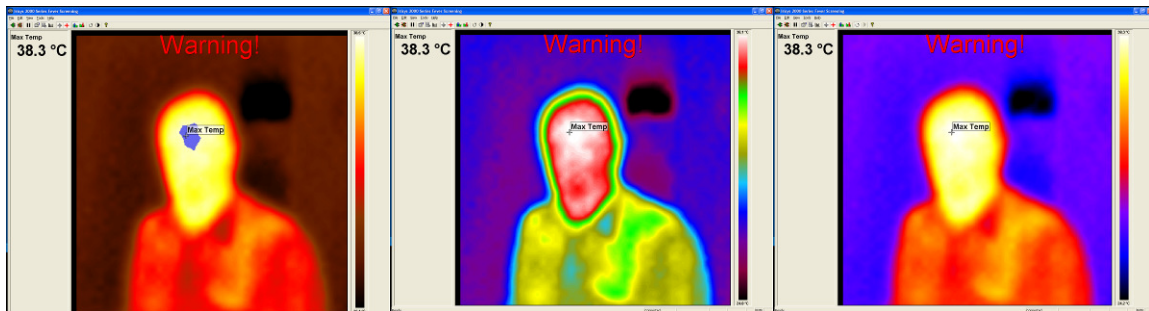


# IRI2012 Fever Screening Camera User Manual



## Safety Warning:

The equipment described in this document uses a Class 2 laser. Under no account should anyone look directly into the laser beam or the laser beam exit aperture, irreversible damage to the eye may occur. The laser should not be operated when there are personnel in the imager's field of view. Caution – use of controls or adjustments or performance of procedures other than those specified in this document may result in hazardous laser radiation exposure.



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## 1. Background

H1N1 Flu has now been reported around the world. H1N1 flu causes fever with the core body temperature rising to greater than 100 F (38.0°C). Other symptoms may include headaches, an overall feeling of discomfort, and body aches.

In light of this various countries are deploying infrared as a screening technology to detect persons with elevated temperatures which may be the result of H1N1 flu.

The purpose of such equipment is to:

- Provide infrared or "heat pictures" of a human face by utilizing an infrared camera and based on these thermal images to provide surface temperature measurements.
- Indicate if a defined threshold temperature is exceeded. Note that the body surface temperature is likely to be lower than the core temperature!

The product that Irisys is offering for such initial screening is the IRI 2012. When a temperature in the scene exceeds the user defined threshold an alarm is flashed up on the camera screen and an audible alarm is sounded.

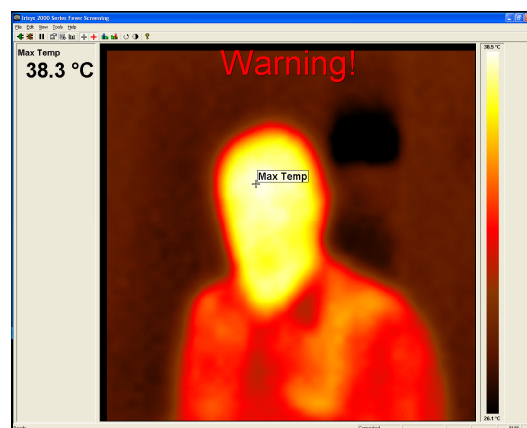
Additionally, the IRI2012 also incorporates a visual camera. This means that a person with fever will not only be detected, but, by use of the visual camera, that person will also be identified. This is particularly useful when screening groups of people. This is called image fusion.

To improve the temperature measurements it may be necessary to use an external temperature reference. This essentially provides a calibration correction for the camera and reduces environmental effects in the measurement. The heat source can either be a reference source (black body) or alternatively a sample person's external temperature which can be confirmed using a contact thermometer.

**It should be noted that the Infrared Camera is not a diagnostic tool for H1N1 virus. It should only be used as a screening tool. Any person exhibiting abnormally high temperatures should be subject to further clinical tests.**



**Figure 1 Imager fusion showing over limit alarm**



**Figure 2 PC image showing Warning**

## 2. Items required.

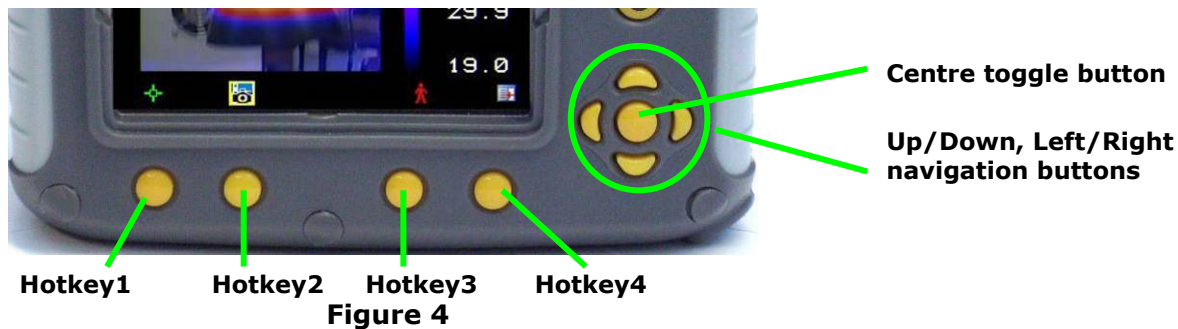






**Figure 3 Contents**

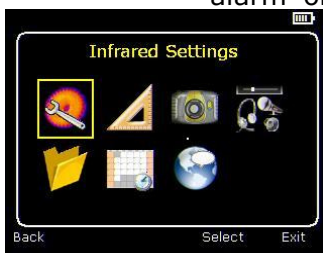
- i. IRI 2012 Fever Screening Camera. ( see figure 3 for contents)
- ii. IBM compatible PC running Windows XP or VISTA (Not 64bit).  
**Note: Please contact Irisys about other Operating Systems.**
- iii. CD with Irisys Fever Screening Software and Drivers.
- iv. USB Connection Cable.

***Note: This user manual is aimed at fever screening applications. For more details on the camera please refer to the IRI2010 user manual.***

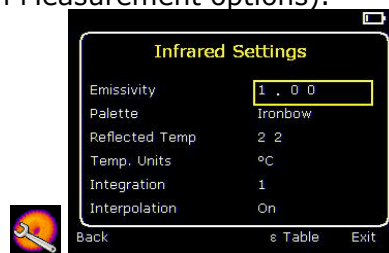
### 3. Quick Setup procedure – Camera only



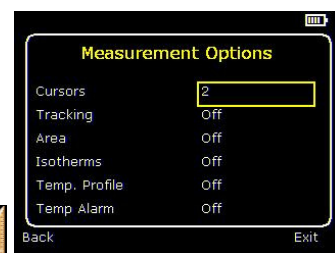
1. Switch on the camera.
2. Camera settings using the hot keys(fig. 4) and Menus.
  - i. Set to 50% visible (digital camera) 50% thermal.
    - a. Press Hotkey 2 until the Visible On/Off icon appears  .
    - b. If off  press the centre toggle button to toggle to Visible On .
    - c. Use the navigation buttons to merge (blend) to 50%.
  - ii. Set the emissivity to 0.98 (in infrared settings), auto hot tracking 'on' and the alarm 'on' (in Measurement options).



Hot key4 for menu




Emissivity



Tracking and alarm

Figure 5

- iii. Set the alarm to your desired temperature i.e. 1°C or 2°C above normal skin temperature.
3. Set up the camera on a tripod with a person in view about 1 to 2 metres away to ensure the distance gives you a head & shoulders image and mark a spot on the floor.
4. Adjust the focus of the camera to the distance to the object – say 1m or 2m.
5. Set your parallax alignment of the digital camera to the same distance 1m or 2m (this is how you line up the thermal image with the digital image).
  - a. Press Hotkey 1 to toggle through to the alignment option .
  - b. Use the centre toggle button to cycle through pre-fixed alignment distances then the navigation buttons to fine align the thermal and visible images if required.
6. Allow it to stabilise for 20 – 30 minutes. You are now ready to measure people's temperatures; they should be asked to stand on the spot marked on the floor for a few seconds facing the camera square on.

**Note:- Please ensure there are no hot spots, such as lights, direct sunlight, electric fans etc, in the field of view; Everything in the field of view should be less than the threshold temperature you set otherwise the auto hot tracker will go to that heat source rather than the person's face.**













## 4. Getting Started

- i. Do not connect the Camera to the PC until instructed.
- ii. Insert the CD with the PC software and drivers into the CD drive.
- iii. Install the Irisys fever Screening Software on to the PC.
- iv. Switch on the Camera.
  - a) Select menu option by pressing Hotkey 4 on the Camera.
  - b) Navigate to the Camera settings menu.
  - c) Select USB data out and toggle it ON.
- v. Connect the Camera and the PC using the USB cable.
- vi. On the PC screen you should see the message "Found New Hardware" and a request to load the driver. (See appendix 1 for more details.)
- vii. Select the option that allows you to load the Gserial Driver from the CD.
- viii. Open the Irisys Fever Screening Software by double clicking on the Desktop Icon labelled "Irisys 2000 Series Fever Screening".
- ix. Click on the connect camera icon (Figure 6 a), or select "connect to camera" in the tools menu.

## 5. Connection Troubleshooting.

- i. Disconnect all cables to the Camera and the PC.
- ii. Restart the fever screening software.
- iii. Switch off the Camera and then switch it on again. ( Power cycle)
  - a) Select menu option by pressing Hotkey 4.
  - b) Navigate to the Camera settings menu.
  - c) Select USB data out and toggle it ON.
- iv. Connect the Camera and the PC using the USB cable.
- v. Click on the connect camera icon (Figure 6 a), or select "connect to camera" in the tools menu.

If the above fails try the same sequence except for item iv. Connect to a different USB port on the PC.

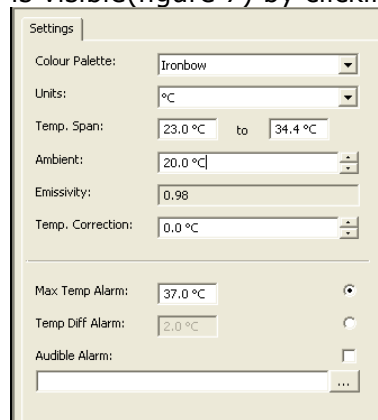
		
a. Connect Camera	b. Disconnect Camera	c. Pause
		
d. Settings tab	e. Measurements display	f. Histograms
		
g. Reference Cursor	h. Blue isotherm	i. Red isotherm
		
j. Continuous Auto span	k. Single Auto span	l. Help

**Figure 6 Icons on the PC software**

## 6. Quick Setup procedure – for the PC

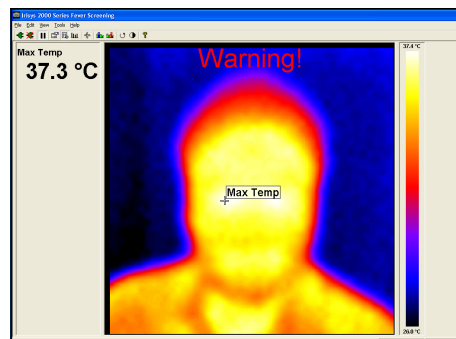
*Note: Section 9 has full details on the software set-up.*

1. Switch on the camera for 20 – 30 minutes to allow it to stabilise and set it to 50% visual (digital camera) 50% thermal.
2. Set up the camera on a tripod with a person in view about 1 to 2 metres away to ensure the distance gives you a head & shoulders image – mark the floor. Focus the camera.
3. Camera Menu Setting
  - i. Select menu option by pressing Hotkey 4 on the Imager.
  - ii. Navigate to the Camera settings menu.
  - iii. Select USB data out and toggle it ON.
4. Connect the Imager and the PC using the USB cable.
5. Open the Irisys Fever Screening Software by double clicking on the Desktop Icon labelled "Irisys 2000 Series Fever Screening".
6. Click on the connect camera icon, or select "connect to camera" in the tools menu.
7. Ensure settings tab is visible (figure 7) by clicking on the settings tab icon (fig 6 d).



**Figure 7**

8. Ambient Temp. - Set this to the ambient temperature.
9. Temp. Correction - The temperature correction allows the user to correct for measurement differences in the camera which are either known or have been measured. The user can correct for up to +/- 10°C in 0.1°C steps. For example if the camera reads 35°C when an object is known to be at 34.5°C, then this function allows the user to correct for this 0.5°C difference.
10. Alarm temp. - Set the temperature above which the warning will trigger.
11. Audible Alarm - Click on the radio button to select an audible alarm if required. This can either be a standard bleep or there is the option to select a .wav sound file.
12. Turn off the settings tab and maximise window. (Figure 8)



**Figure 8**

**Note:- Please ensure there are no hot spots, such as lights, direct sunlight, Electric fans etc, in the field of view; Everything in the field of view should be less than the threshold temperature you set otherwise the auto hot tracker will go to that heat source rather than the person's face.**

---

## 7. Setup procedure including a reference source (Camera)

1. Switch on the camera for 20 – 30 minutes to allow it to stabilise and set it to 50% visual (digital camera) 50% thermal.
2. Set up the camera on a tripod with a person in view about 1 to 2 metres away to ensure the distance gives you a head & shoulders image – mark the floor. Focus the camera.
3. Set up your known heat source (Black-body) at the position of a persons head above the spot you've marked on the floor with the heat source in the centre of the camera view.  
*See below for alternative to heat source.*
4. Leave the camera running and switch on the heat source to a reasonable temperature – say 37°C. ( The reference temperature)
5. Adjust the focus of the camera to the distance to the object – say 1m or 2m
6. Set your parallax alignment of the digital camera to the same distance 1m or 2m (this is how you line up the thermal image with the digital image)
7. Set your emissivity to 1 (assuming you are using a black body – if it's a different source you need to set the emissivity to suit the material of the heat source)
8. After ½ hour take a reading if it's not at the reference temperature then you now know the difference in measurement accuracy of the camera. Record the difference.
9. In the camera menu structure set the auto hot tracking 'on' and the alarm 'on'
10. Set the alarm to your desired temperature i.e. 1°C or 2°C above normal skin temperature (note this is cooler than internal body temperature) – remember the alarm temperature needs to be adjusted + or – for the accuracy difference you got from your reference source (8 above).
11. Set the camera emissivity to 0.98
12. You are now ready to measure people's temperatures; they should be asked to stand on the spot marked on the floor for a few seconds facing square on to the camera.
13. After every hour, repeat 3 – 11 above.
14. Alternative to a reference source.  
If a defined black-body heat source is not available, then the user could measure the temperature of 2 or 3 persons. Use a contact thermometer to measure their surface temperature and use the average as a reference temperature for setting the alarm level. This will not be as accurate as a known black-body heat source.

**Note:- Please ensure there are no hot spots, such as lights, direct sunlight, Electric fans etc, in the field of view; Everything in the field of view should be less than the threshold temperature you set otherwise the auto hot tracker will go to that heat source rather than the person's face.**

## 8. Setup procedure including a reference source (PC)

Note: Section 9 has full details on the software set-up.

1. Switch on the camera for 20 – 30 minutes to allow it to stabilise and set it to 50% visual (digital camera) 50% thermal.
2. Set up the camera on a tripod with a person in view about 1 to 2 metres away to ensure the distance gives you a head & shoulders image – mark the floor.
3. Camera Menu Setting
  - i. Select menu option by pressing Hotkey 4 on the Imager.
  - ii. Navigate to the Camera settings menu.
  - iii. Select USB data out and toggle it ON.
4. Connect the Imager and the PC using the USB cable.
5. Open the Irisys Fever Screening Software by double clicking on the Desktop Icon labelled "Irisys 2000 Series Fever Screening".
6. Click on the connect camera icon, or select "connect to camera" in the tools menu.
7. Ensure settings tab(Figure 9) is visible by clicking on the settings tab icon(fig. 6 d).

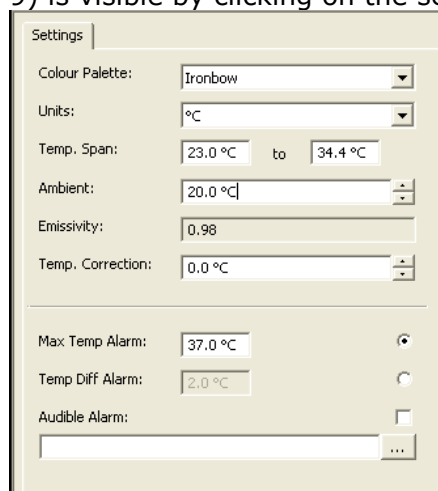


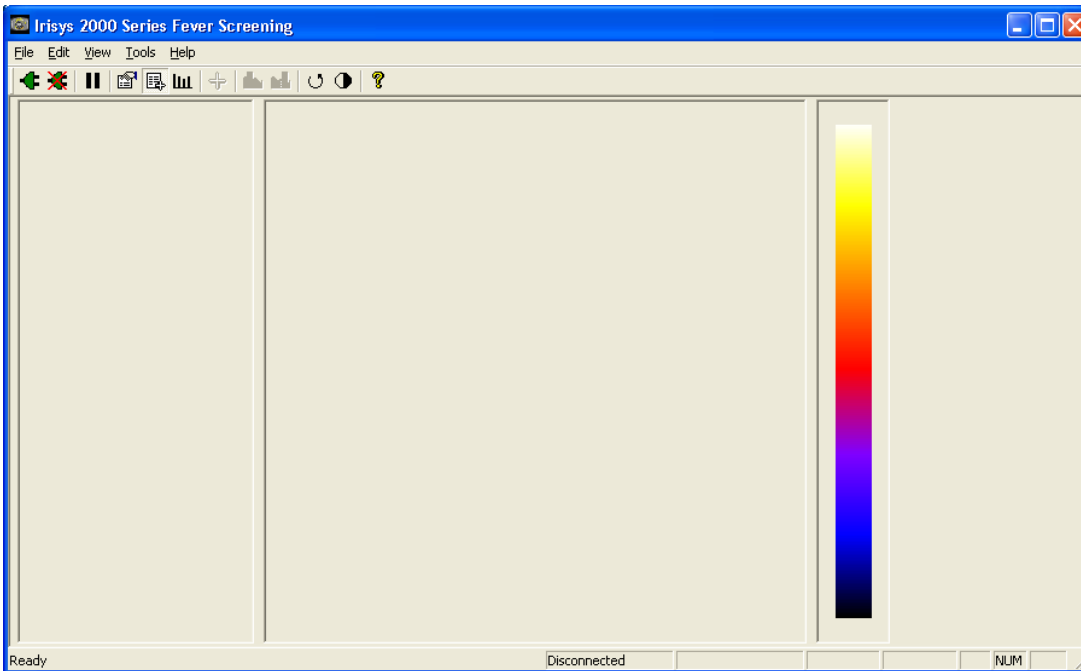
Figure 9

8. Temp. Span – This defines the temperature span used to display the image. There is a choice between auto continuous temperature span selection or single auto temperature span selection. If Auto continuous is selected move to 6 below.  
If single auto temperature span icon is pressed the temperature span will automatically adjust and then remain fixed.
9. Ambient Temp. - Set this to the ambient temperature.
10. Temp. Correction - The temperature correction allows the user to correct for measurement differences in the camera which are either known or have been measured. The user can correct for up to +/- 10°C in 0.1°C steps. For example if the camera reads 35°C when an object is known to be at 34.5°C, then this function allows the user to correct for this 0.5°C difference.
11. There are two choices for the alarm setting. These are mutually exclusive. Selecting one automatically turns off the other choice. Choose Temp. diff. Alarm.
12. Double click on the screen where the reference source is visible.
13. Set the temperature difference value to be above the reference source temperature. For e.g. if the threshold is to be 37°C and the reference source is at 35°C. Then set the difference at 2°C.
14. Audible Alarm - Click on the radio button to select an audible alarm if required. This can either be a standard bleep or there is the option to select a .wav sound file.

**Note:- Please ensure there are no hot spots, such as lights, direct sunlight, Electric fans etc, in the field of view; Everything in the field of view should be less than the threshold temperature you set otherwise the auto hot tracker will go to that heat source rather than the person's face.**

## 9. Software Setup

Figure 10 shows the screen shot when the Irisys 2000 series fever screening software is started. Figure 11 shows the icons and Menus for the software.

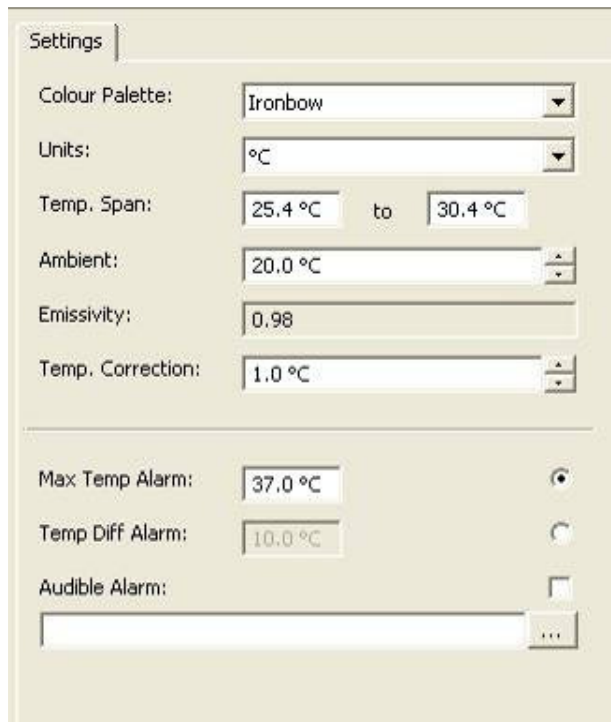


**Figure 10 Start up Screen**



**Figure 11 Icons and Menus**

1. Ensure settings tab (12) is visible by clicking on the settings tab icon(Fig 6 d).



**Figure 12 Settings Tab**

2. Colour palette - The default colour palette is Ironbow. Eight other colour palettes are available to select using the drop down menu. - White hot Mono, Rainbow, Isotherm Style, Hot metal, High Contrast, 16 step Rainbow and Black hot Mono.
3. Units - Select the desired temperature measurement unit. ( °C or °F)
4. Temp. Span – When the software starts, it sets the temperature span automatically. If a different temperature span is required then turn off the Auto continuous selection by pressing the icon(fig 6 j) then either:-
  - a. Press the single auto temperature span icon again. Or
  - b. Manually enter the temperature span required. Or
  - c. Display the histogram(fig 6 f) at the bottom and use the mouse to manually adjust the span.
5. Ambient Temp. - Set this to the ambient temperature.
6. Emissivity – This is fixed at 0.98.
7. Temp. Correction - The temperature correction allows the user to correct for measurement differences in the camera which are either known or have been measured. The user can correct for up to +/- 4°C in 0.1°C steps. For example if the camera reads 35°C when an object is known to be at 34.5°C, then this function allows the user to correct for this 0.5°C difference.
8. There are two choices for the alarm setting. These are mutually exclusive. Selecting one automatically turns off the other choice.
  - a. Alarm temp. - Allows the user to define the threshold temperature; and any object in the scene above this value will trigger the alarm. The default value is 37°C.
  - b. .Temp. Diff. Alarm – This option allows the user to use a reference source in the scene. The alarm is triggered if any object in the scene has a temperature that is greater, by the temp. difference, than the reference source. The temperature difference value is defined by the user.

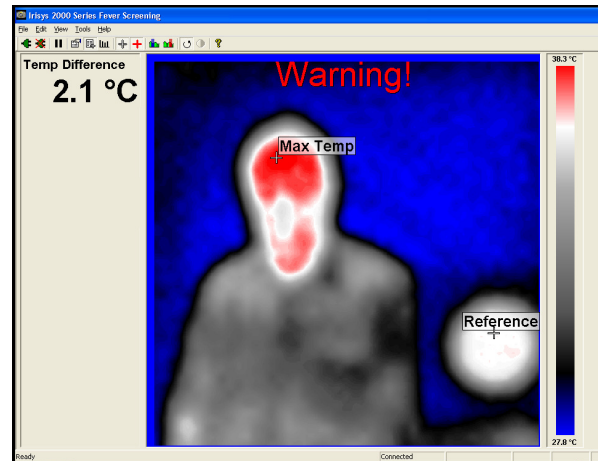
To set the reference cursor.

Double click on the screen to place the reference source. The reference cursor can be moved by double clicking on a new position or by left click and dragging. (Fig. 14)

9. Audible Alarm - Click on the radio button to select an audible alarm if required. This can either be a standard bleep or there is the option to select a .wav sound file.
10. Maximise screen view and turn off settings tab. (see examples in Figures 13 and 14)



**Figure 13 Operating screen shot**

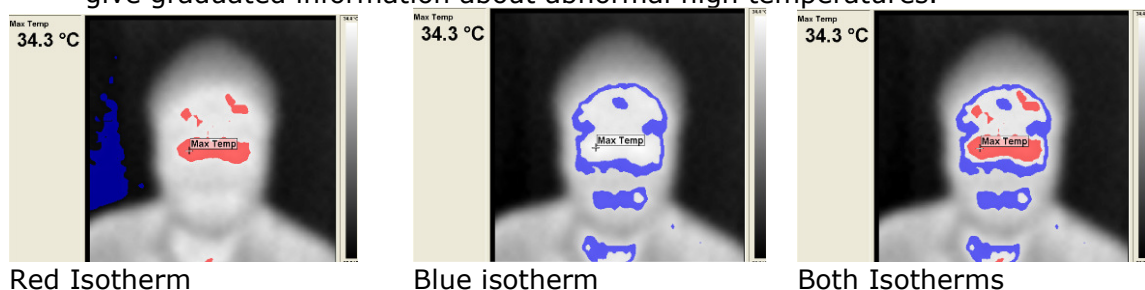


**Figure 14 Screen shot with reference cursor**

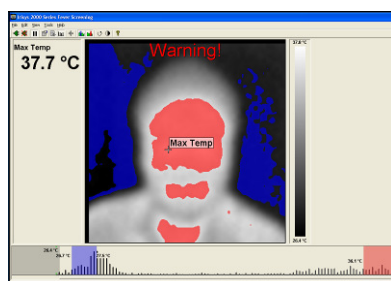
### Other settings

#### a. Isotherms

Isotherms are regions within the scene of the same temperature range and are shown in the same colour. This is best seen using either the white hot or Black hot colour schemes. It can be used to indicate areas of high temperature and therefore give graduated information about abnormal high temperatures.



**Figure 15**



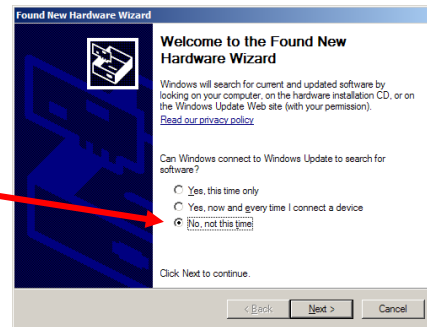
**Figure 16**

The red and blue isotherms can be set by adjusting the red and blue blocks in the level and span adjustment bar. This can be done using a mouse. To adjust the isotherm width, click on the colour block edge and drag. To adjust level, click in the colour block and move. The temperature difference between the centre of the two isotherms is displayed at the bottom.

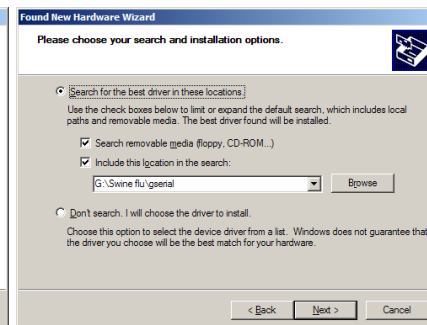
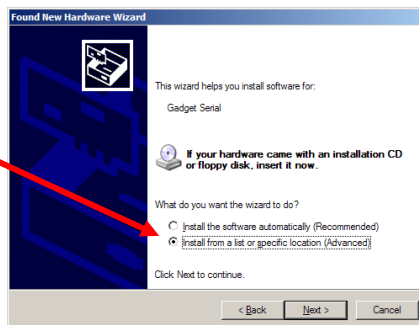
- b. Cursor display  
Pressing the reference icon (fig 6 g) toggles the display of the reference cursor.
- c. Histograms. ( Icon fig 6 f)  
This shows the user the temperature histograms in the scene. The user can also adjust temperature span shown by using the mouse on the histogram. Both the span and the end points can be moved.

## Appendix 1 – Installing the Driver

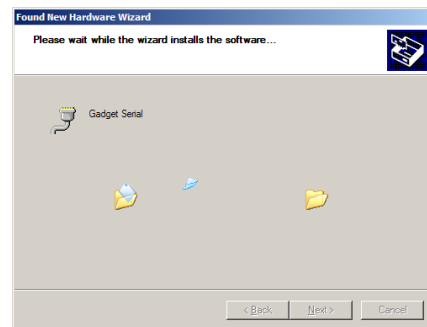
Chose the "No, not this time option" and click "next".



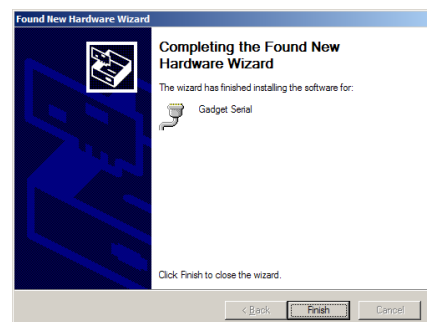
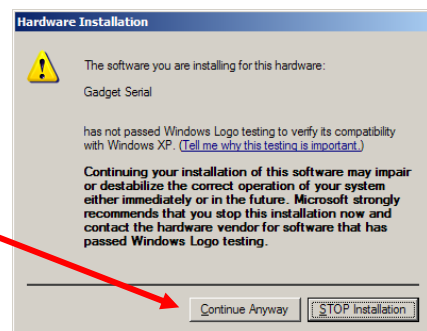
1. Ensure the CD is inserted and
2. select the "install from a list or specific location"
3. Click on "next".



Installing the Driver.

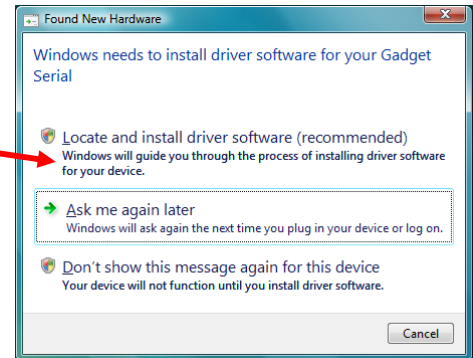


Select and click on the "continue anyway"

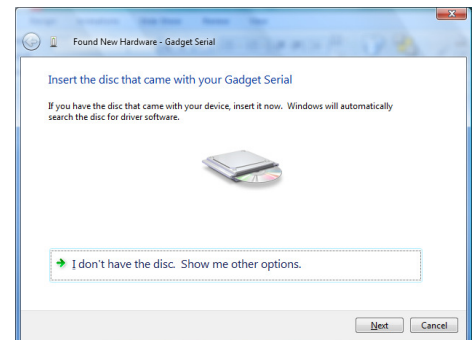


## WINDOWS VISTA (Note: does not work with 64 bit VISTA)

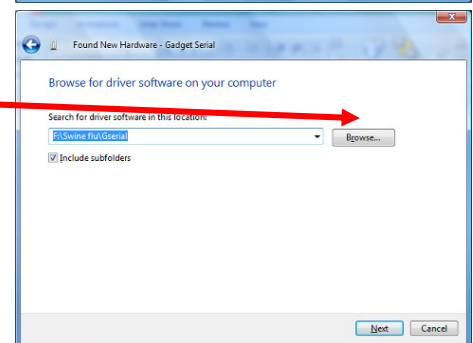
First screen shot when connecting to a VISTA PC.  
Select Locate and Install driver software option.



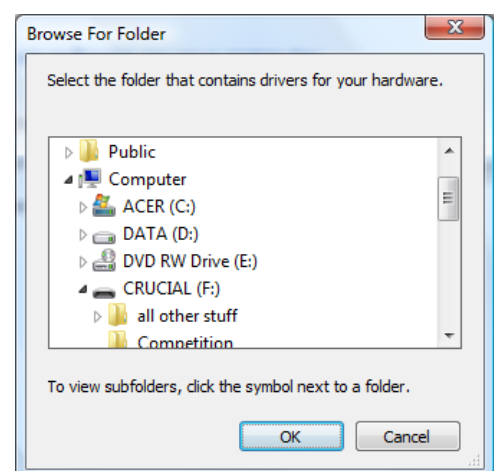
If the software is not on the CD select "I don't have the disc" option. The two screen shots below only apply if this option is selected.



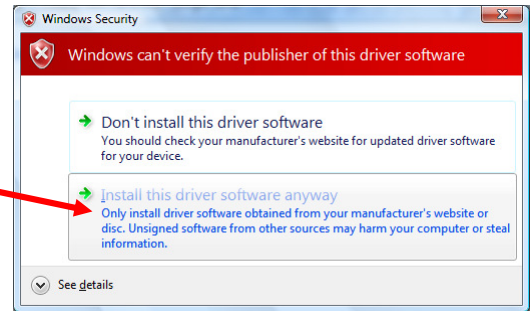
If the "I don't have the Disc" option was selected, click on browse.



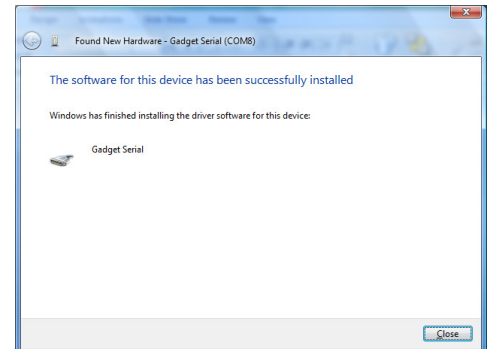
Browse through the folders to locate the location with the software.



Select "Install this driver software anyway"



Software loaded.



---

## Appendix 2 – Frequently Asked Questions

1. The IRI 2012 has an accuracy of  $\pm 2^{\circ}\text{C}$ . Is this too big a tolerance?  
**As Temperature measurement is quite important in this application, it is better to improve the accuracy of the camera using an external reference source.**
2. How can a standard IR camera do the job properly, despite this tolerance?  
**By using an external reference source in the field of view. The imager can then measure the temperature of the reference source and a correction can be made on the human body temperature measurement. A check could be made on the reference source every hour or so. You need an object with a known and accurate temperature – this could be a black body. A black body is a device for calibrating thermal cameras – there are a number of units that can be set at a specific temperature. Alternatively use the camera in temperature difference mode.**
3. If we look at Infra-red cameras used in the Airports today, what kind of Accuracy do they have?  
**The majority of cameras have an accuracy of  $\pm 2\%$  or  $\pm 2^{\circ}\text{C}$  no matter how expensive.**
4. What is the ideal distance to set the camera?  
**Ideally set the distance at 1 or 2 metres – This is the best to give a head & shoulders image**
5. Should we use the Emissivity factor, and if so what should it be set to?  
**Yes it should be set to 0.98 which is the emissivity of human skin (irrespective of skin colour – the emissivity is the same for all races).**
6. What should we set the Ambient temperature to?  
**Set the Ambient temperature to the measured room temperature (unless there's a hot source near by) it would be best to do this in stable conditions.**
7. What affect will changes in ambient temperature have?  
**The ambient temperature should not affect the measurements. (Provided that it is not changing rapidly!)**