TVSPEC-USB

User Guide 1

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1 Introduction

TVSPEC-USB allows you to display visible spectra on your PC. Simply connect TVSPEC-USB to a USB port of your PC, point the spectrometer at a source of light, and observe its spectrum live on your computer monitor. The spectrometer can be used to demonstrate all aspects of colour and spectra at all levels of science in Physics, Chemistry, Biology and Astronomy. Spectra displayed in real time can be saved for future display or measurement. The custom designed software, PCSpectraLite, is used for measurement, analysis and calibration. The images can be saved as bitmaps, which can then be imported into word processing packages for writing reports, and the spectra can be imported into spreadsheets for further analysis. Each TVSPEC comes with a calibration file, which allows the spectra to be displayed directly in wavelength (nm).

2 Precautions

TVSPEC is a fairly robust instrument but should not be dropped otherwise some of the optical components may be damaged. The instrument has been calibrated and its components locked in place. Do not adjust any of the screws otherwise the calibration will be invalid.

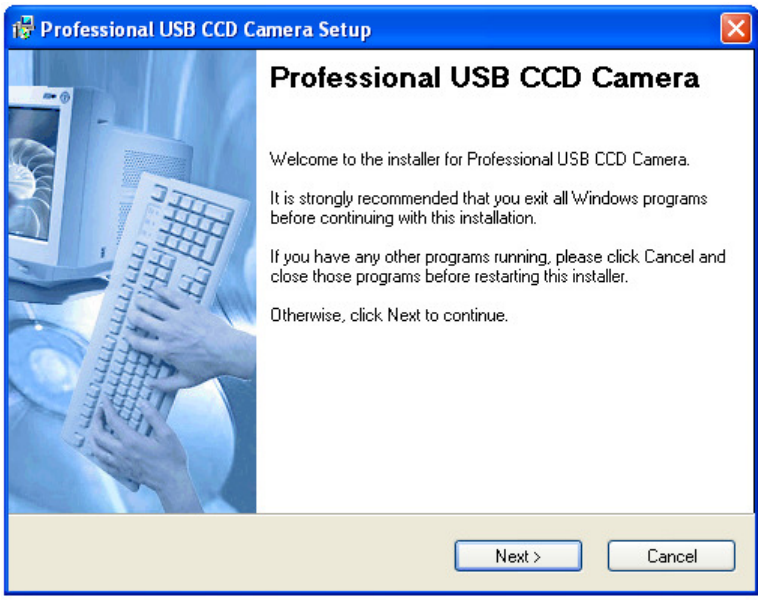
The entrance slit of the spectrometer is fitted with a diffuser. This helps make sure that the slit is evenly illuminated and improves the accuracy of the spectra.

For very weak light sources, this diffuser can be removed, to allow more light to enter the spectrometer. The slit is very fragile indeed and should not be touched.

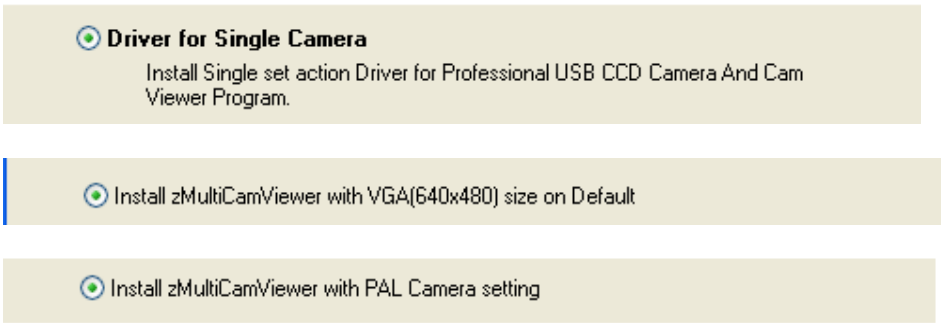
3. Installation

3.1 MultiCam Viewer Software

Connect the TVSPEC-USB to a free USB port on your PC. **Windows** will then prompt you to supply the software for the USB Camera. Insert the **CD-ROM** into the PC and follow the prompts.



Now select the following options:



3.2 PCSpectraLite

This software has been specially written by Intelligent Interfaces Ltd and can be found on the **TVSPEC CD-ROM** in the **PCSpectraLite** folder. Open the **PCSpectraLite** folder and double click on the setup.exe file, which will install the program in the file

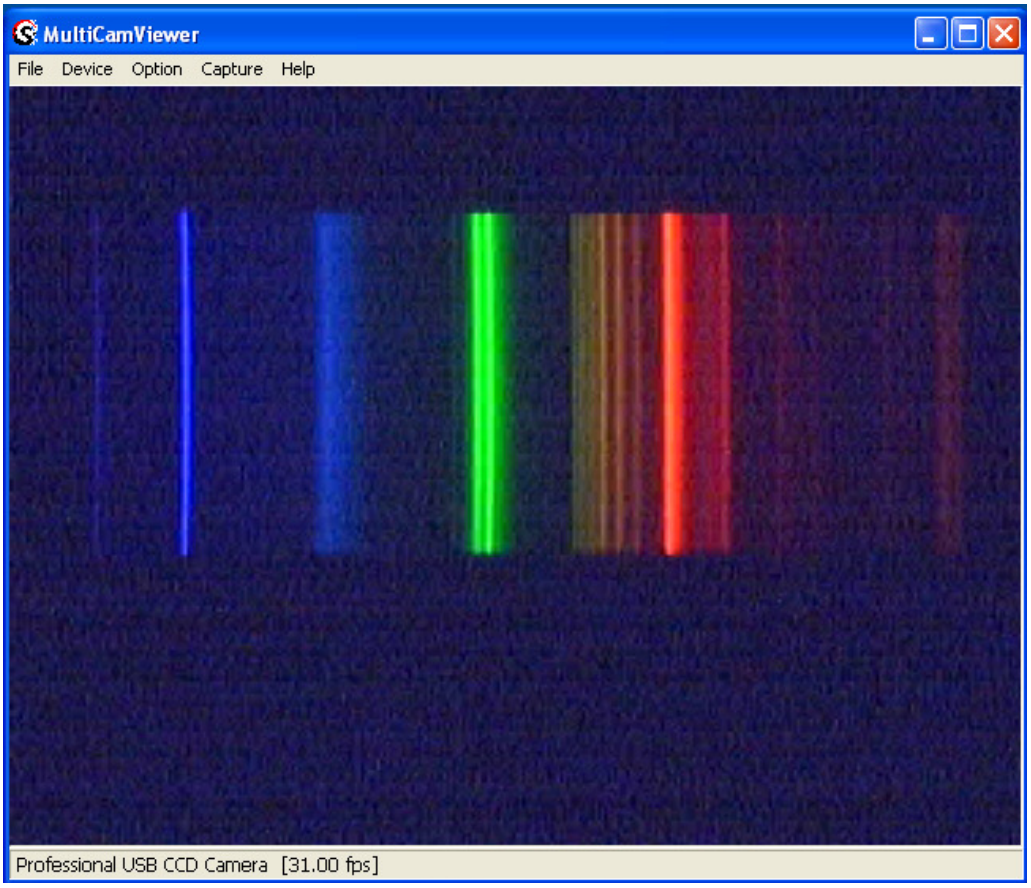
C:\ Program Files\PCSpectraLite\PCSpectraLite.exe. A shortcut to this should then be placed on the desktop.

3.3 Calibration file

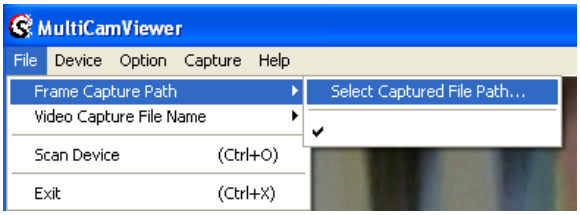
If you wish your spectra to displayed in wavelength (nm) then the file **SpecCal.txt** should be copied into the folder you plan to use to save your spectra. The easiest way to do this is to copy the folder **Spectra** from the **TVSPEC CD-ROM** into the **My Documents** folder on your PC. If you save your spectra into the folder **C:\My Documents\Spectra\MySpectra** which contains the calibration file for your TVSPEC, your spectra will displayed in wavelength (nm), when you use the **PCSpectraLite** program. Each TVSPEC instrument is different and has its own calibration file. There are a number of reference spectra on the **TVSPEC CD-ROM** which can be found in the folder **Spectra\Reference.**

4 Taking Spectra

Click on the MultiCam Viewer ikon and a he program will open a window as below showing the real time colour display.



You need to set the folder to save your captured images using the file option.



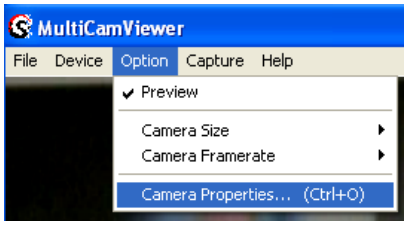
To obtain an accurate colour representation, the camera properties need to be set accurately and a file with the settings is supplied.

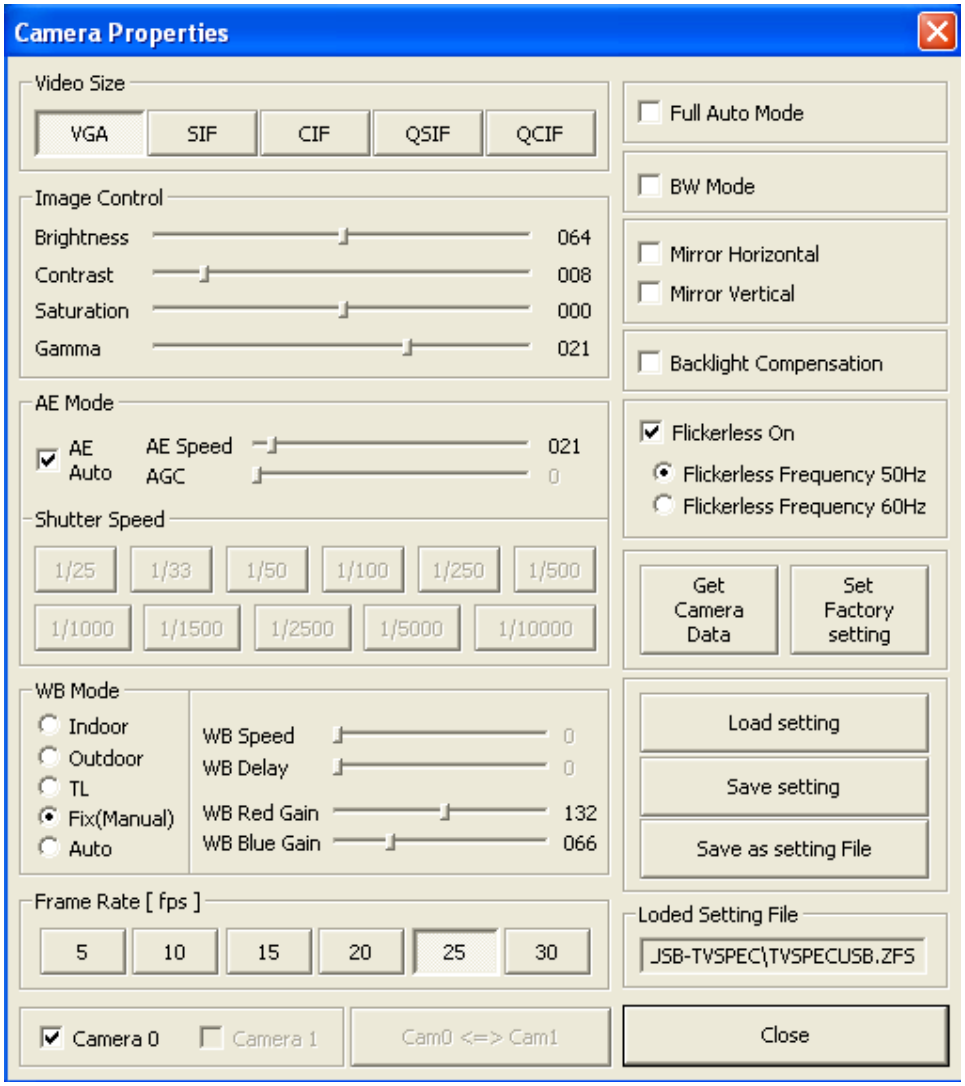
This can be applied by using the “Load Settings” option and loading the supplied file

tvspecusb.ZFS

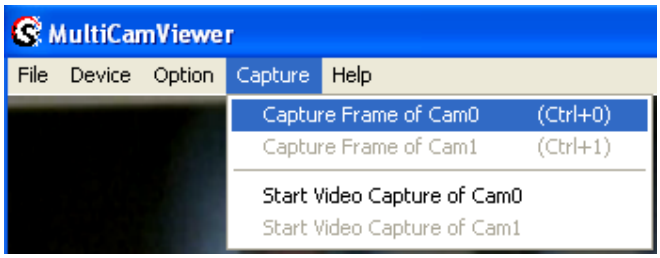
Alternatively you act set

WB Mode to Fix (manual)
Frame Rate to 25fps
Flickerless Frequency to 50Hz
WB Red gain to 132
WB Blue gain to 066





An image can be captured by (Cntrl+0) or clicking on the Capture Frame.

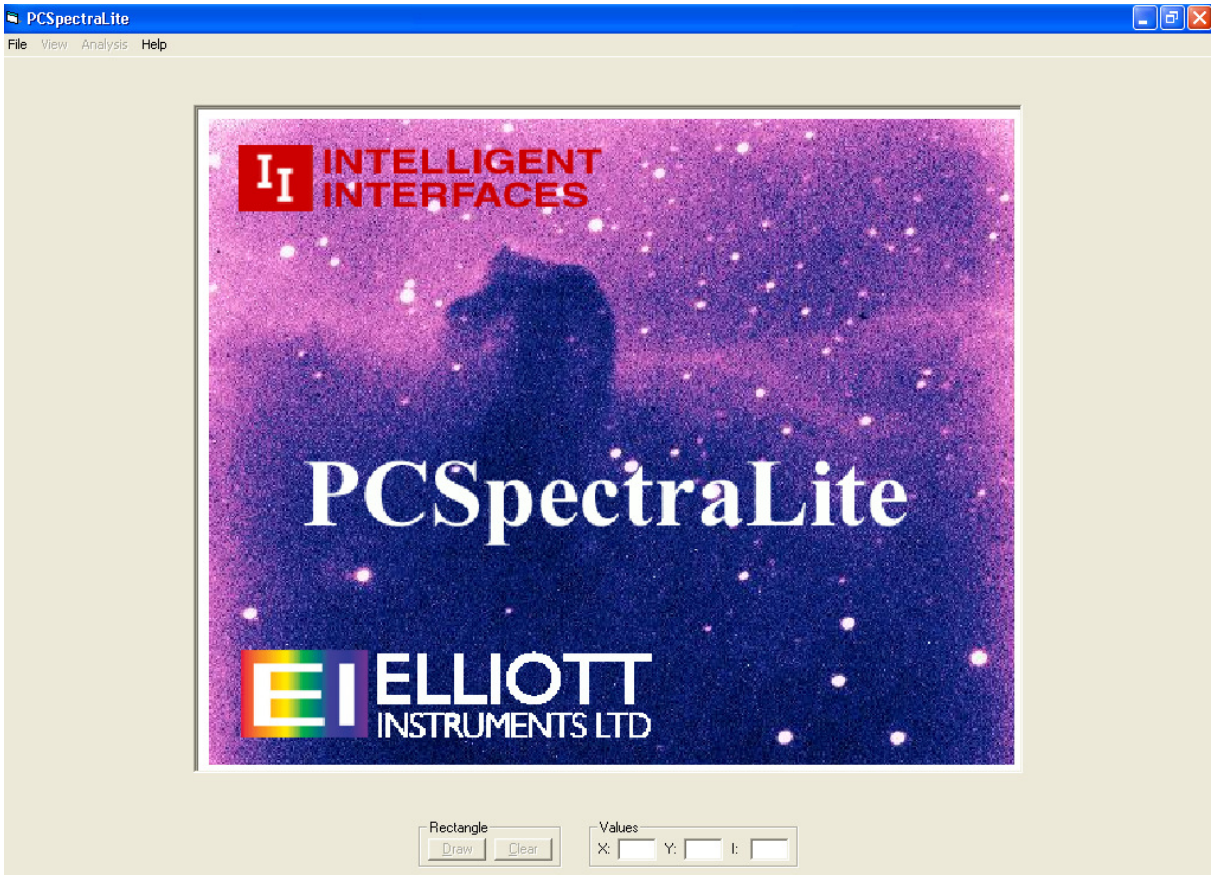


The files are then saved in your preferred folder with the date and time in the file name, for example: For wavelength calibrated image the file SpecCal.txt must be in the same folder.

Name	Size	Type	Date Modified
CAM0_20081110_143523	901 KB	Bitmap Image	10/11/2008 14:35
CAM0_20081110_143538	901 KB	Bitmap Image	10/11/2008 14:35
CAM0_20081110_143540	901 KB	Bitmap Image	10/11/2008 14:35
CAM0_20081110_143543	901 KB	Bitmap Image	10/11/2008 14:35

5 Using PCSpectraLite

Start **PCSpectraLite** by double clicking on its ikon



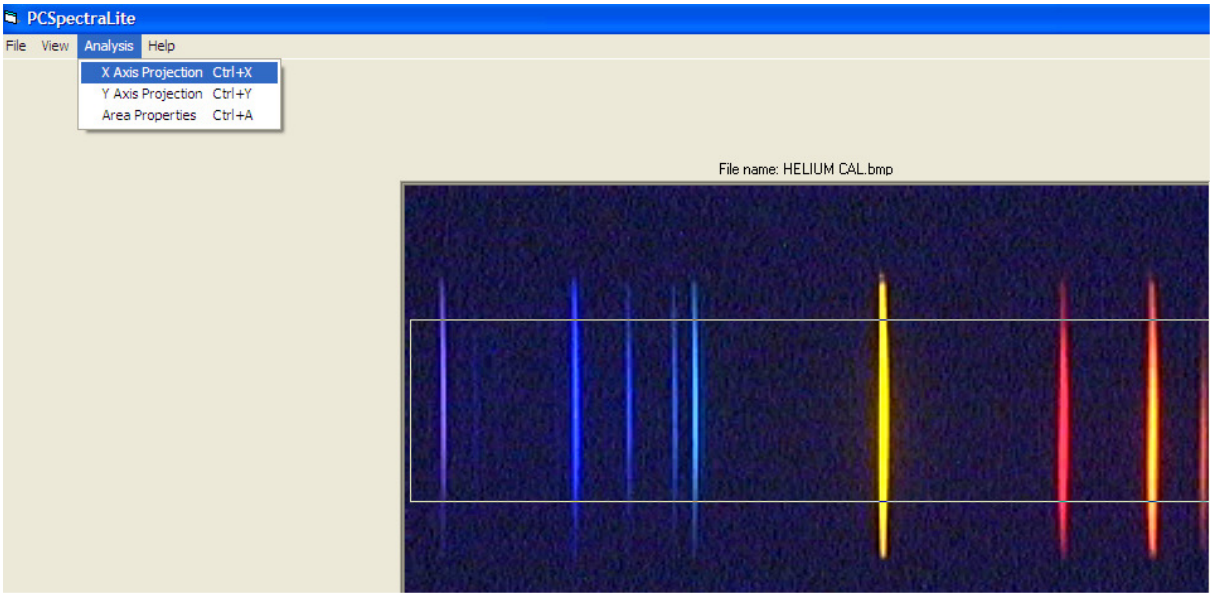
6.1 Loading an Image

Your spectrum file can now be loaded by using the **File Open** option. The program will display a grey scale image of the **.bmp** file, which can be scaled using the **View Zoom** options.

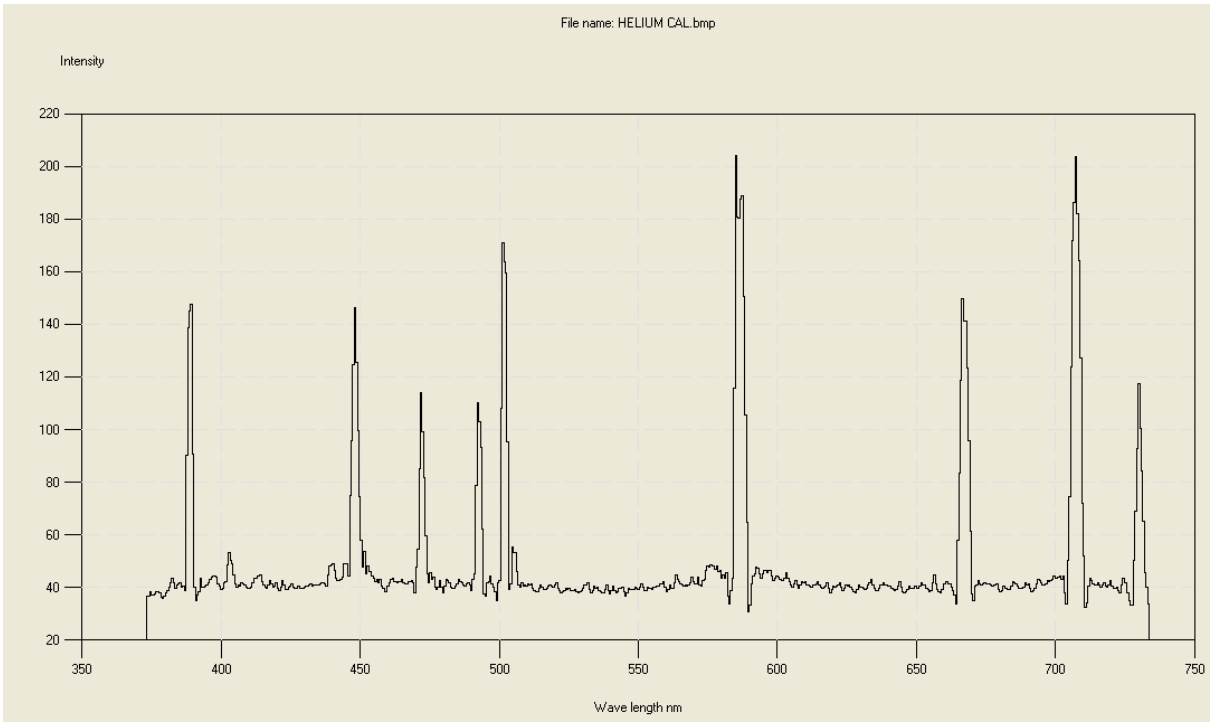
6.2 Plotting a Spectrum Graph

To draw an intensity versus wavelength graph of the spectrum, you need to draw a box to include the region of interest. To do this, click on the **Draw Rectangle** button, and use the mouse to select the region containing the spectrum. A white rectangular box will be drawn over the image of your spectrum to indicate the region of the image to be analysed.

Now select **Analysis X-Axis Projection** to produce your plot



A graph of intensity versus wavelength in nanometres will then be plotted,.



Boxes show the wavelength and the intensity in the spectrum at the point of the cursor. The graph can be printed, or saved as a bitmap or as a csv file suitable for import to a spreadsheet.
For a complete description of all the functions available in PCSpectraLite, see the PCSpectraLite Reference Manual.

7 Technical Specification

Spectral Range	300 ~ 800nm
1 Pixel	0.75nm
Resolution (FWHM)	< 3nm
Wavelength Accuracy	± 1.5nm
Image Size	640 x 480 pixels

Any comments or suggestions, or problems with the installation or use of TVSPEC should be addressed to Dr K H Elliott at the address below.

ELLIOTT INSTRUMENTS LTD

1 Oak Tree Cottage, Lady Hole Lane, Yeldersley DE6 1LR
Telephone: 01335 300856 Email: khelliott@btinternet.com