables

**Pinout local and remote unit. Please use only the genuine cables for connecting the local unit to the Audio-/Video- Equipment**

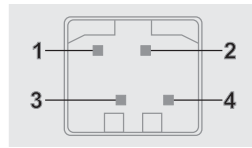
Y/C In/Out connector

 miniDIN 4p-conn.	1	GND
	2	GND
	3	LUMA (Y)
	4	CHROMA (C)

RS232-female/-male

 DB9p-fem./male	1	n.c.	6	DSR
	2	RxD	7	RTS
	3	TxD	8	CTS
	4	DTR	9	n.c.
	5	GND		

## Power Supply Socket

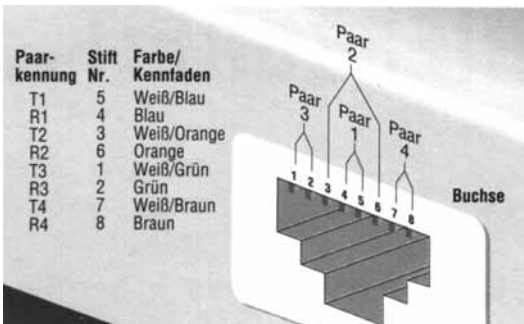


4pol Hirose

1	GND
2	Erde
3	n.c.
4	+6VDC
GEHÄUSE	Schirm

At the plug terminal on the outside of both interface boxes a direct current power supply with 6V/DC has to be connected. We recommend to use our suggested p.s.u. because GND and EARTH shouldn't be connected. Please mount near to the devices ferrite rings in the DC line, to protect against electromagnetic interferences.

## Interconnection Cable: Cat5



To connect Local and Remote Units, please use S/UTP (Cat5) cable acc. to EIA/TIA 56A or TSB 36 or Digital STP 17-03170. Four pairs AWG 24. Pinout acc. EIA/TIA 568A (10BaseT). Screen must be connected on both ends. To enhance EMI resistance, both end should carry a ferrite near to the connectors. Please be careful to have a tension free connection!.

## Hints for using CATx-Cables

The Local and Remote Units are interconnected by industry standard structured cabling (Category 5, Cat5e, Cat6, Cat7 UTP/STP, 4-pair) terminated with RJ45 connectors. This cable is not supplied with the Extenders. The cable used should be solid trunk cable. Stranded patch cable will result in dramatically reduced Interconnection distances (only 60% of trunk cable).

Note: That failure to wire the twisted pairs correctly will impair the video quality dramatically and / or prevent correct operation.

Although a single continuous length of interconnect cable is preferable, operation is possible through multiple patch panels. However, the more patch panels the cable is routed through, the greater the chance of video signal degradation.

## Interconnection Cable: Fibre

Use for interconnecting the local and remote unit:

**Multimode Modules:** Two fibers 50µm or 62.5µm. E.g. I-V(ZN)H 2G50 (Inhouse patchcable) or I-V(ZN)HH 2G62,5 (Inhouse Breakout cable) or I/AD(ZN)H 4G50 (inhouse OR outdoor Breakout cable, stress resistant) or A/DQ(ZN)B2Y 4G62,5 (outdoor cable, stress resistant with protection against animal biting) All notations acc. VDE specification.

**Singlemode Modules:** Two fibers 9µm. E.g. I-V(ZN)H 2E9 (Inhouse patchcable) or I-V(ZN)HH 2E9 (Inhouse Breakout cable) or I/AD(ZN)H 4E9 (inhouse OR outdoor Breakout cable, stress resistant) or A/DQ(ZN)B2Y 4G9 (outdoor cable, stress resistant with protection against animal biting) All notations acc. VDE specification.

## Transceiver-Modules (Fiber Transmission)

The used transceivers are Class 1 laser products. They comply with IEC 60825-1 and FDA 21 CFR 1040.10 and 1040.11. To meet laser safety requirements the transceivers shall be operated within the absolute maximum ratings.

### Caution

**The use of optical instruments with this product will increase eye hazards! All adjustments have been made at the factory prior to shipment of the device. No maintenance or alteration to the device is required.**

**Tampering with or modifying the performance of the device will result in voided product warranty.**

### Usage restrictions

The optical ports of the modules must be terminated with an optical connector or with a dust plug.

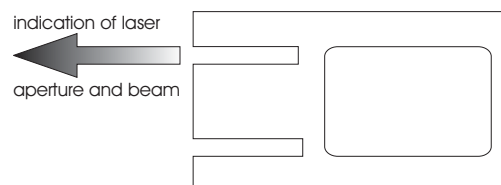
#### Note

Failure to adhere to the above restrictions could result in a modification that is considered an act of "manufacturing," and will require, under law, recertification of the modified product with the U.S. Food and Drug Administration (ref. 21 CFR 1040.10 (i)).

#### Required labels

FDA	IEC
Complies with 21 CFR 1040.10 and 1040.11	Class 1 Laser Product

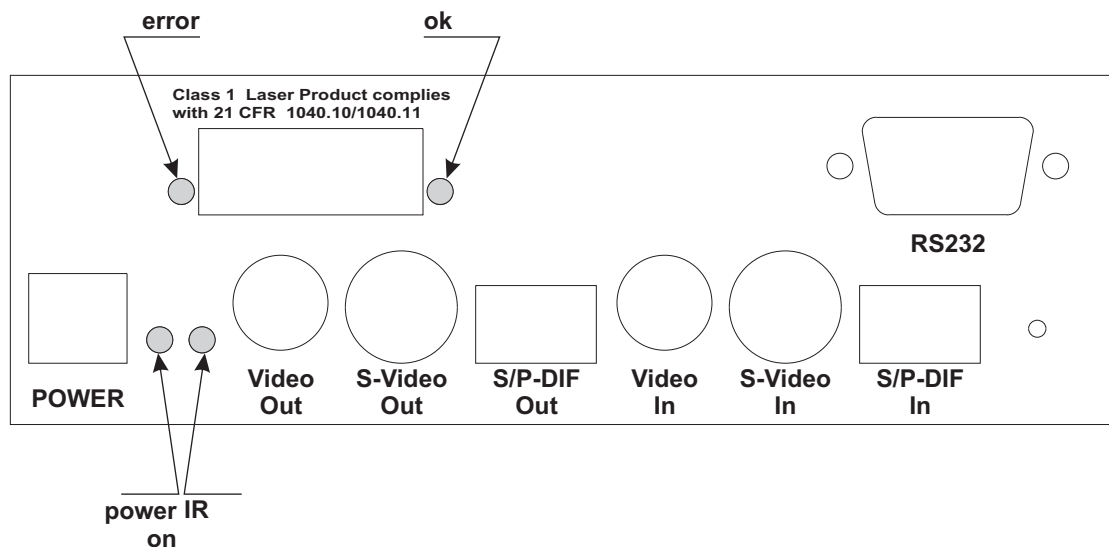
#### Laser emission



## Optical Characteristics (typical)

Description	Multimode	Singlemode
Wavelength	850 nm	1300 nm
Total output power (as defined by IEC: 50mm aperture at 10cm distance)	<400µW	<2000µW
Total output power (as defined by FDA: 7mm aperture at 20cm distance)	<70µW	<180µW
Beam divergence	12°	4°
Launched Power (Average) into multimode fiber 50µm or 62.5 µm diameter or into singlemode fiber 9µm diameter	-5 dBm (-9,5 dBm min)	-3 dBm (-11 dBm min)
average Wavelength	850 nm	1300 nm
Sensitivity (Average Power)	-20 dBm (-17dBm max)	-22 dBm (-20dBm max)
optical Budget - min.l	-6,5dB	-8dB
optical Budget - average	-14dB	-18dB

## Diagnostics at the local/remote units (LED's)



<b>error</b>	<b>Data Error</b>	<b>(red LED)</b>
off:	no communication error	
slow blinking:	one or some few communication errors occurred during the last 60 minutes	
fast blinking	a lot of communication errors occurred during the last 60 minutes.	
(60 minutes after the last communication error occurred, the error counter is cleared automatically)		
<b>ok</b>	<b>Data Link</b>	<b>(green LED)</b>
blinking:	no connection	
continuously on:	connection okay	
<b>power on</b>	<b>Display Power Status</b>	<b>(green LED)</b>
off	no power or internal failure	
on	power ok, device ok	
<b>IR</b>	<b>Display Data Transfer from IR Control</b>	
Blinking	Data Transfer from IR Control (while pressing a key)	

## Getting Started

The DAVX Extender consists of a Local and a Remote Unit interconnected by a fibre cable (2 fibres) or a single structured cable. The Local Unit is connected to the output of your video-/audio source. The monitor and speakers are connected directly to the Remote Unit. Bidirectional devices are local and remote unit at the same time. Local and remote unit are powered by a power supply. Please remind, that all setup processes have to be done at the remote unit. Exception: Cat5 devices with digital audio must be setup for Video Source and Video Format at the local unit.

### Connecting Up

- Switch off your devices and power up the Local/Remote Unit by connecting the mains adapter and switching it on. **Only use the mains adapter supplied.**
- Connect the local unit to the Video-/Audio- Source, the remote unit to the Video-/Audio- Sink and interconnect the devices with the Fibre-/Cat5- Cable.
- Power on your Video-/Audio- Source, your Video-/Audio- Sink and check the data transfer. Check that the IR Control functions.
- Check that the **Data Link** LED on both units stays illuminated and the **Data Error** LED does not blink..

***We recommend, that the complete system is tested in one room before permanent installation. If a long interconnect cable is not available, use a patch lead to test basic unit operation with your PC.***

All configuration and tuning is carried out using the IR Control at the Remote Unit. Setting up bidirectional devices, it is always this channel to be updated, which is displayed at the attached screen. Here you modify settings and parameters.





## Remarks to S/P-DIF Interface

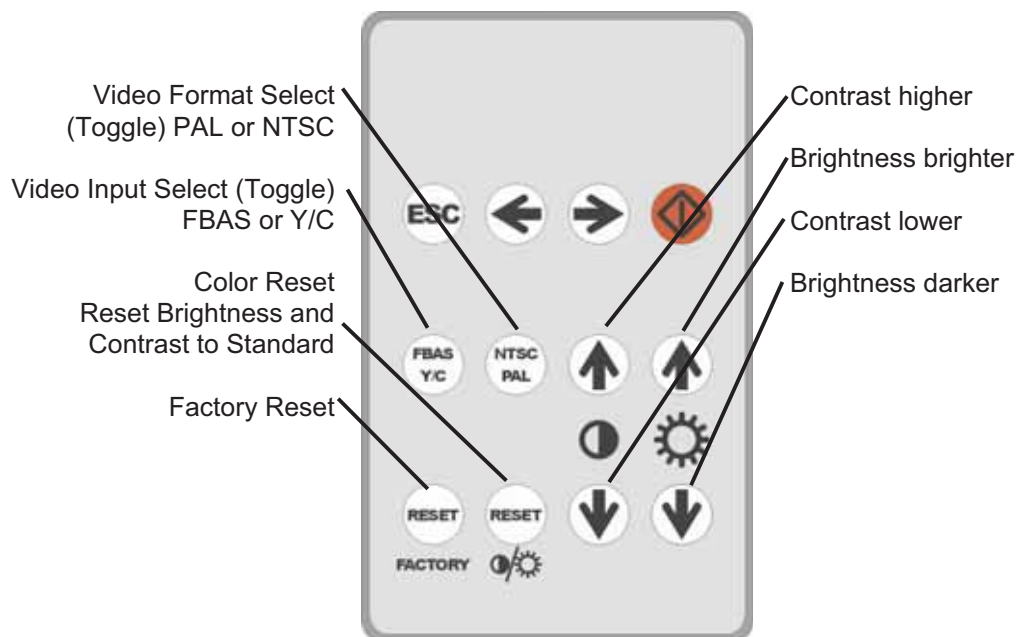
The asynchronous transmission of the digital audio S/P-DIF interface (oversampling) adds jitter to the signal. Serial connection of two pairs of video extenders may increase this jitter to a not tolerable value. This can induce audible errors. This error doesn't occur with the analog audio extender module.

## Firmware Upgrade and external Setup

In some special cases, it might be necessary to update the firmware of the system. Normally this is to be done in the factory. Under some circumstances it might be possible, to do this by the customer. In this case, you will receive from our support a programming cable and software. Please follow the instruction of the program and the shipped brochure.

## IR-Control

Please use the IR-Control displayed below to setup your extender system:




## Usage of IR-Control

For adjusting video parameters of the DAVX, you have to direct the remote control to the current remote device. This is always the device where the monitor is attached, which parameters shall be modified. So you can follow the changings at the remote side.

Also the selection of the input signal Composite or S-Video is to be done at the remote side. If there are two different video sources connected at both inputs simultaneously, it is possible to use the device like a digital video switch. At the remote side Composite and S-Video are

delivered at the same time, independent of the type of connected source. The extender acts also as an video converter from composite to S-Video and vice versa.

Changes made by remote control are immediately stored permanently in the extenders memory. The key '**Factory Reset**' at the remote control resets all DAVX settings to factory default values. This key resets the changes for the local and the remote unit at the same time.

Key	Function	Description
	<b>Input Select</b>	Schaltet zwischen FBAS und Y/C Eingang hin und her (Auslieferungszustand: FBAS)
	<b>Video Mode</b>	Schaltet zwischen PAL und NTSC Format hin und her (Auslieferungszustand: PAL)
	<b>Factory Reset</b>	Zurücksetzen des DAVX-Systems in den Auslieferungszustand (2x drücken!!!)
	<b>Color Reset</b>	Rücksetzen von Brightness und Kontrast auf Standard
	<b>Brightness brighter</b> Brightness darker	 <b>Contrast higher</b> Contrast lower

## Serial Interface (V24/RS232)

No setting up or user adjustments are required.

### Serial Interface – Handling Multiple Serial Devices

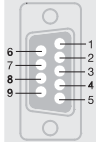
The extender's serial interface transmits/receives six signals (3 signals in each direction). Normally four of these signals are used for hardware handshaking (in addition to TX & RX). However, because each handshaking line can support signals up to 19,200 Baud it is possible to configure the serial interface to handle up to three simple 2-wire (Tx/Rx only) serial links. To do this you will need to construct a custom breakout cable. Please contact technical support for further information.

### Technical Data

#### serial link:

serial speed : Any up to a maximum of 19,200 Baud  
 Serial Data Format : Format Independent  
 Flow Control : RTS, CTS, DTR, DSR are sent across link

**Pinout (serial in/serial out)**

 DB9p-fem./male	1- n.c.	6- DSR
	2- RxD	7- RTS
	3- TxD	8- CTS
	4- DTR	9- n.c.
	5- GND	

**analogue AUDIO-Interface**

The audio interface is line-level and is designed to take the output from a sound card (or other line-level) source and be connected to a set of powered speakers at the other end of the link. Stereo audio may be transmitted either way across the link (simultaneously). No set up is required unless a microphone is connected to the remote unit.

**Technical Data****AUDIO link:**

Description	:	Bi-directional stereo audio link
Transmission Method	:	Digitised virtually CD quality audio (16-bit, 38.4KHz)
Signal Levels	:	Line-Level (5 Volts Pk-Pk maximum)
Input Impedence	:	47K
Local Unit Connectors	:	2 x 3.5mm stereo jack socket (Line In & Line Out)
Remote Unit Connectors	:	2 x 3.5mm stereo jack socket (Line/Mic In & Line Out)
Microphone Support	:	A microphone may be connected to the Remote Unit Pullup resistor provides bias for condenser microphone Option to set microphone amplification to +17dB

**Connect up the extender as follows:**

- Take the line-level output from your sound card (green connector) and connect to 'Line In' on the extender.
- A set of powered speakers may be connected directly to 'Line Out' at the opposite end of the link.

**Audio Interface – Using a Microphone**

A microphone may be plugged into the 'Line In' connector on the Remote Unit.

There are two ways of setting up a microphone:

- The Local Unit's 'Line Out' connection should normally be wired to the microphone input (Red) on your sound card. The sound card should then be set up to provide additional amplification (+20dB). This is the preferred connection method.
- Alternatively, the Remote Unit itself can provide microphone amplification. To set this, open up the Remote Unit and locate the jumper labelled 'MIC' on the daughterboard. Connect this jumper across the pins. The Local Unit's 'Line Out' connection should then be wired to 'Line In' (Blue) on your sound card.
- If your microphone is already amplified, follow the second method but DO NOT install the amplification jumper in the Remote Unit.

**Order Notation****DAVX-Cat5-A/V-Extender unidirectional with digital Audio**

order notation : DAVX-CAT5-DIG1  
parts no.: K452-1S

**DAVX-Cat5-A/V-Extender unidirectional with analogue Audio**

order notation : DAVX-CAT5-ANA1  
parts no.: K452-2S

**DAVX-Multimode-A/V-Extender unidirectional with digital Audio**

order notation : DAVX-MM-DIG1  
parts no.: K450-1S

**DAVX-Multimode-A/V-Extender unidirectional with analogue Audio**

order notation : DAVX-MM-ANA1  
parts no.: K450-2S

**DAVX-Multimode-A/V-Extender bidirectional with digital Audio**

order notation : DAVX-MM-DIG2  
parts no.: K450-1D

**DAVX-Multimode-A/V-Extender bidirectional with analogue Audio**

order notation : DAVX-MM-ANA2  
parts no.: 450-2D

**DAVX-Singlemode-A/V-Extender unidirectional with digital Audio**

order notation : DAVX-SM-DIG1  
parts no.: K451-1S

**DAVX-Singlemode-A/V-Extender unidirectional with analogue Audio**

order notation : DAVX-SM-ANA1  
parts no.: K451-2S

**DAVX-Singlemode-A/V-Extender bidirectional with digital Audio**

order notation : DAVX-SM-DIG2  
parts no.: K451-1D

**DAVX-Singlemode-A/V-Extender bidirectional with analogue Audio**

order notation : DAVX-SM-ANA2  
parts no.: 451-2D

## schedule of parts supplied

All DAVX come with local unit, remote unit, cables to video-/audio- source and two international p.s.u. for local and remote unit.

### List of parts supplied:

- 1x DAVX local unit
- 1x DAVX remote unit
- 1x IRC Infrared Remote Control
- 2x international p.s.u. 90..240VAC-0,5A-47..63Hz/6VDC-2000 mA
- 2x IEC power cord
- 1x FBAS / Cinch Video Cable
- 1x Y/C / miniDIN4p Video Cable
- 1x Audio Cable S/P-DIF Poly-Fibre or 3.5mm stereo jack, depending on model
- 1x serial Cable
- 1x manual

bidirectional devices come with a double set of Video-/Audio- Cables

Interconnect cable between local interface and remote interface is **not included**.

**Caution: Only use the power supply originally supplied with this product.** If you are not able. to use the p.s.u.'s originally supplied, please contact your dealer for replacements.



### order notation accessories

interconnection cable	:	Cat5-Simplex 4x2xAWG24	402-0J
confectioning	:	Cat5-Simplex	402-0A
interconnection cable	:	Multimode 2 Fibres	433-2M
confectioning	:	Multimode SC duplex	251-2C
interconnection cable	:	Singlemode 2 Fibres	433-2S
confectioning	:	Singlemode SC duplex	251-2S
p.s.u.	:	spare for local/ remote unit	260-4E
Cables	:	FBAS / Cinch Video Cable	450-0C
		Y/C / miniDIN4p Video Cable	450-0Y
		Audio Cable S/P-DIF Poly Fibre	450-0S
		Audio Cable 3.5mm stereo jack	450-0K
		serial Cable	026-2X

**EU DECLARATION OF CONFORMITY****declaration of manufacturer**

This is to certify that, when installed and used according to the instructions in this manual, together with the specified cables and the maximum cable length of 3m, the Units:

**K452-1S, K452-2S, K450-1S, K450-2S, K450-1D,  
K450-2D, K451-1S, K451-2S, K451-1D, K451-2D**

are shielded against the generation of radio interferences in accordance with the application of Council Directive 89/336/EEC as well as these standards:

**EN 55022:** 1999 Class A

**EN 55024:** 1999

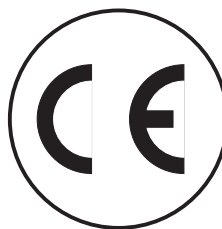
IEC 61000-4-2: 2001

IEC 61000-4-3: 2001

IEC 61000-4-4: 2001

**EN 61000-3-2** 2001

**EN 61000-3-3** 2002



The device was tested in a typical configuration.

Oberteuringen, December 6th, 2006

The management



This equipment has been found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**Disclaimer**

While every precaution has been taken in the preparation of this manual, the manufacturer assumes no responsibility for errors or omissions. Neither does the manufacturer assume any liability for damages resulting from the use of the information contained herein. The manufacturer reserves the right to change the specifications, functions, or circuitry of the product without notice.

The manufacturer cannot accept liability for damage due to misuse of the product or due to other circumstances outside the manufacturer's control. And the manufacturer will not be responsible for any loss, damage, or injury arising directly or indirectly from the use of this product.