

## SECTION 2 - INSTALLATION

SAFETY PRECAUTIONS  
Working with Electronics

The computer equipment that is to be used to operate the iXon CCD Detector should be fitted with appropriate surge/EMI/RFI protection on all power lines. Dedicated power lines or line isolation may be required for some extremely noisy sites.

Appropriate static control procedures should be used during the installation of the system. Attention should be given to grounding. All cables should be fastened securely into place in order to provide a reliable connection and to prevent accidental disconnection. The power supply to the computer system should be switched off when changing connections between the computer and the Detector Head. The computer manufacturer's safety precautions should be followed when installing the Interface Card into the computer.

The circuits used in the detector head and the interface card are extremely sensitive to static electricity and radiated electromagnetic fields, and therefore they should not be used, or stored, close to EMI/RFI generators, electrostatic field generators, electromagnetic or radioactive devices, or other similar sources of high energy fields. The types of equipment that can cause problems are plasma sources, arc welders, radio frequency generators, X-ray instruments, and pulsed discharge optical sources. Operation of the system close to intense pulsed sources (lasers, xenon strobes, arc lamps, and the like) may compromise performance, if shielding is inadequate.

iXon

PCI-1XOR REV D1

Schedn

Andov

Mod: CCF-22

Rev no.: C-1288

2004

SECTION 2





# INSTALLATION

## Care of the Detector Head

YOUR DETECTOR IS A PRECISION SCIENTIFIC INSTRUMENT CONTAINING FRAGILE COMPONENTS. ALWAYS HANDLE WITH THE CARE ACCORDED TO ANY SUCH INSTRUMENT. THERE ARE NO USER-SERVICEABLE PARTS INSIDE THE DETECTOR HEAD. A NUMBER OF SCREWS ON THE DETECTOR HEAD HAVE BEEN MARKED WITH RED PAINT TO PREVENT TAMPERING. IF YOU ADJUST THESE SCREWS YOUR WARRANTY WILL BE VOID.

NEVER USE WATER THAT HAS BEEN CHILLED BELOW THE DEW POINT OF THE AMBIENT ENVIRONMENT TO COOL THE DETECTOR.

You may see condensation on the outside of the detector body if the cooling water is at too low a temperature or if the water flow is too great.

The first signs of condensation will usually be visible around the connectors where the water tubes are attached. In such circumstances switch off the system, and wipe the detector head with a soft, dry cloth. It is likely there will already be condensation on the cooling block and cooling fins inside the detector head.

Set the detector head aside to dry for several hours before you attempt reuse. Before reuse blow dry gas through the cooling slits on the side of the detector head to remove any residual moisture. Use warmer water or reduce the flow of water when you start using the device again.

**NOTE:** Please refer to COOLING in section 2 for further operating characteristics and safety features of your system.

2005  
ser no: C-1588  
type CCI-55  
v4.0a  
2010/02  
CI-1588 BADA  
iXon



## INSTALLING THE HARDWARE PC Requirements

The system requires a PCI-compatible computer. The PCI slot you use must have bus master capability. The minimum recommended specification is:

- 2.4 GHz Pentium Processor or better.
- 1GB of RAM
- Minimum 10,000 RPM Hard drive (RAID 15,000 RPM preferred for extended Kinetic series)
- 32 MB free Hard Disc space.
- Auxiliary internal power connector available

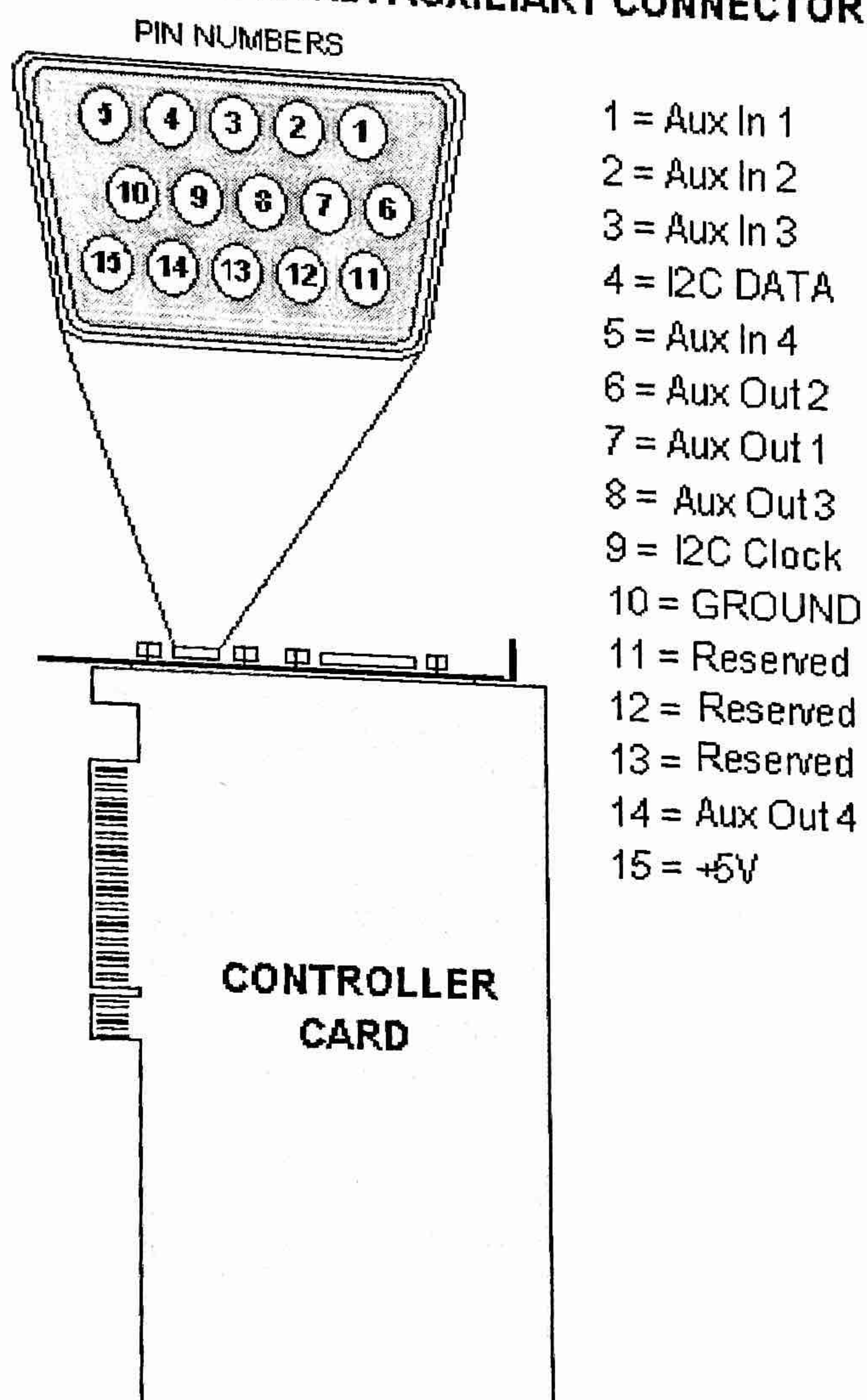
The operating system must be 32 bit Windows (95, 98, 2000, NT, or XP).



The PCI Controller Card is installed as you would other slot-in cards such as graphics cards.

**NOTE:** Please consult the manual supplied with your personal computer to ensure correct installation of the Controller Card for your particular PC.

## CONTROLLER CARD: AUXILIARY CONNECTOR DESCRIPTION



**WARNING:** Pins 11, 12 & 13 are RESERVED, these pins are not available for auxiliary use. Do not make electrical connections to these pin locations when attaching external devices via the Controller Card Auxiliary Connector port or damage may occur to the Controller card, the Detector Head or your external device.



Perform the installation as follows:

1. Exit the computer's operating system and switch off the computer and its accessories (see above).
2. Unplug the computer and its accessories from the wall outlet(s).
3. Unplug all cables from the rear of the computer.
4. Unscrew the cover mounting screws on the computer and set them aside safely.
5. Gently remove the cover of the computer.
6. Situated inside the personal computer are a number of **Expansion Slots**. The Controller Card can be installed in any PCI slot that has bus master capability. Having decided which slot you are going to use, remove the **Metal Filler Bracket** that covers the opening for the slot at the back of the computer. Keep the retaining screw safe, as you will need it later in the installation procedure. You are now ready to install the Controller Card.
7. While observing appropriate static control procedures firmly press the connector on the long edge of the card into the chosen expansion slot, so that the card's metal mounting bracket (located at the end of the card and bearing the connectors for the detector head and the multiple I/O adapter) is next the opening on the back panel of the computer.
8. Making sure that the card's mounting bracket is flush with any other mounting brackets or filler brackets to either side of it, use the screw that you removed from the filler bracket earlier to secure the **Controller Card** in place.
9. Replace the cover of the computer and secure it with the mounting screws.
10. Reconnect any accessories you were using previously.



Connect the elements of your system as follows:

1. Plug your PC into the mains outlet to ensure grounding, but keep the power switched off.
2. Connect the **Detector Head** to the **Controller Card** using the **Cable** provided. The 36-way connectors on the cable are polarized so that there is only one way of installing the cable. It is important that this cable is securely fastened to provide a good grounding between the detector head and Controller Card.
3. Your system has been supplied with a **Power Supply Block (PSB)** for cooling. The PSB connects to the detector head via a 2.1mm Jack plug, and to the mains electricity supply with a standard three-pin plug, or the equivalent plug for your location.
4. There is only one socket on the detector head that the PSB can be connected to.
5. For best performance the PSB should be plugged into the same power source as the computer.





## INSTALLATION

### INSTALLING THE SOFTWARE

#### WINDOWS OPERATING SYSTEMS (95/98/2000/XP)

During the start up sequence the operating system will detect the Andor plug-in card and a dialogue box will prompt you for the location of the device driver. Insert the **Andor CD** and navigate from the dialogue box to the **Setup Information File (atmcd.inf)**. Select the device driver file and click **OK**.

The 'installation wizard' now starts. (If it does not start automatically, run **\setup.exe** on the CD.) Follow the on-screen prompts. Remove the CD and then restart the computer to complete the installation.

Run the Andor application: from the PC's desktop select **Start...Programs...Andor iXon. ...Andor iXon. .**

#### WINDOWS NT

Insert the Andor **CD**. The 'installation wizard' now starts. (If it does not start automatically, run **\setup.exe** on the CD.) Follow the on-screen prompts. The 'installation wizard' now starts. (If it does not start automatically, run **\setup.exe** on the CD.) Follow the on-screen prompts. Remove the CD and then restart the computer to complete the installation.

Run the Andor application: from the PC's desktop select **Start...Programs...Andor iXon. ...Andor iXon. .**

You are ready to make a data acquisition.

iXon

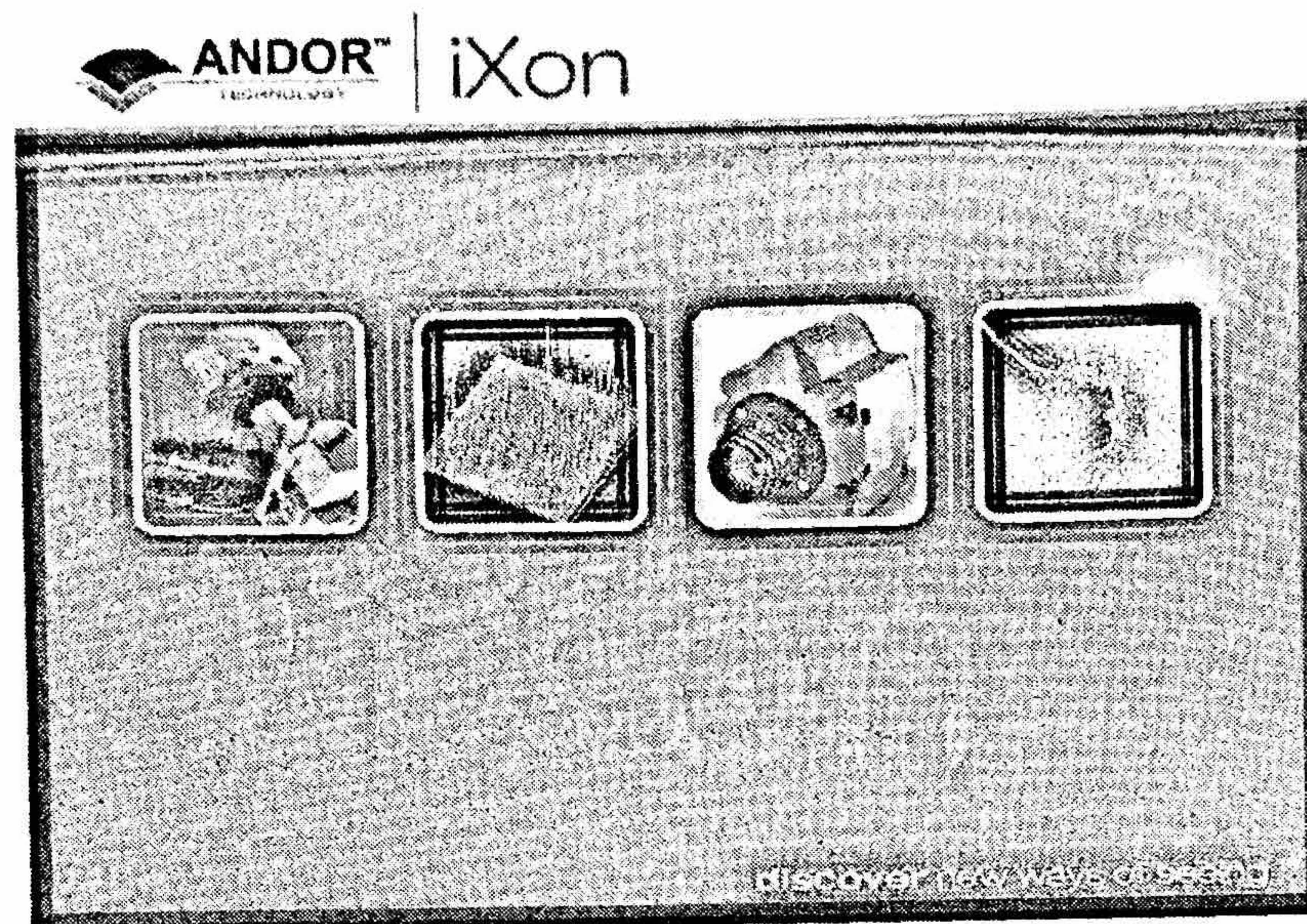
SIS 300/200 AGP  
True Color  
Graphics and video  
Acceleration

DE3VG  
DC000:35  
D  
R  
EXT

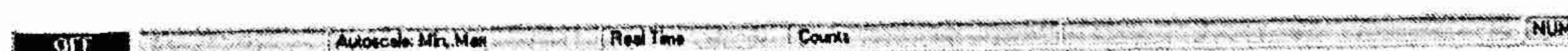
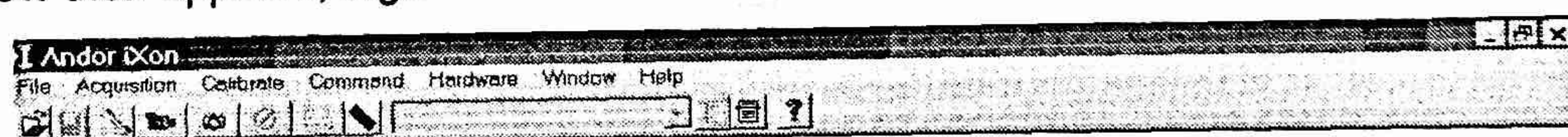


## SECTION 3 – USING THE iXon STARTING THE APPLICATION

On the desktop, click on the  icon and the iXon Splash Screen appears briefly:



The Main Window then appears, e.g.:





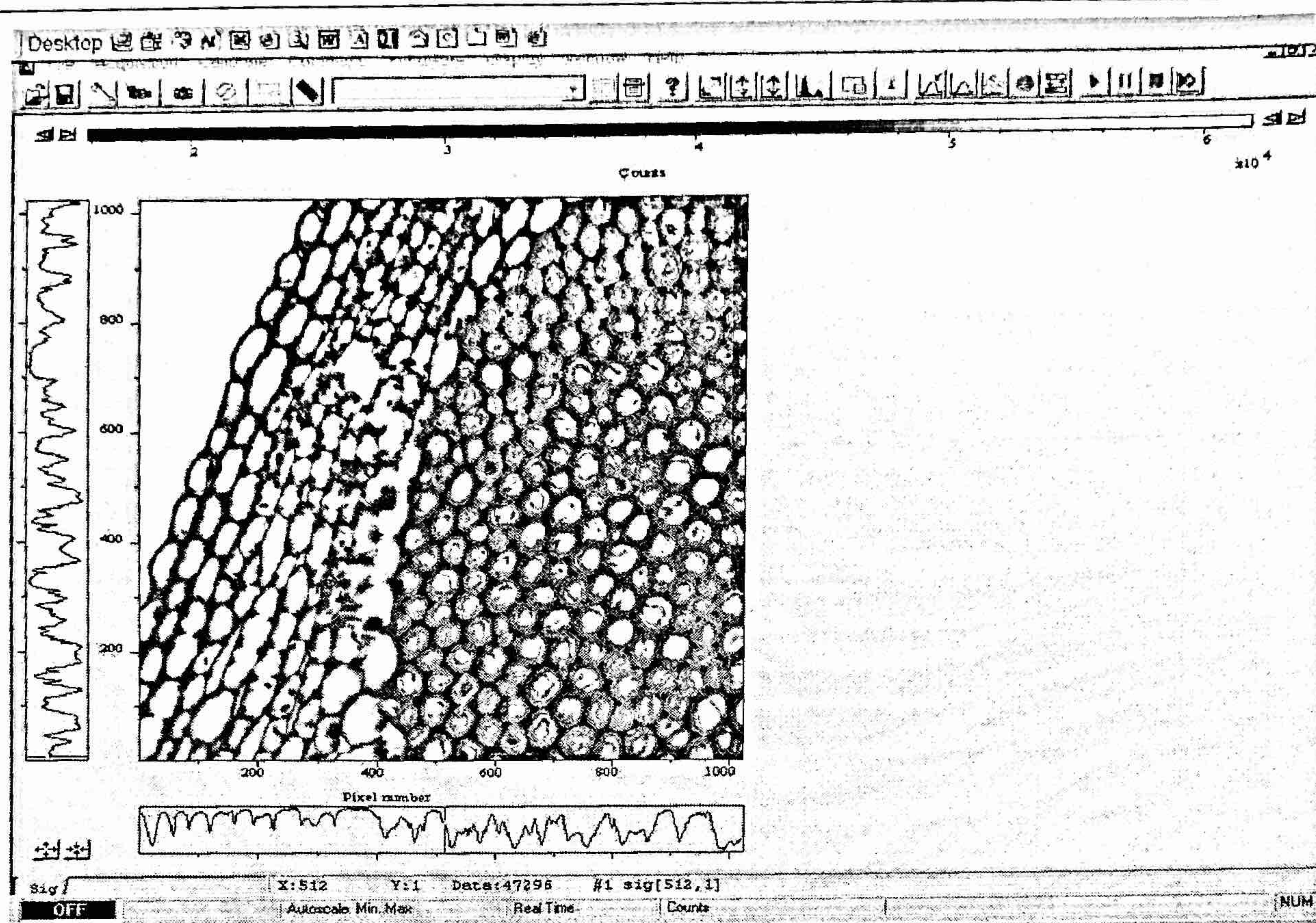




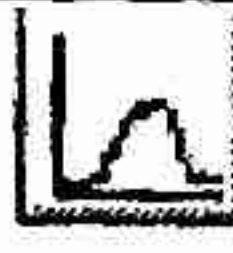













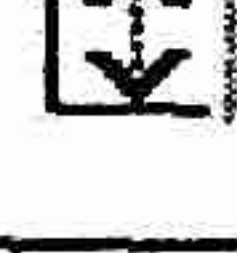


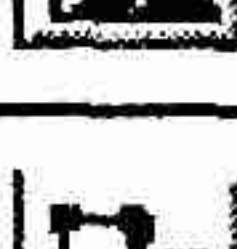
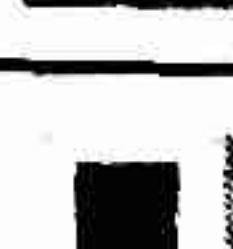



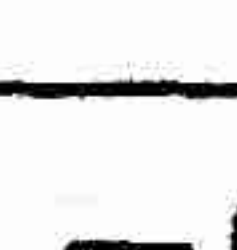
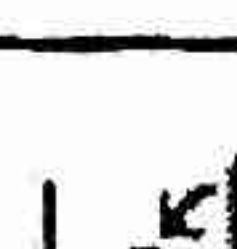
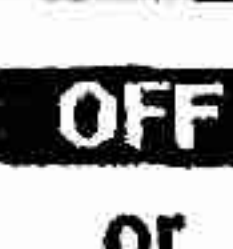


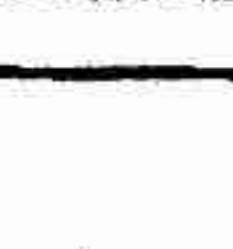
FIGURE 6 – EXAMPLE OF DATA WINDOW DISPLAYING DATA (IMAGE)



## MAIN WINDOW

The Main Window is your "entry point" to the system. The menu options that you select from either execute functions directly, or launch further windows/dialog boxes that let you select the functionality you require. Some menu options on the Main Window are also represented as easy-to-use radio buttons, as shown in Table 1 below.

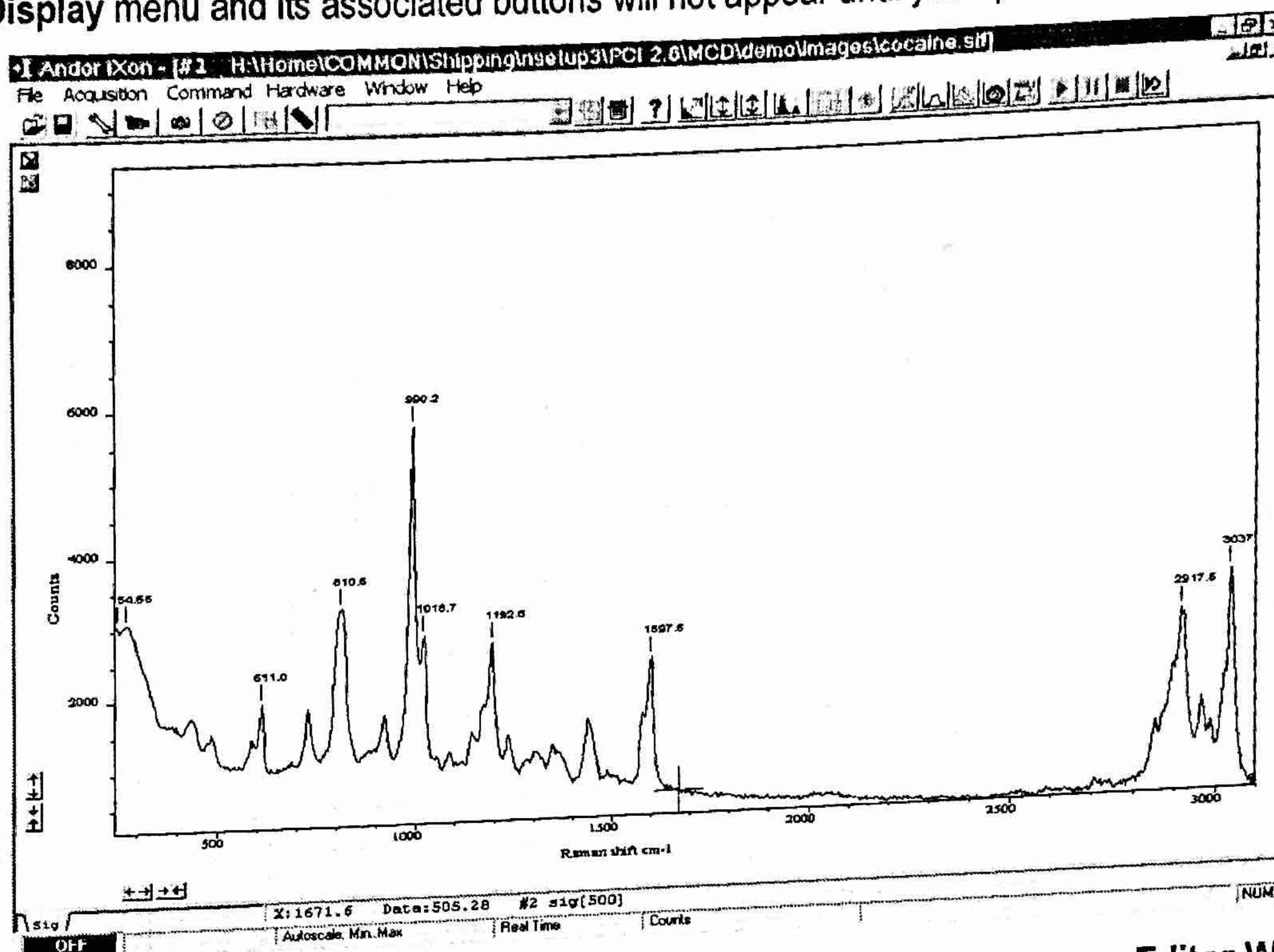
TABLE 3: MAIN WINDOW BUTTONS

ICON	TITLE	ICON	TITLE	ICON	TITLE
	OPEN		CONTENTS		2D DISPLAY
	PRINT		SELECT SUBIMAGE AREA (NOT USED)		3D DISPLAY
	SAVE		SELECT AUTOSCALE AREA (NOT USED)		IMAGE DISPLAY
	REAL TIME		RESET		CHANGE FALSE COLOR PALETTE
	TAKE SIGNAL		RESCALE		TIME STAMP
	ABORT ACQUISITION		ACQUISITION AUTOSCALE #0		PLAY
	SETUP ACQUISITION		DATA HISTOGRAM		PAUSE
	RUN-TIME (NOT USED)		REGION OF INTEREST		STOP
	RUN PROGRAM		FILE INFORMATION		PLAYBACK AUTOSCALE OFF
	COMMAND LINE		2D DISPLAY WITH PEAK LABELS		TEMPERATURE CONTROL

NOTE: Some menu titles and buttons appear on the Main Window only under certain circumstances as shown on the next page.



- The Display menu and its associated buttons will not appear until you open a Data Window, e.g.:



- The Edit & Search menus and their associated buttons appear only when a Program Editor Window is active, e.g.:

```

Andor iXon
File Edit Search Acquisition Calibrate Command Hardware Window Help
istar.pgm

istar.pgm
*****iStarGate Issue 0, Revision 0 program for iStar system *****
*****Last updated 17/05/01 by IMC *****
cls()
output(300,0,500,450)
?iStarGate Issue 0, Revision 0 "
?Program measures gating performance for iStar"
?"
input("enter filename for saving data", fname)

SetSingleScan(0)
SetGain(50)
SetFVB()
SetReadoutTime(15)
SetTriggerMode(0)

create(#2, detectorx(), 1, 60): raw data in (1-20) & (31-59)
create(#3, detectorx()): raw used to store false data
minimizewindow(#2): minimize window (#3)

*****CCD QUALITY AREA PARAMETERS*****
width = detectorx()
height = detectorx()
  
```



## HOT KEYS

Hot keys (or shortcuts) as shown in Tables 2, 3 & 4 enable you to work with the system directly from the keyboard, rather than via the mouse.

TABLE 4: DATA ACQUISITION HOT KEYS

KEY STROKE	DESCRIPTION
F5	Take signal
F6	Autoscale Acquisition
Ctrl + B	Take background
Ctrl + R	Take reference
Esc	Abort Acquisition

TABLE 5: DATA WINDOW HOT KEYS

KEY STROKES	DESCRIPTION	DISPLAY MODE		
		2D	3D	IMAGE
+	Expand ('Stretch') data-axis	✓	✓	✓
-	Contract ('Shrink') data-axis	✓	✓	✓
Ins	If maintain aspect ratio off, expand x-axis. If maintain aspect ratio on, expand x-axis and y-axis	✓	✓	✓
Del	If maintain aspect ratio off, contract x-axis. If maintain aspect ratio on, contract x-axis and y-axis.	✓	✓	✓
/	On image, if maintain aspect ratio off, expand y-axis. On image, if maintain aspect ratio on, expand x-axis			✓
Home	Move cursor furthest left	✓	✓	✓
End	Move cursor furthest right	✓	✓	✓
PgUp	Scroll up through tracks	✓	✓	
PgDn	Scroll down through tracks	✓	✓	
Shift + PgUp	Move to next image in series	✓	✓	✓
Shift + PgDn	Move to previous image in series	✓	✓	✓
Left Arrow	Move cursor left	✓	✓	✓
Right Arrow	Move cursor right	✓	✓	✓
Up Arrow	Scroll trace up (on image: move cursor up)	✓	✓	✓
Down Arrow	Scroll trace down (on image: move cursor down)	✓	✓	✓
Shift + Left Arrow	Scroll trace/image left	✓	✓	✓
Shift + Right Arrow	Scroll trace/image right	✓	✓	✓
Ctrl + Left Arrow	Peak search left	✓		
Ctrl + Right Arrow	Peak search right	✓		



TABLE 5: DATA WINDOW HOT KEYS (CONTINUED)

KEY STROKES	DESCRIPTION	DISPLAY MODE		
		2D	3D	IMAGE
Left Arrow	Move cursor left	✓	✓	✓
Right Arrow	Move cursor right	✓	✓	✓
Up Arrow	Scroll trace up	✓	✓	✓
Down Arrow	Scroll trace down	✓	✓	✓
Shift + Left Arrow	Scroll trace/image left	✓	✓	✓
Shift + Right Arrow	Scroll trace/image right	✓	✓	✓
Ctrl + Left Arrow	Peak search left	✓	✓	✓
Ctrl + Right Arrow	Peak search right	✓	✓	✓
F7	Toggle Palette	✓	✓	✓
F8	Reset	✓	✓	✓
F9	Rescale	✓	✓	✓
Alt + F9	Toggle Rescale Mode	✓	✓	✓
Ctrl + F9	Scale to Active (See Displaying Data section)	✓		
F10	File information	✓	✓	✓

TABLE 6: ANDOR BASIC PROGRAMMING LANGUAGE HOT KEYS

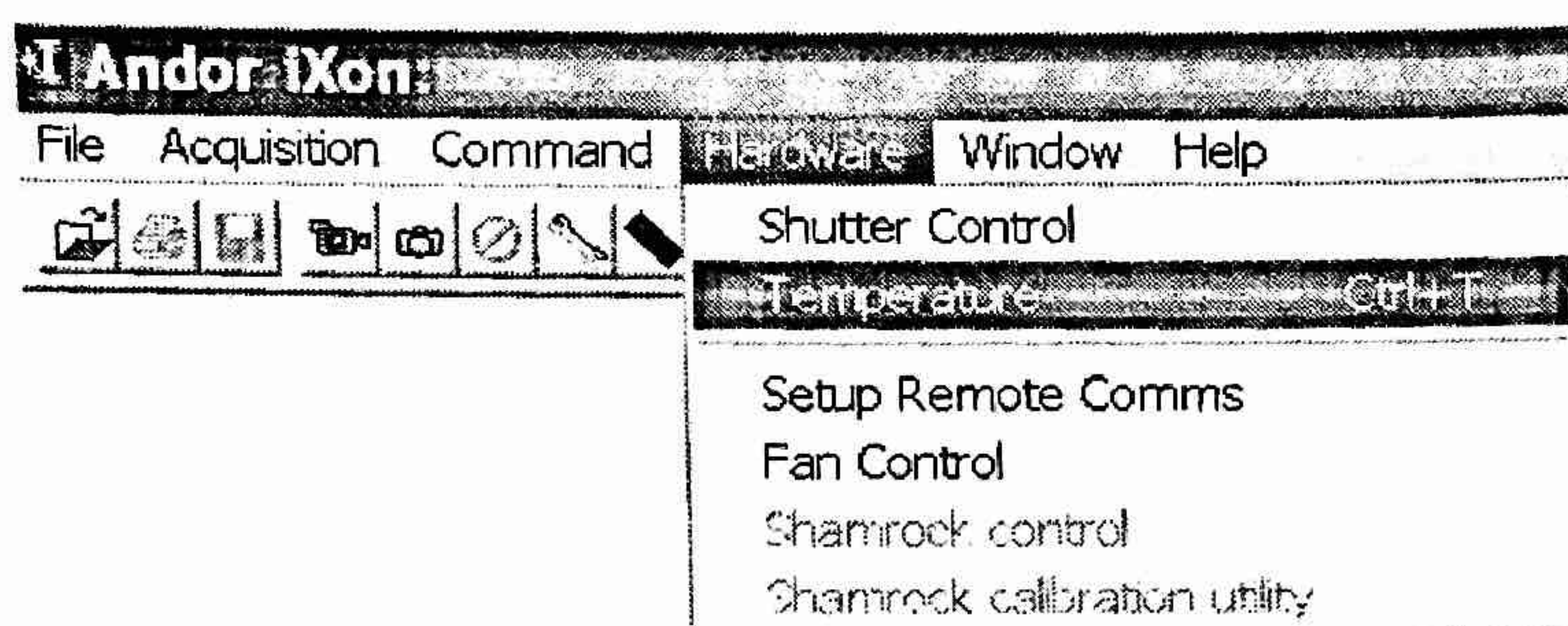
KEY STROKES	DESCRIPTION
Ctrl + P	New program
Ctrl + E	Run program
Esc	Abort acquisition / program
Ctrl + L	Command line
Ctrl + F1	Context sensitive help on reserved words in the Andor Basic programming language is available if you are using the Program Editor Window.



## SECTION 4 – PRE-ACQUISITION

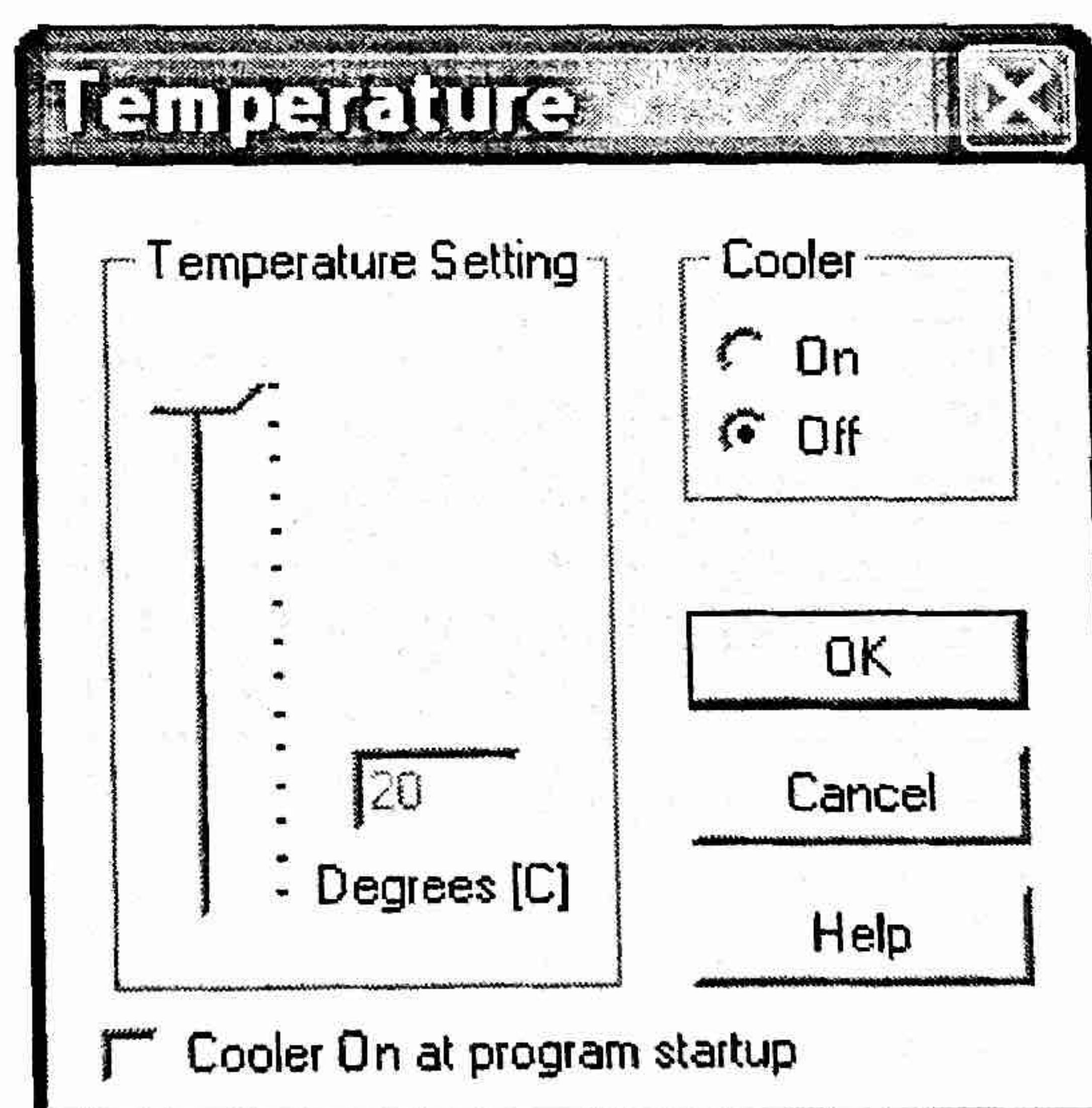
### SETTING TEMPERATURE

For accurate readings, the CCD should first be cooled, as this will help reduce dark signal and associated shot noise. To do this, either select the **Temperature** option from the **Hardware** drop-down menu on the Main Window:



or click the **OFF** button in the bottom-left of the screen.

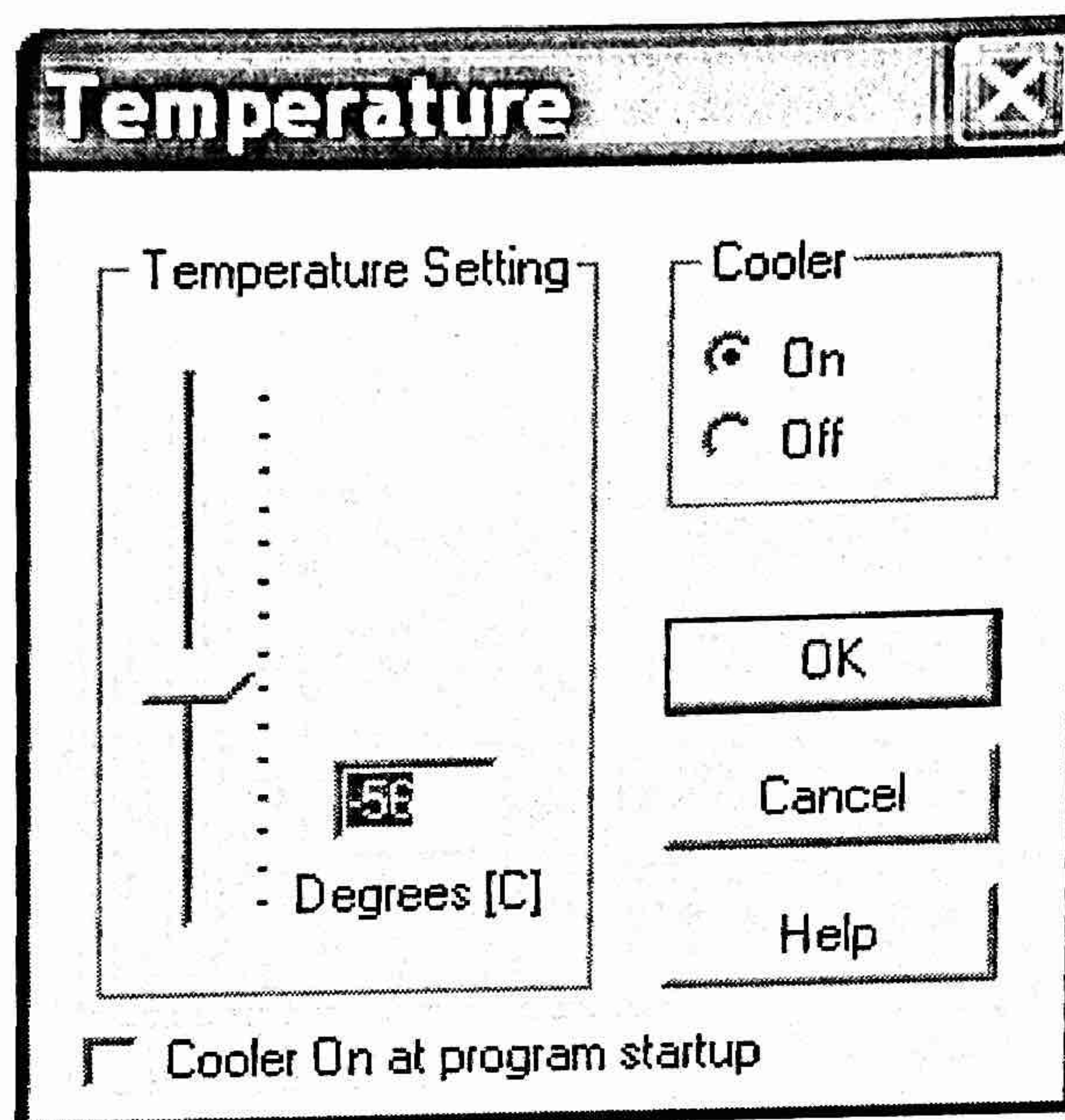
This will open up the **Temperature Control** dialog box :



Select **On** in the Cooler check box.



The **Degrees (C)** field in the **Temperature Setting** section will now be highlighted in blue and the Cooler will be indicated as **On**, e.g.:



To adjust the temperature, either type in the new figure in the **Degrees (C)** box or slide the arrowed bar down or up.

Once the desired temperature has been selected, click **OK**. The dialog box will disappear and the **Temperature Control** button in the bottom-left of the screen will show the current temperature highlighted in red e.g.:

**45°C**

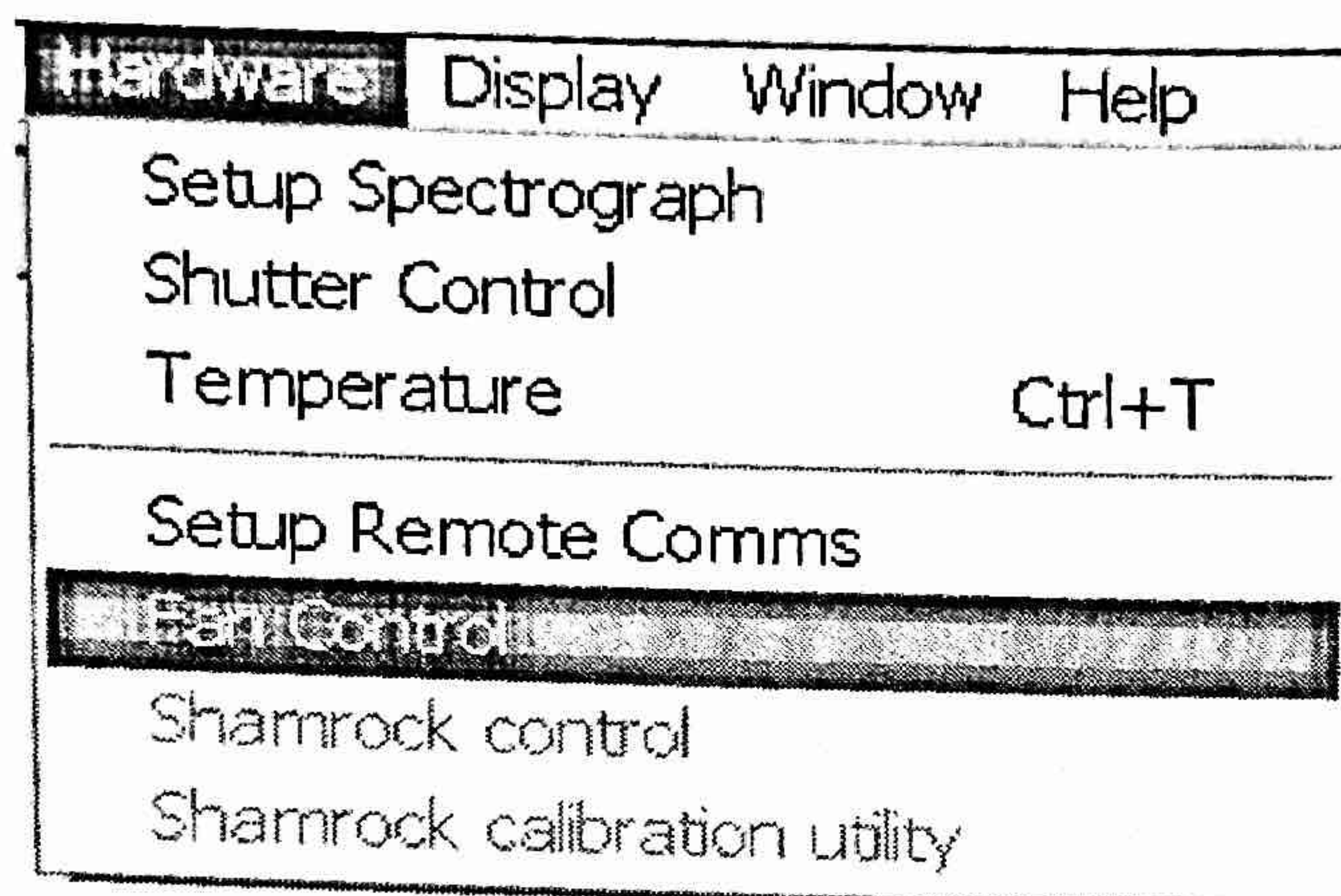
This figure will change as the head cools. Once the head has reached the desired temperature, the highlighted area changes to blue.

You can also select the option to have the Cooler is on as soon as you start the application. This is selectable in the bottom-left of the Temperature dialog box.

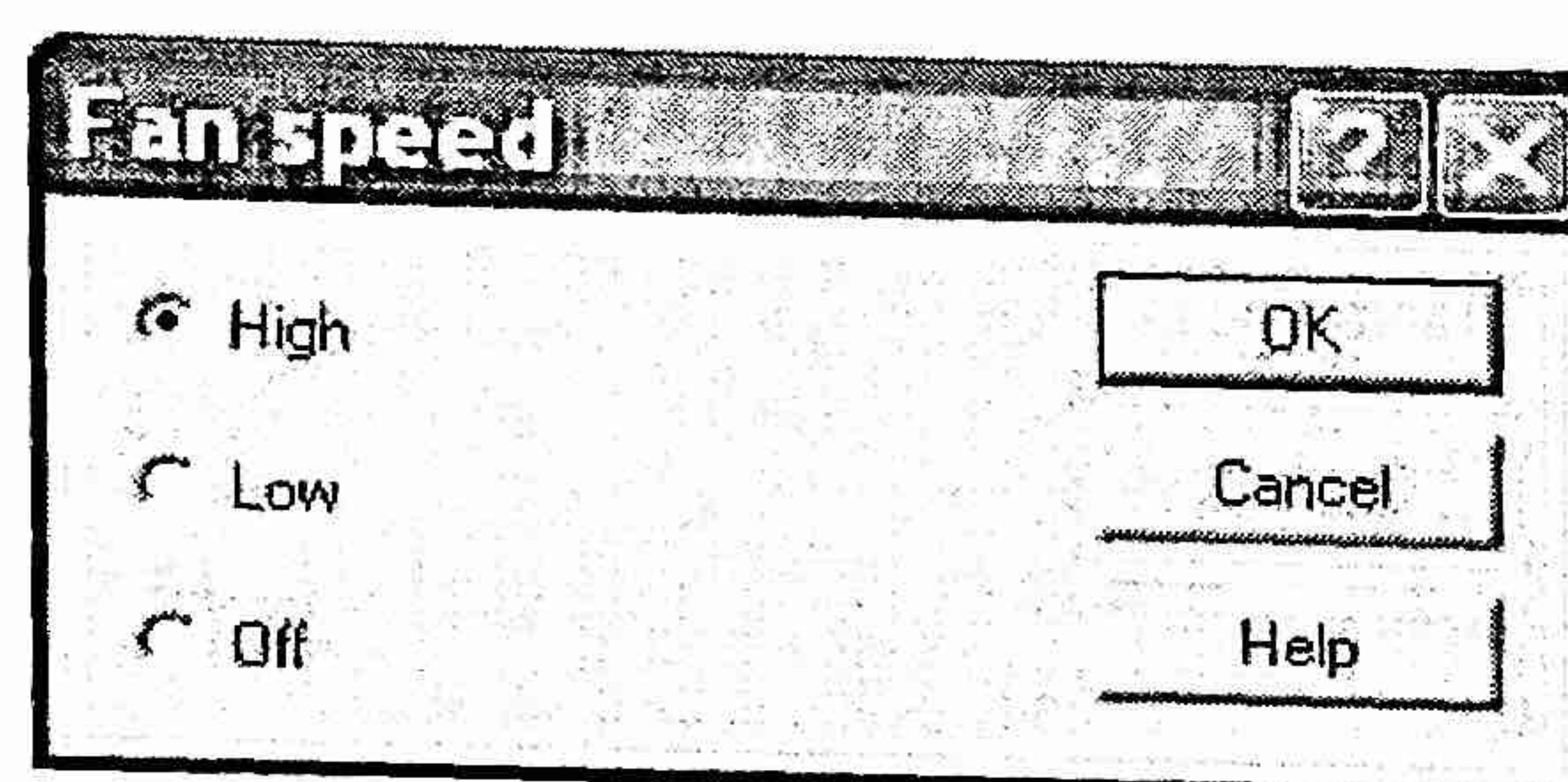
**PLEASE REFER TO COOLING IN SECTION 2 FOR DETAILS OF MINIMUM ACHIEVABLE TEMPERATURES, AND IMPORTANT ADVICE ON AVOIDING OVERHEATING.**



The speed of the cooling fan can also be controlled. Select Fan Control from the Hardware drop-down menu as shown:



The Fan speed dialog box will appear:




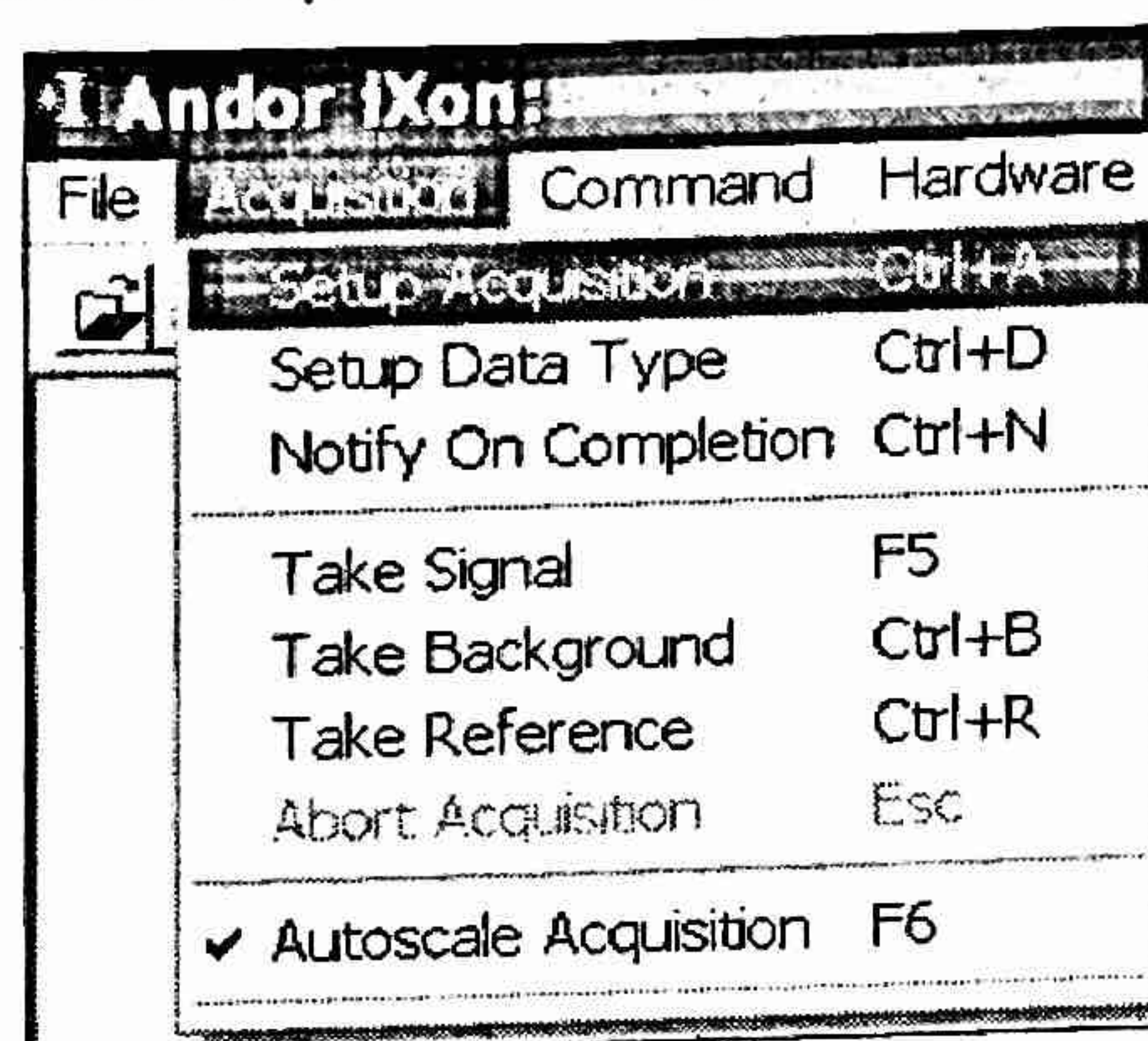
Select the speed you require as necessary (this may affect the cooling ability of the CCD).

**NOTE:** After changing from High to Low, it may be necessary for the camera temp to stabilize before acquiring data. However for optimum performance it is recommended to leave the fan setting at HIGH.

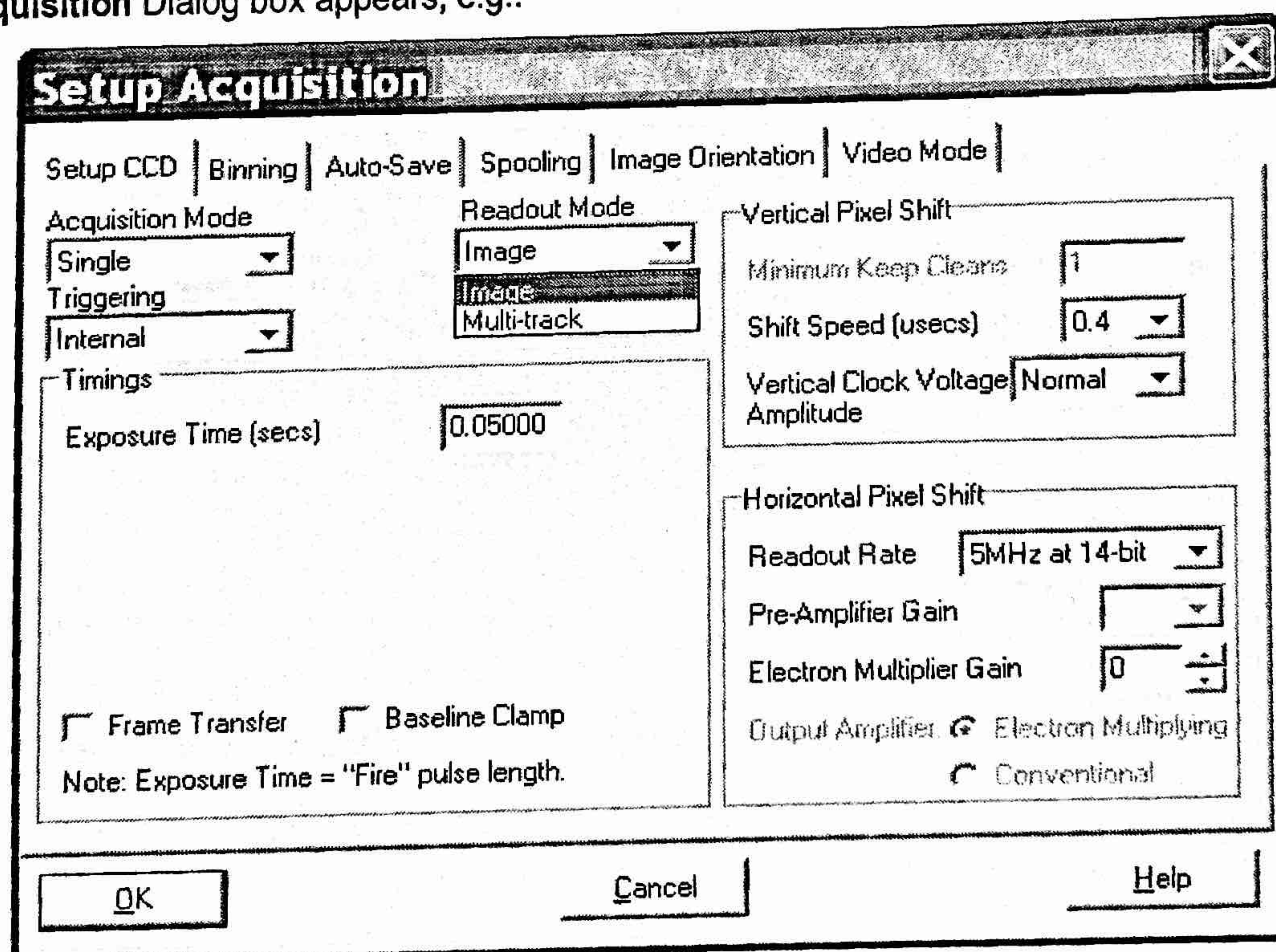


To select the mode of acquisition prior to data capture, you can choose one of the following options:

- Click the  button,
- Type in **Ctrl+A** from the keyboard
- Select **Setup Acquisition** from the **Acquisition** drop-down menu:



The **Setup Acquisition** Dialog box appears, e.g.:





## PRE-ACQUISITION

As you select an Acquisition Mode you will notice that you are able to enter additional exposure-related parameters in a column of text boxes. Appropriate text boxes become active as you select each Acquisition Mode.

The value you enter in one text box may affect the value in another text box. The following matrix lists the Acquisition Modes and for each mode indicates the parameters for which you may enter a value in the appropriate text box:

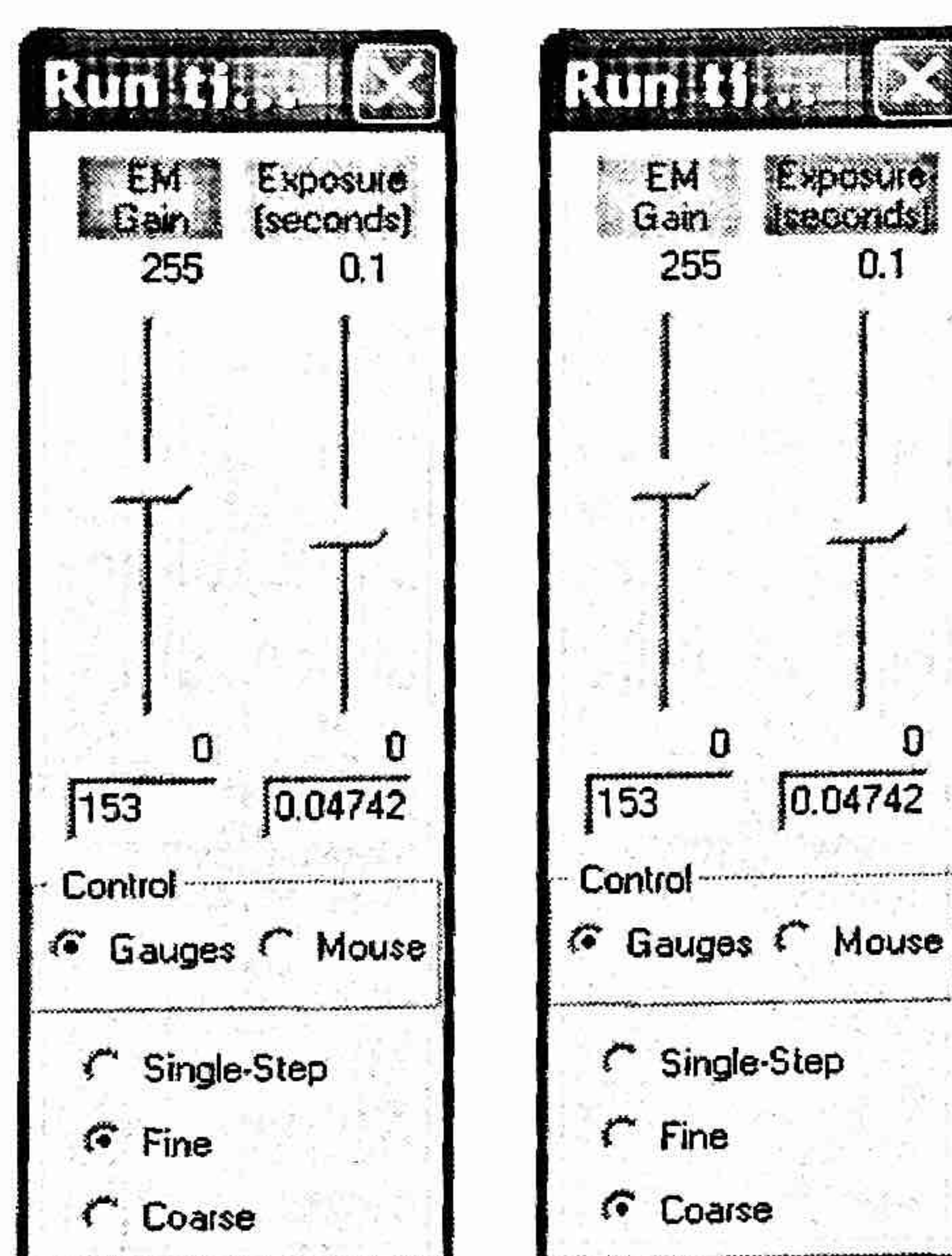
Mode	Exposure Time	Accumulate Cycle Time	No. of Accumulations	Kinetic Cycle Time	No. in Kinetic Series
Single Scan	✓				
Accumulate	✓	✓	✓		
Kinetic	✓			✓	✓



The Run Time Control provides the user with the ability to control the following parameters using slider controls:

- EM Gain
- Exposure time of the CCD

The controls are activated by clicking on the  button on the Main Window. When selected, the dialog box appears, e.g.:



Each dialog box has sliders that can be moved up and down to control the required parameters and there are three levels of control:

Single-Step

Fine

Coarse.

The controls can also be accessed either by using the relevant buttons on the Remote Control (the buttons are explained later in this section) or by moving the windows pointer with the mouse or the remote control unit (if attached). The gauge that is active has its name highlighted in green and the actual setting of each gauge is given in the text boxes below them.

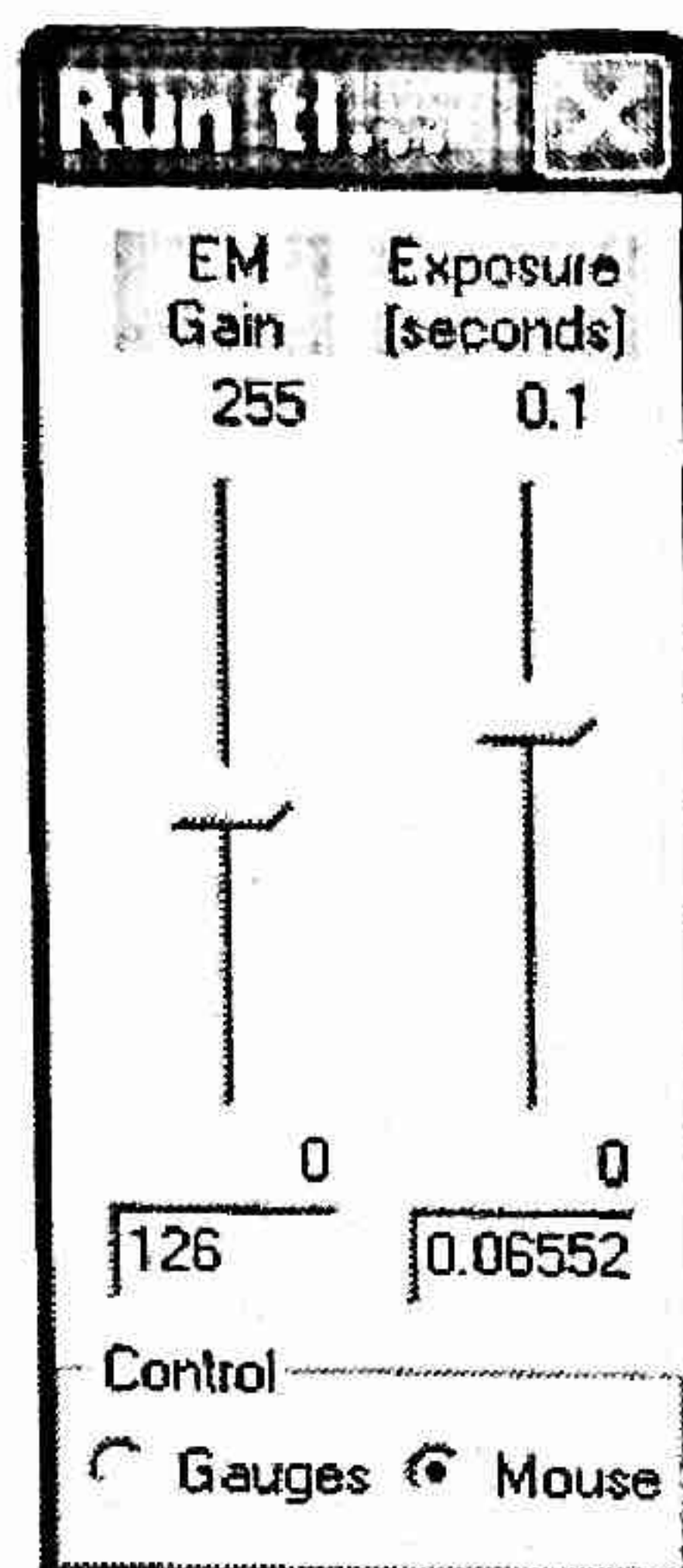
The EM Gain gauge can be varied from a setting of 0 to 255.

The Exposure gauge can be varied from the minimum exposure setting.

**Note:** The exposure gauge upper limit will auto-range as the setting is increased.



When the **Control** ction is selected for **Mouse**, the Single-Step, Fine & Coarse selectors are removed and the slider titles are no longer highlighted in green, e.g.:



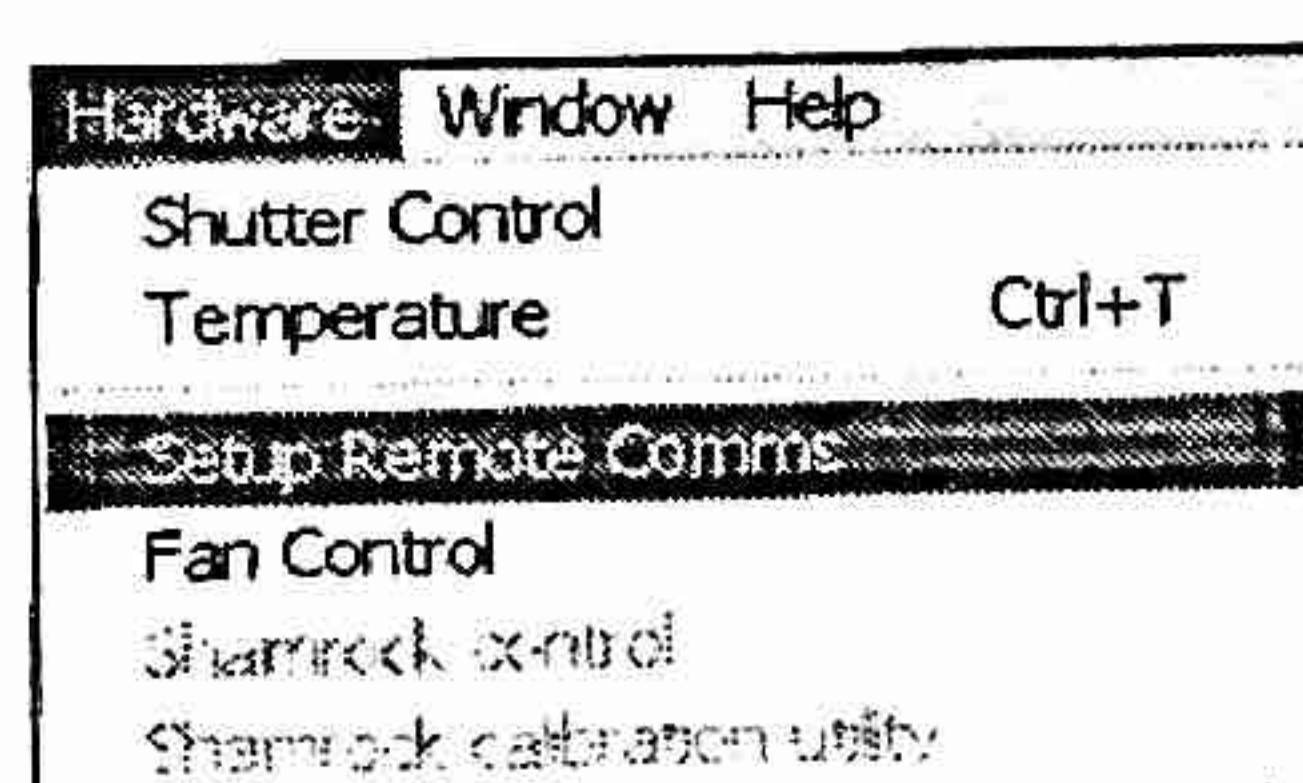
While the remote is being used to access the Run Time Control dialog box, the Trigger on the underside of the Remote Control is used to make or cancel an acquisition. It has the same function as pressing the green Take Signal button or the red Cancel Take Signal on the toolbar of the main window.



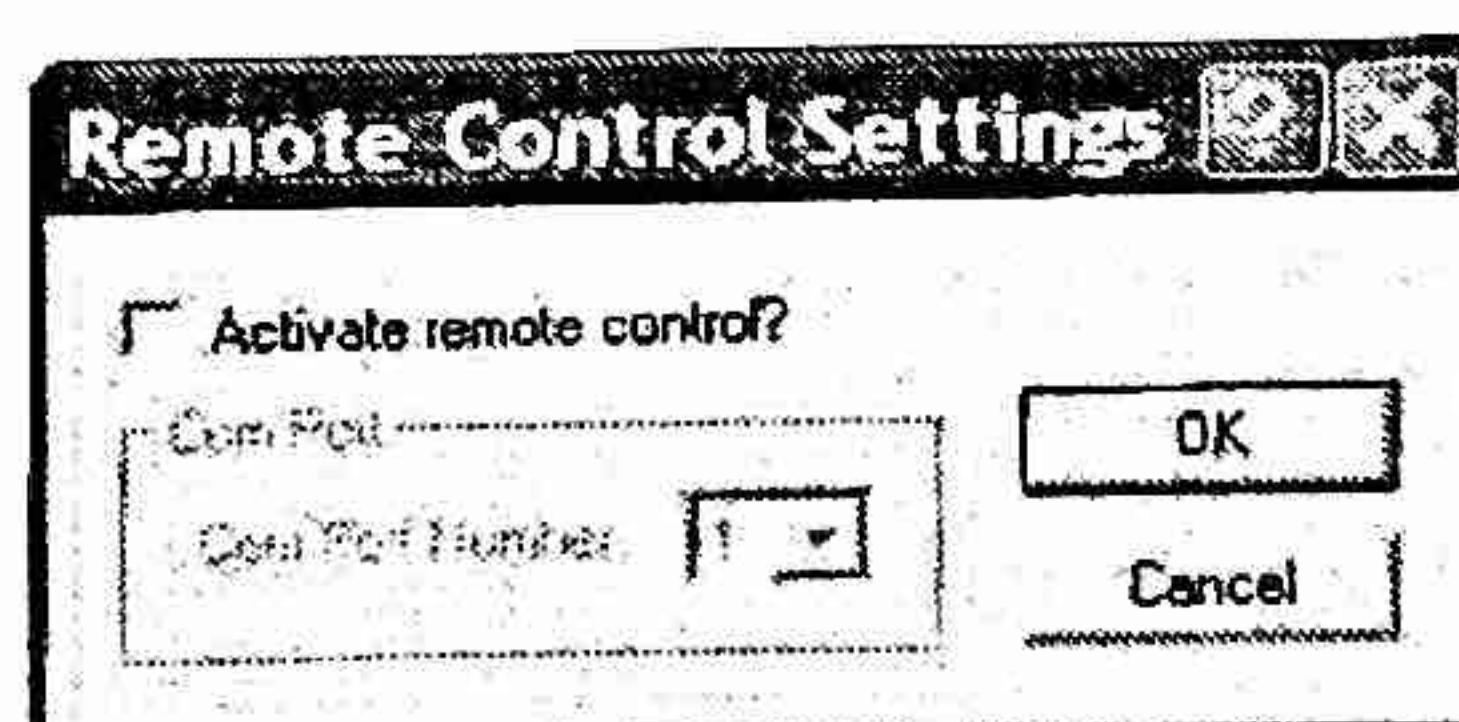
The Remote Control (figure 5, page 49) allows various commands of the iXon software to be modified using an infra-red signal sent to a Receiver (figure 6, page 49). The range of operation of the remote control is up to a distance of 12m from the receiver along the line of sight. Connect the lead from the Remote Control Receiver to a serial RS232 Com Port at the back of your computer.

The receiver should be positioned in a slightly shadowed place, away from the glare of the room lights (underneath the computer monitor or on a shadowed shelf above the monitor, for example). This should be done as certain energy-saving fluorescent lighting may generate interference that may cause erratic windows pointer movement or erroneous commands to occur. Insert two AAA batteries (included) into the back of the remote control handset.

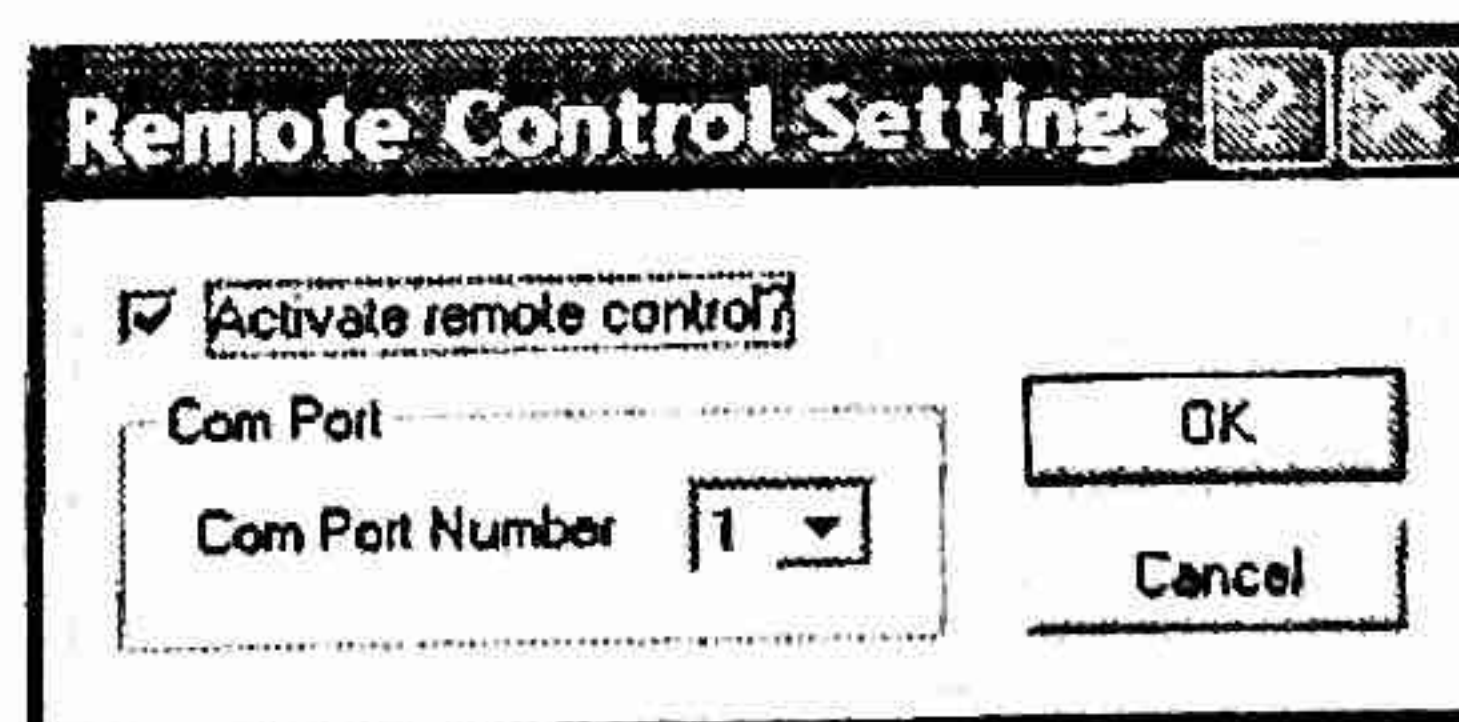
To enable the infra-red Remote Control to be activated, go to the **Hardware** Menu on the main window of the software and select **Setup Remote Comms** as shown:



The Remote Control Settings dialog box appears as shown:



Click in the **Activate remote control ?** box and the dialog box changes as shown:



Select the tick box to activate the remote control. Then from the Com Port Number drop-down menu select the Port that the receiver is connected to.

**NOTE:** Com Port Number 1 is the default.



The remote control has two modes of operation.

The first mode provides direct control over the **Run Time Control** dialog box (see Run-Time Control), where the following parameters may be varied:

- Autoscale ON/OFF
- EM Gain
- Exposure Time
- Run/Abort acquisition

**Note Gain and Exposure time may also be modified using the Setup Acquisition Dialog Box**

The second mode of operation allows the remote to be used as a general tool for moving the Windows pointer around and accessing all the various menus and dialog boxes of both the iXon software and the general Windows interface.



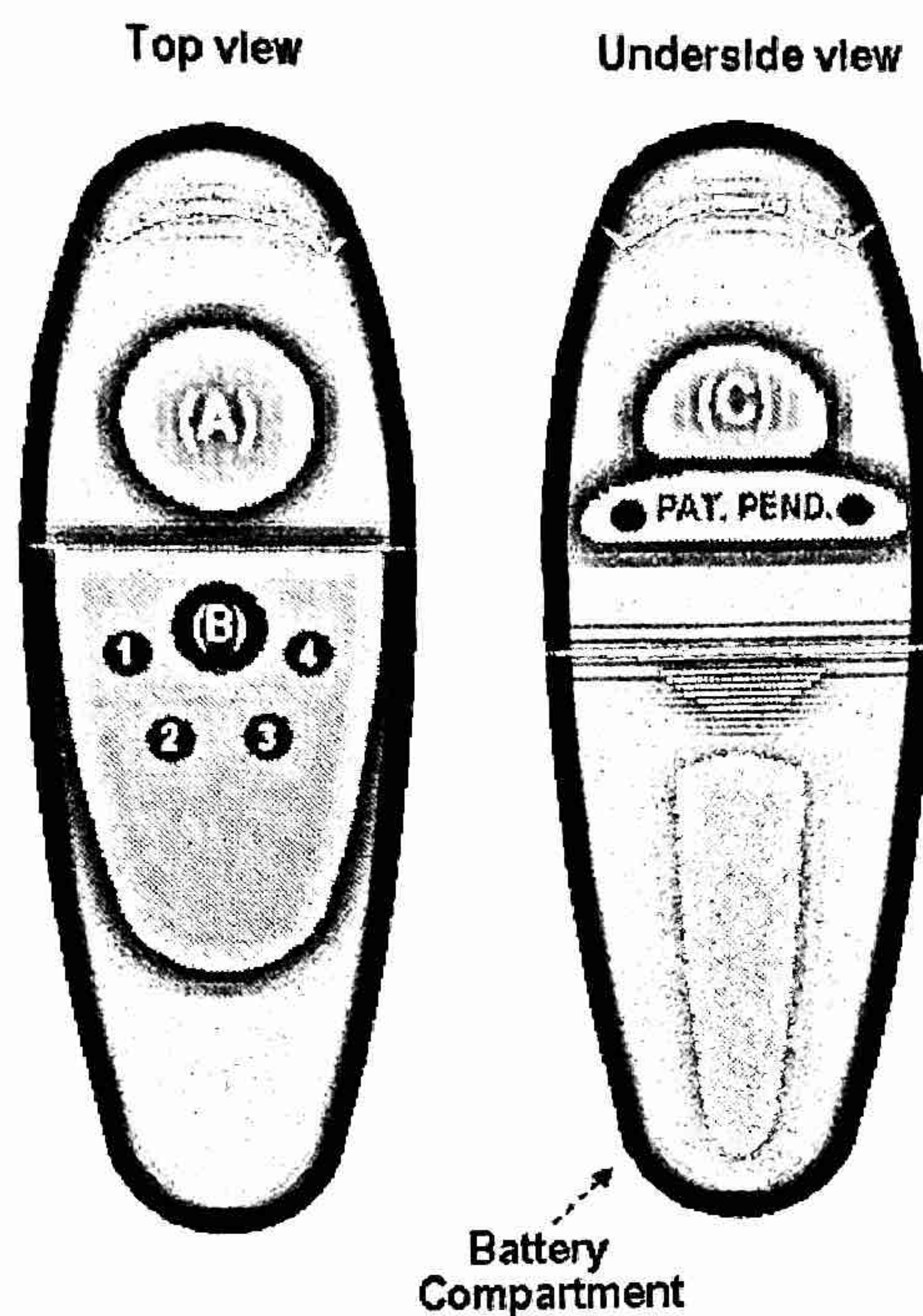


FIGURE 5 - REMOTE CONTROL

BUTTON	RUN TIME FUNCTIONS	WINDOWS FUNCTIONS
A	Moves the gauges of the dialog box	Moves the Windows pointer
B	Switches between control of the Run Time Control dialog box and the Windows pointer	
C	Run/Abort acquisition	Activates the relevant menu selection made by the Windows pointer
1	Selects between the two Run Time control gauges	INACTIVE
2	Selects control over the gauges between single-step, fine and coarse	INACTIVE
3	Switches the Autoscale function on or off	
4	As button 1	INACTIVE

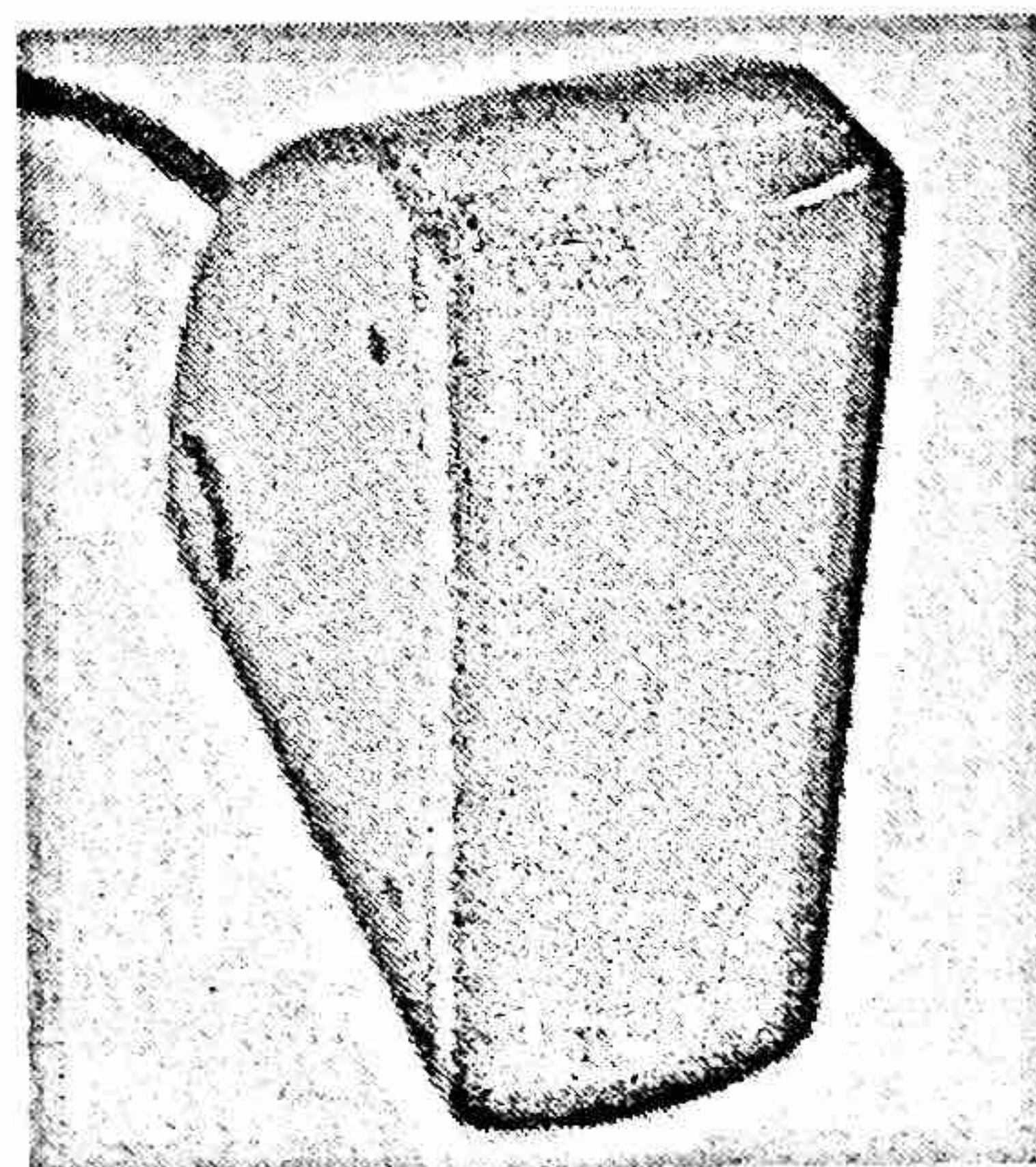


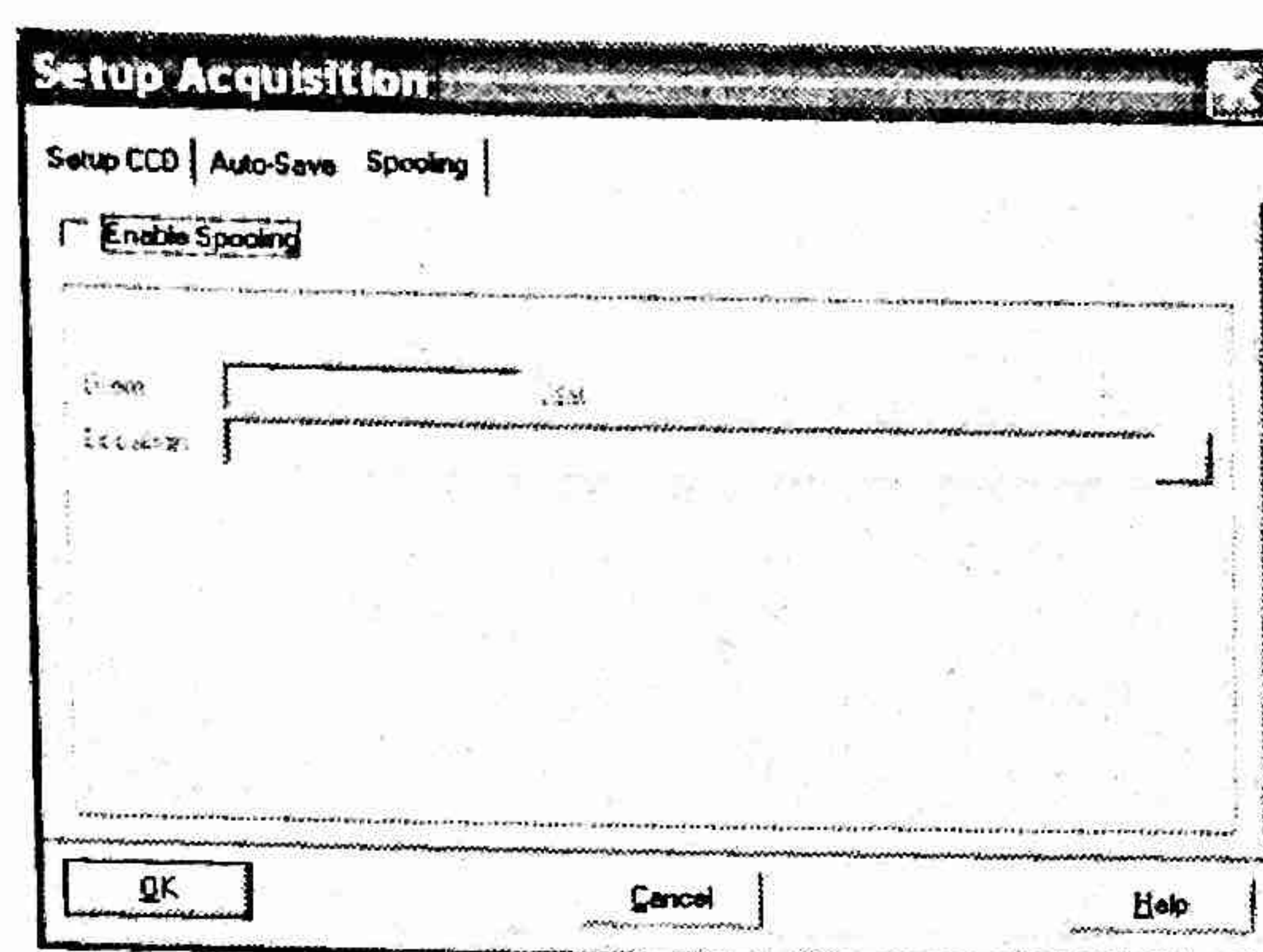
FIGURE 6 - IR RECEIVER



## SPOOLING

The Andor MCD software allows you to spool acquisition data direct to the hard disk of your PC. This is particularly useful when acquiring a series of many images. The amount of data generated by a Kinetic Series of e.g. 1000 acquisitions, is huge, and more than most PC RAM can handle.

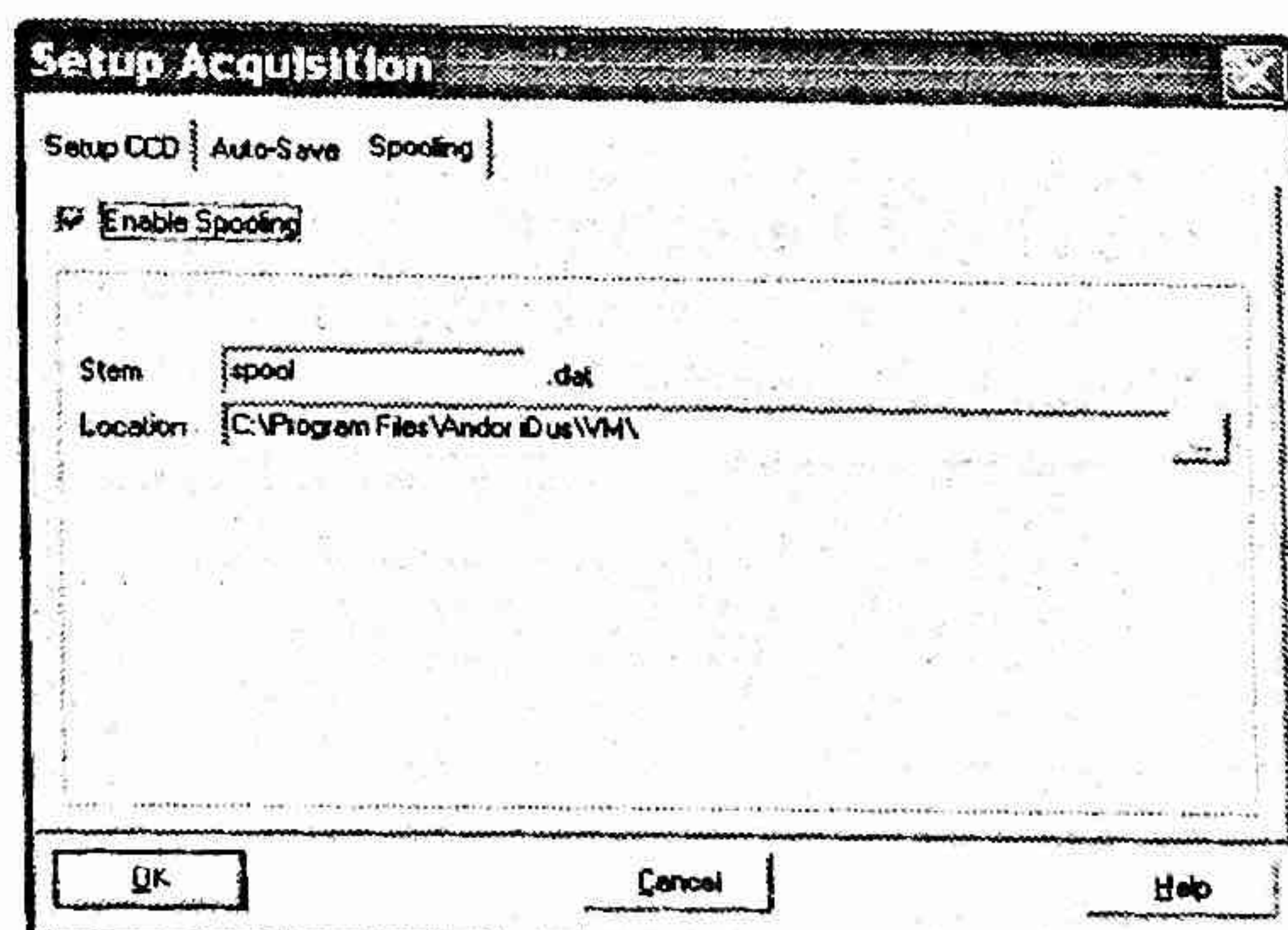
To select click on the **Spooling** tab and the Spooling dialog box appears e.g.:



With the spooling function enabled, data is written directly to the hard disk of you PC, as it is being acquired.

To enable the spooling function on your software, tick Enable Spooling on the Spooling dialog Box.

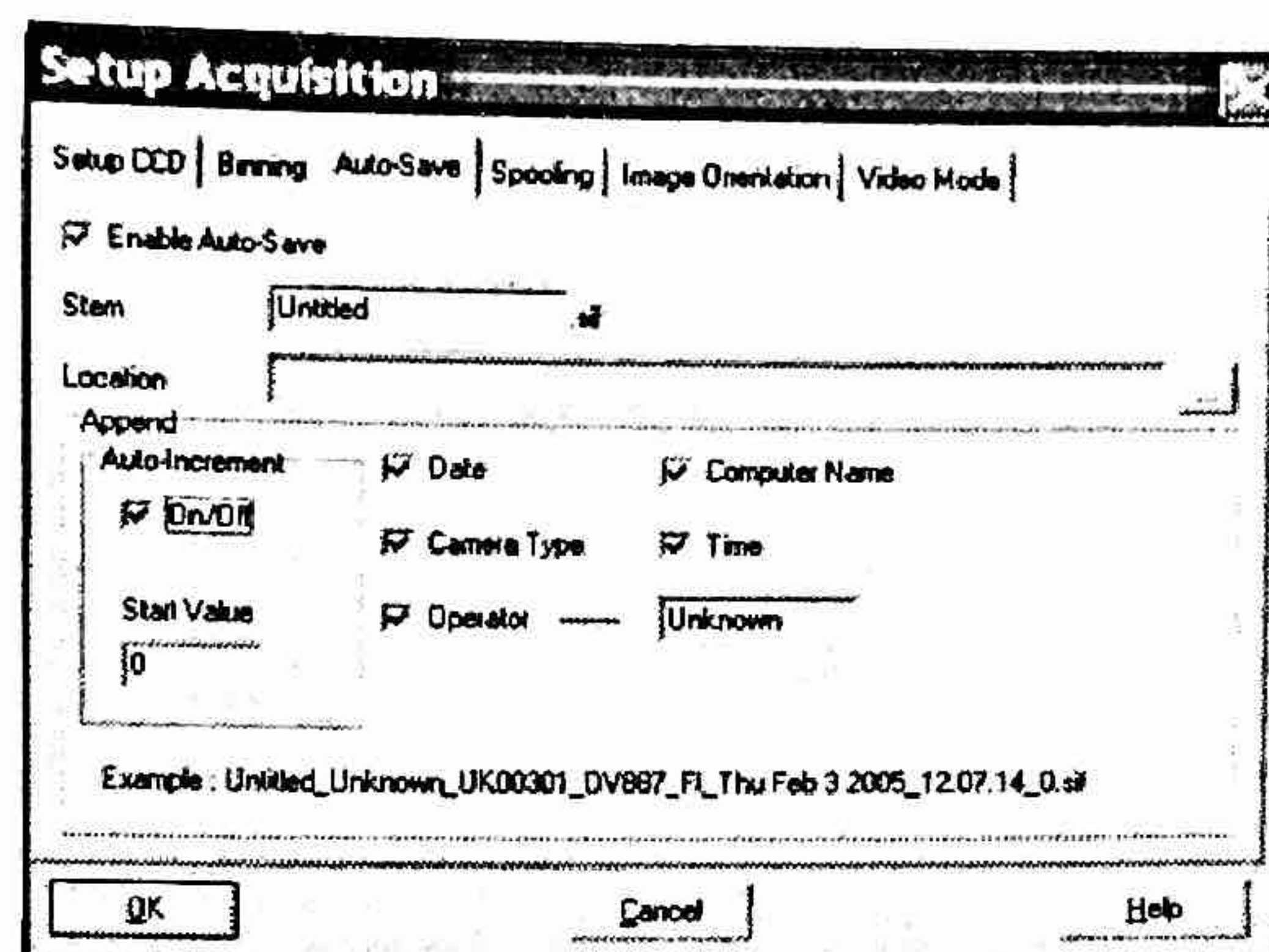
You must also enter a stem name, and also select a location for the for this spooled data file, e.g.:



**NOTE:** Spooling large amounts of data straight to hard disk for later retrieval requires a hard disk of sufficient read-write speed. Andor recommends only very high-speed hard disk drives be used for this type of operation.



**AUTO-SAVE**  
Auto-Save allows you to set parameters and controls for the auto saving of acquisition files thus removing the worry of lost data and files. To select, click on the Auto-Save tab on the Setup Acquisition dialog box The Auto-save dialog box appears, e.g.:



Tick the **Enable Auto-Save** box. If selected, acquisitions will be saved automatically when each one is completed. Each subsequent auto-saved file will over-write the previously auto-saved one.

There is also an **Auto-Increment On/Off** tick box. This allows a number to also be appended to the main Stem Name. This number is automatically incremented each time a file is saved. This time the auto-saved files will not overwrite any previous auto-saved files. In the Auto-Save dialog box, a Stem Name may be entered. This is the main root of the name that the acquisition is to be saved as.

The Stem Name can be appended with a number of details:

- Operator name (supplied by user)
- Computer name
- Camera type
- Date
- Time

Any combination of these may be selected by activating the relevant tick box.

**NOTE:** This function will only auto-save single scan, kinetic series, fast kinetics or accumulated images, NOT data acquired in video mode.