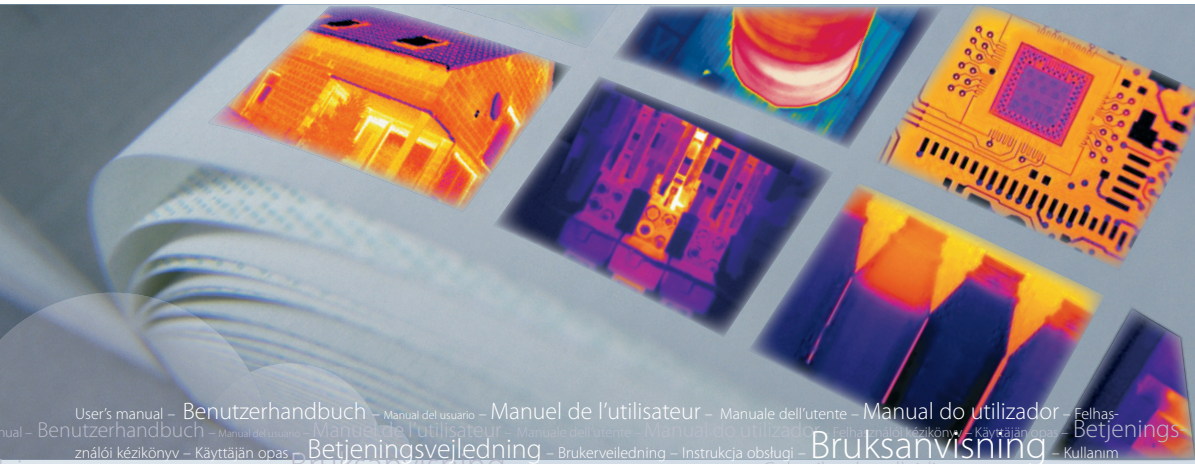
User's manual



Camera Connections

For ThermaCAM™ Researcher 2.9

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Revision	a249
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Camera Connections

User's manual

Publ. No. T559010 Rev. a249 – ENGLISH (EN) – November 1, 2007

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Table of contents

1 How to connect and control the camera

Before you can begin using the camera, you need to connect it to your computer and to a power supply.

SEE ALSO: For more information about this, see sections:

- 2 – FireWire configuration on page 19
- 3 – PC-Card interface configuration on page 25
- 4 – IC2-DIG16 interface configuration on page 35
- 5 – IRFlashLink interface configuration on page 45
- 6 – Gigabit Ethernet interface configuration on page 51

In order to be able to show a live image, ThermaCAM™ Researcher has to establish a software connection to the camera. The status information of the **Camera Control** panel will reveal if the program is trying to connect to the camera or not. If it says **Disconnected**, you will have to order a new connection by selecting **Connect** from the **Camera** menu.

On the same menu, there is a **Normalized connection** command, which sets the camera in a state suitable for almost any computer during the connection process.

If ThermaCAM™ Researcher is showing a disk image, you will have to select **Show Camera Image** from the **Camera menu** or press CTRL + L or click this toolbar button to make the program consider connecting to the camera and displaying its image.

10418703;a2

Figure 1.1 Show camera image toolbar button

The purpose of doing these soft connections/disconnections is that it enables you to run two or more copies of ThermaCAM™ Researcher. You can disconnect the camera from one copy and connect it to another instead.

If you have two (or more) FireWire or Ethernet cameras, you can connect each camera to a separate copy of ThermaCAM™ Researcher, perhaps with a slight loss of performance.

After the connection is established, it may still take some time before the logo image disappears. The camera may have to run for a while, before its detector is cool enough to produce a live image.

The first time a SC 1000, SC 4000 or SC 6000 camera is connected, a large calibration file will be unloaded from the camera, before a live image can be shown.

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NOTE: If you get into connection difficulties here, see section 1.12 – About connection difficulties on page 18.
NOTE: Do not remove the FireWire cable or PC-Card interface or switch off the camera while ThermaCAM™ Researcher is running unless you have selected **Disconnect** from the **Camera** menu first.

The **Camera Information** dialog box and the **Camera Control** panel are the two main ways by which you communicate with the camera.

Take a quick look at the **Camera Information** dialog box, which can be reached from the **Camera** menu or by clicking on the camera symbol to the right on the status line below the image. It will probably show the name of the camera and that it is working. Otherwise the reason of failure is displayed here (or in the **Device Status** panel displayed if you click on the interface symbol to the lower right of the program window).

Let's take a quick look at the **Camera Control** panel. We will study it in more detail in the next sub-chapters.

Let's examine the **Measurement Range** list on the second tab. Select a range, which covers the expected measurement temperatures. The range limits are blackbody temperatures, so if your measurement target has a shiny surface with a low emissivity, you will be able to make measurements above the range limits.

An image, which is probably blurry, is shown on the screen. Otherwise, click the candle toolbar button to get a better scale in the PC. Some cameras have their own ways of adjusting the image and improving its quality. See the appropriate camera control description below.

10418803;a2

Figure 1.2 **Candle** toolbar button

Aim the camera onto the target. Focus the camera, either by using the focus buttons on the **Camera Control** panel or the three buttons below (found on the standard toolbar). You also have the option to use the F9/F11/F12 keys.

10418903;a2

Figure 1.3 **Focus** toolbar buttons

Click the arrow target button to autofocus the camera.

Hold down the other buttons in order to run the focus motor of the camera towards infinity or towards the lens. Release the button when the focus is OK, or rather slightly before. There is a small delay before the focus motor stops.

If you are satisfied with your image, you can freeze it by clicking this button on the standard toolbar or pressing CTRL + F or F8:

10419003;a2

Figure 1.4 **Freeze** toolbar button

If it is an interesting image, you had better save it on disk right now. If you leave the program without first recording the image, the image is lost.

1.1 ThermoVision™ A-series Camera Control

ThermaCAM™ Researcher allows you to connect A-series cameras either through a FireWire interface or through an ethernet interface.

ThermoVision™ model	Interface to ThermaCAM™ Researcher
A20 M/V Ethernet	None
A40 M/V Ethernet	None
A20 M Firewire	FireWire
A40 M Firewire	FireWire
A20 V Firewire	None
A40 V Firewire	None
A320	Standard Ethernet
A320G	Gigabit Ethernet

When more than one camera is detected, this dialog box is displayed.

10770203;a1

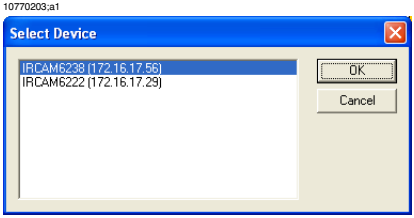

Figure 1.5 **Select device** dialog box

The Ethernet cameras will not be detected, unless they have been assigned an IP-number (like 172.16.17.56 above). This can be done automatically by a DHCP server or manually by a utility program which is distributed with the camera.

The control panel below is used for the ThermoVision™ A-series cameras.

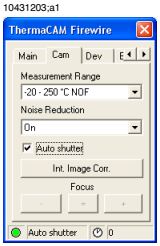

Figure 1.6 **ThermoVision™ A-series FireWire** dialog box

If some button is disabled on your camera control, it is because your particular camera does not support that function.

The selected **Measurement Range** should cover the expected measurement temperatures. The range limits are blackbody temperatures, so if your measurement target has a shiny surface with a low emissivity, you will be able to make measurements above the range limits.

If you click the **Int. Image Correction** button on the **Camera Control** panel, the camera will respond by making a rather heavy clicking sound when the internal shutter is pulled and adjust its own temperature scale once to the current image. It is highly recommended to use the **Int. Image Correction** function now and then, since it improves the image quality. Select the **Auto shutter** option if you want an automatic internal image correction. This automated process can be disabled as it may affect the recording of images. When you switch it off, a warning will appear on the status field of the control. This warning will become red if you leave it switched off for a long time.

NOTE: There is a related function in the **Image** menu, on the standard toolbar and on the scaling toolbar. That function is called **Auto Adjust**. It will continuously adjust the scale to the image locally, within the PC.

If noise reduction is set to **On**, it will blur the image of moving objects.

If the camera is connected to the PC using the ThermaCAM™ Connect 2.0 software and ThermaCAM™ Researcher at the same time, the live image may seem frozen.

The **Downsample** checkbox is only available for A20 cameras. This option affects how much disk space each image will occupy when stored on the hard disk. If enabled, disk space for each image will be significantly reduced. However, a performance penalty (in terms of apparent image quality, but not in measurement) is introduced when storing and reading image files.

10430703;a2

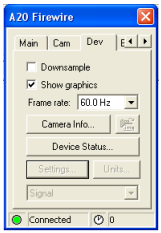

Figure 1.7 **ThermoVision™ A-series FireWire** dialog box

Select the desired frame rate from the list box. The frame rate specifies how many images per second will be captured of the target in question.

NOTE: For cameras with a fixed frame rate, this selection will be unavailable.
NOTE: For some cameras, frame rates higher than 25/30 Hz may not be supported.
NOTE: For some computers, frame rates higher than 25/30 Hz may not work properly.

1.2 ThermaCAM™ S-series Camera Control

This control panel is used for ThermaCAM™ S60, ThermaCAM™ S40, ThermaCAM™ SC640, and similar camera models.

10419103;a1

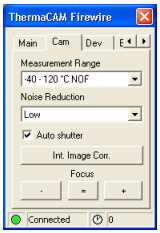

Figure 1.8 **ThermaCAM™ S-series FireWire** dialog box

If some button is disabled on your camera control, it is because your particular camera does not support that function.

The selected **Measurement Range** should cover the expected measurement temperatures. The range limits are blackbody temperatures, so if your measurement target has a shiny surface with a low emissivity, you will be able to make measurements above the range limits.

If you click the **Int. Image Correction** button on the **Camera Control** panel, the camera will respond by making a rather heavy clicking sound when the internal shutter is pulled and adjust its own temperature scale once to the current image. It is highly recommended to use the **Int. Image Correction** function now and then, since it improves the image quality. Select the **Auto shutter** option if you want an automatic in-

ternal image correction. This automated process can be disabled as it may affect the recording of images. When you switch it off, a warning will appear on the status field of the control. This warning will become red if you leave it switched off for a long time.

NOTE: There is a related function in the **Image** menu, on the standard toolbar and on the scaling toolbar. That function is called **Auto Adjust**. It will continuously adjust the scale to the image locally, within the PC.

At the bottom of the **Cam** tab, there are three focus buttons: Near focus (–), auto focus (=) and far focus (+).

If noise reduction is set to **Low** or **High**, it will blur the image of moving objects.

The camera control will block the camera power down function to ensure proper operation during image recording. To prevent the camera from shutting down when disconnected, make sure that the power down timeout is disabled in the camera.

10566703;a1

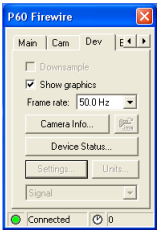

Figure 1.9 ThermaCAM™ S-series FireWire dialog box

Select the desired frame rate from the list box. The frame rate specifies how many images per second will be captured of the target in question.

NOTE: For cameras with a fixed frame rate, this selection will be unavailable.
NOTE: For some cameras, frame rates higher than 25/30 Hz may not be supported.
NOTE: For some computers, frame rates higher than 7 Hz may not work properly.
NOTE: Use the **Normalized connection** command on the ThermaCAM™ Researcher **Camera** menu if connection fails due to a too high frame rate.

1.3 Indigo standard Ethernet interface

This chapter applies to all Indigo camera models, when the optimum eBus driver is not used.

It is possible to use a standard network interface in order to acquire images from an iPort frame grabber device connected to the network. Please note that the standard network interface is scanned only if no frame grabber device can be detected over the optimum driver connection.

The iPort frame grabber device can be connected to a host PC either directly or through a network switch. If a device is detected on any of your standard Ethernet network interfaces, the following dialog box will be presented:

10573803;a2

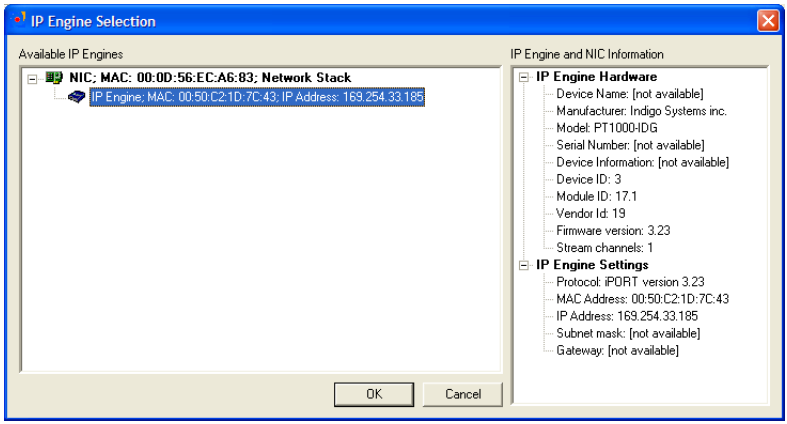

Figure 1.10 Network Device Finder dialog box

The device identification process can take quite a long time in Windows®. Until it has finished, you will get a **Device not present** message.

A list of detected devices will be presented. If the device has been given an IP address it will be displayed. If the IP address is not shown or if the IP address needs to be modified, then select any adapter entry in the adapter list directly below the device entry. Right-click the adapter entry and select **Set IP…** from the context menu. A dialog box will be presented:

When the IP address has been set, click OK in the **Network Device Finder** dialog box to proceed with the connection process.

SEE ALSO: For more information, see section 7 – Standard Ethernet interface configuration on page 57.

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1.4 Indigo Merlin Camera Control

This control panel is used for Indigo Merlin cameras.

10569603;a1

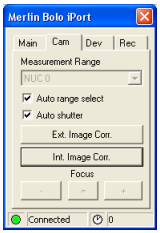

Figure 1.11 Merlin Bolometer iPort – camera control tab

If a button is disabled on your camera control, it is because your particular camera does not support that function.

The **Measurement Range** list contains a list of all available NUC tables in the camera. Each NUC table corresponds to a measurement temperature range. The camera is delivered with a set of pre-defined NUC tables, but user-defined NUC tables can be added to the camera. There is a small windows application on the CD designed for this purpose in the *Indigo MerlinUI* sub directory. The names of the NUC tables can be changed to more user-friendly names.

Select the **Auto range** option if you want the camera to select the best suitable measurement range (or NUC table).

If you click the **Int. Image Correction** button on the **Camera Control** panel, the camera will respond by making a clicking sound when the internal shutter is pulled and adjust its own temperature scale once to the current image. It is highly recommended to use the **Int. Image Correction** function now and then, since it improves the image quality.

Select the **Auto shutter** option if you want an automatic internal image correction. This automated process can be disabled as it may affect the recording of images. When you switch it off, a warning will appear in the status field of the control. This warning will turn red if you leave it switched off for a long time.

NOTE: There is a related function on the **Image** menu, on the standard toolbar and on the scaling toolbar. That function is called **Auto Adjust**. It will continuously adjust the scale to the image locally, on the PC.

If you try to study targets whose temperatures are close to or even outside the measurement range, it might happen that the image becomes noisy due to detector offset errors. That is when you should use the **External Image Correction** function. Aim the camera towards a surface with a flat temperature close to that of the target. Click the button. The image will now be subjected to an offset correction so that every part of

the image will get the same value as that in the middle. Aim the camera towards the target again. This correction will last until the next time you internally correct the camera image, or run **Ext. Image Correction** again.

10569703;a1

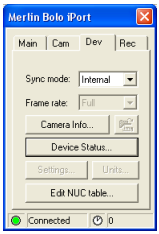

Figure 1.12 Merlin Bolometer iPort – device control tab

Select the desired **Sync mode** from the list box. An external sync signal can be applied in order to synchronize the camera with other external equipment.

Select the desired frame rate from the list box. The frame rate specifies how many images per second will be captured of the target in question. Full frame rate corresponds to either 50 (PAL) or 60 (NTSC) images per second depending on video mode.

Set user-friendly names on the camera NUC tables by using the **Edit NUC** table button. You can also add more items to the name list in case the camera contains more than the default number of NUC tables.

1.5 Indigo Omega Camera Control

This control panel is used for Indigo Omega cameras.

10569803;a1

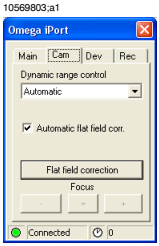

Figure 1.13 Omega iPort – camera control tab

If a button is disabled on your camera control, it is because your particular camera does not support that function.

The **Dynamic range control** contains a list of the available modes for range control. The camera has two modes, one for low-temperature scenes (below 150 °C) and one mode for high-temperature scenes (up to 500 °C). If the camera has the optional automatic dynamic range control feature, then an automatic mode is also available.

If you click the **Flat field correction** button on the control panel, the camera will respond by making a clicking sound when the internal shutter is pulled and adjust its own correction coefficients. It is highly recommended to use the **Flat field correction** function now and then, since it improves the image quality.

Select the **Auto flat field corr.** option if you want an automatic flat field correction. This automated process can be disabled as it may affect the recording of images. When you switch it off, a warning will appear on the status field of the control. This warning will become red if you leave it switched off for a long time.

NOTE: There is a related function in the **Image** menu, on the standard toolbar and on the scaling toolbar. That function is called **Auto Adjust**. It will continuously adjust the scale to the image locally, within the PC.

10569903;a1

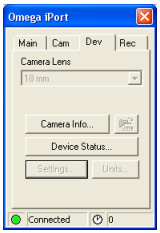

Figure 1.14 Omega iPort – device tab

If the Omega camera has been calibrated for more than one lens, then the **Camera Lens** list box will be enabled. Select the correct lens from the list after a lens switch to notify the camera of the change.

1.6 Indigo Phoenix Camera Control

This control panel is used for Indigo Phoenix cameras.

10573703;a2

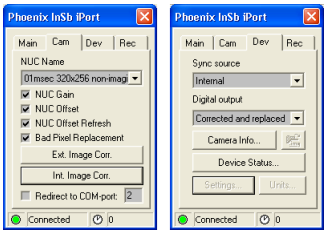

Figure 1.15 Phoenix iPort – camera control tabs

If a button is disabled on your camera control, it is because your particular camera does not support that function.

The **NUC Name** list contains a list of all available NUC tables. These tables include integration time, window size etc. The Phoenix camera system can internally store a number of these NUC tables. NUC tables can be added or edited using an application delivered with the camera.

The check boxes below allow you to enable or disable various processing of the digital video stream along the digital video path. Specifically, aspects of the active NUC table and the associated bad pixel map can be enabled or disabled independent of each other by using these check boxes. Typically, all of these check boxes would be enabled, but depending on the application, you can choose to bypass selected parts of the NUC and bad pixel replacement. Bypassing part of the NUC or bad pixel replacement in this way affects both the digital video output and the analog video output.

- **NUC Gain**: Check this option when you want the active NUC gain coefficients to be applied to the individual pixel digital values
- **NUC Offset**: Check this option when you want the active NUC offset coefficients to be applied to individual pixel digital values
- **NUC Offset Refresh**: You should check this option if you want the NUC offset refresh coefficients (if any exist) to be applied
- **Bad Pixel Replacement**: This option enables bad pixel replacement

If you click on the **Int. Image Correction** button on the Camera Control panel, the camera will respond by making a clicking sound when the internal shutter is closed and the camera adjusts its own offsets to the current image. It is highly recommended to use the **Int. Image Correction** function now and then (especially at power up), since it improves the image quality.

It is often desirable to use an external normalization source, as opposed to the internal shutter, since any non-uniformity in the camera lens is then also corrected. To do that, use the **Ext. Image Correction** button. Aim the camera towards a surface with a flat temperature close to that of the target. Click the button. The image will now be subjected to an offset correction so that every part of the image will get the same value as that in the middle. Aim the camera towards the target again. This correction will last until the next time you internally correct the camera image, or run **Ext. Image Correction** again.

The **Sync source** controls the synchronization of the FPA integration period in non-imaging mode. In imaging mode the sync signal is used to actively start the readout of valid video.

The **Digital ouput** control sets restrictions for the check boxes on the **Cam** tab:

- Uncorrected output (no corrections allowed)
- Corrected output (only NUC corrections allowed)
- Corrected and replaced output (all corrections allowed)

1.7 SC4000/SC6000 Camera Control

This control panel is used for ThermoVision™ SC4000/SC6000 cameras. It has a **Cal** tab, a **NUC** tab, a **Dev** tab, and optionally a **HSDR** tab for calibration, non-uniformity correction, device handling, and high speed data recording.

10755103;a1

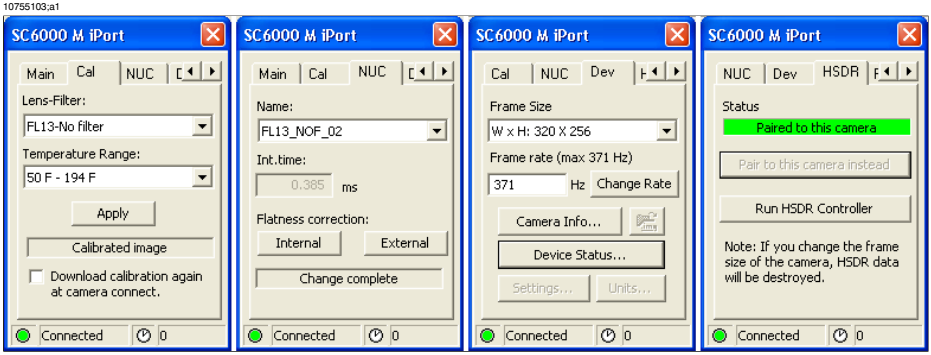

Figure 1.16 Cumulus iPort – camera control tabs

If a button is disabled on your camera control, it is because your particular camera does not support that function.

The **Lens-Filter** list contains the calibrated lenses and filters of your camera. The **Temperature Range** list shows the calibrated ranges for the chosen lens and filter in the first list. When you have selected your lens, filter and range, please press the **Apply** button.

The calibration file of the camera is normally downloaded to your PC when you connect to the camera for the first time. If you need to refresh this information, mark the **Download** check box, disconnect and connect again.

The **Name** list on the **NUC** tab shows the NUC tables currently stored in the camera. All tables are shown, not only those associated with a calibration. The tables contain non-uniformity correction data, integration time, frame size and other settings. If you select a NUC name from this list, you will switch to that table but get a non-calibrated IR-image. To get a calibrated image, you have to use the controls on the **Cal** tab.

The **Int.time** field shows the current integration time in milliseconds.

To improve the image quality, you can apply an **Internal** or **External Flatness correction**. By allowing the camera to look at an internal or external thermally flat surface, with a temperature well within the current temperature range limits, you can even out many image distortions. Just press the **Internal** or **External Flatness correction** buttons. You will not invalidate the current calibration if you do this, but the name of the current NUC table is lost. The quality improvement can be considerable, especially if external correction is used and the camera recently was switched on. The external correction is better, because it also includes the lens non-uniformities.

The **Frame Size** list on the **Dev** tab shows a number of alternative image sizes for calibrated cameras. If you reduce the frame size you can increase frame rate without overloading the camera. Fill in a new value in the **Frame Rate** edit box and press **Change Rate** to do this. The current maximum recommended frame rate is shown above the button. Even if the camera doesn't get overloaded, your computer can still have difficulties with high frame rates.

If you should happen to increase the frame size without remembering to reduce the frame rate, ThermaCAM™ Researcher will reduce it to 5 Hz for you.

If the camera somehow was set to conditions overloading the computer, use the **Normalised Connection** alternative on the **Camera** menu to reset them when you connect the camera.

The **Camera Info** button brings up a dialog window with information from the calibration of the camera.

The **Device Status** button shows information regarding the connection to the camera.

The **HSDR** tab will only show up if a ThermaCAM™ Researcher HSDR module is installed on the computer. The High Speed Data Recorder is a unit which captures a very high speed raw pixel data stream from the camera and stores it directly on disk. The recording can afterwards be converted into an image format suitable for ThermaCAM™ Researcher. The camera calibration will then be preserved.

You must pair the camera to the HSDR before you can begin using the HSDR Controller software to make HSDR recording.

It is not a very good idea to change the Frame Size setting in ThermaCAM™ Researcher when you have precious data stored in the HSDR, since the change will wipe out all stored data. When a HSDR recording is in progress, the frame size list box will become disabled.

1.8 THV 500 Camera Control

This control panel is used for ThermaCAM™ SC 500, ThermaCAM™ SC 2000, ThermaCAM™ SC 3000 and similar camera models.

10419203;a1

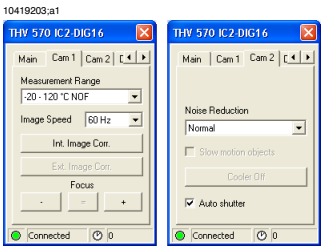

Figure 1.17 **THV 570 IC2-DIG16** dialog box

If some button is disabled on your camera control, it is because your particular camera does not support that function.

The selected **Measurement Range** should cover the expected measurement temperatures. The range limits are blackbody temperatures, so if your measurement target has a shiny surface with a low emissivity, you will be able to make measurements above the range limits.

The **Image Speed** control allows you to increase the speed by which images are captured in a high-speed camera. The speed by which they are grabbed by the PC frame grabber remains unchanged, however. This has the effect that the high-speed image size is reduced proportionally, so that each frame will contain more than one image. Only under one condition, when you record images at full speed into one single file, will you be able to retrieve all the captured high-speed images. In all other cases, you will only see the first image of each grab.

If you click the **Int. Image Correction** button on the **Camera Control** panel, the camera will respond by making a rather heavy clicking sound when the internal shutter is pulled and adjust its own temperature scale once to the current image. It is highly recommended to use the **Int. Image Correction** function now and then, since it improves the image quality. Select the Auto shutter checkbox if you want an automatic internal image correction.

NOTE: There is a related function in the Image menu, on the standard toolbar and on the scaling toolbar. That function is called **Auto Adjust**. It will continuously adjust the scale to the image locally, within the PC.

If you try to study targets whose temperatures are close to or even outside the measurement range, it might happen that the image becomes noisy due to detector offset errors. That is when you should use the **External Image Correction** function (only available for cooled camera models). There is a button on the camera control panel and a camera menu item for this purpose. Aim the camera towards a surface with a flat temperature close to that of the target. Click the button. The image will now be subjected to an offset correction so that every part of the image will get the same value as that in the middle. Aim the camera towards the target again. This correction will last until the next time you internally correct the camera image, or run **Ext. Image Correction** again.

At the bottom of the **Cam1** tab, there are three focus buttons. Near focus (-), auto focus (=) and far focus (+).

Let's move over to the second tab on the **Camera Control** panel.

High noise reduction will blur the image of moving objects.

To improve image quality, you can select the **Slow motion objects** check box if you are viewing slowly moving or still targets.

The **Cooler** button will switch on/off the camera cooler.

The **Auto shutter** check box will switch on/off the automated internal image correction. This automated process can be disabled as it may affect the recording of images. When you switch it off, a warning will appear on the status field of the control. This warning will become red if you leave it switched off for a long time.

1.9 SC 1000 Camera Control

This control panel is used for ThermaCAM™ SC 1000 only.

10419403;a1

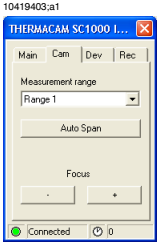

Figure 1.18 ThermaCAM™ SC 1000 dialog box

Select a **Measurement Range** that covers the expected measurement temperatures.

If you click the **Auto Span** button on the **Camera Control** panel, the camera will adjust its own temperature scale once to the current image.

The focus function will only work if the focus motor switch by the lens socket is in the R position.

The SC 10000 camera also has a non-uniformity correction (NUC) function, available only through its **Set-up** menus that you can use to improve the image quality.

The SC 1000 has a calibration file, which will be unloaded from the camera, when it is connected for the first time. If you have the camera sent in for recalibration, you have to initiate the unloading of this file again, from the **Dev** tab.

1.10 THV 900 Camera Control

This control panel is used for ThermoVision™ 900 Cameras.

10419503;a1

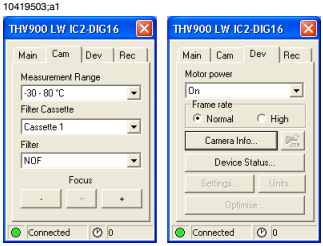

Figure 1.19 **THV900 LW IC2-DIG16** dialog box

There is a **Cassette** selection, which must be set to the same number as the cassette actually installed in the camera, a **Filter** selection, which reflects the IR filters of that cassette, and a **Measurement Range** selection. The **Measurement Range** selection is tightly coupled to the two others. If you change them, the measurement ranges will change accordingly.

The range should cover the expected measurement temperatures. The range limits are blackbody temperatures, so if your measurement target has a shiny surface with a low emissivity, you will be able to make measurements above the range limits.

Ideally you should make your proper **Cassette**/**Filter**/**Range** selections immediately, but it is often easier to select a measurement range, which is well suited to the surroundings first and then set the proper range afterwards. It makes it easier for you to focus the camera.

The **Motor power** switches control the camera horizontal and vertical scanning mirror motors. On Stirling cooled cameras you may also put the cooler in standby.

You can double the frame rate by selecting the high frame rate option. The number of lines will decrease when the frame rate is high. The scanner use the high frame rate as long as the power is on, or until you select normal frame rate again. After a power on, the frame rate is always normal.

1.11 THV 1000 Camera Control

This control panel is used for ThermoVision™ 1000 cameras only.

Let us investigate some of the alternatives in the Camera Control panel.

10419703;a1

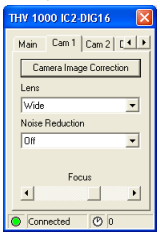

Figure 1.20 **Cam 1** tab of the **THV 1000 IC2-DIG16** dialog box

Camera Image Correction performs an internal autoadjust maneuver.

Lens changes the camera field of view.

Noise reduction selects the level of noise reduction. Heavy reduction will reduce the noise for still or slow moving objects but will blur fast moving targets.

Focus controls the camera focus. Infinity focus is at the right end of the slide bar.

10419803;a1

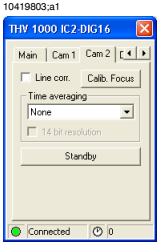

Figure 1.21 **Cam 2** tab of the **THV 1000 IC2-DIG16** dialog box

Line corr. corrects each image for geometric detector differences. This will give you a better image quality but will decrease the image display rate.

Focus calibration: The focus has a tendency to drift as the temperature of the lens varies. Use this function to set the correct focus infinity position.

Time averaging: In order to reduce noise set the number of images to average from and then click **Record One Image**. You can't combine time averaging with sequence file recording.

14 bit resolution: Save time averaged images with 14 bits per pixels. To interpret the image correctly, you need special software.

Standby: Set the camera cooler and motors in standby mode. Click the button again to restart the camera.

1.12 About connection difficulties

At times, you may run into difficulties establishing a connection with the camera. Here are some suggestions on what you can do:

Problem	Possible cause & solution
The program is having problems with the camera. It only works now and then.	Take care when inserting your PC-Card interface properly into the PC-Card adapter. Make sure that the card has been recognised and properly configured (is indicated with a little tune) before you start ThermaCAM™ Researcher. The same caution is required when the interface is to be removed or switched off. Always exit the program or select **Disconnect** from the camera menu before you pull the interface out or switch the power off.
The program refuses to establish a contact with the camera. The status information keeps saying **Disconnected** while the camera is running.	The camera may be connected to another copy of ThermaCAM™ Researcher. Switch over to that one and disconnect the connection. Now the new ThermaCAM™ Researcher can connect to the camera.
The status information says **Connected**, but no live image is shown.	If you are using a ThermaCAM™ SC 1000, check that no **Maintenance Required** information is displayed in the camera viewfinder. If you accidentally have put the SC 1000 in setup mode, it can also cause this problem.

SEE ALSO: Your problems may be related to the hardware installation. For more information about hardware installation, see sections:

- 2 – FireWire configuration on page 19
- 3 – PC-Card interface configuration on page 25
- 4 – IC2-DIG16 interface configuration on page 35
- 5 – IRFlashLink interface configuration on page 45
- 6 – Gigabit Ethernet interface configuration on page 51

2 FireWire configuration

2.1 *System parts: ThermaCAM™ S- and ThermoVision™ A-series – FireWire interface*

This configuration is used for the following camera models:

- ThermaCAM™ S60
- ThermaCAM™ S65
- ThermaCAM™ S40
- ThermaCAM™ S45
- ThermaCAM™ SC640
- CPA 8200
- CPA 8000
- ThermoVision™ A20 M FireWire
- ThermoVision™ A40 M FireWire

10430403;a2

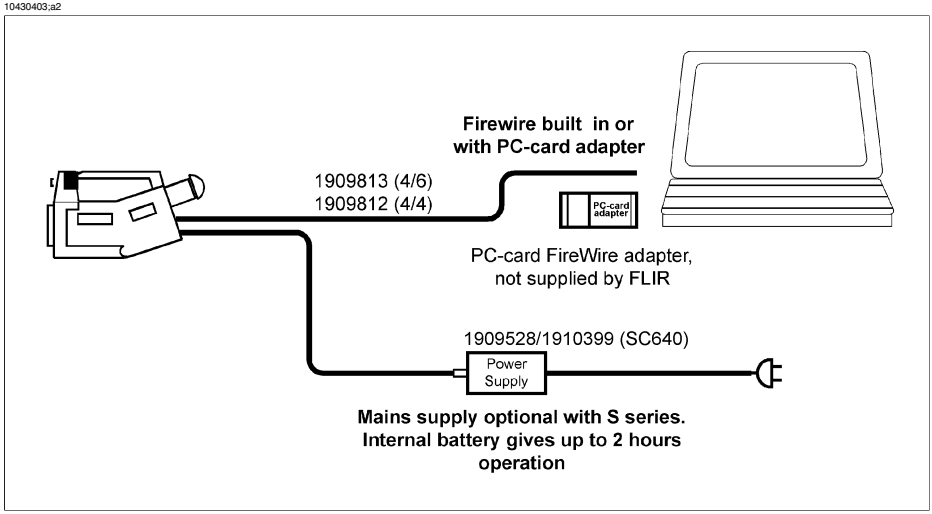

Figure 2.1 ThermaCAM™ S-series – FireWire interface & laptop computer

10430503;a2

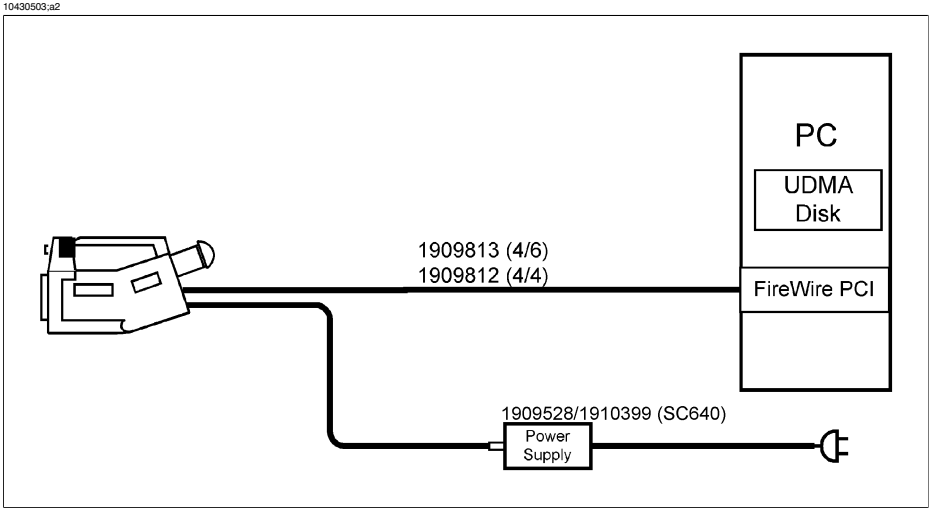

Figure 2.2 ThermaCAM™ S-series – FireWire interface & desktop computer

10430603;a1

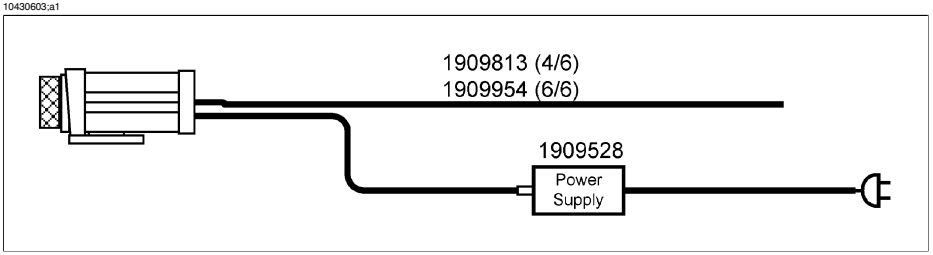

Figure 2.3 ThermoVision™ A-series – FireWire interface

Necessary parts:

- A FireWire cable, 6 pole/4 pole, max 4.5 m / 14.8 ft.
- A power supply (the camera battery can also be used)
- An optional FireWire hub, to be able to add a 6 pole/6 pole extension cable
- ThermaCAM™ Researcher CD-ROM (not shown), including PC driver software and Direct X

2.2 Software limitations

The FireWire configuration works on Windows 98 (second edition), Windows ME, Windows 2000, Windows XP, and Windows Vista operating systems (SC640 onlyon Windows 2000/XP/Vista).

In Windows 98/ME, due to file system limitations, you can not get full burst recording rate.

In Windows 2000/XP/Vista, full burst rate recording of the cameras is only possible when the target disk is formatted with a NT file system (NTFS) and is fast enough.

2.3 PC recommendations

To get a reasonably high performance you should have a Pentium desktop computer with a clock rate of 1 GHz or more.

If IDE Ultra DMA/100 is supported on your computer, then there is no need for striped SCSI disks. There are such disks that are so fast that you don't need to use striped volumes. We now recommend 7200 RPM 30 GBUltra DMA/100 disks (or better). Your computer not only has to support this technology, you also have to have service pack 2 of Windows 2000 (or Windows XP/Vista) to make it work.

If you have a serial ATA disk (SATA) that is even better.

The FireWire adapter in the PC must conform to the 1394a-2000 specifications and must support bus speeds up to 400 Mb/s.

DirectX 8.1 (or higher) is required for the FireWire configuration.

The amount of memory in the PC should be at least twice the Microsoft® recommendation.

Our recommendation is to set the color palette to 256 colors. TrueColor gives a lower frame rate, but better color fidelity.

2.4 Installing the FireWire camera driver software

2.4.1 General instructions

Step	Action
1	If needed, insert a FireWire Adapter into a free PCI bus slot on your desktop PC. The adapter must conform to the IEEE-1394a-2000 specification and be capable of supporting a serial bus speed of 400 Mb/s. Windows should automatically detect the new hardware and ask for its drivers, which are supplied by the Firewire Adapter manufacturer
2	Disable any sensitive equipment (especially disks), that you may already have connected to your FireWire adapter.
3	If you have Windows 98, make sure that the ThermaCAM™ Researcher software is installed first.
4	Switch on the camera and check that the camera has the Digital Video Mode setting DCAM before you plug it into your computer. SC640 does not have this setting.
5	Connect the 1394 cable between the camera to the FireWire adapter of the PC when the camera is up and running.

2.4.2 Windows Vista

Step	Action
1	Please log in as Administrator during this installation. Windows should detect the camera, after a while.
2	If Windows displays a **New Hardware Found** Wizard for the device **FLIR ThemaCAM**, select **Locate and install** and **Don't search online**. Either insert the ThermaCAM™ Researcher CD-ROM or select **Don't have the disk** and **Browse my computer** to let Windows find an appropriate driver on the CD or in your C:\Program Files\Flir Systems\Device drivers directory.
3	Please allow Windows to continue installing the software despite the complaints about the FLIR drivers not being digitally signed. If Windows refuses to let you do this, please check that the Windows Update Driver setting (Right-click on My Computer -> Properties -> Hardware tab) is not set to **Never**.
4	Some cameras will also contain a FLIR 1394 Network Adapter device. You can install it in the same way, if you like. ThermaCAM™ Researcher does not use it.

2.4.3 Windows 2000/XP

Step	Action
1	Log in as Administrator. Windows should detect the camera after a while.
2	If Windows displays a **New Hardware Found Wizard** for the device FLIR ThemaCAM, either let Windows search for the best available driver or select **Install from a specific location (Advanced)** to let Windows find an appropriate driver in your “C:\Program Files\Flir Systems\Device drivers” directory.
3	Allow Windows to continue installing the software despite the complaints about the FLIR drivers not being digitally signed. If Windows refuses to let you do this, please check that the Driver Signing setting (Right-click on **My Computer** → **My Computer** → **Properties** → **Hardware** tab) is not set to **Block**.

2.4.4 Windows 98SE/ME

Step	Action
1	Have your Windows(TM) 98/ME system CD available.
2	Windows should detect the camera after a while.
3	If nothing seems to happen, and the ThermaCAM™ appears in the Device Manager category **Other devices** (Right click on **My Computer** → **Properties** → **Device Manager** tab), click on the failing ThermaCAM™ device name and press the Remove button. Un-plug and plug the camera cable back into the Firewire adapter to make the ThermaCAM™ re-appear as an “Imaging device”.
4	When Windows starts asking you for files, please follow the instructions on the screen. Browse to your Windows CD for Windows files and to “C:\Program Files\Flir Systems\Device drivers” for the flirdcam.sys file and click **Next.**

The FLIR Systems device drivers can also be found on the ThermaCAM™ Researcher CD-ROM, if you find that more convenient.

There are cameras capable of supporting other devices, such as the FLIR 1394 Network Adapter and the FLIR USB Adapter. These devices belong to the ThermaCAM™ Connect 3.0 or ThermaCAM™ QuickReport product, which has drivers for them.

You do not have to install these drivers to make ThermaCAM™ Researcher work.

2.5 Troubleshooting the FireWire installation

To work properly, the FireWire configuration needs:

- Windows 98 (sec ed), ME, 2000, XP or Vista
- Direct X 8.1 (or higher)
- A successful installation of ThermaCAM™ Researcher
- A correct **Type of camera** and **Type of connection** setting in the **Select Camera** dialog.
- A 6 (or 4) to 4 FireWire cable for ThermaCAM™ S-series
- A 6 (or 4) to 4 FireWire cable for ThermaCAM™ SC640-series
- A 6 (or 4) to 6 FireWire cable for ThermoVision™ A-series
- A IEEE-1394a-2000 FireWire adapter
- A successful installation of the FireWire Adapter driver
- A camera equipped for FireWire digital output with its digital video mode set to DCAM
- The Driver Signing setting of the Windows Device Manager should not block unsigned files (Windows 2000, XP, Vista)
- The TCP/IP protocol Automatic Metric setting should not be set
- A successful installation of the FLIR ThermaCAM™ camera driver for each camera used
- A 1GHz (or faster) PC or laptop equipped with a IEEE-1394a-2000 interface capable of serial bus speed of 400 Mb/s.
- Recent updates from Microsoft and the computer manufacturer
- With Windows® XP Service Pack 2, S series cameras must have filekit 2.2.5 (or higher) and A series cameras must have filekit 1.2.12 (or higher). The FLIR ThermaCAM™ driver must have version 5.20.2600.923 (or higher).
- Administrator rights (or a change in the Local Security Policy) for the users that plug in/out the camera on Windows 2000/XP
- Proper settings if you have a firewall in your computer.
- That ThermaCAM™ Connect 2.0 is not connected to the camera
- Acrobat Reader from http://www.adobe.com

Some laptop computers are not equipped with the correct FireWire interface. In such cases, a proper FireWire interface can be added using a CardBus interface adapter. A desktop PC needs a free PCI slot in order to install a FireWire interface card. The FireWire connector of your PC may have 4 or 6 pins.

The IEEE-1394a-2000 adapter must be capable of a serial bus speed of 400 Mb/s in order to achieve full real time recording speed (50/60Hz). Even when this is the case, limitations elsewhere in the computer may not allow full speed.

With some laptop chipsets there is a problem cause by too much latency in the C3 power state transition which cause buffer underruns. This can be cured by a change in the Windows® registry. For more information, see Publ. No. T559004, Installation Hints, on the CD-ROM.

Since FireWire is a fairly recent addition to the Windows world, hardware and software weaknesses still plague the technology. We recommend that you visit the Microsoft Windows Update website (windowsupdate.microsoft.com) to refresh your software and Windows drivers, and that you visit the corresponding site of your computer manufacturer to receive its latest updates.

Some Windows versions don't support FireWire interface cards. You cannot use the FireWire interface on Windows 95, 98 (first edition) and NT 4.0.

Do not connect other FireWire equipment to your computer when you transfer IR images.

Please disable any sensitive equipment (especially disks) that you may already have connected to your FireWire adapter before you plug in the camera.

SEE ALSO: For more information, see the following documents on the CD:

- Installation Hints (Publ. No. T559004)
- System configurations (Publ. No. 1 557 783)

3 PC-Card interface configuration

3.1 System parts: ThermaCAM™ SC – PC-Card interface

This configuration is used for the following camera models:

- Thermovision 550
- Thermovision 570
- AGEMA 550
- AGEMA 570
- ThermoVision™ Alert
- ThermaCAM™ SC 500
- ThermaCAM™ SC 2000
- ThermaCAM™ SC 3000

NOTE: This system configuration does not apply to ThermaCAM™ SC 1000.

10416303;a1

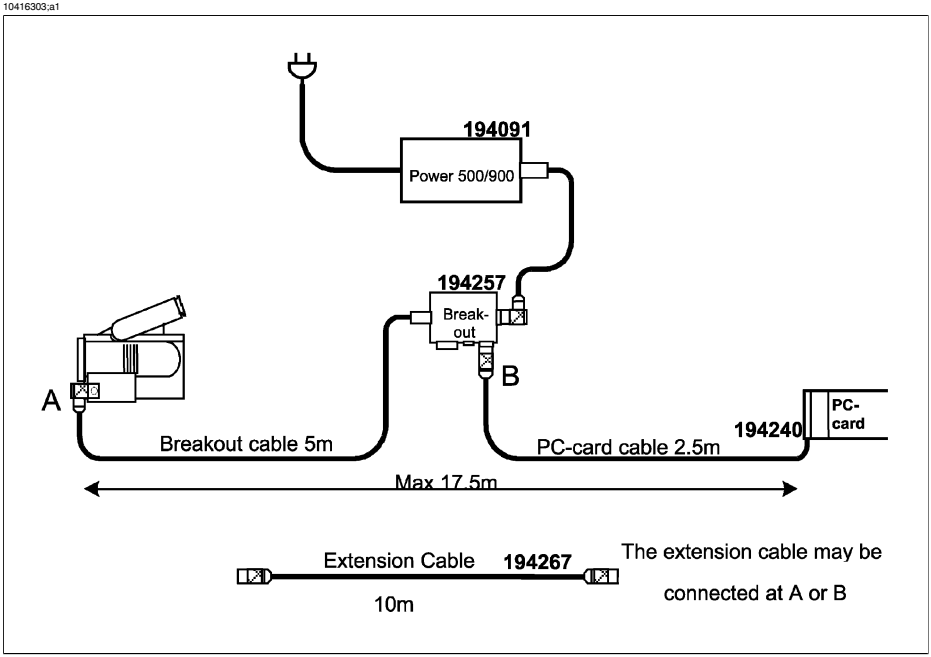

Figure 3.1 ThermaCAM™ SC – PC-Card interface system parts

Necessary parts:

- A break-out box (P/N 194 257)

- A PC-Card interface 500 (P/N 194 240). A PCMCIA-standardised card with a cable that fits into the Remote connector on the break-out box.
- A power supply 500/900 (P/N 194 091). A ThermaCAM 5XX battery pack can also be used.
- An optional extension cable
- ThermaCAM™ Researcher CD-ROM (not shown), including PC driver software

NOTE: For ThermaCAM™ SC 3000, the break-out box can be omitted. Instead, connect the power supply cable to the power inlet of the camera and plug the PC-Card interface into the data connector of the camera, like this:

10416403;a1

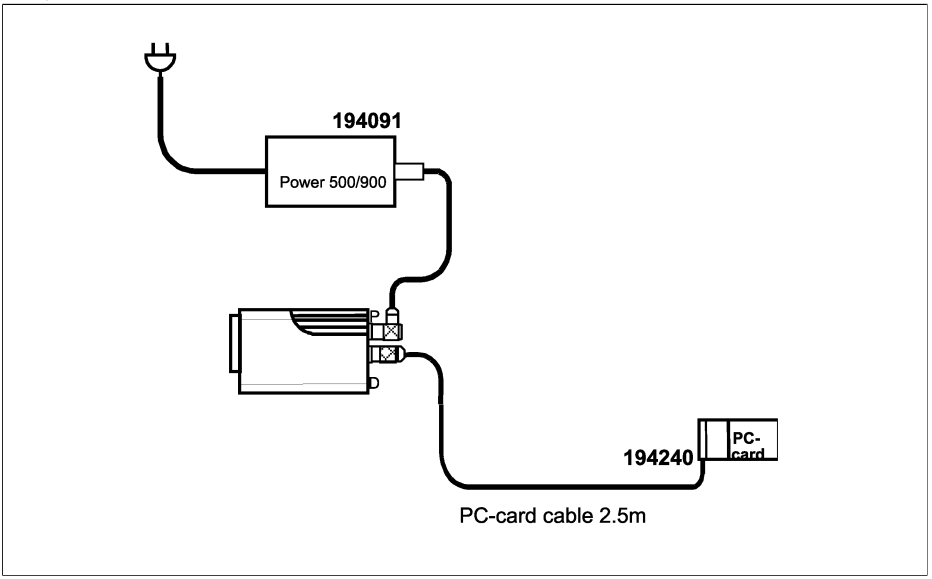

Figure 3.2 ThermaCAM™ SC 3000 – alternative configuration

Make sure that the cables are connected in the right way. The connectors are of the same type, so you might make mistakes when connecting these cables. That can not, however, harm the hardware.

NOTE: You must not use the serial port connector (DSUB) of the break-out box while the PC-Card interface is connected to it. That could harm the camera.
NOTE: The computer side of the PC-Card interface has to be treated with care, since it is quite vulnerable to damage.
SEE ALSO: For more information, see section:

- 3.8 – Installing the driver software for the PC-Card interface on page 30.

3.2 System parts: ThermaCAM™ SC 1000 – PC-Card interface

This configuration is used for only one camera model: ThermaCAM™ SC 1000.

10416503;a1

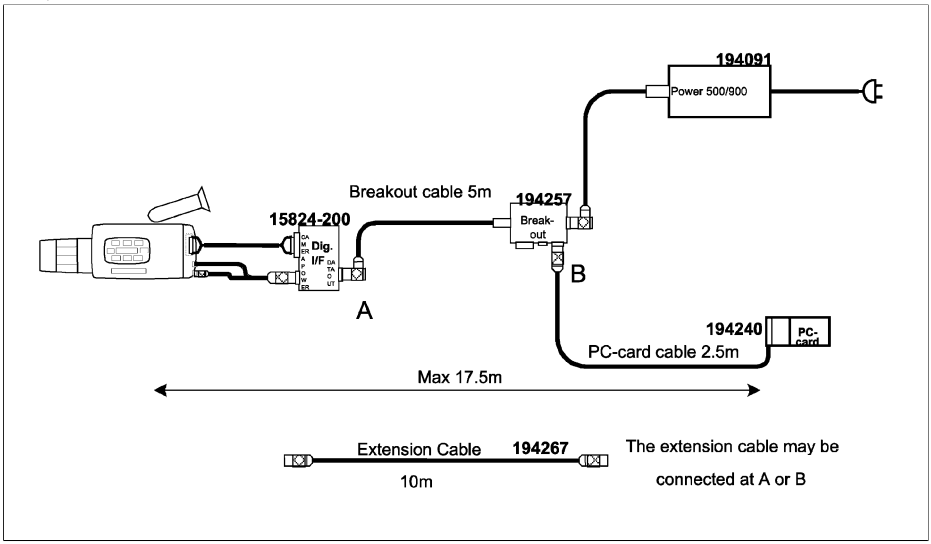

Figure 3.3 ThermaCAM™ SC 1000 – PC-Card interface system parts

Necessary parts:

- A SC 1000 digital interface box (P/N 15824-200) with cables that connect to the SC 1000 battery connector, digital output connector and remote connector
- A break-out box (P/N 194 257) with a cable that fits into the SC 1000 interface box
- A PC-Card interface 500 (P/N 194 240). A PCMCIA-standardised card with a cable that fits into the remote connector on the break-out box.
- A power supply 500/900 (P/N 194 091). A ThermaCAM 5XX battery pack can also be used.
- An optional extension cable (P/N 194 267)
- ThermaCAM™ Researcher CD-ROM (not shown) including PC driver software

NOTE: Make sure that the cables are connected in the right way. The connectors are of the same type, so you might make mistakes when connecting these cables. That can not, however, harm the hardware.
NOTE: The computer side of the PC-Card interface has to be treated with care, since it is quite vulnerable to damage.
SEE ALSO: For more information, see section:

- 3.8 – Installing the driver software for the PC-Card interface on page 30.

3.3 System parts: Thermovision® 900 PC-Card interface

10416603;a1

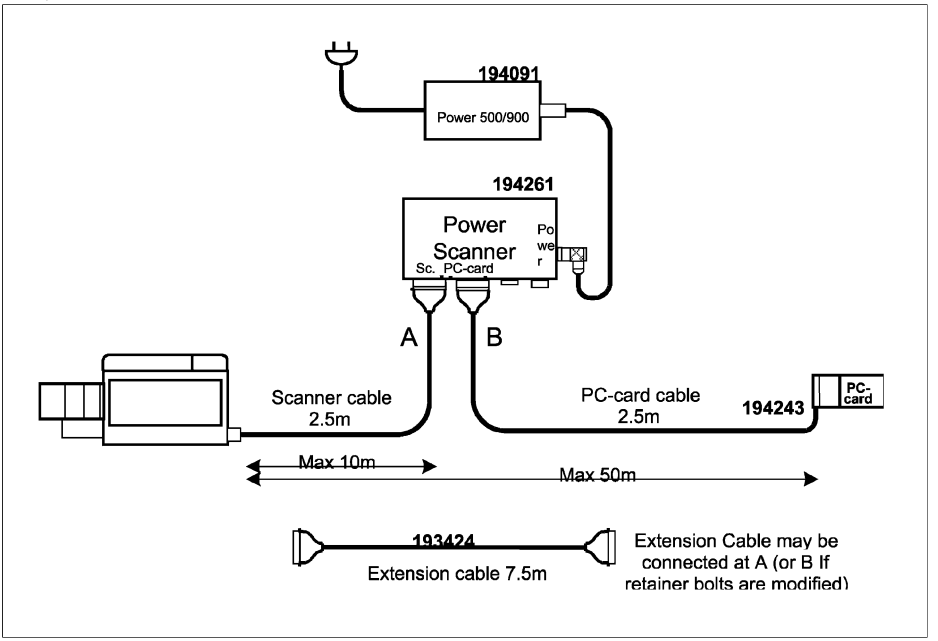

Figure 3.4 Thermovision® 900 PC-Card interface system parts

Necessary parts:

- A PC-Card interface 900 (P/N 194 243): A PCMCIA-standardised card with a cable that fits into the side of the power scanner box.
- A power scanner 900 box (P/N 194 261)
- A power supply 500/900 unit (P/N 194 091)
- An optional extension cable (P/N 193 424)
- ThermaCAM™ Researcher CD-ROM (not shown) including PC driver software

NOTE: The computer side of the PC-Card Interface has to be treated with care, since it is quite vulnerable to damage.

SEE ALSO: For more information, see section:

- 3.8 – Installing the driver software for the PC-Card interface on page 30.

3.4 System parts: Thermovision® 1000 PC-Card interface

10416703;a1

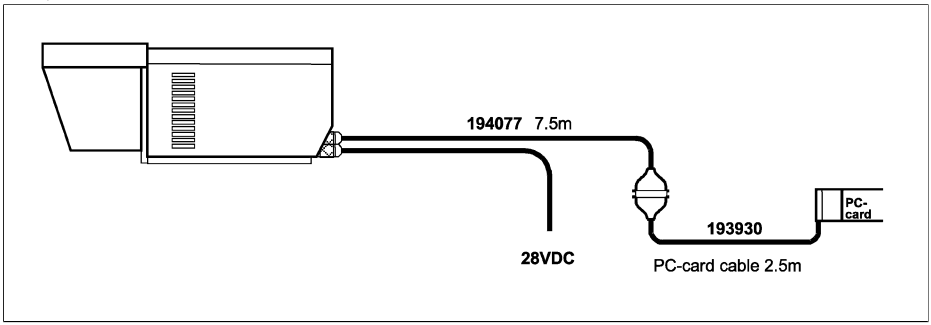

Figure 3.5 Thermovision® 1000 PC-Card interface system parts

Necessary parts:

- A PC-Card interface 1000 (P/N 193 930): A PCMCIA-standardised card with a cable that fits to the Thermovision 1000 scanner.
- ThermaCAM™ Researcher CD-ROM (not shown), including PC driver software

NOTE: The computer side of the PC-Card interface has to be treated with care, since it is quite vulnerable to damage.

SEE ALSO: For more information, see section:

- 3.8 – Installing the driver software for the PC-Card interface on page 30.

3.5 Hardware limitations

Due to hardware and software driver limitations only one PC-Card interface 500/900/1000 can be inserted and functional at the same time. If you try to insert a second PC-Card interface, a hardware resource conflict will occur and the second card will not be configured correctly, which is indicated with a single low pitch beep.

3.6 Software limitations

The PC-Card interface configuration works on Windows 95, 98, ME, NT 4.0 (with service pack 3 or higher), 2000 and XP. You might need a service pack on Windows 2000 to get your PC-Card adapter to work properly.

3.7 PC recommendations

To get a reasonably high performance you should have a Pentium desktop or laptop computer with a clock rate of 200 MHz or more. It should also have a fast display adapter and a fast hard disk.

Our recommendation is to set the color palette to 256 colors. TrueColor gives a lower frame rate, but better color fidelity.

3.8 Installing the driver software for the PC-Card interface

3.8.1 Windows NT 4.0

Step	Action
1	Log in as Administrator.
2	Install CardWare 6.00.007 (or higher). CardWare allows you to insert and remove PC-Cards while Windows NT 4 is running.
3	Insert the ThermaCAM™ Researcher CD-ROM into your CD drive. The CD-ROM will show a window of its own from which you can select to install Windows NT drivers.
4	Start that installation utility and select **PC-Card Interface** drivers only. **NOTE:** Do not select any other drivers.
5	The installation utility will copy some files and update the Windows Registry.

3.8.2 Windows 2000 and Windows XP

3.8.2.1 How to install the driver

Step	Action
1	Insert the PC-Card interface into the card adapter.
2	Windows will now detect the new hardware and display a **New Hardware Found** message together with a wizard dialog box.
3	Insert the ThermaCAM™ Researcher CD-ROM into your CD drive. The CD-ROM will show a window of its own, but just remove that by clicking **Exit**. Follow the wizard instructions. When the wizard asks for search locations, install from a specific location (Advanced) to browse to C:\Program Files\FLIR Systems\Device Drivers and click **Next**. In the last wizard step you should hear a double beep from the computer indicating that the resource allocation was successful.
4	Windows will then continue to install a second device, which is the imaging device. During the installation of this device, Windows will display a sign saying **Digital Signature Not Found**. Answer **Yes** here.
5	The third and last device installed is the communications port.

3.8.2.2 How to update an existing driver

Step	Action
1	Insert your PC-Card interface and your ThermaCAM™ Researcher CD-ROM.
2	Remove the appearing CD-ROM window.
3	Go to the **Control Panel** and open the **System** icon and select the **Hardware** tab. Click on the **Device Manager** button.
4	Open **Imaging devices** and double click on the **PC-Card interface** and then select the **Driver** tab. Click on **Update driver**.
5	Follow the instructions and when the wizard asks you what to do, select the **Display a list** option and then click on the **Have disk** button to make Windows read the driver from C:\Program Files\FLIR Systems\Device Drivers. Select the appropriate driver from the list.

3.8.3 Windows 98/Millennium

3.8.3.1 How to install the driver

Step	Action
1	Insert the PC-Card interface into the card adapter.
2	Windows will now detect the new hardware and display a **New Hardware Found** message together with a wizard dialog box.
3	Insert the ThermaCAM™ Researcher CD-ROM into your CD drive. The CD-ROM will show a window of its own, but just remove that by clicking **Exit**. If you have Windows 95 version A then select the alternative driver from disk provided by hardware manufacturer and click OK, otherwise follow the wizard guide. Install from a specific location (Advanced) to browse to C:\Program Files\FLIR Systems\Device Drivers and click **Next**. You should hear a double beep from the computer indicating that the resource allocation was successful.
4	Windows 95/98/ME will then continue to install the second device, which is the communications port. Windows 95/98/ME will display a sign saying **Unknown device**, which is quite all right. During the installation of the second device, Windows 95/98/ME may ask if you want to overwrite the communications port driver software provided by Microsoft. Do not replace the existing one.
5	During the installation of the third and final device, the image device, Windows 95/98/ME will again display a sign saying **Unknown device**.

3.8.3.2 How to update an existing driver

If you have previously installed a device driver for a PC-Card interface, you may now need to update your driver.

Step	Action
1	Insert your PC-Card interface and your ThermaCAM™ Researcher CD-ROM.
2	Remove the appearing CD-ROM window.
3	Go to the **Control Panel** and open the **System** icon and select **Device Manager**.
4	Open **Multi-function adapters** and double click on the **PC-Card interface** and then select the **Driver** tab. Click on **Update driver**. Follow the instructions to make Windows read the driver from C:\Program Files\FLIR Systems\Device Drivers. It takes a while for Windows to install the driver.
5	Follow the instructions and when the wizard asks you what to do, select the **Display a list** option and then click on the **Have disk** button to make Windows read the driver from C:\Program Files\FLIR Systems\Device Drivers. Select the appropriate driver from the list.

NOTE: It may well happen that Windows does not find any new driver to load on the CD-ROM. This is quite OK, if you already have the most recent drivers.

3.9 Optimizing the driver installation

The optimising option is only available if the PC-Card interface is used under Windows 95/98/ME. The PC-Card adapter in your system is initialised by the operating system. Three additional wait states are added to each memory access by default. Memory accesses are used by ThermaCAM™ Researcher to transfer images from the PC-Card interface to the system memory.

If you have an Intel PCIC compatible controller in your PC-Card adapter you can try to optimise the image transfer speed by reducing the number of PC-Card memory wait states. Before you try this, make sure you have a PCIC compatible controller. This information can be found in the **System Device Manager** (**Control Panel**), under PCMCIA socket device properties. If you have a PCIC compatible controller from Cirrus Logic, it will require a different kind of optimisation compared to controllers from other vendors.

After you have installed ThermaCAM™ Researcher, select **Optimise** from the **Camera control** panel. This dialog box will then appear:

10574203;a1

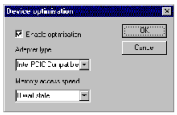

Figure 3.6 **Device optimisation** dialog box

Select the **Enable optimisation** check box. Select the appropriate adapter type. The most common type is **Intel PCIC Compatible**. Try with 0 wait states first. If you still have a live image the optimising is successful, otherwise go back to the dialog box and increase the number of wait states. Repeat this until you have a live image again.

3.10 Troubleshooting the PC-Card installation

Problems with the PC-Card interface and its installation don't always show up immediately. You might not notice them until you try to get a live image from the camera.

Our experience is that hardware installations do not always run smoothly. A number of detailed suggestions on how to overcome known difficulties are available in an InstHints document on the Camera Connections CD-ROM.

To work properly, the PC-Card interface configuration needs:

- A correct **Type of camera** and **Type of connection** setting in the **Select Camera** dialog box
- One of the fixed I/O space range (3f8-3ff, 2f8-2ff, 3e8-3ef or 2e8-2ef)
- Interrupt request (IRQ) 3,4,5,7,9,10,11,12 or 15. An ISA-type interrupt is required, even for PCI bus adapters.
- A 4 kByte window in the computer memory
- The fix addresses 380 to 387 in the computer I/O space
- CardWare 6.00.007 (or higher) on Windows NT 4.0 installed by an administrator
- Software for the three device drivers in Windows 95/98/ME/2000/XP, just one on Windows NT 4.0
- A successful installation of ThermaCAM™ Researcher
- A functional PC Internal Card Reader on an ISA or PCI bus
- A functional PC-Card interface
- Reliable cables and electrical connections
- A camera equipped with digital output
- Adobe Acrobat Reader (free download at http://www.adobe.com)

The most frequent difficulties occur on laptop computers with lots of equipment that occupy the scarce computer resources. Installation problems, such as only partly successful device driver installations are also rather frequent.

This fairly simple troubleshooting scheme may help you locate your problem:

- When you insert the PC-Card interface, you should hear a “happy sound". If you don’t hear any sound at all or a “sad sound” there migh be something wrong with the PC-Card adapter (or its BIOS settings) or the installation of the drivers or a resource conflict.
- If you get a “happy” sound but ThermaCAM™ Researcher says **Disconnected**, one might still suspect the device driver installation. Only the presence of the first (out of three) device drivers is required to get a “happy sound". Other possibilities are a resource conflict or that another instance of ThermaCAM™ Researcher already is connected to the camera.
- ThermaCAM™ Researcher does try to establish a connection with the camera using the serial communication port before trying to capture any images. If you get the **Connecting** status text without any reply from the camera, there could be cabelling problems or problems with the BIOS settings for the PC-Card adapter or, simply, the wrong type of camera or connection type.
- If you get a serial connection to the camera (ThermaCAM™ Researcher says **Connected**) but no image, there might be some problem with the camera (such as insufficient cooling or hardware) or problems with the image flow (i.e. cabelling problems) or a computer memory window resource conflict.

SEE ALSO: For more information, see the following documents on the CD:

- Installation Hints (Publ. No. T559004)
- System configurations (Publ. No. 1 557 783)

4 IC2-DIG16 interface configuration

4.1 System parts: ThermaCAM™ SC parallel interface

This configuration is used for the following camera models:

- Thermovision 550
- Thermovision 570
- AGEMA 550
- AGEMA 570
- ThermoVision™ Alert
- ThermaCAM™ SC 500
- SC 2000
- SC 3000

10417003;a1

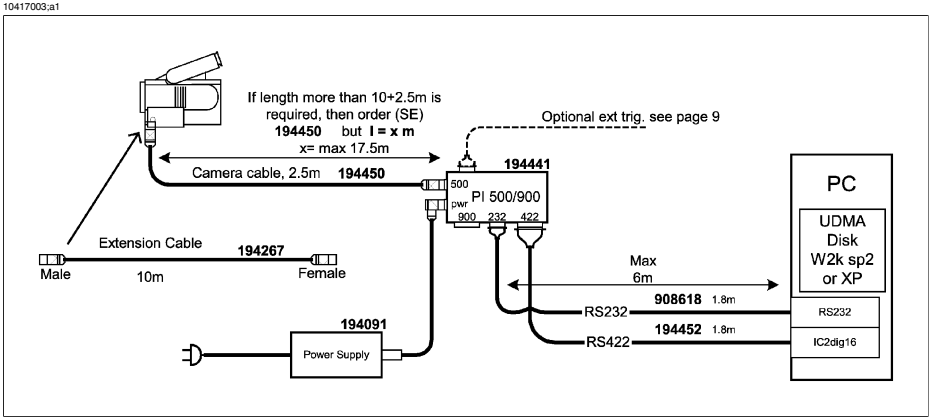

Figure 4.1 ThermaCAM™ SC parallel interface system parts

Necessary parts:

- IC2-DIG16 frame grabber (in the PC) from Imaging Technology Inc. in USA: A PCI-standardised card with a 44-pin DSUB cable that fits into the side of the parallel interface (PI). A standard RS 232-C cable that connects a serial port in the PC with the parallel interface.
- A parallel interface (PI) 500/900 box (P/N 194 441).
- Camera cable 500 (P/N 194 450). For ThermaCAM™ SC 3000, plug this cable into the **Data** connector of the camera (not into the **Power** connector).
- A power supply 500/900 unit (P/N 194 091).
- An optional extension cable (P/N 194 267)

- The ThermaCAM™ Researcher CD-ROM (not shown) including PC driver software.
- A desktop computer with a fast UDMA disk for image storage.

SEE ALSO: For more information, see section:

- 4.8 – Installing the driver software for the IC2-DIG16 on page 42.

4.2 System parts: ThermaCAM™ SC 1000 parallel interface

This configuration is used only for one camera model:

- ThermaCAM™ SC 1000

10417103;a1

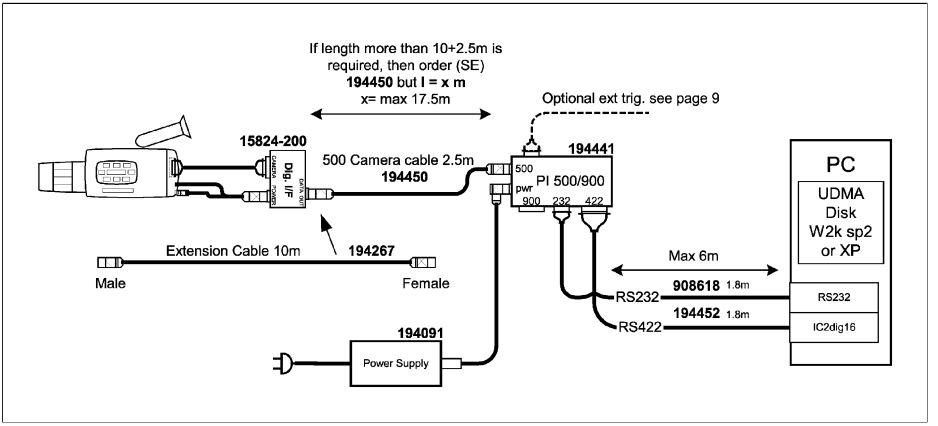

Figure 4.2 ThermaCAM™ SC 1000 parallel interface system parts

Necessary parts:

- A SC 1000 digital interface box (P/N 15824-200) with cables that connect to the battery connector, digital output connector and remote connector of the SC 1000.
- IC2-DIG16 frame grabber (in the PC) from Imaging Technology Inc. in USA: A PCI-standardised card with a 44-pin DSUB cable that fits into the side of the parallel interface (PI). A standard RS 232-C cable that connects a serial port in the PC with the parallel interface.
- A parallel interface (PI) 500/900 box. (P/N 194 441)
- Camera cable 500 (P/N 194 450)
- A power supply 500/900 unit (P/N 194 091)
- An optional extension cable (P/N 194 267)
- ThermaCAM™ Researcher CD-ROM (not shown) including PC driver software
- A desktop computer with a fast UDMA disk for image storage

SEE ALSO: For more information, see section:

- 4.8 – Installing the driver software for the IC2-DIG16 on page 42.

4.3 System parts: Thermovision® 900 parallel interface

10417203;a1

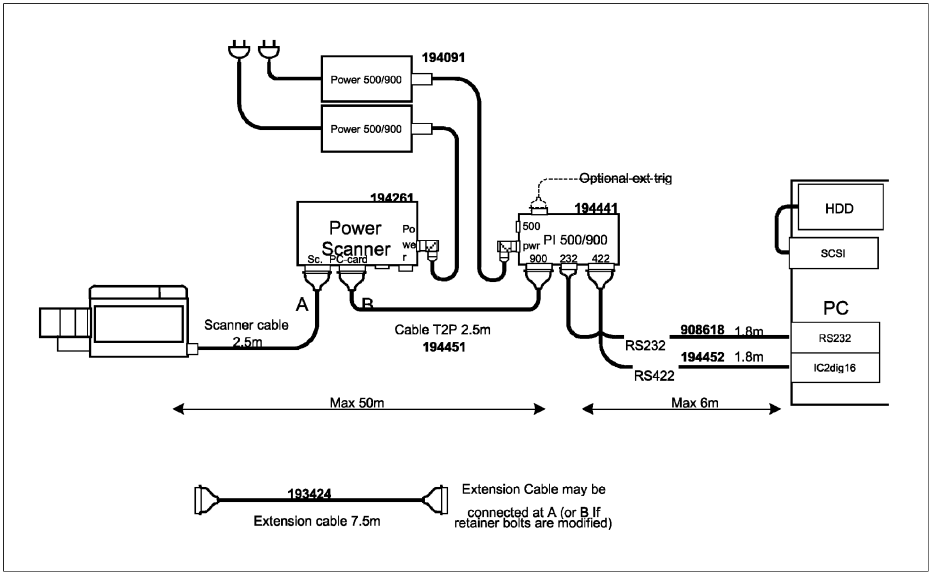

Figure 4.3 Thermovision® 900 parallel interface system parts

Necessary parts:

- IC2-DIG16 frame grabber (inside the PC) from Imaging Technology Inc. in USA: A PCI-standardised card with a 44-pin DSUB cable that fits into the side of the parallel interface (PI). A standard RS 232-C cable that connects a serial port in the PC with the parallel interface.
- A parallel interface (PI) 500/900 box (P/N 194 441)
- A power scanner cable (P/N 194 451)
- A power scanner 900 box (P/N 194 261)
- Two power supply 500/900 units (P/N 194 091)
- An optional extension cable (P/N 193 424)
- ThermaCAM™ Researcher CD-ROM (not shown), including PC driver software
- A desktop computer with a fast UDMA disk for image storage

SEE ALSO: For more information, see section:

- 4.8 – Installing the driver software for the IC2-DIG16 on page 42.

4.4 System parts: Thermovision® 1000 parallel interface

10417303;a1

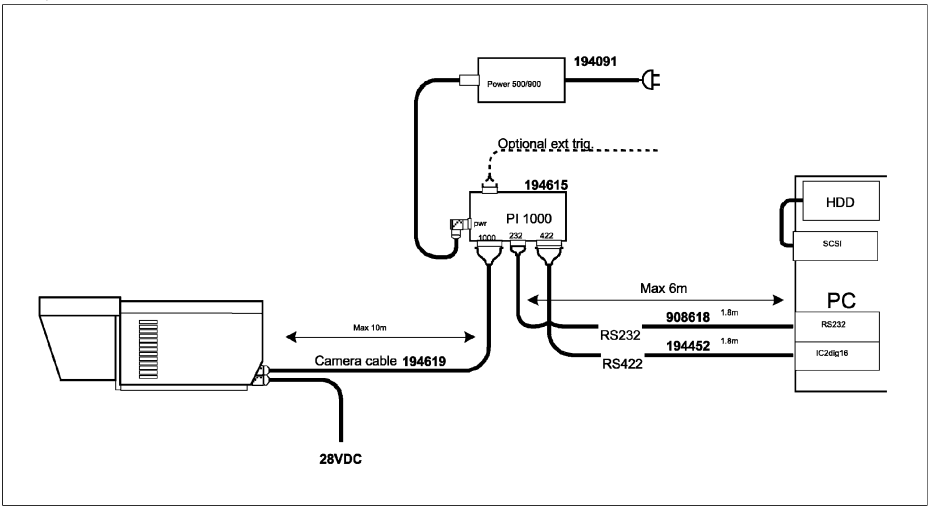

Figure 4.4 Thermovision® 1000 parallel interface system parts

Necessary parts:

- IC2-DIG16 frame grabber (in the PC) from Imaging Technology Inc. in USA: A PCI-standardised card with a 44-pin DSUB cable that fits into the side of the parallel interface (PI). A standard RS 232-C cable that connects a serial port in the PC with the parallel interface.
- A parallel interface (PI) 1000 box (P/N 194 615)
- A power supply 500/ 900 unit (P/N 194 091)
- A Thermovision 1000 power supply 28 VDC
- ThermaCAM™ Researcher CD-ROM (not shown) including PC driver software.
- A desktop computer with an Ultra DMA/100 disk for image storage.

SEE ALSO: For more information, see section:

- 4.8 – Installing the driver software for the IC2-DIG16 on page 42.

4.5 Parallel interface (PI)

10417403;a1

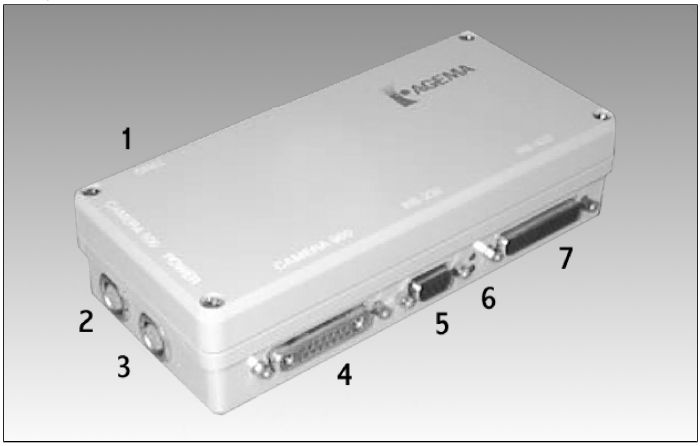

Figure 4.5 Parallel interface

There are two green LED's (6) between the RS-232 connector (5) and the RS422 connector (7). When power is applied to the parallel interface, the bottom LED will flash for approximately 15–20 seconds indicating a boot phase. The parallel interface is ready when the bottom LED stops flashing. If the flashing continues a boot error has occurred. The top LED will start flashing (camera frame frequency divided by 8) when it detects an input signal on either Camera 900 or Camera 500 connector. If an input signal is detected on both connectors, then the Camera 900 input has priority.

The parallel interface is equipped with a trig input connector (DSUB-9 Male) which can be configured by modifying jumpers on the interface circuit board. The trig inputs are not debounced. The easiest way to test the TTL trig input is simply to ground the TTL input pin, which will create at least one negative flank and a trig signal.

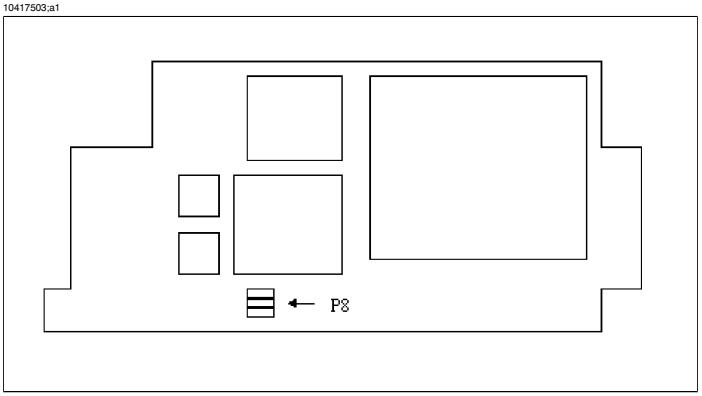

Figure 4.6 Top view of the parallel interface circuit board

Jumper	P8:1 Trig type	P8:2 Trig slope	P8:3
ON	TTL input (default setting)	Negative (default setting)	Not used
OFF	OPTO coupled	Positive	Not used

4.5.1 Pin description for the TRIG connector

Pin	Name	Direction	Description
1	OPTO+	Input	OPTO isolated trig input. Threshold 0.1 mA at 1.4 V >10 (s duration 1.5 mA at 5V / 15 mA at 24V Max 24 V cont. Used together with pin 6.
2	TTL	Input	TTL trig input. Threshold 1.2 V >1 (s duration Max 24 V cont. (12 mA)
3	VSYNC	Output	TTL synch. output. Pulse on first image pixel to frame grabber. 0–5 V max 5 mA. Pulse width 62.5 ns (THV 500) or 125 ns (THV 900)
4	EXSYNCB	Output	TTL buffered synch. signal from THV 900 scanner. 0–5 V max 5 mA
5	EXSYNC	In/Output	Synch. signal to/from THV 900 scanner
6	OPTO-	Input	OPTO return

Pin	Name	Direction	Description
7	GND		Ground for TTL signals
8	GND		Ground for TTL signals
9	RESERVED		

4.6 Software limitations

The frame grabber configuration works on Windows 95 (OS/R1), Windows 98, Windows NT 4.0 (with service pack 3 or higher) and Windows 2000 operating systems. It has been tested and works on the Windows XP operating system, but the driver manufacturer has not yet acknowledged full compatibility.

In Windows 95/98/ME, due to file system limitations you cannot get full burst recording rate for the cameras.

In Windows NT 4/2000/XP, full burst rate recording of the cameras is only possible when the target disk is formatted with a NT File System (NTFS).

Images can be stored on PC-Card hard disks. Windows NT 4.0 will not allow you to insert or remove such disks at will. To access them you will have to restart the computer. Unicore Software Inc. (www.unicore.com) and SystemSoft Corporation (www.systemsoft.com) have released software packages (CardWare/CardWizard), which add PC-Card hot swapping functionality to Windows NT 4.0. If you intend to use the PC-Card Interface on NT 4, you have to install CardWare 6.00.007 (or higher) from Unicore.

4.7 PC recommendations

To get a reasonably high performance you should have a Pentium desktop computer with a clock rate of 200 MHz or more.

To achieve burst recording it should have either an internal or external SCSI striped disk set or a 7200 rpm Ultra DMA/100 disk formatted with the NT file system (NTFS). Ultra DMA/100 requires Windows XP or service pack 2 of Windows 2000.

The manufacturer of the IC-PCI frame grabber card does not recommend computers marketed for home use from Packard Bell, Compaq and Acer.

Our recommendation is to set the color palette to 256 colors. TrueColor gives a lower frame rate, but better color fidelity.

4.8 Installing the driver software for the IC2-DIG16

NOTE: When you start to use the IC2-DIG16 card, after having installed these drivers, it may happen that the computer does reprogram the prom of the IC2-DIG16 card and order you to restart the computer immediately. That is part of the normal installation routine for this card, and nothing to worry about, unless it happens more than once. You will have to be logged in as Administrator in NT for this reprogramming to be possible.

4.8.1 Windows NT 4.0

Step	Action
1	Insert the IC2-DIG16 frame grabber into a free PCI bus slot.
2	Log in as Administrator during the installation.
3	Insert the ThermaCAM™ Researcher CD-ROM into your CD drive. The CD-ROM will show a window of its own from which you can select to install Windows NT drivers. Start that installation utility and select **Frame grabber** drivers.
4	The installation utility will copy some files and update the Windows Registry.

4.8.2 Windows 95/98/ME/2000/XP

Step	Action
1	Insert the IC2-DIG16 into a free PCI bus slot. Windows 95/98/ME/2000 will detect the new hardware and display a **New Hardware Found** message (or **Multimedia Video Controller Found**) together with a Wizard dialog box
2	Insert the ThermaCAM™ Researcher CD-ROM into your CD drive. The CD-ROM will show a window of its own, but just remove that by clicking **Exit.**
3	If you have Windows 95 version A then select the alternative driver from disk provided by hardware manufacturer, otherwise follow the wizard guide. Browse to C:\Program Files\FLIR Systems\Device Drivers to find the driver

4.9 Troubleshooting the IC2-DIG16 installation

Problems with the frame grabber and its installation don't always show up immediately. You might not notice them until you try to get a live image from the camera.

Our experience is that hardware installations do not always run smoothly. A number of detailed suggestions on how to overcome known difficulties are available in an InstHints document on the ThermaCAM™ Researcher CD-ROM.

To work properly, the frame grabber configuration needs:

- A correct **Type of camera** and **Type of connection** setting in the **Select Camera** dialog box
- A standard serial port

- Appropriate BIOS settings
- Software for the device drivers on Windows NT/2000/XP
- A functional IC2-DIG16 frame grabber
- A successful installation of ThermaCAM™ Researcher
- A number of fix computer memory slots
- An interrupt request (IRQ) of the right (PCI) type
- A parallel interface to convert the camera output
- Reliable cables and electrical connections
- A camera equipped for digital output

The most frequent problem with the frame grabber installation are no doubt plain cabling connection difficulties.

This fairly simple troubleshooting scheme may help you locate your problem:

- If you get a message in the system event log on Windows NT 4 from the mvcntp device (= the frame grabber) or a warning symbol for the **Imaging Device** in the **Device Manager** on Windows 2000, then the BIOS settings for the frame grabber resources aren't OK. Check the interrupt types and make sure that the **BIOS PnP OS** flag is set to **NO**. Moving the frame grabber to another PCI slot might also help.
- If ThermaCAM™ Researcher says **Disconnected**, there is something wrong with the selected serial port or its settings. The serial port may also be occupied by another instance of ThermaCAM™ Researcher
- ThermaCAM™ Researcher does try to establish a connection with the camera using the serial communication port before trying to capture any images. If you get the **Connecting** status text without any reply from the camera, there could be cabelling problems or, simply, the wrong type of camera or connection type.
- If you get a serial connection to the camera (ThermaCAM™ Researcher says **Connected**) but no image, there might be some problem with the camera (such as insufficient cooling or hardware) or problems with the image flow (i.e. cabelling problems) or the wrong type of interrupt for the frame grabber or a computer memory window resource conflict. Other PCI cards in the computer might be interfering with the frame grabber.

SEE ALSO: For more information, see the following documents on the CD:

- Installation Hints (Publ. No. T559004)
- System configurations (Publ. No. 1 557 783)

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5 IRFlashLink interface configuration

5.1 System parts: ThermaCAM™ SC IRFlashLink interface

This configuration is used for the following camera models:

- Thermovision 550
- Thermovision 570
- AGEMA 550
- AGEMA 570
- ThermoVision™ Alert
- ThermaCAM™ SC 500
- SC 2000
- SC 3000

10431003;a2

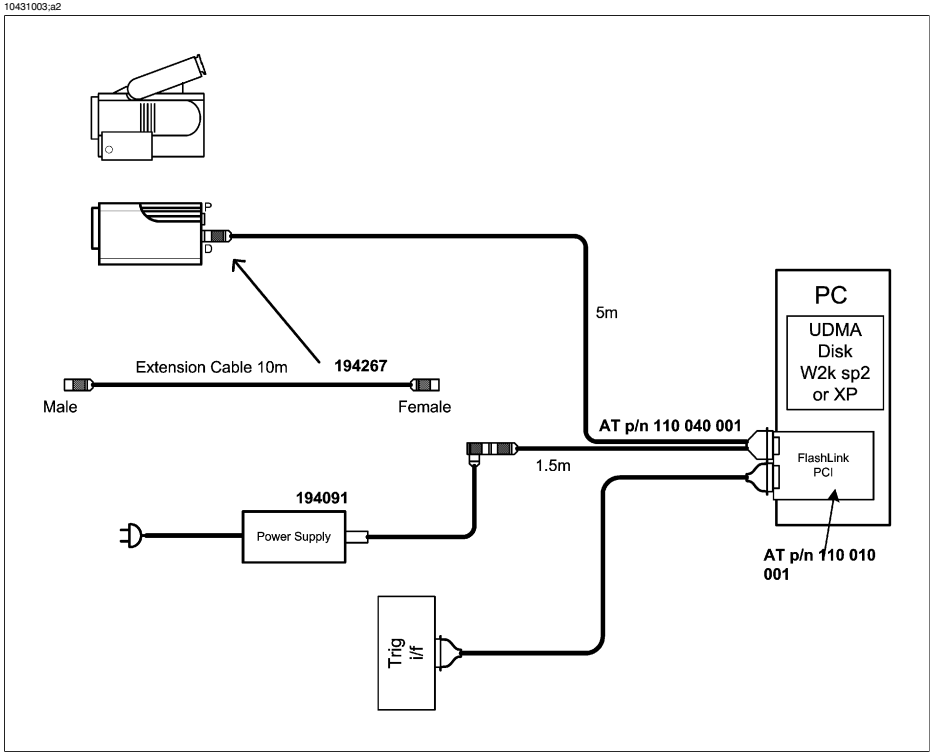

Figure 5.1 ThermaCAM™ SC IRFlashLink, serial or high-speed interface system parts

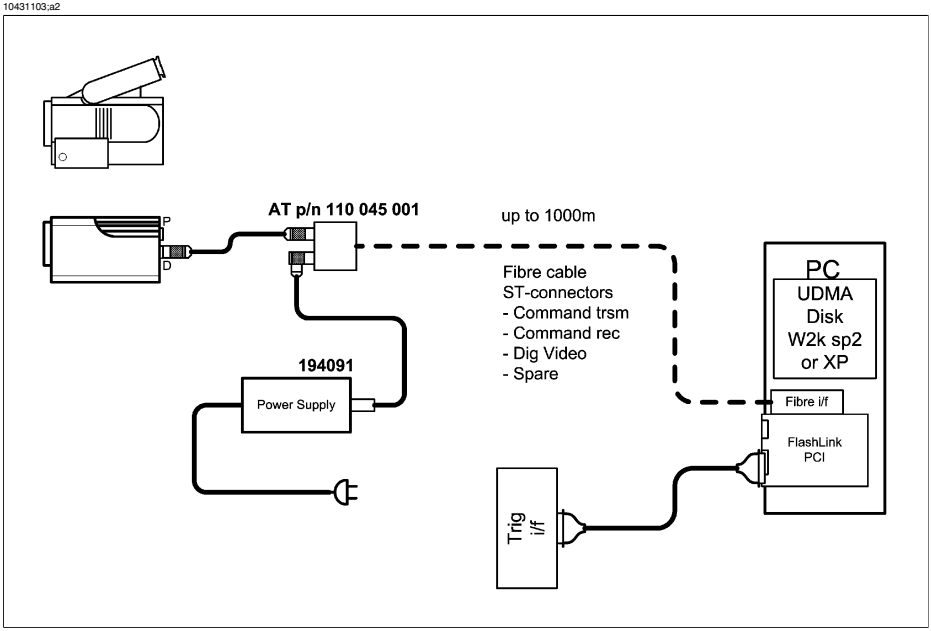

Figure 5.2 ThermaCAM™ SC IRFlashLink, fiber link interface system parts

Necessary parts:

- IRFlashLink frame grabber (in the PC) from Automation Technology in Germany
- German camera cable
- A power supply 500/900 unit (P/N 194 091).
- An optional extension cable (P/N 194 267)
- The ThermaCAM™ Researcher CD-ROM (not shown) including PC driver software.
- A desktop computer with a fast UDMA disk for image storage
- A CD-ROM from Automation Technology including the IRFlashLink PC driver software (not shown)
- An optional trig cable

SEE ALSO: For more information, see section:

- 5.6 – Installing the driver software for IRFlashLink on page 49.

5.2 System parts: ThermoVision™ 900 IRFlashLink interface

This configuration is used only for one camera model:

- ThermoVision™ 900

10566803;a1

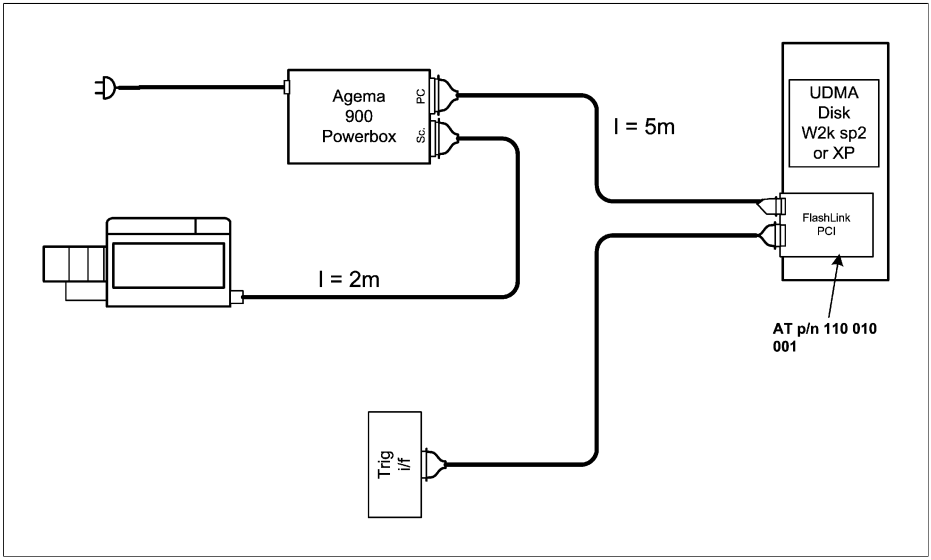

Figure 5.3 ThermoVision™ 900 IRFlashLink interface system parts

Necessary parts:

- An AGEMA 900 Power box from Automation Technology in Germany
- IRFlashLink frame grabber (in the PC) from Automation Technology in Germany
- German camera cable
- ThermaCAM™ Researcher CD-ROM (not shown) including PC driver software
- A desktop computer with a fast UDMA disk for image storage
- A CD-ROM from Automation Technology including the IRFlashLink PC driver software (not shown)
- An optional trig cable

SEE ALSO: For more information, see section:

- 5.6 – Installing the driver software for IRFlashLink on page 49.

5.3 System parts: ThermaCAM™ SC 1000 IRFlashLink interface

This configuration is used only for one camera model:

- ThermaCAM™ SC 1000

10430903;a2

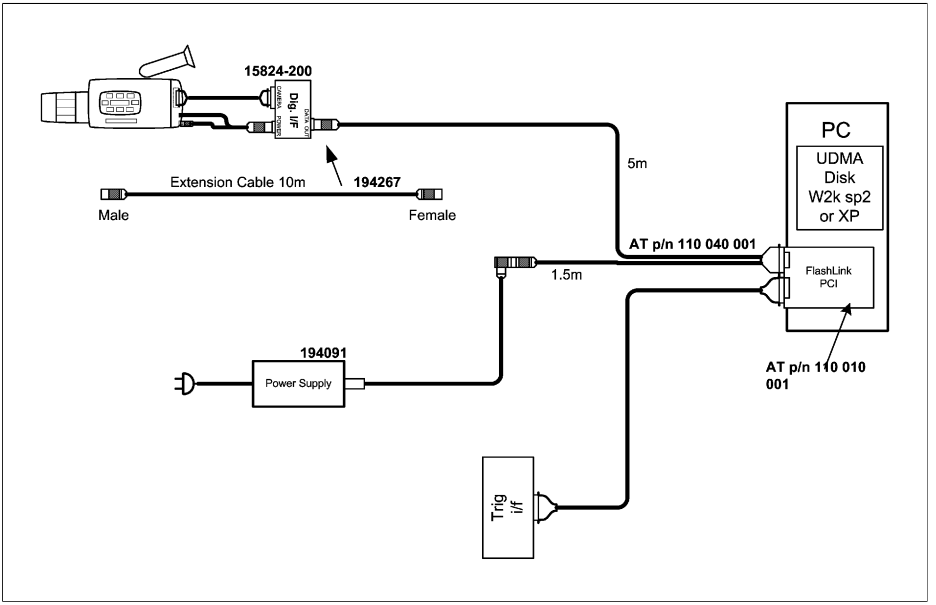

Figure 5.4 ThermaCAM™ SC 1000 IRFlashLink interface system parts

Necessary parts:

- A SC 1000 digital interface box (P/N 15824-200) with cables that connect to the battery connector, digital output connector and remote connector of the SC 1000.
- IRFlashLink frame grabber (in the PC) from Automation Technology in Germany
- German camera cable
- A power supply 500/900 unit (P/N 194 091)
- An optional extension cable (P/N 194 267)
- ThermaCAM™ Researcher CD-ROM (not shown) including PC driver software
- A desktop computer with a fast UDMA disk for image storage
- A CD-ROM from Automation Technology including the IRFlashLink PC driver software (not shown)
- An optional trig cable

SEE ALSO: For more information, see section:

- 5.6 – Installing the driver software for IRFlashLink on page 49.

5.4 Software limitations

The IRFlashLink configuration works on Windows NT 4.0, Windows 2000, or Windows XP operating systems.

Full burst rate recording of the cameras is only possible when the target disk is formatted with a NT File System (NTFS).

ThermaCAM™ SC images can be stored on PC-Card hard disks. Windows NT 4.0 will not allow you to insert or remove such disks at will. To access them you will have to restart the computer. Unicore Software Inc. (www.unicore.com) and SystemSoft Corporation (www.systemsoft.com) have released software packages (CardWare/CardWizard), which add PC-Card hot swapping functionality to Windows NT 4.0.

5.5 PC recommendations

To get a reasonably high performance you should have a Pentium desktop computer with a clock rate of 1 GHz or more.

To achieve burst recording it should have an 7200 rpm Ultra DMA/100 disk formatted with the NT file system (NTFS). Ultra DMA/100 requires Windows XP or service pack 2 of Windows 2000.

Our recommendation is to set the color palette to 256 colors. TrueColor gives a lower frame rate, but better color fidelity.

5.6 Installing the driver software for IRFlashLink

5.6.1 Windows NT 4.0

The IRFlashLink manufacturer provides a simple setup program which installs the NT4 version of the IRFlashLink driver.

5.6.2 Windows 95/98/ME

Not supported.

5.6.3 Windows 2000/XP

Please log in as Administrator for this installation.

Step	Action
1	Insert the IRFlashlink board into a free PCI bus slot.
2	Windows will now detect the board and display a **New Hardware Found** message.
3	Let Windows search for an appropriate driver on the IRFlashlink CD-ROM, and allow it to install the software despite Windows complaints about the drivers not being digitally signed. Windows will detect several new devices and install several drivers for this board.

Step	Action
4	After the installation, you can either use *auto port detection*, or specify which COM port number the IRFlashlink serial port connector did get. To do the latter, follow these steps: ■ Go to the **Control Panel** and double click on **System** ■ Go to the **Hardware** tab (if any). Select the **Device Manager** ■ Open the **Ports (COM & LPT)** branch ■ Look for the **IRFlashLink Serial Port** ■ Remember to fill in this number in the **Select Camera** dialog in ThermaCAM™ Researcher later.

5.7 Troubleshooting the IRFlashLink installation

To work properly, the configuration needs:

- WindowsNT 4.0/2000/XP
- A functional IRFlashlink frame grabber
- A successful installation of the IRFlashlink driver
- A successful installation of ThermaCAM™ Researcher
- A correct **Type of camera**, **Type of connection** and COMPORT number setting in the **Select Camera** dialog
- Reliable cables and electrical connections
- A camera equipped for digital output
- Acrobat Reader from http://www.adobe.com

SEE ALSO: For more information, see the following documents on the CD:

- Installation Hints (Publ. No. T559004)
- System configurations (Publ. No. 1 557 783)

6 Gigabit Ethernet interface configuration

6.1 System parts: Gigabit Ethernet interface

This configuration is used for the following camera models:

- Merlin uncooled microbolometer
- Merlin NIR (InGaAs)
- Merlin QWIP
- Merlin MID (InSb)
- Omega UL3 uncooled microbolometer
- Phoenix with RTIE
- Cumulus (SC4000/SC6000)
- ThermoVision™ A320G

10570003;a3

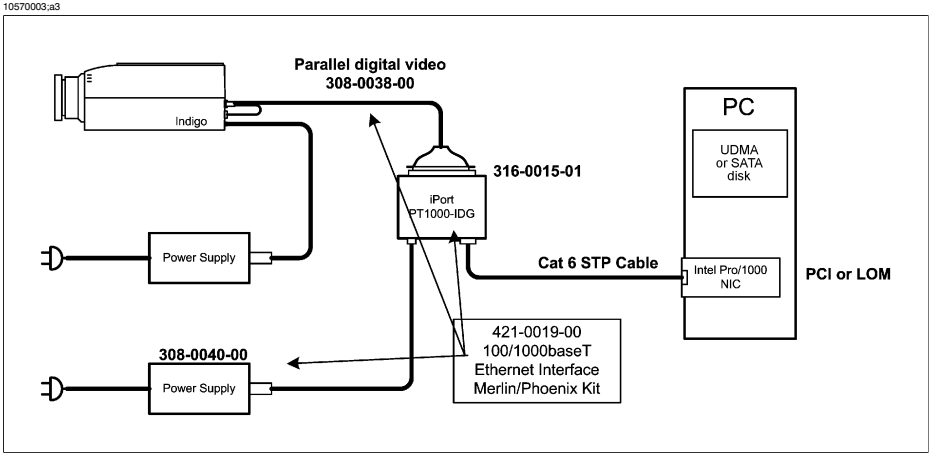

Figure 6.1 ThermaCAM™ Researcher & Indigo Merlin system parts

10570103;a3

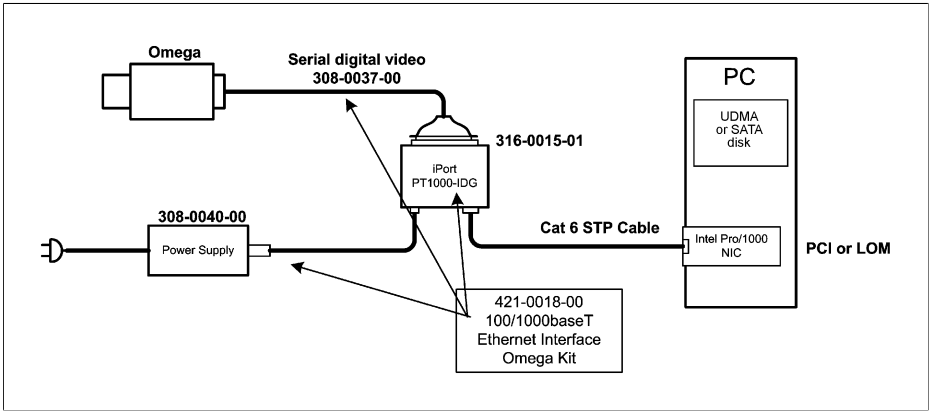

Figure 6.2 ThermaCAM™ Researcher & Indigo Omega system parts

10570203;a4

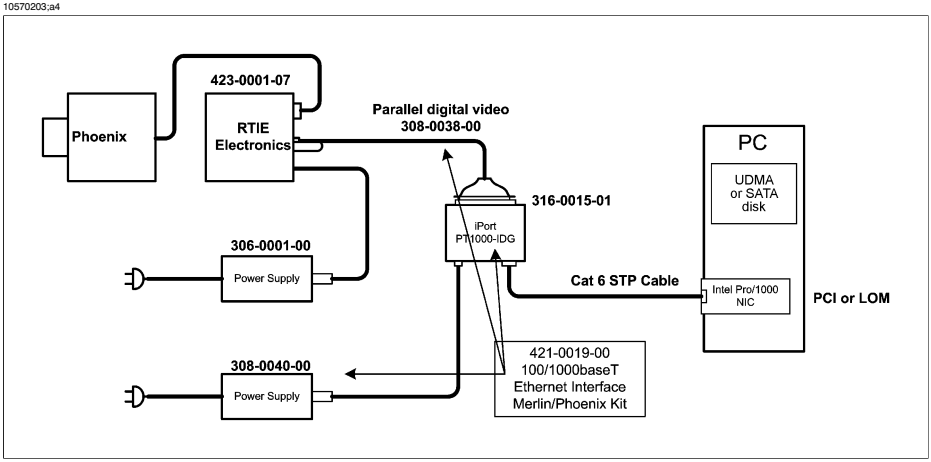

Figure 6.3 ThermaCAM™ Researcher & Indigo Phoenix system parts

10755203;a1

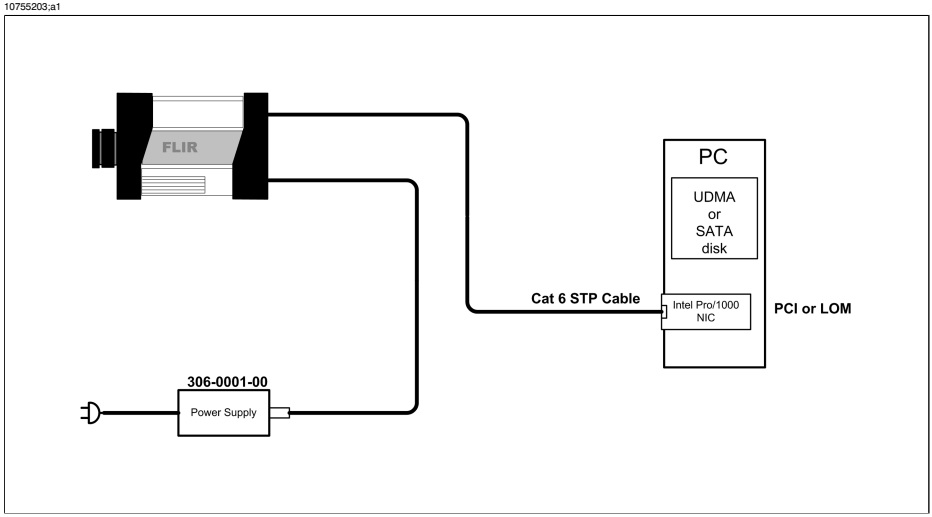

Figure 6.4 ThermaCAM™ Researcher & Indigo Cumulus system parts

10772003;a1

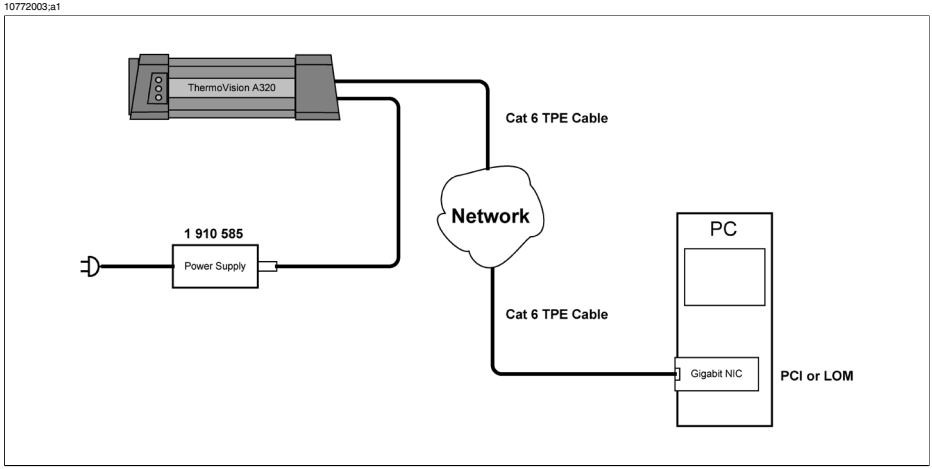

Figure 6.5 ThermaCAM™ Researcher & ThermoVision™ A320G system parts

Necessary parts:

- Intel PRO/1000 compatible Network Interface Card (NIC) in the PC
- An iPort™ PT1000-IDG frame grabber with firmware version 3.8 or later (p/n 316-0015-01)
- A standard CAT6 STP Ethernet cable (up to 100 meters without intervening hardware).
- Cable to connect Merlin with the iPort™ frame grabber (p/n 308-0038-00) or a cable to connect Omega with the iPort™ frame grabber (P/N 308-0037-00)

- ThermaCAM™ Researcher CD-ROM (not shown) including PC driver software.
- A desktop computer with a fast UDMA or SATA disk for high speed image storage

6.2 Software limitations

The Gigabit Ethernet configuration works on Windows 2000, Windows XP, and Windows Vista operating systems.

Full burst rate recording of the cameras is only possible when the target disk is formatted with a NT File System (NTFS).

6.3 PC recommendations

Minimum requirements are:

- A Pentium 4 computer with a clock rate of 1.4 GHz or more.
- At least 128 MB SDRAM PC133 or DDR PC2100 RAM.
- Gigabit Ethernet network adapter (either PCI card or LAN on the motherboard) based on the Intel 82540 network chip (Intel 82541 and Intel 82546 are also acceptable).

To achieve burst recording it should have an 7200 rpm Ultra DMA/100 disk formatted with the NT file system (NTFS). Ultra DMA/100 requires Windows XP/Vista or service pack 2 of Windows 2000.

If you have a serial ATA (SATA) disk, that is even better.

6.4 Installing driver software for the Gigabit Ethernet interface

6.4.1 Windows 2000/XP/Vista

To take full advantage of the GigaBit interface you need the eBus optimal driver.

You need to install ThermaCAM™ Researcher before installing this driver.

To copy the eBus driver suite onto your hard disk, run the installation program present in the Pleora eBus folder of the ThermaCAM™ Researcher CD. This will also make some documentation about the driver suite available from the Start Menu. See Pleora Technologies Inc -> eBus Driver suite -> Documentation.

More detailed instructions on how to install the eBus optimal driver can be found in this Pleora documentation.

Note that the eBus optimal driver is only compatible with the Intel PRO/1000 family of network adapters (either a PC network interface card, often referred to as a NIC, or a LAN on the motherboard, often referred to as a LOM). If you have some other kind of network adapter, use the universal driver instead.

The ordinary driver for your network adapter has almost certainly already been installed by Windows. You will have to update the previous installation with the Pleora driver.

You need to log in as administrator (or as a user with administrator rights) to do this.

Please follow these steps to replace your Gigabit network interface driver with the Pleora device driver:

1 First make sure that your computer has been fully updated by **Windows Update**.
2 Run the **Driver Installation Tool** from the **Pleora Technologies, Inc.** -> **eBus Driver suite** menu.
3 Find your Gigabit Ethernet Adapter and select **Configure**.
4 Select the optimal eBus Driver, if you have Intel PRO/1000 adapter, or the universal if you have another adapter. Press **Finish** and, after a while, **Continue**.
5 You may also have to update the new driver.
6 Press Exit and allow the computer to reboot.

If you have Windows XP Service Pack 2, you will have to let its Firewall allow ThermaCAM™ Researcher to access the network to be able to connect to your camera.

If you do not use an Intel PRO/1000 network adapter or do not install the Pleora drivers, the ThermaCAM™ Researcher software will still allow you to set an IP number to the interface and try to connect to the camera using the ordinary networking functions of Windows. This connection will not give full speed performance for most cameras. For more information about this, please see section 4.3.

If you already had a "High Performance" driver installed for your PT1000 ethernet adapter, you have to get rid of that by re-installing the original driver from Intel, in order to be able to use the new Driver Installation Tool.

6.4.2 Windows 95/98/ME/NT 4.0

Not supported.

6.5 Troubleshooting the Gigabit Ethernet interface installation

To work properly, the configuration needs:

- Windows 2000/XP/Vista
- A functional Network Interface Card (NIC) compatible with the Intel PRO/1000 family of network adapters. Please note that configurations with more than one Gigabit network interface and optimum driver have not been tested.
- An iPort™ PT1000-IDG frame grabber box with firmware version 3.8 (or later), unless it is built into the camera.
- A successful installation of the optimum eBus device driver. You need to install ThermaCAM™ Researcher before installing the device driver.

- A Pentium 4 computer with a clock rate of 1.4 GHz (or faster). At least 128 MB SDRAM PC133 or DDR PC2100 RAM.
- A successful installation of ThermaCAM™ Researcher
- Select **Ethernet** as **Type of connection** in the **Select Camera** dialog.
- NetBIOS enabled on the TCP/IP connection to the camera
- Reliable cables and electrical connections. Gigabit Network adapters require shielded CAT6 cables.
- A camera equipped and configured for digital output.
- Proper settings if you have a firewall in your computer.

SEE ALSO: For more information, see the following documents on the CD:

- Installation Hints (Publ. No. T559004)
- System configurations (Publ. No. 1 557 783)

7 Standard Ethernet interface configuration

7.1 System parts: Standard Ethernet interface configuration

This configuration is used for the following camera models:

- Merlin uncooled microbolometer
- Merlin NIR (InGaAs)
- Merlin QWIP
- Merlin MID (InSb)
- Omega UL3 uncooled microbolometer
- Phoenix camera with RTIE backend electronics
- Cumulus (SC4000/SC6000)
- ThermoVision™ A320

10574003;a1

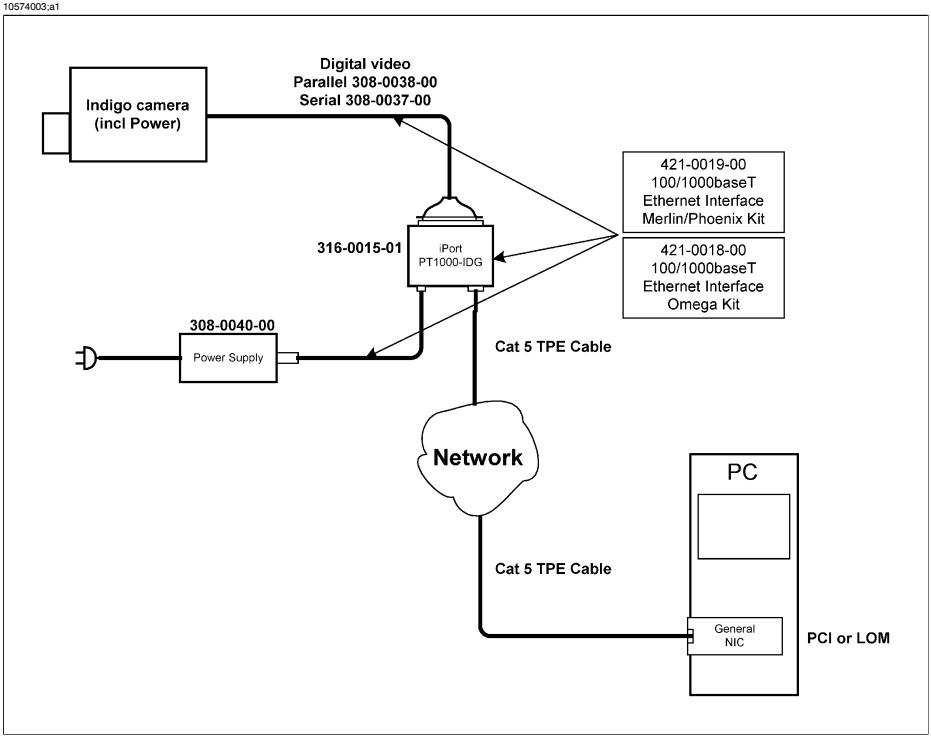

Figure 7.1 ThermaCAM™ Researcher & Indigo Merlin/Omega/Phoenix system parts

10755303;a1

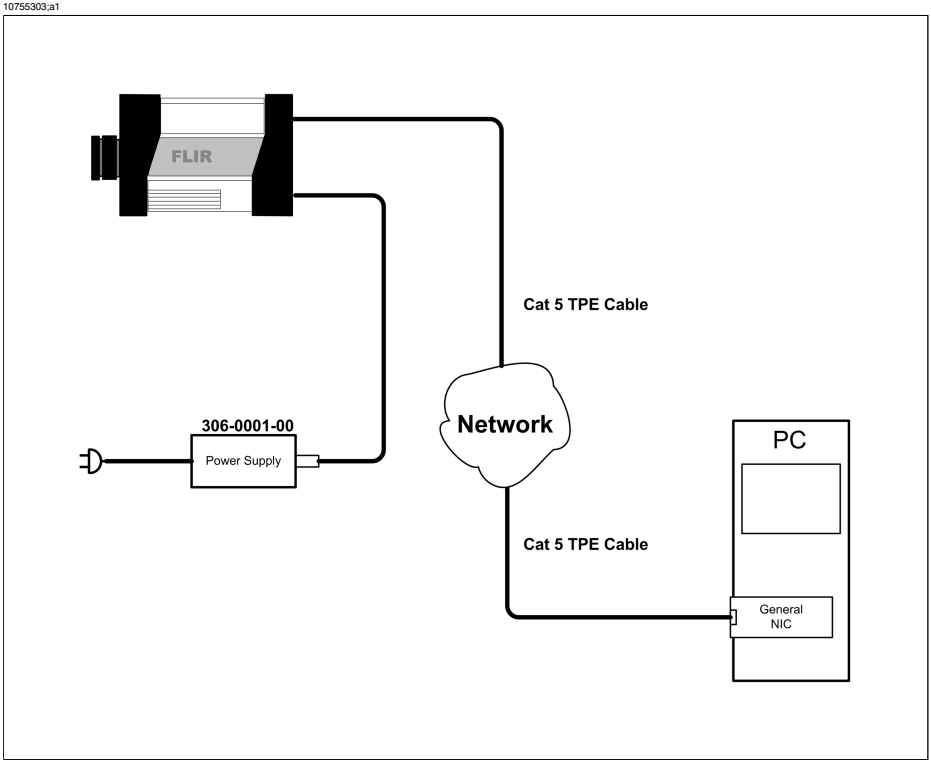

Figure 7.2 ThermaCAM™ Researcher & Indigo Cumulus system parts

10771903;a1

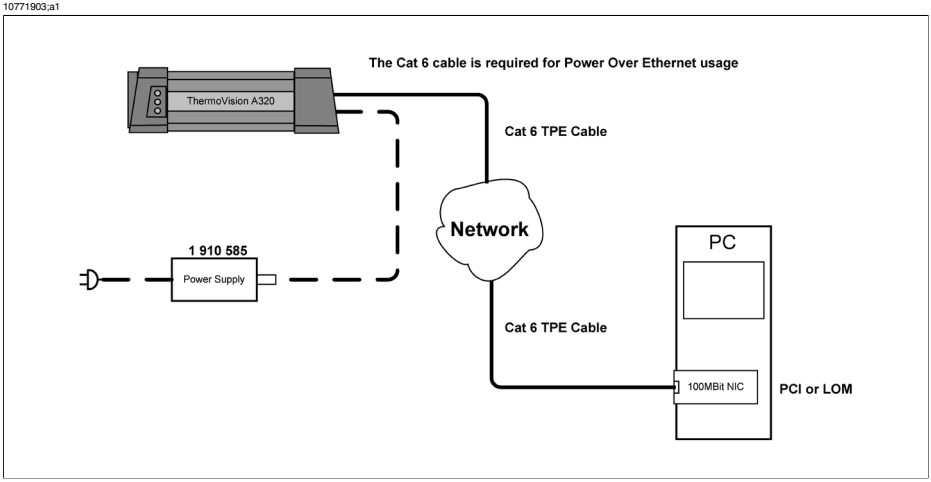

Figure 7.3 ThermaCAM™ Researcher & ThermoVision™ A320 system parts

Necessary parts:

- Any network interface supporting at least Fast Ethernet (100 Mbit/s)
- An iPortTM PT1000-IDG frame grabber with firmware version 3.8 or later
- A standard CAT5 Ethernet cable (up to 100 meters without intervening hardware)
- Cable to connect camera with the iPortTM frame grabber
- ThermaCAM™ Researcher CD-ROM (not shown)
- A desktop or laptop computer

7.2 Software limitations

The Ethernet configuration works on Windows 2000 and Windows XP operating systems.

Full burst rate recording of the cameras is not possible in this configuration.

7.3 PC recommendations

Minimum requirements are:

- A Pentium 4 computer with a clock rate of 1.4 GHz or more.
- At least 128 MB SDRAM PC133 or DDR PC2100 RAM.
- Any network interface supporting at least Fast Ethernet (100 Mbit/s)

7.4 Ethernet bandwidth requirements

It is important to understand that the cameras in this configuration will stream uncompressed digital video data on the network. This will consume a lot of bandwidth and can affect the normal network traffic causing congestions and slow response.

It is strongly recommended that you configure your network so that the digital video packet data does not affect any normal Ethernet traffic. Small local area networks designated for video streaming is recommended. These networks can either be Fast Ethernet or Gigabit Ethernet networks depending on the camera model (see figure below).

Figure 7.4 Network type recommendations

Camera model	Bandwidth requirement	Network recommendation
Merlin (60 Hz)	~100 Mbit/s	Use Gigabit Ethernet
Omega (30 Hz)	~12 Mbit/s	Use Fast Ethernet
Phoenix (60 Hz) Resolution 320 x 256	~100 Mbit/s	Use Gigabit Ethernet
Phoenix (60 Hz) Resolution 640 x 512	~400 Mbit/s	Use Gigabit Ethernet

7.5 Troubleshooting the standard Ethernet interface installation

To work properly, the configuration needs:

- Windows 2000/XP/Vista
- Any network interface supporting at least Fast Ethernet (100 Mbit/s)
- An iPortTM PT1000-IDG frame grabber with firmware version 3.8 or later
- A Pentium 4 computer with a clock rate of 1.4 GHz or more. At least 128 MB SDRAM PC133 or DDR PC2100 RAM.
- A successful installation of ThermaCAM™ Researcher
- Select **Ethernet** as **Type of connection** in the **Select camera** dialog box
- NetBIOS enabled on the TCP/IP connection to the camera
- Proper settings if you have a firewall in your computer
- Reliable cables and electrical connections
- A camera equipped and configured for digital output
- An IP number assigned to the interface
- An IP number assigned to the camera

SEE ALSO: For more information, see the following documents on the CD:

- Installation Hints (Publ. No. T559004)
- System configurations (Publ. No. 1 557 783)

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A note on the technical production of this manual

This manual was produced using XML—the *eXtensible Markup Language*. For more information about XML, please visit http://www.w3.org/XML/

A note on the typeface used in this manual

This manual was typeset using Swiss 721, which is Bitstream's pan-European version of the Helvetica™ typeface. Helvetica™ was designed by Max Miedinger (1910–1980).

The following file identities and file versions were used in the formatting stream output for this manual:

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config.xml a5

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