

# Installation manual

## iGuard<sup>®</sup>

**The digital video recording system**

Rev. 2.90

Status: September 2010

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## Preface

We have taken every possible care in preparing this manual. Nevertheless, we are unable to provide any guarantee with regard to content, entirety or quality of the details contained in this manual. The contents of this manual are revised regularly and brought up to latest standards. Furthermore, we are also unable to guarantee that the product will operate fault-free even if the specifications and recommended system configuration are observed.

Under no circumstances whatsoever are we able to guarantee that a specific application objective can be achieved with the purchase of this product.

Liability for immediate damages, subsequent damages and damages to others resulting from the purchase of this product is excluded within the terms of existing legislation. Liability under any circumstances is restricted to the product price.

Furthermore we exclude any liability for any possible increase in telephone costs due to unwanted connections during the use of iGuard<sup>®</sup> RemoteView and/or iGuard<sup>®</sup>.

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## **Copyright**

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IDS Imaging Development Systems GmbH grants the purchaser the right to use the software herewith. Copying the software in any form whatsoever, with the exception of a backup copy, is strictly forbidden.

Use MJPEG-Codec from MainConcept GmbH Aachen (© 1999 MainConcept GmbH) for video compression if using a FALCON series frame grabber.

## **Security**

We mention that the content of this manual is not a part of an earlier treatment. All guarantees are based on your license treatment, when you bought the system.

If you need further information or if you have special problems which are not mentioned in this manual, you can contact your installer, or the address listed below.

The installation and maintenance must be done by qualified personnel.

The correct and secure function of this system is based on careful transport, correct storing, installation and maintenance.

## **Data Security**

You can also store data of persons. Please take care of legislative order concerning data security.

The system and any storage media as floppy-discs, CDs, removable disks etc. should also only be reachable for you or authorised persons..

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## **Environment**

Please take care of the correct use of this system. Otherwise guarantee cannot be granted.

Take care of direct sun-, wetness- and shock-protection.

The following environment is necessary:

### Use:

Temperature: 0° C to 60° C

### Non use:

Temperature: -20° C to 80° C

## **Installation and maintenance**

The installation, maintenance and perhaps repairing must be done by qualified personnel.

## **Trademarks**

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# 1 Introduction

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Thank you for your decision to purchase *iGuard*<sup>®</sup>. *iGuard*<sup>®</sup> is a digital video recording system for the surveillance of rooms, premises, buildings, production workshops, critical public areas or any outdoor areas where security is important.

Beside an audio channel there can be recorded up to 40 analogue and 16 further IP cameras at the same time. A simultaneous display of all cameras for live surveillance is possible at the same time as recording. Basically the system allows two different operational recording modes which may also be combined with each other:

**Long-time recording** analogous to the operation of a standard video recorder, which however has an option for recording only motion pictures.

**event-triggered recording** that is the recording of alarms with their pre-history via a ring buffer.

In case of event-triggered recording the system is controlled through digital inputs which can be connected with any form of event triggering sensors. In addition, the system allows a logical operation of external sensors with an internal generated digital input. Motion detection with the connected cameras which then operate as video sensors is already integrated into the software.

This means that the system is fully customisable and allows all forms of configurations according to date, time, connected periphery, ambient conditions and plausibility routines. External reactions to occurring alarms are controlled by digital outputs.

*iGuard*<sup>®</sup> therefore offers the best possible customisation to your application, both with regard to your various different alarm triggers such as for instance cameras, light barriers etc., and also in case of alarms to control your various external devices such as for instance sirens, alarm systems, lighting etc.. By defining different alarm configurations, you also have the possibility to adjust the video recording to the actual surveillance task in question and thereby maximise the performance of your system.

In addition, *iGuard*<sup>®</sup> possesses a well-planned user administration. By the assignment of up to 13 different user rights and 3 individual camera rights, it allows for each user to have access to certain functions on an individual basis according to his range of tasks. Such access may also be denied to others. This enables you to make the best possible adjustment to your particular requirements.

Finally, *iGuard*<sup>®</sup> is developed in terms of clarity and comprehensibility of the windows and dialogs. Most buttons are provided with easy to understand symbols that are placed at suitable points within the window. This allows an intuitive

operation of the program. However, if questions do arise, the online help is available at any time.

The delivery includes, free of charge, the *iGuard® RemoteView* and *iGuard® Player* programs in addition to the *iGuard®* program itself. Using *iGuard® RemoteView*, you have the possibility to remote access (via LAN or ISDN/DSL) the system in order to revise the recorded videos and to watch camera-pictures live. Here *iGuard® RemoteView* functions as a client accessing *iGuard®* as a server. When operating *iGuard®* with separate hard discs, *iGuard® RemoteView* enables you to carry out local playback on an external PC. The *iGuard® Player* allows you to replay video recordings or exported AVI sequences.

We would like to wish you a lot of success with this product. Please do not hesitate to contact your individual installer at any time if you have any further questions.

## 2 Prerequisites

### 2.1 Operating system

*iGuard*<sup>®</sup>, *iGuard*<sup>®</sup> RemoteView and the *iGuard*<sup>®</sup> Player were developed for operation with Microsoft Windows XP<sup>®</sup>, Windows Vista<sup>®</sup> and Windows 7<sup>®</sup>. It only supports 32-bit systems. The desktop resolution must be at least 1024x768 pixel with 15/16-bit colour resolution. We recommend a resolution of at least 1280x1024 with 15/16-bit colour resolution.



The operating systems Windows 95/98, Windows ME, Windows NT, Windows 2000 and Windows 2003 Server will no longer be supported.

### 2.2 Hardware

In *iGuard*<sup>®</sup>, dependant on the system, the *FALCONplus*/*FALCONquattro* frame grabber or *DORADOquattro* video compression board of the IDS Imaging Development Systems GmbH is used.

The video data are recorded to local hard drives or network drives. The use of removable hard discs is possible, too. The direct storage on removable media as DVD-RAM, DVD-/R DVD-/RW, CD-R/W is possible.

The Hardware-drivers support an Interrupt-Sharing with other devices (therefore the driver of the other device must support an Interrupt-Sharing as well):



There is no use of hard disc compression. First, the image data is already compressed, and besides, the additionally gained memory wouldn't justify the performance forfeit (the compression affects the hard disc access speed).

The used graphics card must include DirectDraw support with the required DirectDraw functions. There is no software emulation of the DirectDraw functions. With regard to DirectDraw functions, it should be noted that they depend not only on the graphics hardware used but also very specifically on the graphics drive being used. The drivers of the same graphics card can offer different DirectDraw support with different operating systems or different driver versions. For this reason, IDS is unable to guarantee perfect functioning with all available graphics cards on the market. Although *iGuard*® checks whether the graphics driver provides all the necessary DirectDraw functions, it is possible that a graphics driver registers a DirectDraw function which it is not really able to provide or not with the required performance.

For the use of a telecommunication via ISDN we recommend to use ISDN boards of AVM: FRITZ! PCI or FRITZ! USB 2.0. In case of questions concerning the installation of these boards please apply to the manufacturer.

## 2.3 Resolution and file format

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The files stored by *iGuard*® have the extension .IGD. The resolution of the stored images is:

- by using normal resolution  
384x288 Pixel (*FALCON*) alternatively 352x288 Pixel (*DORADOquattro*)
- by using high resolution  
768x288 Pixel (*FALCON*) alternatively 704x288 Pixel (*DORADOquattro*).
- by using maximum resolution  
768x576 Pixel (*FALCON*) alternatively 704x576 Pixel (*DORADOquattro*).

## 3 Hardware Installation



### **FALCONplus/FALCONquattro**

When installing the *FALCONplus/FALCONquattro*, make sure that the driver of a TV tuner board (e.g. WinTV from Hauppauge) or a comparable multimedia board with a Bt848 or Bt878 chip has been removed completely beforehand from your computer. The drivers of various other suppliers overwrite part of the EEPROM of the *FALCONplus/FALCONquattro* board immediately after they are started without checking beforehand whether the installed board comes from another manufacturer. The result is the *FALCON* driver can no longer recognise the board. Reprogramming the EEPROM can only be carried out by IDS GmbH at a charge!

For this reason, parallel operation of multimedia boards from other manufacturers with the *FALCON* board is not possible!

### 3.1 Board installation

This chapter describes the installation of a video compression board in your system. The software should be installed completely before the installation of the hardware.



### **Warning! Static electricity!**

Make sure that you discharge to earth any static electricity in your body before working on the inside of the PC. Failure to do so can result in an electrical discharge destroying hardware components.

The installation of the *FALCON/DORADOquattro* board is very easy. Please proceed as following:

- Pull out the mains plug. When using ATX motherboards, it is possible that the PCI-bus is still live after switching off the system. Plugging in or removing boards in this state can result in the motherboard and/or the *FALCON/DORADOquattro* being destroyed.
- Open the housing.
- Remove the cover of a 32 bit PCI slot not in use which has bus mastering function. See the manual of your motherboard to find out which slot has bus mastering function.

- Insert the card in the free PCI slot of your system. The board was designed so that it can be inserted into slots which are normally available for short plug-in boards. Make sure that your *FALCON/DORADOquattro* does not come into contact with any electric components such as plug pins or components of the system.



**Static electricity - leakage current!**

Avoid contact with any components, circuit-board conductors and plug pins! There is a danger of components being destroyed by the discharge of static electricity!

Condensation can form on the surface of the board following transportation of the *FALCON/DORADOquattro* - particularly with cold outside temperatures - leading to leakage current and malfunctions as a result. Allow the *FALCON/DORADOquattro* to warm up to room temperature first before putting it into operation.

- Fasten the slot cover of the *FALCON/DORADOquattro* in place with a screw.
- Check again that the board is inserted correctly into the system slot.
- Close the housing.

## 3.2 Video connecting

---



The following points are to be considered when connecting video sources:

- Connect/reconnect video sources only when power is off
- Pay attention to potential equilisation

The video sources are connected via BNC connectors as well as expansion slots and breakout cables with *FALCONquattro* and *DORADOquattro*.

### 3.3 Multi-board support *FALCON/DORADOquattro*

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With multi-board support of the *FALCON*, make sure that each board can be addressed individually. Each board has a clearly defined identification number (*BoardID*) for this purpose so that it can be identified. The BoardID is set to 1 as standard. If several boards are being used in a system, the boards will have to be allocated individual board ID's. This assignment is carried out using the IDSID.EXE resp. DVRBID.EXE program.

When allocating the board ID's, it is advisable to make a note of the boards' serial numbers in the order of their installation (from right to left or similar).

*iGuard*® always requires a *FALCON/DORADOquattro* with BoardID 1 and with multi-board support additional cards with rising uninterrupted board ID's (2, 3, 4).

Important: If an optocoupler board is being connected, it can only be connected to the *FALCON* with board ID 1!



If an optocoupler board or the watchdog is being connected, it can only be connected to the *FALCON/DORADOquattro* with board ID 1!

The board-related programs are available for reading out the board information and setting the board ID's.

<b><i>FALCON</i></b>	<b><i>DORADOquattro</i></b>
IDSINFO.EXE	DVRBINFO.EXE
IDSID.EXE	DVRBID.EXE

### 3.3.1 Application program IDSinfo/ DVRBinfo

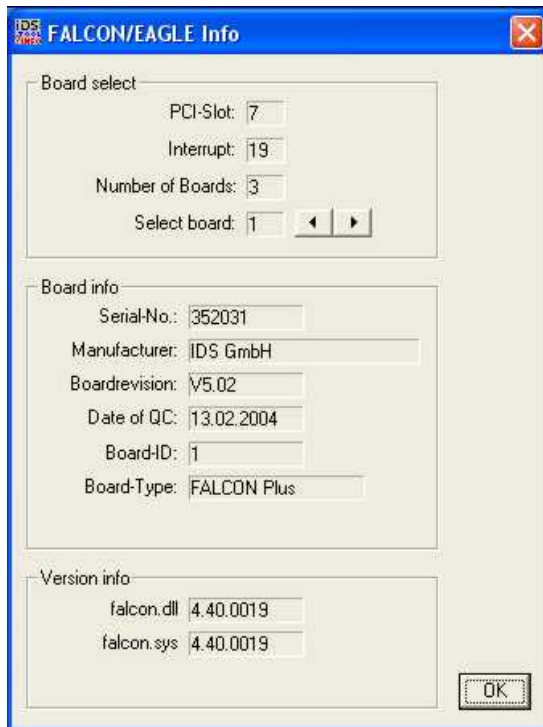


Figure 1: IDSinfo

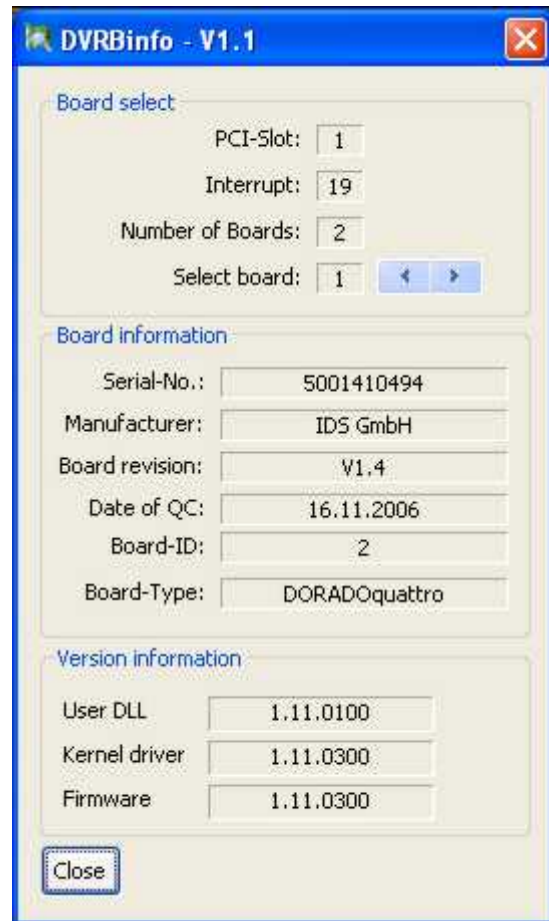


Figure 2: DVRBinfo

#### Board select

- **PCI-Slot**  
States the number of the PCI-Slots where the corresponding *FALCON/ DORADOquattro* board has been inserted. The numbering of the PCI slot depends on the mainboard and does not necessarily start with 1.



A system with 4 PCI slots, for instance, usually does **not** have PCI slot numbers 1-4 but numbers such as 14-17.

With the *DORADOquattro* boards the number of the board-internal *Slots* are indicated here. This internal *Slots* has the numbers 4 to 7.

- **Interrupt**  
States the interrupt occupied by the selected board.
- **Number of Boards**  
Specifies the number of available *FALCON/DORADOquattro* boards.
- **Select board**  
Selects one of the available *FALCON/DORADOquattro* boards. Its data is contained in the Board information section. A board can be selected using the two touch buttons.

### Board info section

- **Serial-No.**  
Shows the serial number stored in the board's EEPROM. This is a 10 digit serial number (*DORADOquattro*) resp. a 6 digit number (*FALCON*).
- **Manufacturer**  
Details of the manufacturer of the board.
- **Board revision**  
Current hardware revision of the board.
- **Date of QC**  
Date of final test (quality control) of the board.
- **Board-ID**  
Identification number of this board. Boards can be differentiated and selected individually using this number if running with multiple board operation. The ID can be defined by the user (program: *IDSID.EXE* resp. *DVRBID.EXE*). The standard value for board ID's is 1.
- **Board-Type**  
Type number of the board.

### Version info section

#### **FALCON**

- **falcon.dll**  
Version info of the API programming DLL
- **falcon.sys**  
Version info of the system driver

#### **DORADOquattro**

- **dvr.b.dll**  
Version info of the API programming DLL
- **dvr.b.sys**  
Version info of the system driver
- **dvr.b.out**  
Version info of the Firmware

### 3.3.2 Application program IDSid/DVRBid

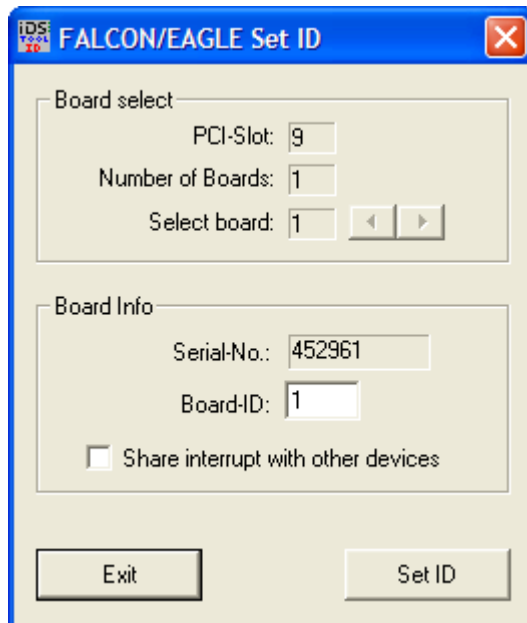


Figure 3:: IDSid

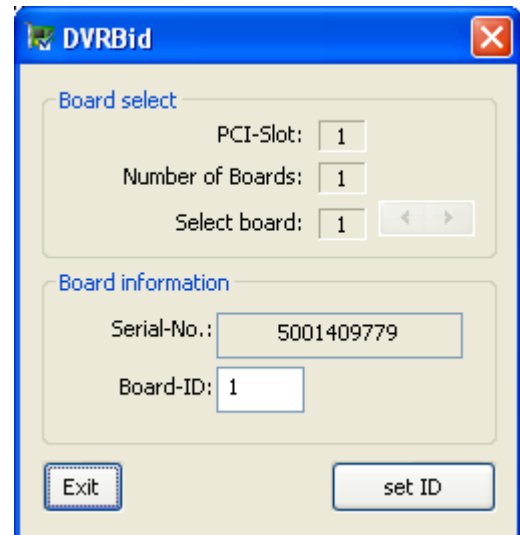


Figure 4: DVRBid

#### Board select section

- **PCI-Slot**  
States the number of the PCI-Slots where the corresponding *FALCON/DORADOquattro* board has been inserted. The numbering of the PCI slot depends on the mainboard of your computer and does not necessarily start with us (a system with 4 PCI slots, for instance, usually does not have PCI slot numbers 1-4 but numbers such as 14-17!!!).
- **Number of Boards**  
Specifies the number of available *FALCON/DORADOquattro* boards.
- **Select board**  
Selects one of the available *FALCON/DORADOquattro* boards. Its data is contained in the Board information section. A board can be selected using the two touch buttons.

#### Board Info section

- **Serial-No.**  
Shows the 10 digit (*DORADOquattro*) resp. 6 digit (*FALCON*) serial number stored in the board's EEPROM.
- **Board-ID**  
Identification number of this board. The number identifies a specific board if multiple board operation is being used. The standard value for a board ID is 1. Alphanumerical figures or negative numbers are not permitted. Value range of the board ID: [1...254].

### 3.4 Optocoupler board (available as option)

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An optocoupler board can also be purchased as an optional extra to the *FALCONplus*, *FALCONquattro* and *DORADOquattro* and allows the connection of alarms for event controlled recording and the control of switch outputs as a reaction to alarms.

A ribbon cable is included with the optocoupler board for connection of one of the *FALCON/DORADOquattro* boards with the optocoupler board. The optocoupler board does not require a plug-in slot in the system. Next to the slots, there's often an unused panel in the system housing. Remove the panel and connect the optocoupler board there.

## 3.5 USB Input/Output Modules (optional)

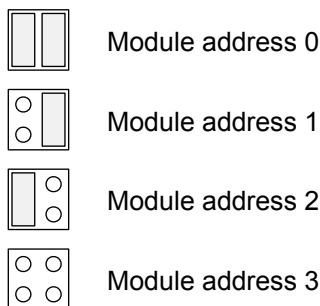
*iGuard*<sup>®</sup> supports the following Input/output modules:

- USBOPTO8
- USBREL8
- USBOPTOREL16

### 3.5.1 USBOPTO8/USBREL8

The USB I/O modules (USBOPTO8/USBREL8) allow you to increase the number of alarm inputs and output lines available in *iGuard*<sup>®</sup>.

The modules are supplied with power via USB, so no additional mains adaptors are required. You can operate up to four modules of the same type. These modules are addressed via jumpers with which you can set the module addresses 0 – 3.



The modules are mounted on top hat rails. Other devices are connected to the modules via pluggable terminal strips. Because the opto couplers are laid out as alternating current opto couplers, the polarity of the input signal is arbitrarily. An LED shows the current state of each input/output.

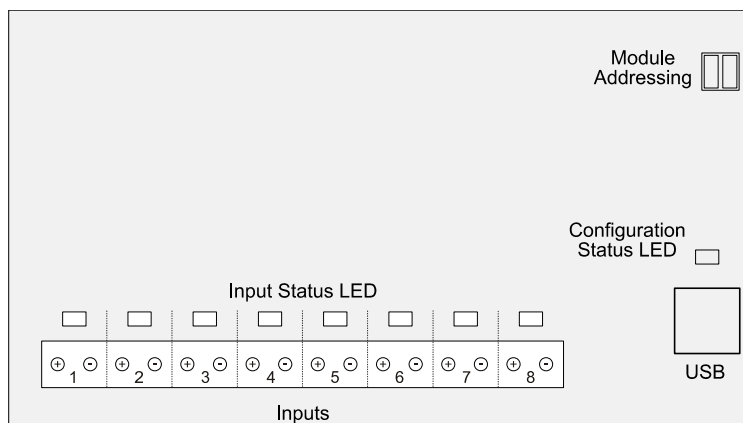


Figure 5: USBOPTO8 (USB input module)

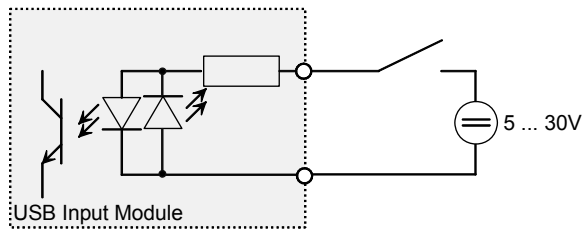


Figure 6: Connecting USBOPT08

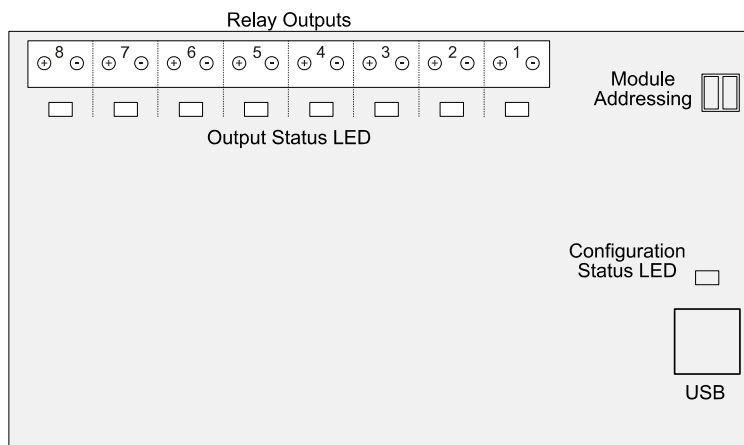


Figure 7: USBREL8 (USB output module)

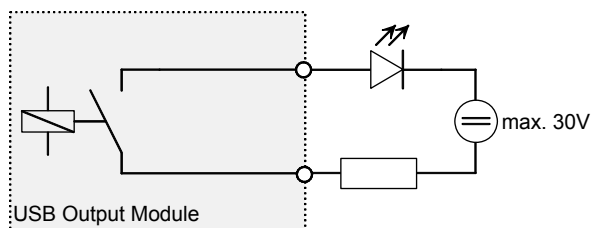


Figure 8: Connecting USBREL8

### 3.5.2 USBOPTOREL16

The module *USBOPTOREL16* offers 16 optically isolated inputs and 16 relay outputs. Contrary to the modules *USBOPTO8* and *USBREL8 iGuard®* supports only 1 module of the type *USBOPTOREL16*.

With this module power supply is possible alternatively by the USB interface or an external 12V connection. It is set by the jumper J1.

☒ Power supply via USB interface

☐ External 12V power supply

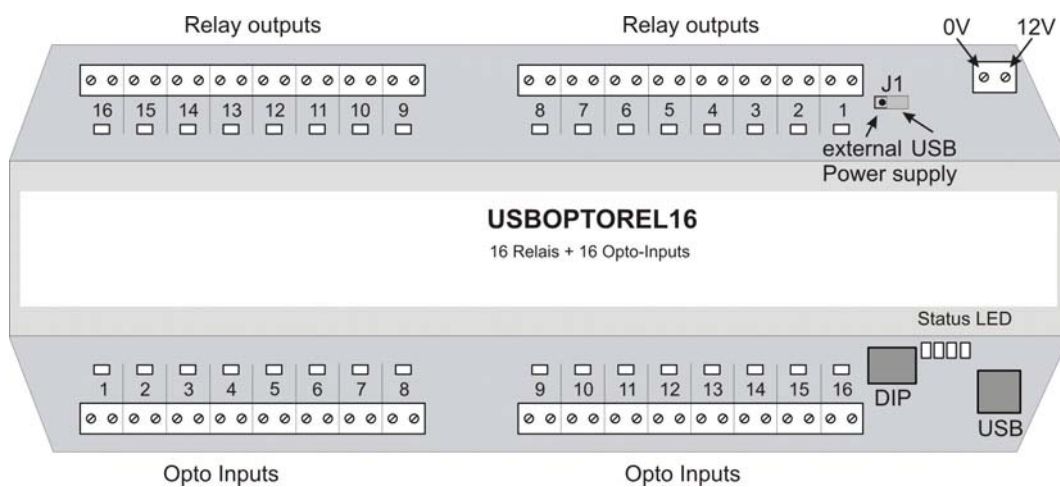


Figure 9:USBOPTOREL16

## 4 Software Installation

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The software should be installed completely before installing the hardware (*FALCON* or *DORADOquattro*).

If the hardware does not work after installation of the software, all unknown multimedia devices must be removed manually from the device manager. Then after a new start of the computer the used hardware should be correctly detected and be started.

### 4.1 iGuard® Installation

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The latest version of the software can be found at <http://www.iguard.de/download>. Download and unpack the “iGuard Demo and Full version” file (\*.zip-archive). Then start the contained executable file (\*.exe) in order to install iGuard.



Administrator rights are necessary to install the software. This applies to both new installations as well as for any subsequent driver update.

You have several possible methods of installation available, depending on whether you wish to install iGuard® and/or iGuard® RemoteView or iGuard® Player. User defined installation is of course also possible. The following 6 installation versions can be selected:

1. Standard Installation (*FALCON*)
2. Standard Installation (*DORADOquattro*)
3. Standard Installation (LAN cameras)

The installation corresponds with an installation of iGuard® as server with *FALCON/DORADOquattro* as hardware components. The iGuard® RemoteView program (client) is not installed in this case. The configuration files and documentation are installed along with iGuard®. The installation of the *FALCON/DORADOquattro* drivers, *FALCON/DORADOquattro* tools, iGuard® Player and software codecs also takes place.

#### 4. RemoteView Module

This installation version is intended for setting up an external client for the revision of recorded video data. In this version *iGuard*<sup>®</sup> RemoteView, *iGuard*<sup>®</sup> Player and the Software Codec are installed.

#### 5. User defined

In the user-defined installation you are able to decide which components you wish to install or not. Components to be installed must be given a control tag. User defined installation should only be undertaken after careful consideration.

#### 6. Demo

In case of an installation as a demo version, *iGuard*<sup>®</sup> is installed with the configuration files, the hardware simulation, *iGuard*<sup>®</sup> RemoteView and *iGuard*<sup>®</sup> Player. Documentation is also installed. As no boards are installed, recording and operation are not possible. *iGuard*<sup>®</sup> can only be used as a simulation or demo program.



Should individual components of the software be damaged at a later date, it may be possible to attempt to repair these. The “Repair” option will appear for this purpose after starting setup.exe. This will have the effect of re-installing every file that have been installed during the first installation. It should be noted that existing files may be overwritten in this procedure!

*iGuard*<sup>®</sup> is distributed with several language versions. For some of them there is no online help available so far. The installation program installs all languages and automatically uses the language which was specified in the system settings by country. The English language version is selected automatically if the chosen language is not available.

Further languages are intended for subsequent versions, or these can, as soon as other languages are available, be downloaded from [www.iguard.de](http://www.iguard.de).

The following program- and data base files can be found after the installation and initial startup of *iGuard*<sup>®</sup> within the installation directory on your system:

Files	Description
iGuard.dat	Configuration file including the settings of the application, the used hardware, the configured scenarios and the settings of the user administration.
iGuard_deu.pdf	German user manual
iGuard_enu.pdf	English user manual
iGuard_install_deu.pdf	German installation manual
iGuard_Install_enu.pdf	English installation manual
addresses.tbk	Telephone book of iGuard® RemoteView
iGuard_Messages.VDB	Data base file including the logbook entries
iGuard_Record.VDB	Data base file for the recorded video data
iGuardPowerFailure.exe	Program for automatic closing of iGuard® and shutting down the operational system thereafter in case of a power failure. This is called up by the software of the UPS (uninterrupted power supply)

Table 1: Installed Program- and Data base files in Windows

## Checking the installation

Please check the following points

- Was your video capture hardware recognised as *FALCON* or *DORADOquattro*? One of the following entries must be present in the sub-directory *Audio, video and game controller* of the device manager depending on the type of board being used:
  - IDS FALCON
  - IDS DORADO

If an error has occurred while integrating into Windows, it is possible that the *FALCON* or *DORADOquattro* has been entered in another directory *Other components* or *Unknown devices* as video controller or multimedia device. In this case, proceed as follows:

- Delete the entry and close the dialogue box
- Start the PC again
- Upon re-starting, Windows detects the *FALCON* or *DORADOquattro* as a new board. It should now be registered as described above.
- Has an interrupt conflict occurred?  
You will find the interrupt assignment in the device manager of your operating system.



Double assignment of interrupts is not always recognised by Windows as a conflict. The *FALCON* or *DORADOquattro* should not operate with a shared IRQ and should be assigned its own interrupt wherever possible. With ACPI-based systems, however, this is not always possible. For a non-ACPI-based installation of the operating system, press the F5 key when Windows Setup is displayed and then select the "Standard PC" option.

If the *FALCON/DORADOquattro* has not been assigned its own Interrupt, you will have to change the assignment:

- Interrupts can only be changed in BIOS or by changing slots. We recommend assigning the *FALCON/DORADOquattro* one of the interrupts 9, 10 or 11 or using the PCI slot 2 or 3.
- Further help for changing the interrupt can be found in your manuals for Windows and your PC or motherboard. There you will often find a table with a summary of the PCI slots and their interrupt assignment.



The drivers of the *FALCON/DORADOquattro* are not certified by Microsoft. The user must have administrator rights to install the driver. In addition, the operating system must be configured so that it accepts non-certified drivers.

The drivers of the *DORADOquattro* do not support the suspend and hibernate mode.

Starting and ending the driver is not possible either in the device manager without ending the operating system as well.

## 4.2 Harddisc DMA (direct memory access):

Digital video recording is to be regarded as equivalent to a high occurrence of data. It is imperative that hard discs with DMA capability be used with the hard disc controller of the main board operating in DMA mode so that the image data can be stored on the hard disc at sufficient speed.

Fundamentally, we recommend installing the mainboard manufacturer's latest chip set driver.

Image errors or omissions or other losses of performance noticed while operating *iGuard*® can be an indication of not only insufficient computer capacity or lack of RAM but also an insufficient data transfer rate from or to the hard disc.

Under Windows, the operating system ensures that DMA is used for the transfer of data from or to the hard disc.

We recommend using fast SCSI hard discs (U2W or U160) or fast IDE hard discs (UDMA) with a speed of at least 7200 rpm for maximum performance and maximum data throughput. When using these hard discs, make sure adequate cooling is provided because hard discs with speeds of 7200 rpm and more reach fairly high operating temperatures.

## 5 Hardware Description

### 5.1 *FALCONplus*

This chapter describes the hardware of the *FALCONplus*. It includes an explanation of interrelationships with a fundamental description of video recording. In addition, all relevant differences in comparison with the other *FALCON* boards are explained.

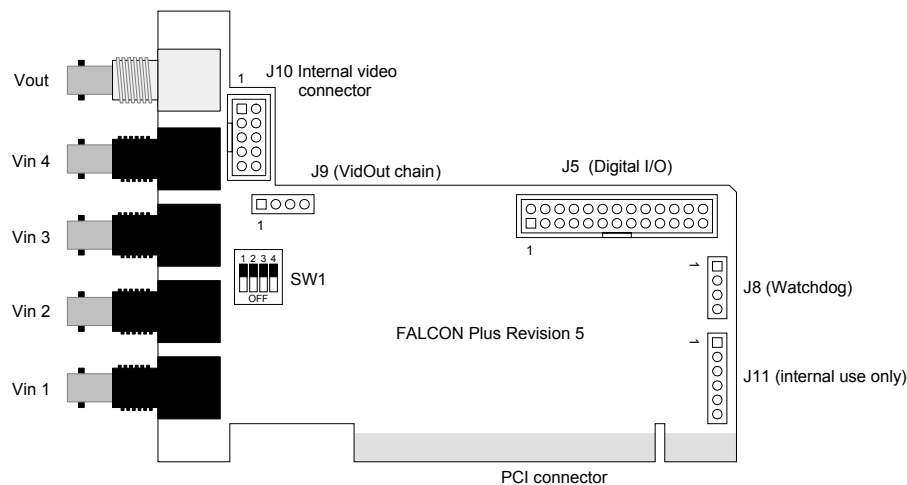


Figure 10: *FALCONplus*

	Plug connection	Signals
J5	26 pin pole-type	8 digital TTL-I/O, 4 trigger inputs each
Vin1...Vin4	BNC sockets	Video inputs 1– 4
Vout	BNC socket (white)	Video output

Table 2: *FALCONplus* plug connectors

Pin assignment of J5 is described in section 7.1.1 *FALCONplus plug connectors*.

### 5.1.1 Video recording

---

With the *FALCONplus* board, you have the possibility of connecting up to 4 video sources if using one *FALCONplus* and up to 16 if using up to 4 *FALCONplus*. All cameras, however, must have the same video standard (e.g. PAL or NTSC).

When using *n FALCONplus* and *n* cameras we recommend assigning one camera to each **FALCONplus** to record 100 frames per second.

### 5.1.2 Switchover speeds

---

At least 12 switchovers per second can be achieved with the *FALCONplus* in Multiplex mode. This figure applies separately to each *FALCONplus* if using more than one *FALCONplus*.

You can find a summary of switchover times for different operating modes in the table below.

Operating mode	1/4-PAL and 1/2-PAL		1/1-PAL	
No. of cameras per board (up to 4 boards possible)	1	2...4	1	2...4
Switchover speed [fps]	25	12	20-25	

Table 3: *FALCONplus* switching rates

### 5.1.3 Video Output

---

With the *FALCONplus* Rev. 5 every video input can be through-connected to the video output. The video output is separated compared to the video input and has got an own 75 Ohm video buffer.

### 5.1.4 Video Daisy Chain

---

In a multiple board mode there is a video daisy chain available which gives the possibility to connect every video input (up to 16) to the video output.

The following figure shows the board-to-board connection of the video outputs with one cable only. The number of cascading boards is limited to four.

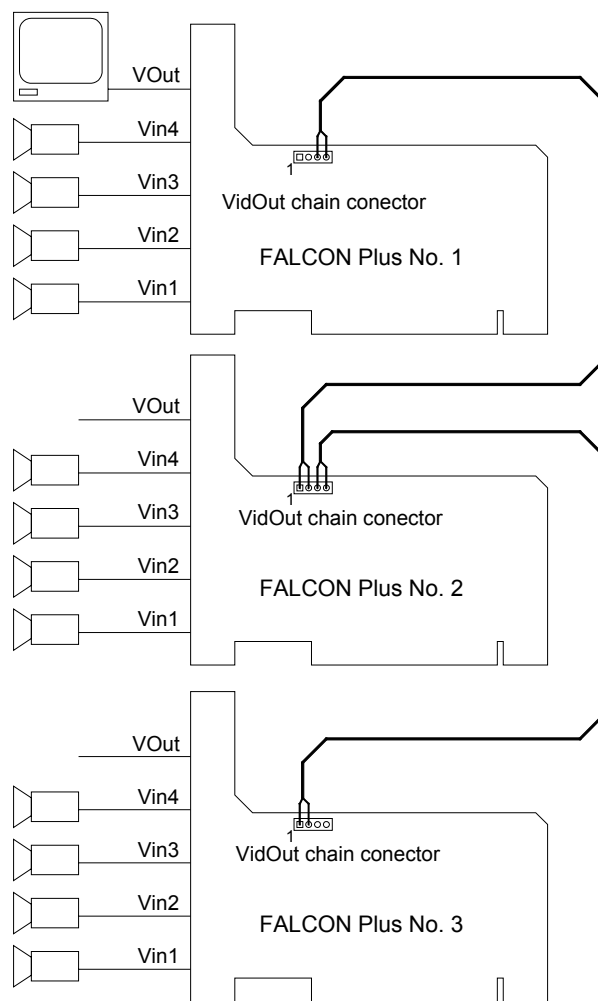


Figure 11: FALCONplus Video Daisy Chain

### 5.1.5 Digital TTL-I/O inputs

With *FALCONplus* there is the possibility of connecting up to 8 digital inputs (4 of which trigger inputs) and 8 digital inputs through the J5 26-pin pole-type plug connector on the *FALCONplus* board for controlling the video recordings. Eight digital outputs are also provided as alarm outputs. Matching optocoupler boards can also be purchased as optional extra for connecting the digital inputs and outputs.

### 5.1.6 Multiple board support

The *FALCON* driver can support 4 *FALCONplus* cards at the same time. There is no multiple board support with other cards.

### 5.1.7 Hardware Watchdog

---

The *FALCONplus* (ex Rev. 5) has a onboard hardware watchdog. At the end of the waiting time a relay contact is activated (normally-open contact) if the application do not retrigger the watchdog. After connecting the relay contact with the reset input of the PC main board the whole system can be rebooted.

There is also a connection for an existing reset button, whereby its function remains. The hardware Watchdog is connectable only to a *FALCON* with the ID 1.

### 5.1.8 Switchable 75 $\Omega$ termination

---

The 75 Ohm termination of each of the four video inputs can be switched on/off by the on board DIP switch. The default setting is ON.

### 5.1.9 Accessories

---

- Reset Cable for watchdog
- VidOut chain cable for video output daisy chain.
- Opto IO board (option)

## 5.2 FALCONquattro

In this section the hardware of the *FALCONquattro* is described, the latest and most powerful member of the *FALCON* family. The connectors and a fundamental description of image acquisition is given here. In addition, all relevant differences in comparison with the other *FALCON* boards are explained.

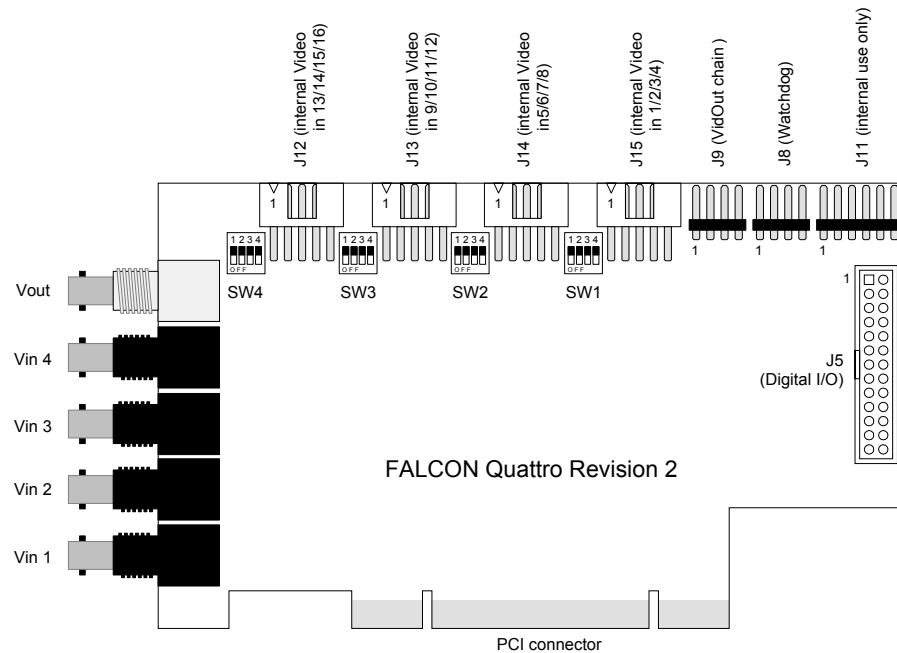


Figure 12: FALCONquattro

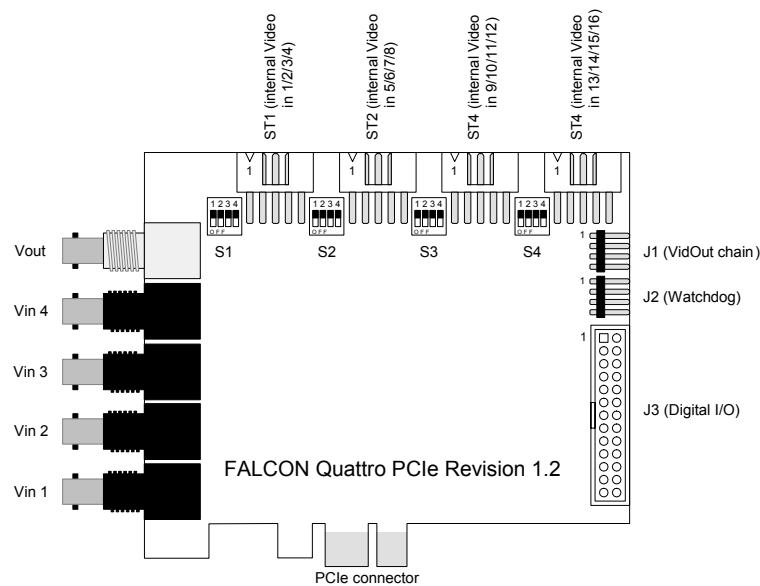


Figure 1: FALCONquattro express



The Performance of the *FALCONquattro express* responds those of the *FALCONquattro*.

### FALCONquattro connectors

	Plug connection	Signals
J12	10 pin pole-type	Video inputs 13/14/15/16 via video extension board
J13	10 pin pole-type	Video inputs 9/10/11/12 (via video extension board)
J14	10 pin pole-type	Video inputs 5/6/7/8 (via video extension board)
J15	10 pin pole-type	Video inputs 1/2/3/4 (via video extension board) or via the BNC sockets
J5	26 pin pole-type	8 digital TTL-I/O, 8 trigger inputs each
Vin 1 ... 4	BNC sockets	Video inputs 1/2/3/4 (or via J15 plug)
Vout	BNC socket	Video output (white)
J8	4 pin band-type	Watchdog
J9	4 pin band-type	VideoOut Chain

Table 4: Plug connector chart FALCONquattro

Pin assignment is described in section 7.1.2 *FALCONquattro/FALCONquattro express*.

### FALCONquattro express connectors

	Plug connection	Signals
ST1	10 pin pole	Video inputs 1/2/3/4 (via video extension board or via the BNC sockets)
ST2	10 pin pole	Video inputs 5/6/7/8 (via video extension board)
ST3	10 pin pole	Video inputs 9/10/11/12 (via video extension board)
ST4	10 pin pole	Video inputs 13/14/15/16 via video extension board)
J1	4 pin band	VideoOut Chain
J2	4 pin band	Watchdog
J3	26 pin pole-type	Je 8 digitale TTL-I/O, 8 Triggereingänge
Vin 1 ... 4	BNC sockets	Video inputs 1/2/3/4 (or via J15 plug)
Vout	BNC socket	Video output (white)

Table 5: Plug connector chart FALCONquattro

Pin assignment is described in section 7.1.2 *FALCONquattro/FALCONquattro express*.

### 5.2.1 Video recording

*FALCONquattro* supports all usual monochrome and color cameras with composite video outputs. These are highly exact digitized and transferred into the PC. The max. possible resolution amounts to 768 x of 576 pixels in PAL. The *FALCON* driver supports also the independent switching of the video inputs in a desired order.

Up to 16 composite video sources can be connected to the *FALCONquattro*. The connection of the video inputs 1 to 4 is made via 4 BNC sockets on the slot or via socket J15 respectively ST1. The twelve other video inputs can be connected via an external video extension board on sockets J12 to J14 (ST2 to ST4 with *FALCONquattro express*).

Compared to *FALCONplus*, *FALCONquattro* does not only have one video encoder, but four. So, having four video encoder chips on the board and without switching via a multiplexer as with *FALCONplus*, *FALCONquattro* makes up to 4 camera images simultaneously (25 fps).

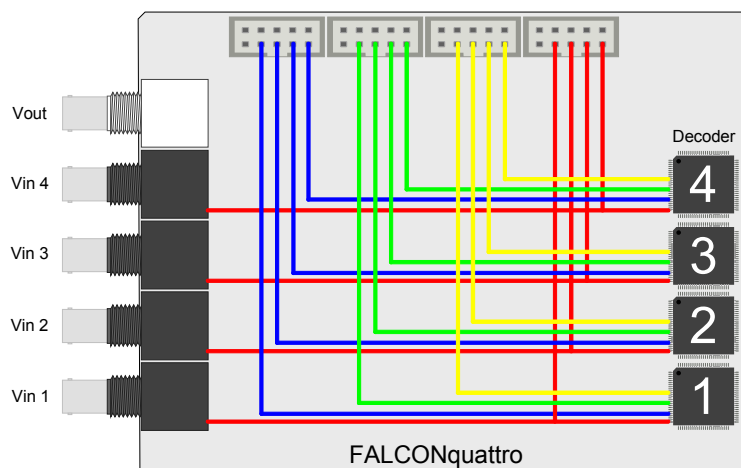


Figure 13: Video inputs – video decoder assignment

If connecting 1 – 4 cameras to your system, we recommend only using inputs 1 – 4 on the *FALCONquattro*.

## 5.2.2 Switchover speeds

---

You can find a summary of switchover times for different operating modes in the table below.

Operating mode	1/4-PAL and 1/2-PAL		1/1-PAL	
No. of cameras	1 ... 4	5 ... 16	1 ... 2	3 ... 16
Switchover speed [fps]	25 each	50 <sup>*1)</sup>	25 each	24 <sup>*2)</sup>

<sup>\*1)</sup>: In multiplex mode 12fps each A/D-converter

<sup>\*2)</sup>: In multiplex mode 6fps each A/D-converter

Table 6: *FALCONquattro* switching rates

## 5.2.3 Video Output

---

With the *FALCONquattro* every video input can be through-connected to the video output. The video output is separated compared to the video input and has got an own 75 Ohm video buffer.

## 5.2.4 Digital TTL-I/O Inputs

---

Over the 26-pin jack J5 it is possible to connect 8 digital inputs, 4 trigger inputs and 8 digital outputs to the *FALCONquattro* board for the controlling of the image recording. For the connection of the digital inputs and outputs optionally optical coupler boards can be acquired.

## 5.2.5 Multiple board support

---

There is no multiple board support with other cards.

## 5.2.6 Hardware Watchdog

---

The *FALCONquattro* has an onboard hardware watchdog. At the end of the waiting time a relay contact is activated (normally-open contact) if the application does not retrigger the watchdog. After connecting the relay contact with the reset input of the PC mainboard the whole system can be rebooted. There is a further connection option for an existing reset button in the PC casing, allowing its functionality to be retained.

## 5.2.7 Switchable 75 Ω termination

---

The 75 Ohm termination of each of the four video inputs can be switched on/off by the on board DIP switch. The default setting is ON.

### 5.2.8 Accessories

---

- Reset Cable for watchdog
- Opto IO board (option)

## 5.3 DORADOquattro

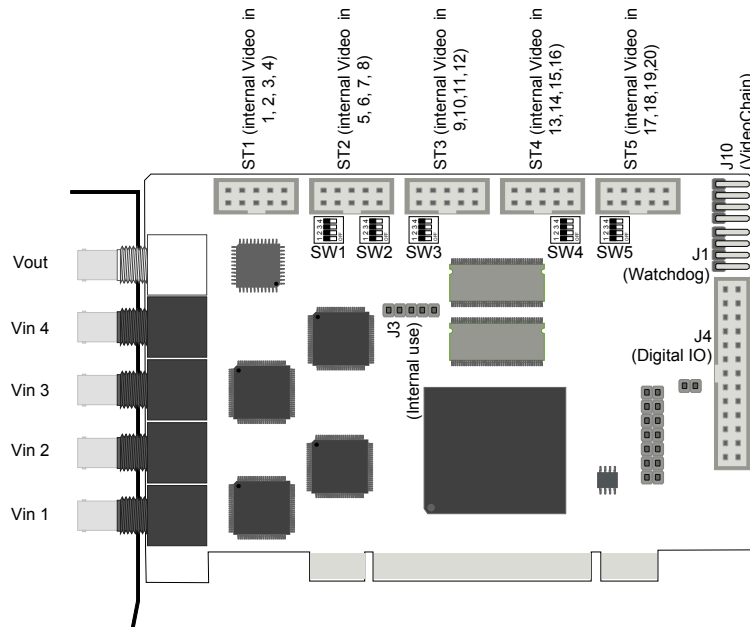


Figure 14: DORADOquattro

	Plug connection	Signals
Vin 1...Vin 4	BNC sockets	Video inputs 1/2/3/4
Vout	BNC sockets	Video output (white)
ST1	10 pin pole-type	Video inputs 1/2/3/4 (via video extension board)
ST2	10 pin pole-type	Video inputs 5/6/7/8 (via video extension board)
ST3	10 pin pole-type	Video inputs 9/10/11/12 (via video extension board)
ST4	10 pin pole-type	Video inputs 13/14/15/16 (via video extension board)
ST5	10 pin pole-type	Video inputs 17/18/19/20 (via video extension board)
J4	26 pin pole-type	J8 digital TTL-I/O, 8 trigger inputs each
J1	4 pin band-type	Watchdog
J10	4 pin band-type	VideoChain
SW1	Quad DIP Switch	75-ohm termination Vin 1/2/3/4
SW2	Quad DIP Switch	75-ohm termination Vin 5/6/7/8
SW3	Quad DIP Switch	75-ohm termination Vin 9/10/11/12
SW4	Quad DIP Switch	75-ohm termination Vin 13/14/15/16
SW5	Quad DIP Switch	75-ohm termination Vin 17/18/19/20

Table 7: Plug connector chart DORADOquattro

Pin assignment of ST1 ... ST5 is described in section (s. chapter 7.2.1 Pin assignment DORADOquattro).

### 5.3.1 Video recording

The *DORADOquattro* supports all standard monochrome and colour cameras with composite video output. This is digitised at high precision and transferred to the PC. The maximum possible resolution is 704 x 576 pixels in PAL. The *DORADOquattro* driver also supports independent video input switching in a desired order.

A total of up to 20 video sources can be connected to the *DORADOquattro*. The connection of the video sources 1-4 is made by four BNC sockets on the slot and/or over an external video extension board which is attached at the plug ST1. The remaining 16 video inputs can be connected over external video extension boards to the plugs ST2 – ST5.

The *DORADOquattro* has four video decoders. As a result, the four video inputs that are connected to the BNC connectors can record in parallel. Connection of the video inputs to the video decoder is shown in the following illustration.

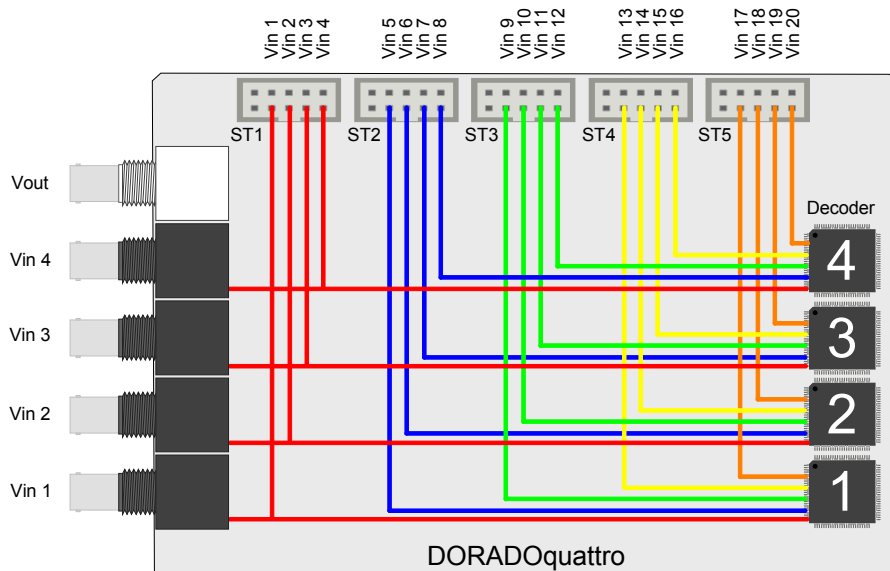


Figure 15: Video inputs – video decoder assignment

### 5.3.2 Switchover speeds

---

You can find a summary of switchover times for different operating modes in the table below.

Operating mode	1/4-PAL and 1/2-PAL		1/1-PAL	
No. of cameras	1 ... 4	5 ... 16	1 ... 4	1 ... 20
Switchover speed	25 each	50 * <sup>1)</sup>	13,5 ... 25	30 * <sup>2)</sup>

\*<sup>1)</sup>: In multiplex mode 12fps each A/D-converter

\*<sup>2)</sup>: In multiplex mode 7.5fps each A/D-converter

Table 8: DORADOquattro switching rates

### 5.3.3 Video Output

---

With the *DORADOquattro* every video input can be through-connected to the video output. The video output is separated to the video input and has got an own 75 Ohm video buffer.

### 5.3.4 Video Daisy Chain

---

See [5.1.4 Video Daisy Chain](#).

### 5.3.5 Digital TTL I/O

---

*DORADOquattro* has 8 digital inputs, 4 trigger inputs and 8 digital outputs. To connect the digital inputs/outputs optionally a opto coupler board can be purchased. You can find details regarding the opto coupler board in the corresponding chapter [7.3.1 Connecting the frame grabber](#).

### 5.3.6 Multiple board support

---

The *DORADOquattro* driver can support 4 *DORADOquattro* cards at the same time. There is no multiple board support with other cards.

### 5.3.7 Hardware Watchdog

---

The *DORADOquattro* has a onboard hardware watchdog. At the end of the waiting time a relay contact is activated (normally-open contact) if the application do not retrigger the watchdog. After connecting the relay contact with the reset input of the PC mainboard the whole system can be rebooted. The hardware Watchdog is connectable only to a *DORADOquattro* with the ID 1.

### 5.3.8 Switchable 75 $\Omega$ termination

---

The 75 Ohm termination of each of the four video inputs can be switched on/off by the on board DIP switch. The default setting is ON.

### 5.3.9 Accessories

---

- Reset-cable for watchdog
- OPTO I/O board (option)

## 5.4 Video extension boards (optionally available)

---

Additionally, for *FALCONquattro*/*DORADOquattro* video extension boards are available to make the internal possibilities of video connection externally available.

### 5.4.1 Video extension board IS-SLOT-4 (*FALCONquattro*/express/*DORADOquattro*)

---

For connection of further 4 video sources the external video extension board IS-SLOT-4 is available. It can be attached at plug J13 to J15 respectively ST1 to ST3 (*DORADOquattro* ST1 to ST5) by means of a flat ribbon cable with the 10-pin socket at its end. Connect the signified area of the 10-pin socket with the 1 signified on the board belonging to the connector J13 to J15 (*FALCONquattro*) respectively ST1 to ST5 (*DORADOquattro*). Video sources can be connected via BNC sockets.

Following figure shows the video extension board with flat ribbon cable for connection of further 4 video sources via BNC sockets.

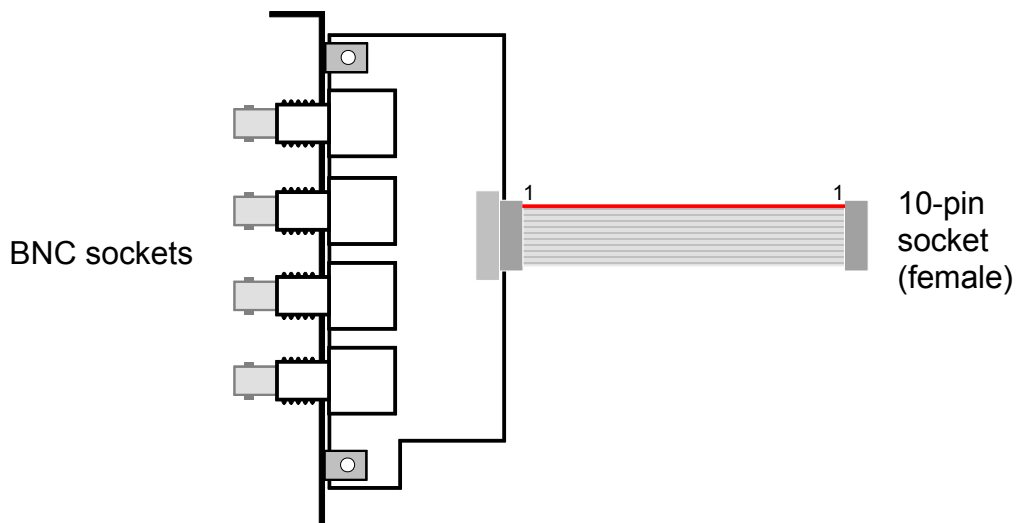


Figure 16: Video extension board with 4 BNC sockets (IS-SLOT-4)

Pin assignment of 10-pin socket is described in the appendix (see [7.5.1 Video extension board IS-SLOT-4 \(FALCONquattro/DORADOquattro\)](#)).

### 5.4.2 Video extension board IS-SLOT-D26 (*FALCONquattro/express/-DORADOquattro*)

Alternatively up to 16 video sources can be attached with video extension board IS-SLOT-D26 in connection with two video connecting cables (see 5.5 *Video connecting cables (available as option)*) via BNC sockets on *FALCONquattro*. For this the connecting cables 1 to 4 of the extension board are attached to the following plugs:

- J12 to J15 – *FALCONquattro*
- ST1 to ST4 – *FALCONquattro express*
- ST2 to ST5 – *DORADOquattro*

At the bracket of the extension board there are two 26 pin Sub-D sockets, each socket can be connected with one video connecting cable for 8 video inputs. Following figure shows the video extension board with Sub-D sockets and flat ribbon cables.

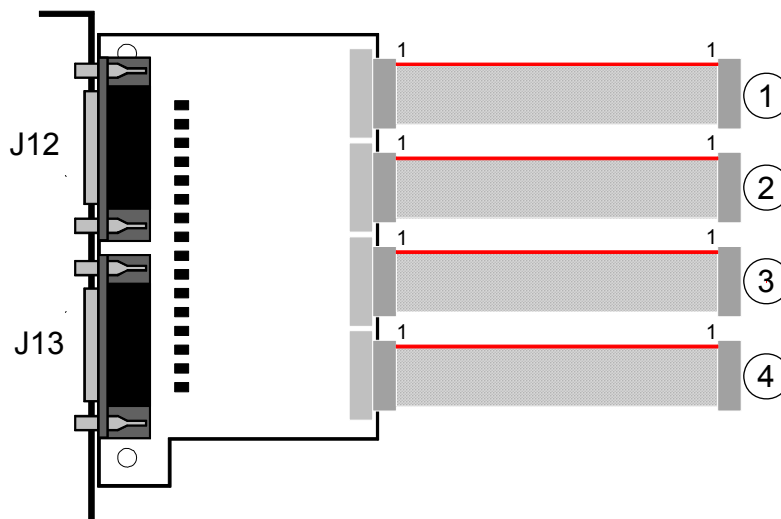


Figure 17: Video extension board IS-SLOT-D26 for *FALCONquattro/DORADOquattro*

The pin assignment of J12 and J13 are described in the appendix (see paragraph 7.5.2 *Video extension board IS-SLOT-D26 (FALCONquattro/DORADOquattro)*).

## 5.5 Video connecting cables (available as option)

For connecting video sources to the *FALCONquattro*/*DORADOquattro* via the extension boards with Sub-D sockets break out cables are required. These are connected to the Sub-D sockets of the respective extension board. Each cable possesses eight BNC sockets each for one video source.

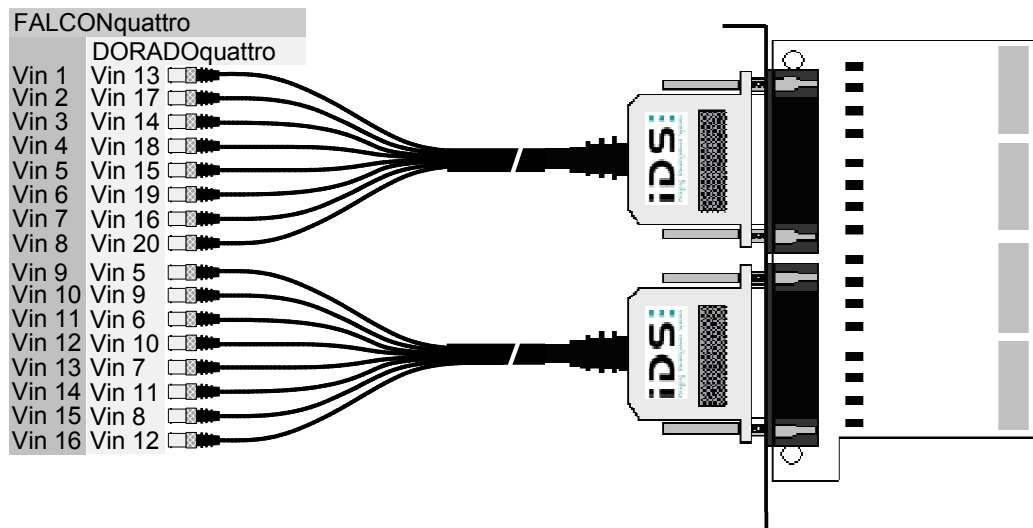


Figure 18: Video extension board with 2 video connecting cables

As a result of the different allocation of the video inputs an adapted video connecting is necessary while using a *DORADOquattro*.

## 6 *iGuard®* UPS operation

### 6.1 Preconditions

---

If *iGuard®* is being operated with a UPS (uninterruptable power supply), you can use the **iGuardPowerFailure.exe** program in order to terminate *iGuard®* under controlled conditions in the event of a power failure and record information about the power failure in the logbook.

In this case, the UPS being used has to be equipped with a software which starts an external program in the event of a power failure.

### 6.2 Installation of iGuardPowerFailure.exe

---

The **iGuardPowerFailure.exe** program is included with the installation package and it is installed by default.

### 6.3 Call-up parameters for iGuardPowerFailure.exe

---

The **iGuardPowerFailure.exe** program evaluates various command line parameters.

- 1  
UPS signals a power failure. An entry is made in the log-book.  
Example: "iGuardPowerFailure.exe 1"
- 2 or call-up without parameters  
iGuard® is terminated immediately.  
Example: "iGuardPowerFailure.exe 2"
- 0  
Message that the power supply is present again. *iGuard®* is not terminated.  
Example: "iGuardPowerFailure.exe 0"

## 7 Appendix

### 7.1 *FALCONplus/FALCONquattro* board technical data

Colour resolution:	Video recording and compression is always in YUYV format.		
Video input/ video output:	FALCONplus 4 composite video inputs, 1 composite video output FALCONquattro up to 16 composite Video inputs, 1 composite video output		
Video standards:	PAL, NTSC		
Video scanning rate:	PAL: 14.75 MHz NTSC: 12.27 MHz		
A/D conversion:	PAL: 1/50 s (20 ms) per field NTSC: 1/60 s (16.7 ms) per field		
Geom. resolution:	PAL: 768 x 576 pixel with 2 fields NTSC: 640 x 480 pixel with 2 fields		
Power consumption:	FALCONplus	+5V +12V -12V	275mA 75mA 75mA
	FALCONquattro:	+5V +12V -12V	1060mA 45mA 45mA
	FALCONquattro express:	+3.3V	1800mA

Table 9: Technical Details of the *FALCONplus/FALCONquattro/FALCONquattro express*

#### 7.1.1 *FALCONplus* plug connectors

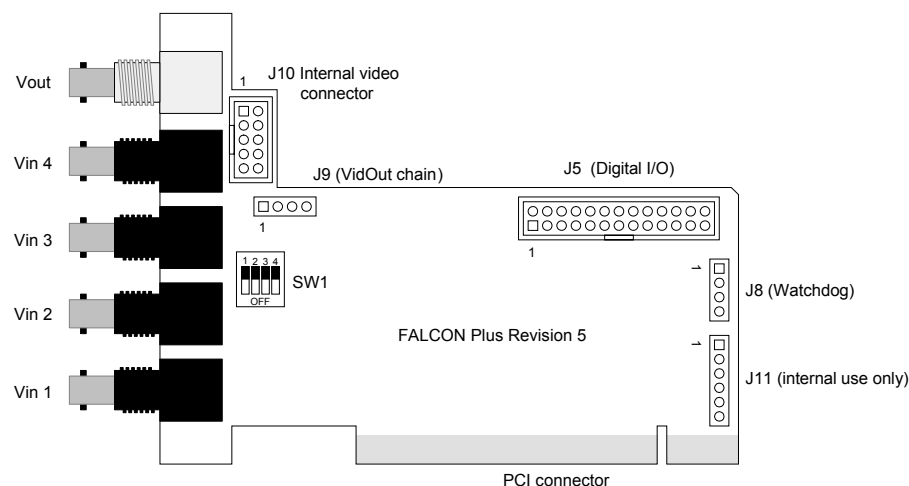


Figure 19: *FALCONplus* plug connectors

**Pin assignment of J5:**

Pin	Assignment	Pin	Assignment
1	Digital Input 1	14	Digital Output 6
2	Digital Input 2	15	Digital Output 7
3	Digital Input 3	16	Digital Output 8
4	Digital Input 4	17	n.c.
5	Digital Input 5	18	n.c.
6	Digital Input 6	19	Trigger Input 1
7	Digital Input 7	20	Trigger Input 2
8	Digital Input 8	21	Trigger Input 3
9	Digital Output 1	22	Trigger Input 4
10	Digital Output 2	23	GND
11	Digital Output 3	24	n.c.
12	Digital Output 4	25	n.c.
13	Digital Output 5	26	VCC (+5V)

Table 10: Pin assignment J5 FALCONplus

**SW1 – 75Ω Termination**

Dipsw	Assignment	Dipsw	Assignment
1	to Vin_1	3	to Vin_3
2	to Vin_2	4	to Vin_4

Table 11: Assignment SW1 Termination FALCONplus

**J8 (Hardware Watchdog)**

Pins	Assignment
1,2	Relay contact (Shutter)
3,4	Relay contact (Shutter)

Table 12: J8 (Hardware Watchdog FALCONplus)

## 7.1.2 FALCONquattro/FALCONquattro express plug connectors

### Pin assignment FALCONquattro

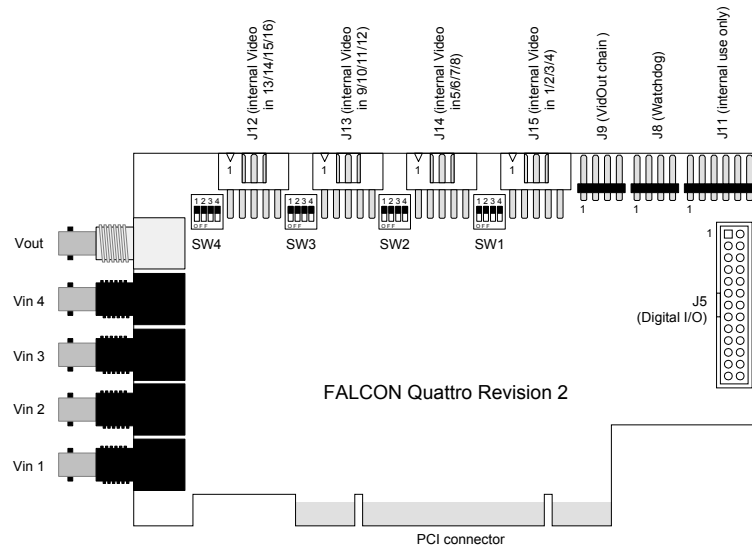


Figure 20: FALCONquattro plug connectors

### Pin assignment of J12 (video inputs 1-4):

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 15 (Video In 15)
3	VIN 13 (Video In 13)	8	GND
4	GND	9	VIN 16 (Video In 16)
5	VIN 14 (Video In 14)	10	GND

Table 13: Pin assignment J12 FALCONquattro

### Pin assignment of J13 (video inputs 5-8):

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 11 (Video In 11)
3	VIN 9 (Video In 9)	8	GND
4	GND	9	VIN 12 (Video In 12)
5	VIN 10 (Video In 10)	10	GND

Table 14: Pin assignment J13 FALCONquattro

**Pin assignment of J14 (video inputs 9-12):**

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 7 (Video In 7)
3	VIN 5 (Video In 5)	8	GND
4	GND	9	VIN 8 (Video In 8)
5	VIN 6 (Video In 6)	10	GND

*Table 15: Pin assignment J14 FALCONquattro***Pin assignment of J15 (video inputs 13-16):**

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 3 (Video In 3)
3	VIN 1 (Video In 1)	8	GND
4	GND	9	VIN 4 (Video In 4)
5	VIN 2 (Video In 2)	10	GND

*Table 16: Pin assignment J15 FALCONquattro***Pin assignment of J5 (trigger inputs):**

Pin	Assignment	Pin	Assignment
1	Digital Input 1	14	Digital Output 6
2	Digital Input 2	15	Digital Output 7
3	Digital Input 3	16	Digital Output 8
4	Digital Input 4	17	Trigger Input 5
5	Digital Input 5	18	Trigger Input 6
6	Digital Input 6	19	Trigger Input 1
7	Digital Input 7	20	Trigger Input 2
8	Digital Input 8	21	Trigger Input 3
9	Digital Output 1	22	Trigger Input 4
10	Digital Output 2	23	GND
11	Digital Output 3	24	Trigger Input 7
12	Digital Output 4	25	Trigger Input 8
13	Digital Output 5	26	VCC (+5V)

*Table 17: Pin assignment J5 FALCONquattro*

### Pin assignment J8 (Hardware Watchdog)

Pins	Assignment
1, 2	Relay contact (Shutter)
3, 4	Relay contact (Shutter)

Table 18: Pin assignment J8 (Hardware Watchdog FALCONquattro)

### Pin assignment J9 (VideoChain)

Pin	Assignment	Pin	Assignment
1	GND	3	GND
2	Video IN	4	Video OUT

Table 19: Pin-assignment J9 (VideoChain FALCONquattro)

### SW1 – 75Ω Termination

Dipsw	Belegung	Dipsw	Belegung
1	für Vin_1	3	für Vin_3
2	für Vin_2	4	für Vin_4

Table 20: Assignment SW1 Termination FALCONquattro

### SW2 – 75Ω Termination

Dipsw	Belegung	Dipsw	Belegung
1	für Vin_5	3	für Vin_7
2	für Vin_6	4	für Vin_8

Table 21: Assignment SW2 Termination FALCONquattro

### SW3 – 75Ω Termination

Dipsw	Belegung	Dipsw	Belegung
1	für Vin_9	3	für Vin_11
2	für Vin_10	4	für Vin_12

Table 22: Assignment SW3 Termination FALCONquattro

### SW4 – 75Ω Termination

Dipsw	Belegung	Dipsw	Belegung
1	für Vin_13	3	für Vin_15
2	für Vin_14	4	für Vin_16

Table 23: Assignment SW4 Termination FALCONquattro

Pin assignment FALCONquattro express

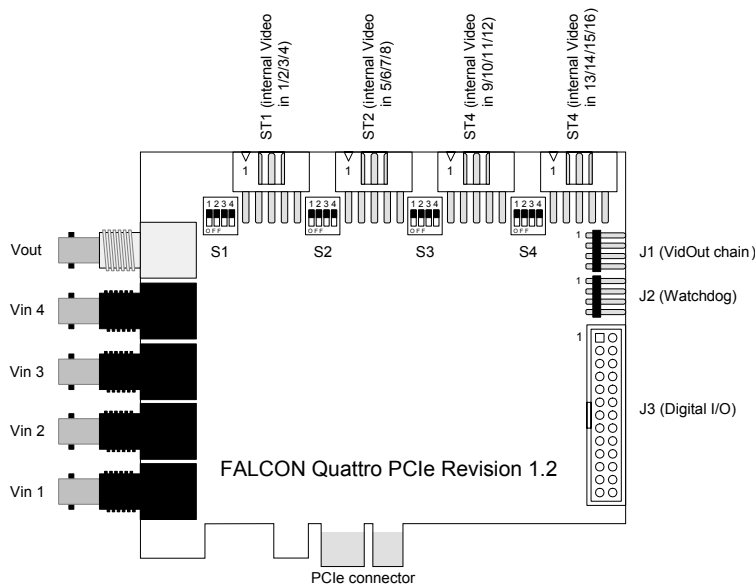


Figure 2: FALCONquattro express plug connectors

Pin assignment of ST1 (video inputs 1-4):

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 3 (Video In 3)
3	VIN 1 (Video In 1)	8	GND
4	GND	9	VIN 4 (Video In 4)
5	VIN 2 (Video In 2)	10	GND

Table 24: Pin assignment ST1 FALCONquattro express

Pin assignment of ST2 (video inputs 5-8):

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 7 (Video In 7)
3	VIN 5 (Video In 5)	8	GND
4	GND	9	VIN 8 (Video In 8)
5	VIN 6 (Video In 6)	10	GND

Table 25: Pin assignment ST2 FALCONquattro express

### Pin assignment of ST3 (video inputs 9-12):

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 11 (Video In 11)
3	VIN 9 (Video In 9)	8	GND
4	GND	9	VIN 12 (Video In 12)
5	VIN 10 (Video In 10)	10	GND

Table 26: Pin assignment ST3 FALCONquattro express

### Pin assignment of ST4 (video inputs 13-16):

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 15 (Video In 15)
3	VIN 13 (Video In 13)	8	GND
4	GND	9	VIN 16 (Video In 16)
5	VIN 14 (Video In 14)	10	GND

Table 27: Pin assignment ST4 FALCONquattro express

### Pin assignment J1 (Hardware Watchdog)

Pins	Assignment
1, 2	Relay contact (Shutter)
3, 4	Relay contact (Shutter)

Table 28: Pin assignment J1 (Hardware Watchdog FALCONquattro express)

### Pin assignment J2 (VideoChain)

Pin	Assignment	Pin	Assignment
1	GND	3	GND
2	Video IN	4	Video OUT

Table 29: Pin-assignment J2 (VideoChain FALCONquattro express)

**Pin assignment of J3 (trigger inputs):**

Pin	Assignment	Pin	Assignment
1	Digital Input 1	14	Digital Output 6
2	Digital Input 2	15	Digital Output 7
3	Digital Input 3	16	Digital Output 8
4	Digital Input 4	17	Trigger Input 5
5	Digital Input 5	18	Trigger Input 6
6	Digital Input 6	19	Trigger Input 1
7	Digital Input 7	20	Trigger Input 2
8	Digital Input 8	21	Trigger Input 3
9	Digital Output 1	22	Trigger Input 4
10	Digital Output 2	23	GND
11	Digital Output 3	24	Trigger Input 7
12	Digital Output 4	25	Trigger Input 8
13	Digital Output 5	26	VCC (+5V)

Table 30: Pin assignment J3 FALCONquattro express

**S1 – 75Ω Termination**

Dipsw	Belegung	Dipsw	Belegung
1	für Vin_1	3	für Vin_3
2	für Vin_2	4	für Vin_4

Table 31: Assignment S1 Termination FALCONquattro express

**S2 – 75Ω Termination**

Dipsw	Belegung	Dipsw	Belegung
1	für Vin_5	3	für Vin_7
2	für Vin_6	4	für Vin_8

Table 32: Assignment S2 Termination FALCONquattro express

**S3 – 75Ω Termination**

Dipsw	Belegung	Dipsw	Belegung
1	für Vin_9	3	für Vin_11
2	für Vin_10	4	für Vin_12

Table 33: Assignment S3 Termination FALCONquattro express

#### S4 – 75Ω Termination

Dipsw	Belegung	Dipsw	Belegung
1	für Vin_13	3	für Vin_15
2	für Vin_14	4	für Vin_16

Table 34: Assignment S4 Termination FALCONquattro express

## 7.2 DORADOquattro board technical data

Colour resolution:	Video recording and compression is always in YUV 4:2:2 format.		
Video input:	20 composite video inputs		
Video output:	1 composite video output		
Video standards:	PAL		
Video scanning rate:	PAL:	14,75 MHz	
Geom. resolution:	704 x 576 pixel with 2 fields		
Power consumption:	+5 V	≤	20 mA
	+3,3 V	≤	1,7 A

Table 35: Technical Details of the DORADOquattro

### 7.2.1 Pin assignment DORADOquattro

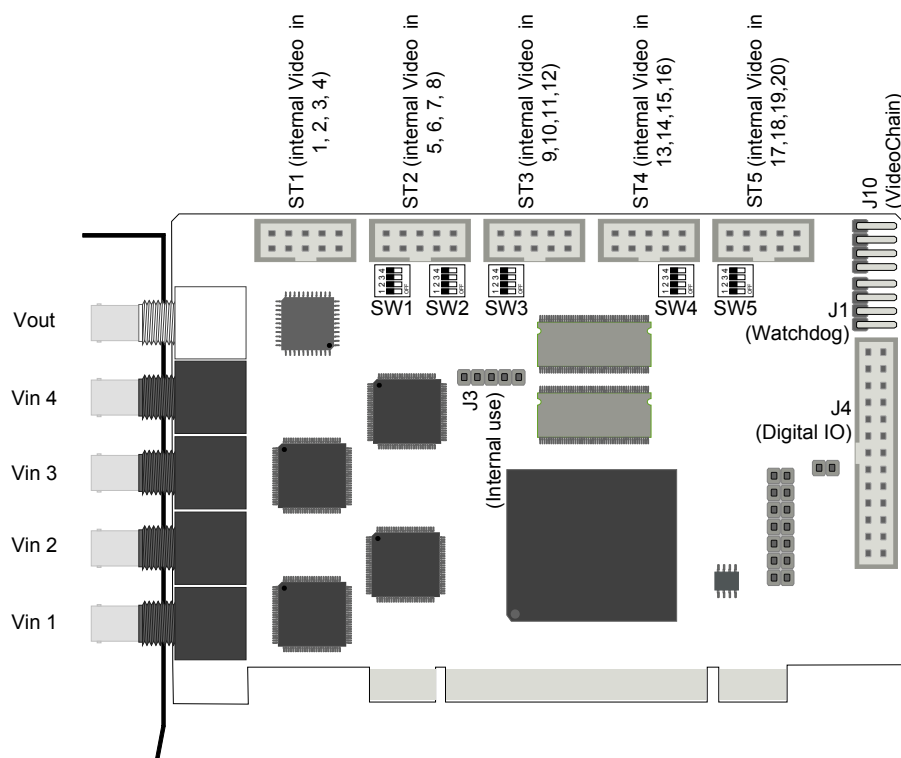


Figure 21: Pin assignment DORADOquattro

**Pin assignment ST1 (video inputs 1/2/3/4):**

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 3 (Video In 3)
3	VIN 1 (Video In 1)	8	GND
4	GND	9	VIN 4 (Video In 4)
5	VIN 2 (Video In 2)	10	GND

Table 36: Pin assignment ST1 DORADOquattro

**Pin assignment ST2 (video inputs 5/6/7/8):**

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 7 (Video In 7)
3	VIN 5 (Video In 5)	8	GND
4	GND	9	VIN 8 (Video In 8)
5	VIN 6 (Video In 6)	10	GND

Table 37: Pin assignment ST2 DORADOquattro

**Pin assignment ST3 (video inputs 9/10/11/12):**

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 11 (Video In 11)
3	VIN 9 (Video In 9)	8	GND
4	GND	9	VIN 12 (Video In 12)
5	VIN 10 (Video In 10)	10	GND

Table 38: Pin assignment ST3 DORADOquattro

**Pin assignment ST4 (video inputs 13/14/15/16):**

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 15 (Video In 15)
3	VIN 13 (Video In 13)	8	GND
4	GND	9	VIN 16 (Video In 16)
5	VIN 14 (Video In 14)	10	GND

Table 39: Pin assignment ST4 DORADOquattro

**Pin assignment ST5 (video inputs 17/18/19/20):**

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 19 (Video In 19)
3	VIN 17 (Video In 17)	8	GND
4	GND	9	VIN 20 (Video In 20)
5	VIN 18 (Video In 18)	10	GND

Table 40: Pin assignment ST5 DORADOquattro

**Pin assignment J4 (Trigger inputs):**

Pin	Assignment	Pin	Assignment
1	Digital Input 1	14	Digital Output 6
2	Digital Input 2	15	Digital Output 7
3	Digital Input 3	16	Digital Output 8
4	Digital Input 4	17	nc
5	Digital Input 5	18	nc
6	Digital Input 6	19	Trigger Input 1
7	Digital Input 7	20	Trigger Input 2
8	Digital Input 8	21	Trigger Input 3
9	Digital Output 1	22	Trigger Input 4
10	Digital Output 2	23	GND
11	Digital Output 3	24	nc
12	Digital Output 4	25	nc
13	Digital Output 5	26	VCC (+5V)

Table 41: Pin assignment J4 DORADOquattro

**Pin assignment J1 (Hardware Watchdog)**

Pins	Assignment
1,2	Relay contact (Shutter)
3,4	Relay contact (Shutter)

Table 42: Pin assignment J1 (Hardware Watchdog DORADOquattro)

**Pin assignment J10 (VideoChain)**

Pin	Assignment	Pin	Assignment
1	GND	3	GND
2	Video IN	4	Video OUT

Table 43: Pin-assignment J10 (VideoChain DORADOquattro)

### 7.3 Optocoupler-boards for *FALCONplus*, *FALCONquattro*, *DORADOquattro* (optional)

---

The inputs switch voltages between 5V and 24V, the outputs are switching the attached device to ground. All outputs can handle a maximum of 100 mA. The fuse protection is realized with a reversible fuse. All inputs are short-circuit proofed. For attaching inductive devices, we advice the use of protective circuits. The optocoupler boards do not need necessarily a PC Slot. We recommend to use a free slot.

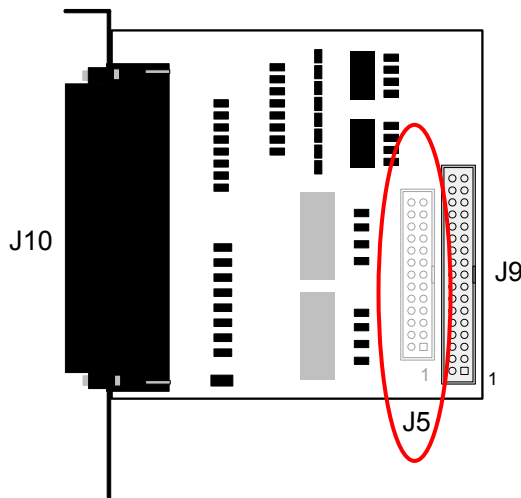


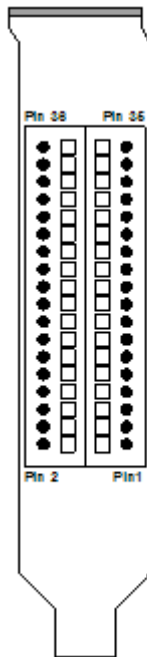
Figure 22: Optocoupler-board OPTO I/O III for FALCON/DORADOquattro

#### 7.3.1 Connecting the frame grabber

---

Via *J5* (*FALCON-Family*) resp. *J4* (*DORADOquattro*) and the 24 pin ribbon cable the optocoupler-extension board is connected to the specific frame grabber.

### 7.3.2 36 pin adapter bushing of the OPTO I/O III



Pin	Assignment	Pin	Assignment
36	GND	35	Power IN (max. 24V)
34	GND	33	Digital Input 4
32	GND	31	Digital Input 3
30	GND	29	Digital Input 2
28	GND	27	Digital Input 1
26	GND	25	Alarm input 4
24	GND	23	Alarm input 3
22	GND	21	Alarm input 2
20	GND	19	Alarm input 1
18	GND	17	Alarm output 8
16	GND	15	Alarm output 7
14	GND	13	Alarm output 6
12	GND	11	Alarm output 5
10	GND	9	Alarm output 4
8	GND	7	Alarm output 3
6	GND	5	Alarm output 2
4	GND	3	Alarm output 1
2	GND	1	Power IN (max. 24V)

Table 1: Pin assignment of the OPTO I/O III



For correct support of the OPTO I/O III in *iGuard*<sup>®</sup> it is necessary to edit „pirmcr.ini“. The file is located in the windows directory ( C:\windows\ resp. C:\winnt\ ). Open the file with an editor (e.g. the Windows editor in the Programs-Accessories Folder) and add directly after *[PIRMCR]* „Bundle=1“. Save the file and restart *iGuard*<sup>®</sup> if necessary.

### 7.3.3 Input circuit OPTO I/O III

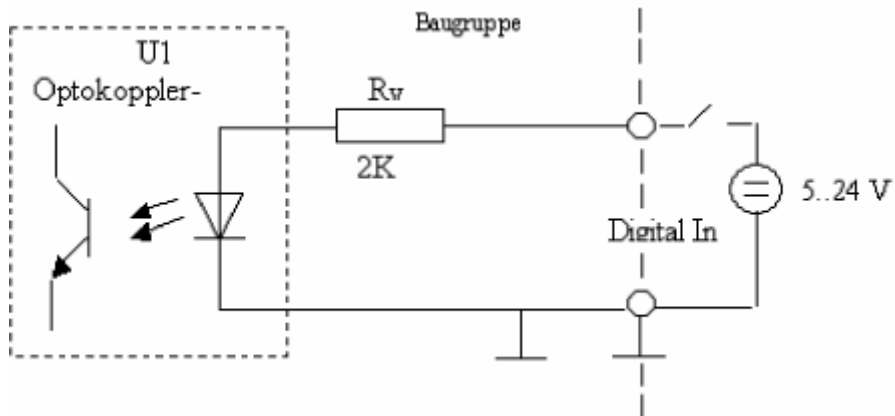


Figure 23: Optocoupler-Input circuit

### 7.3.4 Output circuit of the OPTO I/O III

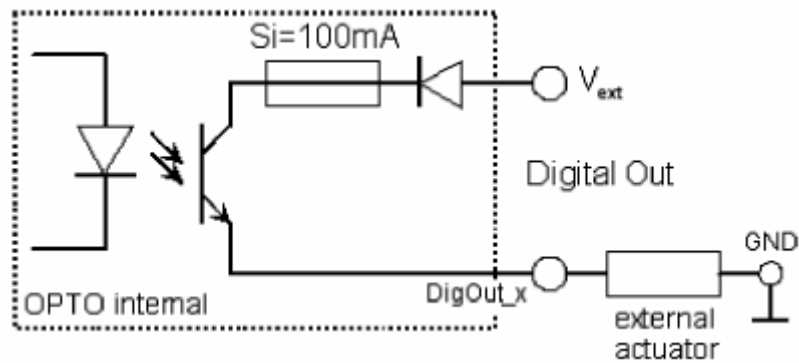


Figure 24: Optocoupler-output circuit of the OPTO I/O III

### 7.3.5 Opto coupler boards technical Data

#### Alarm inputs

Number of Trigger- resp. Alarm inputs:	OPTO I/O III: 4
Trigger edge:	positive or negative
Activating Interrupts:	Yes
Voltage range:	5 to 24 V DC
Input current:	12 mA (typical.)
Galvanic separation:	Up to 300 V

Table 44: Technical Details of the opto coupler boards, alarm inputs

#### Digital Inputs:

Number of digital Inputs:	OPTO I/O III: 4
Activating Interrupts:	No
Voltage range:	5 to 24 V DC
Input current:	12 mA (typical)
Galvanic separation:	Up to 300 V

Table 45: Technical Details of the opto coupler boards, digital inputs

#### Digital outputs:

Number of digitale outputs:	OPTO I/O III: 8
Voltage range:	5 bis 24 V Gleichspannung, verpolungssicher
Output current:	100 mA (reversible Sicherung)
Galvanic separation:	bis 300 V

Table 2: Technical Details of the opto coupler boards, digital outputs

## 7.4 USB Input/Output Modules (optional)

### 7.4.1 USBOPT08

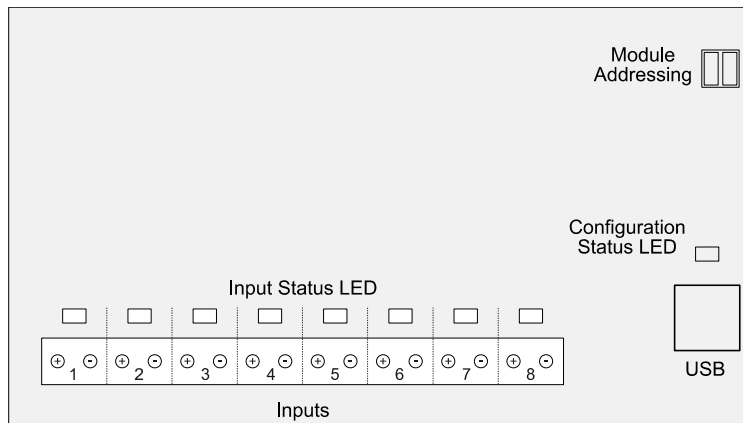


Figure 25: USBOPT08

System bus	USB
Module dresse	Can be set from 0-3 with jumpers (up to four modules of the same type can be operated)
Inputs	8, optically isolated (5 ... 30V)
Input voltage	max. 10mA
Displays	Initialisation, Status of input signals
Connections	Pluggable screw-type terminals
CE	Yes
Temperature range	0 ... 70°C
Power supply	over USB

## 7.4.2 USBREL8

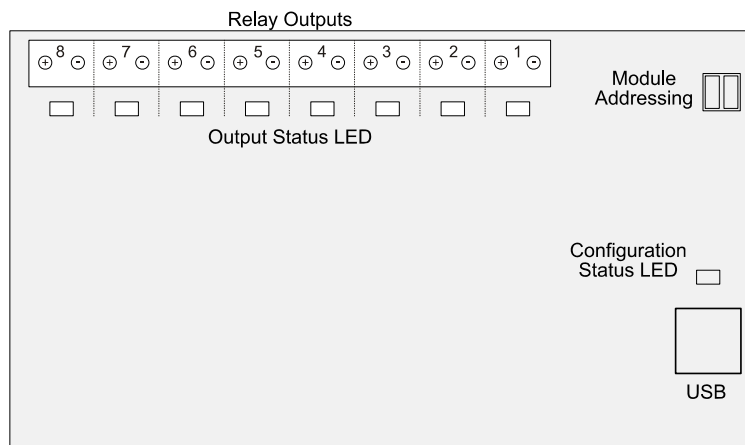


Figure 26: USBREL8

System bus	USB
Module address	Can be set from 0-3 with jumpers (up to four modules of the same type can be operated)
Outputs	8 DIL-Relay (max. 15W/1A)
switchable voltage	30V
Displays	Initialisation, Status of relays
Connections	Pluggable screw-type terminals
CE	Yes
Temperature range	0 ... 70°C
Relay switching time	1ms (with bouncing)
Power supply	over USB

### 7.4.3 USBOPTOREL16

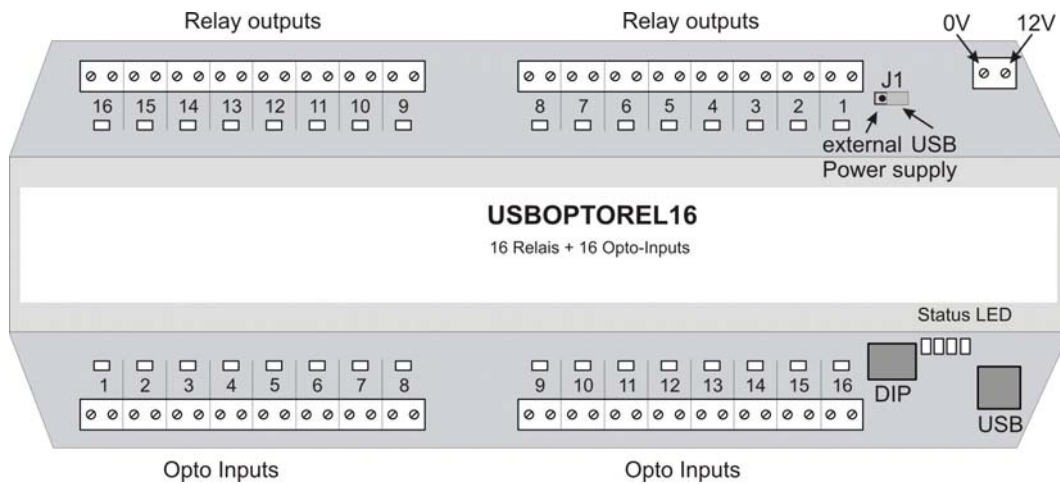


Figure 27: USBOPTOREL16

Systembus	USB
Inputs	16, optically isolated, 12 ... 30V (optional 5 ... 12V)
Outputs	16 DIL-Relay (max. 15W/1A)
Switchable voltage	up to 40V
Relay switching time	1ms (with bouncing)
Connections	Screwing terminal
CE	Yes
Temperature range	0 ... 70°C
Power supply	USB or external 12V connection (via jumper J1)

## 7.5 Pin assignments of the video extension boards

### 7.5.1 Video extension board IS-SLOT-4 (*FALCONquattro/DORADO-quattro*)

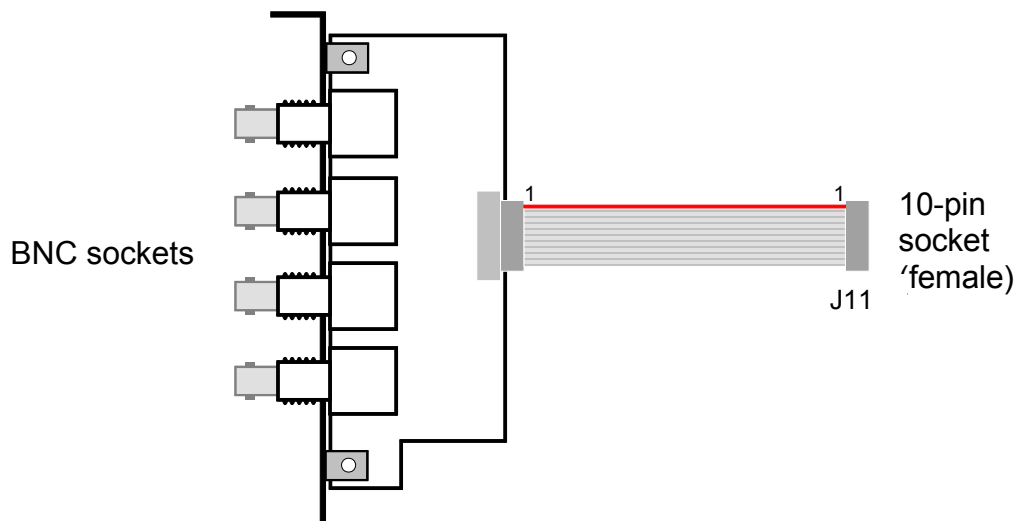


Figure 28: Video extension board with 4 BNC sockets (IS-SLOT-4)

#### Pin assignment of J11 (extension board, 10 pin DSUB socket):

Pin	Assignment	Pin	Assignment
1	GND	6	GND
2	GND	7	VIN 3 (Video In 3)
3	VIN 1 (Video In 1)	8	GND
4	GND	9	VIN 4 (Video In 4)
5	VIN 2 (Video In 2)	10	GND

Table 46: Pin assignment J11 (video extension board IS-SLOT-4t)

## 7.5.2 Video extension board IS-SLOT-D26 (FALCONquattro/DORADO-quattro)

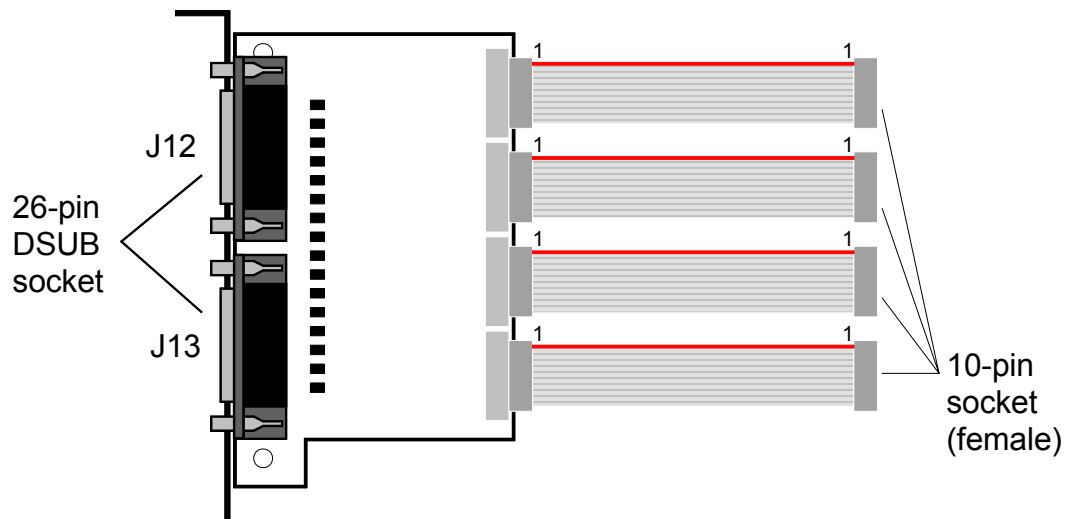


Figure 29: Video extension board with DSUB sockets (IS-SLOT-D26)

### Pin assignment of J12 (extension board, 26 pin DSUB socket):

Pin	Assignment	Pin	Assignment
1	VIN 1 (Video In 1)	14	GND
2	VIN 5 (Video In 5)	15	GND
3	VIN 2 (Video In 2)	16	GND
4	VIN 6 (Video In 6)	17	GND
5	VIN 3 (Video In 3)	18	GND
6	VIN 7 (Video In 7)	19	nc
7	VIN 4 (Video In 4)	20	nc
8	VIN 8 (Video In 8)	21	GND
9	nc	22	nc
10	GND	23	nc
11	GND	24	GND
12	GND	25	nc
13	GND	26	nc

Table 47: Pin assignment J12 (video extension board IS-SLOT-D26)

**Pin assignment of J13 (extension board, 260 pin DSUB socket):**

Pin	Assignment	Pin	Assignment
1	VIN 9 (Video In 9)	14	GND
2	VIN 13 (Video In 13)	15	GND
3	VIN 10 (Video In 10)	16	GND
4	VIN 14 (Video In 14)	17	GND
5	VIN 11 (Video In 11)	18	GND
6	VIN 15 (Video In 15)	19	nc
7	VIN 12 (Video In 12)	20	nc
8	VIN 16 (Video In 16)	21	GND
9	nc	22	nc
10	GND	23	nc
11	GND	24	GND
12	GND	25	nc
13	GND	26	nc

*Table 48: Pin assignment J13 (video extension board IS-SLOT-D26)*

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