



EASY USERS GUIDE TO THE HAMAMATSU C5680 STREAK CAMERA

VERSION 1.00

The aim of this manual is to train the user in the basic safe operation of the Hamamatsu Streak Camera C5680 (Not to be confused with the Hamamatsu Femtosecond Streak Camera (FESCA)). For more details on particular functions in the software please refer to the HPD-TA User Manual.

Any comments on this manual will be greatly appreciated.
Rob Heathcote – September 2006

TRANSPORTATION

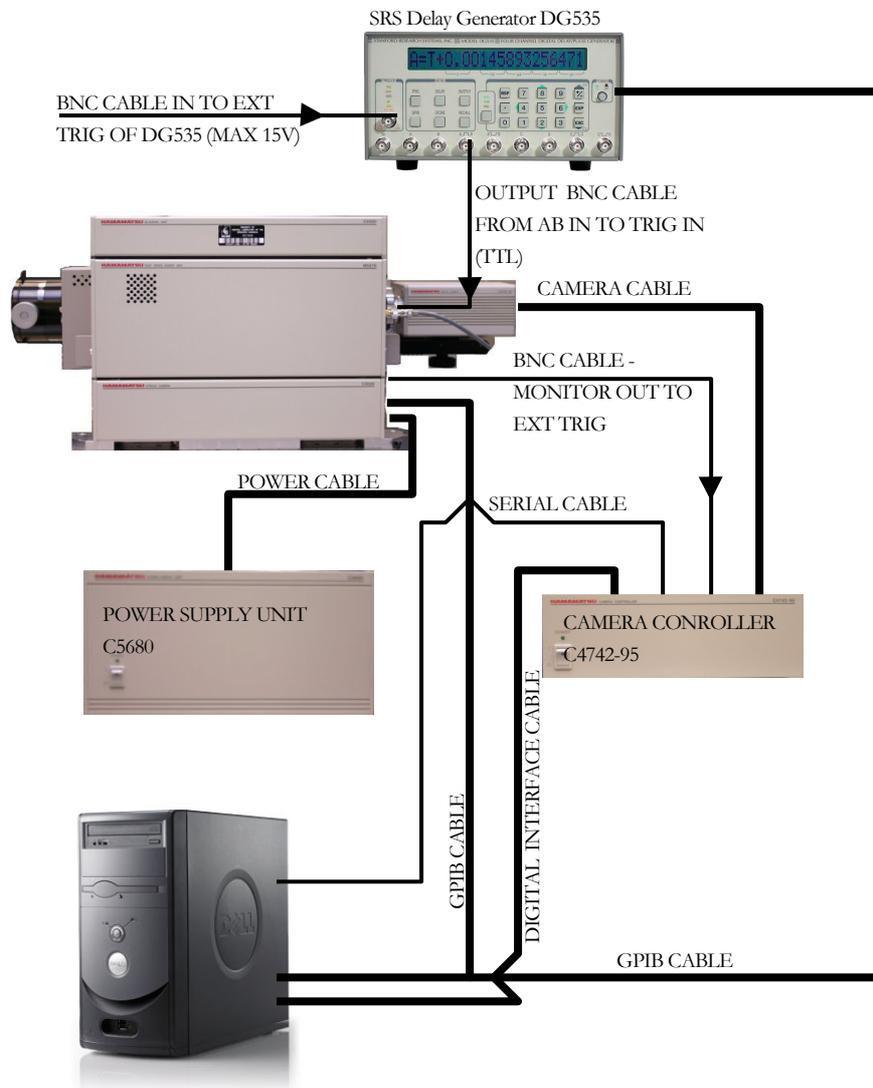
The streak camera should only be moved by a member of the target area staff.

Notes: The camera should only be lifted from its base. The handle at the top is NOT designed to bare the weight of the camera. Take special care not to put any load on the CCD camera or its mount or the entrance slit housing. Only move the streak camera once all cables have been removed.



HARDWARE SETUP

The Streak camera components should be wired in the following way. Once every thing is connected power can be brought on. It is recommended that the power to the controller units and Computer be brought on individually. Before starting the software make a note of the GPIB address of SRS Delay box (DG535) {Address can be found by pressing the GPIB menu button on the front panel.}.



When using a DG535 it is very important that as a 50Ω load is specified for the AB output, that a 50Ω load (50Ω terminator) be present on -AB output as well.

It is not always possible to run the streak camera with a DG535 because of timing issues. The minimum internal delay of a DG535 is 85ns and the maximum internal delay of the streak camera is 83.4ns(@ the 50ns range). The time between trigger and the light needs to be greater than the combined cable and internal delays of the units. If the delays are greater then the DG535 will have to be exchanged for manual delay boxes such as Hamamatsu C1097.



OPERATING THE PROGRAM

The software for running the streak camera is called HPD-TA 32. Before starting the program all components need to be powered up. The current version of the software is 7.00

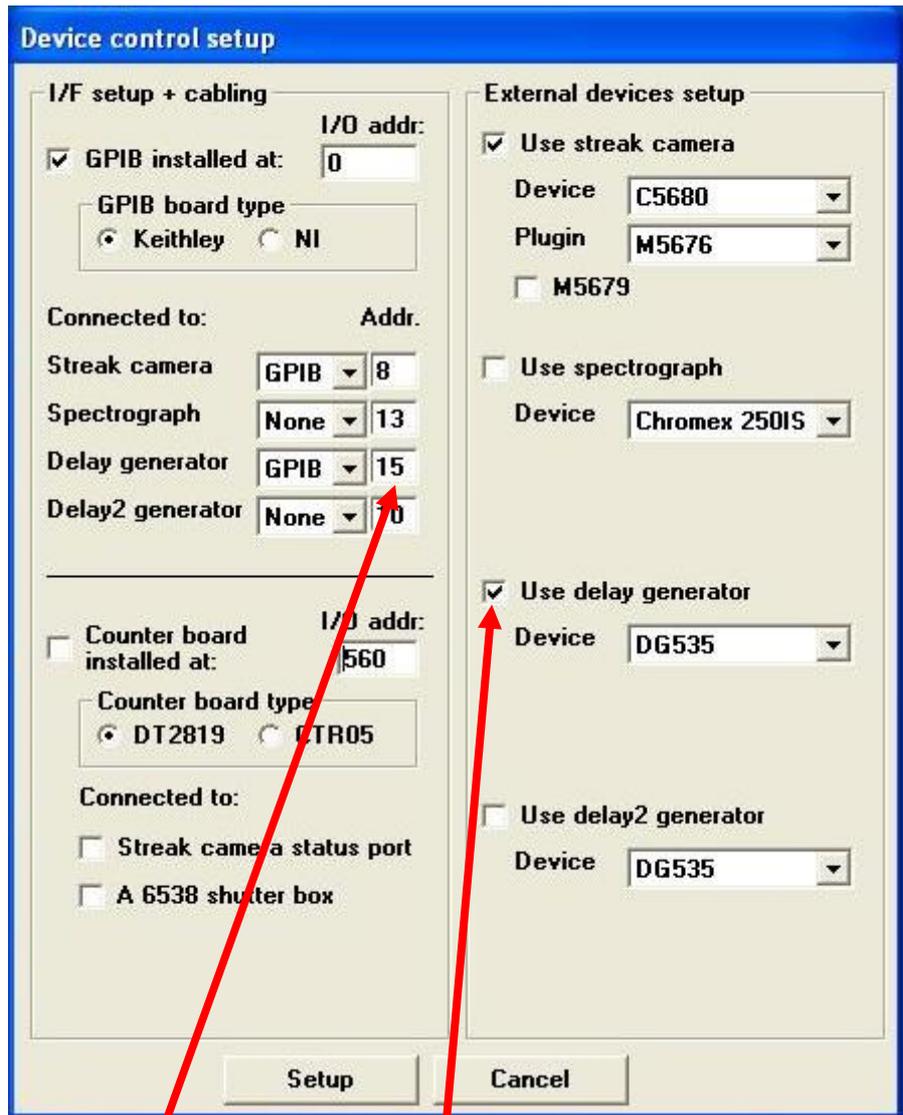
On starting the program the following window will appear.



The camera type should be 4742-95(ORCA)/PCDIG

The streak devices should be C5680/M5676 on GPIB address 8. There may also be a DG535.

If you are running the system with a DG535 Stanford Delay Generator then the GPIB address of the device needs to match it in the program. If a DG535 needs to be added or the address changed click the Setup button.



Use this box to set the correct GPIB address to the DG535 you are using.

Check this box if you are using a DG535.

All other setting should remain as in the diagram above.

Once this is been done and the changes have taken place click OK on the start window.

To start the acquisition controller click the camcorder symbol at the top of the screen.



GENERAL NOTES

The entrance housing consists of transmissive input optics that image the slit on to the cathode. To give the sharpest image for the wavelength the camera is being operated in the camera focusing ring may need to be adjusted.

The vertical position of the slit can be adjusted with the large screw on the top of the entrance housing next to the main body. This will normally not be required.

F8 is a panic button which will instantaneously close the shutter and reduce the gain to zero.

In focus mode you will notice a bright horizontal band across the screen even when the shutter is closed. This is the thermal background/dark current of the cathode. The dimensions of the cathode are 0.15 mm x 5.33 mm. It is therefore important that extreme care is taken when operating this camera, as the slit cannot be moved to another region of the screen if the cathode is damaged.

If you need to capture an image in focus mode then a separate trigger synchronous with the laser will need to be applied to the Ext trig on the rear panel of the CCD controller. This is because the Monitor Out only gives out a signal when the streak camera is sweeping.

Triggering Internal Delays

For the signal to appear at the centre of the screen, the external trigger has to arrive at the camera at the exact times given in Table 1) before the light hits the slit.

Sweep Range ns	Internal Delay ns	Difference ns	Accumulative Difference ns
50	83.4		
20	44.1	39.3	39.3
10	32.4	11.7	51
5	26.8	5.6	56.6
2	16.9	9.9	66.5
1	13.2	3.7	70.2
0.5	18.9	-5.7	64.5
0.2	14.8	4.1	68.6

Table 1 Internal delay values



SCREEN LAYOUT

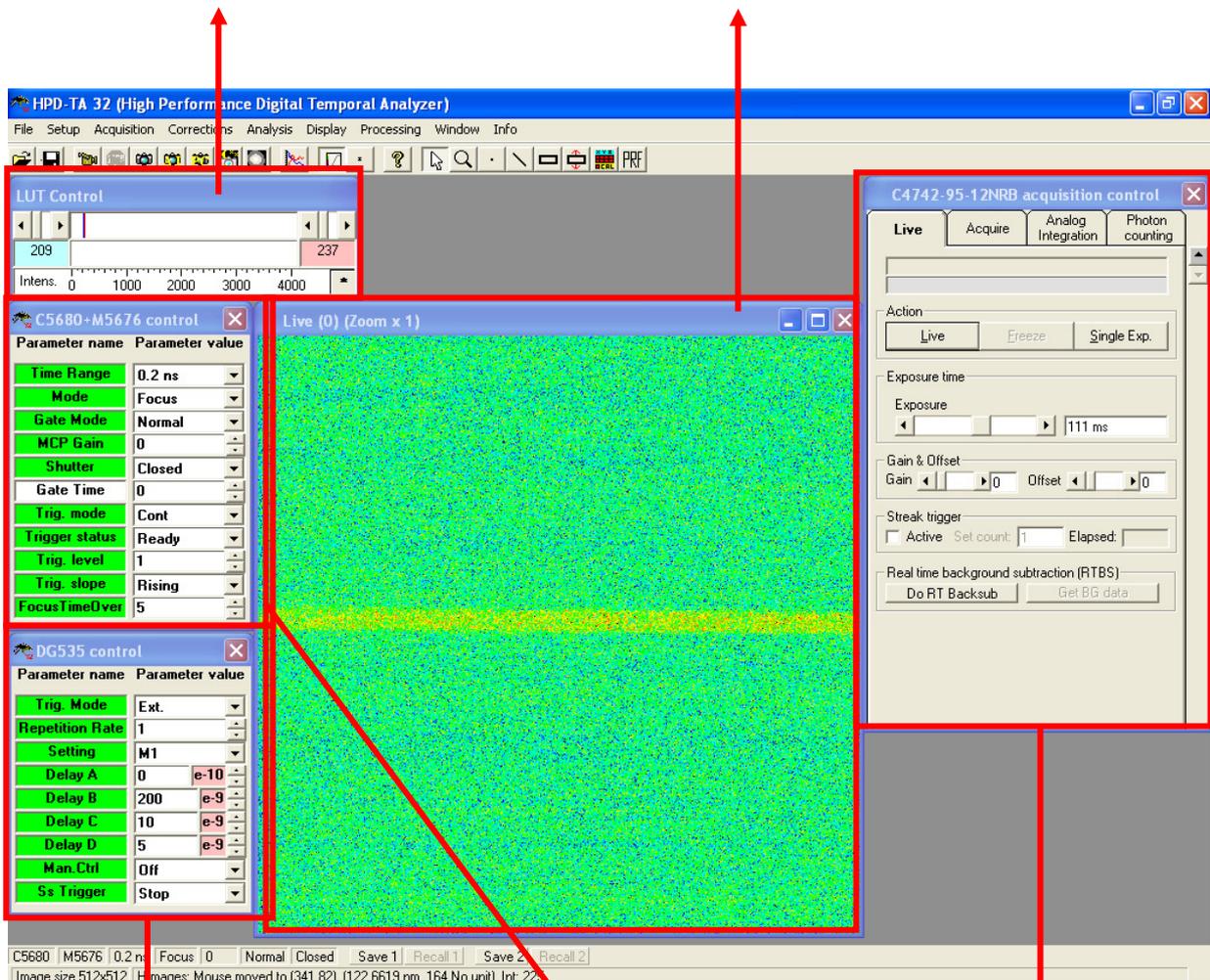
LUT controls (Look Up Table)

Changes the way the image is displayed in the image window. Effectively changes the contrast.

Image window

In “live” the image will be refreshed in the live window.

In acquire each capture will appear in a new window.



DG535 control

This window controls the Stanford Research Systems (SRS) delay generator.

This is only present if one can be used.. See hardware setup

C5680-M5676 control

This is control for the main streak camera unit.

C4742-95-12NRB acquisition control

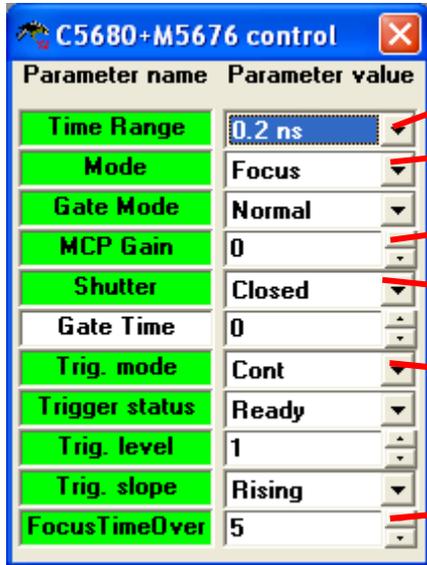
This window controls the image acquisition.



WINDOW EXPLANATIONS:

C5680+M5676 control

This window controls the streak camera.



Changes the sweep range

Changes the operation mode

Controls the value on the MCP (Maximum of 63)

Controls shutter

Changes between allowing single and continuous triggers

The time after which the shutter automatically closes when in focus mode

The manufacturer has recommended that the finder mode not be used as it can easily result in damage to MCP if gain is set >1.

LUT control

This tool changes the contrast of the displayed images on the screen. The asterisk/star button in the right hand lower corner auto scales to the min and max intensity values of the displayed image.

C4742-95-12NRB Acquisition Control

This dialog box is the controls for the CCD camera. For most applications LIVE and ACQUIRE are the only options that will be needed. For the uses of ANALOG INTEGRATION and PHOTON COUNTING please refer to the HPD-TA manual.

LIVE runs the camera either in free run or capture on every trigger.

ACQUIRE lets the CCD capture one frame then stops.

DG535 Control Window

(This only applies for applications where a DG535 can be used)

This dialog box allows you to control a DG535 delay box from the computer. This has the added benefit that it can be setup to remember the delay settings for each Sweep Speed.

The delays are best altered using the up and down arrow keys. To move in steps of 10 hold down either Ctrl, Shift or Alt while using the arrow keys. For steps of 100 hold any combination of 2 of Alt, Shift and Ctrl and for steps of a 1000 hold all 3.



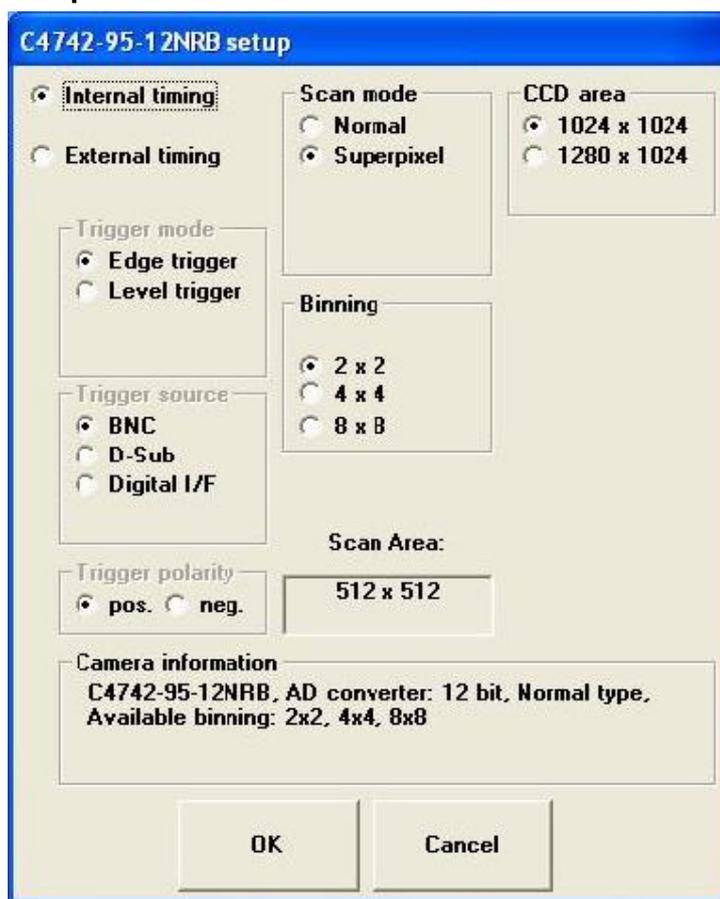
If delays are typed in the return key will need to be pressed before the value changes.

To change the exponent of the range press “E”

To change the setup of the DG535, select ‘manual input’ to ON. This should give you all the options of the DG535 as running it manually.

MENU EXPANATIONS:

Setup>C4742-95-12NRB...



The C4742-95-12NRB setup dialog box should be set as in the diagram above.

The reason why the CCD is set to bin 2x2 is because the limiting factor in resolution is the streak unit itself. Running the CCD camera at its full 1024x1024 pixels does not gain you any more resolution from the system.



Setup>Trigger setup.

Trigger method for operate mode

In ‘Not synchronised’ the CCD camera “free runs” and is similar to the way the camera operates in focus mode.

In ‘Sequential trigger’ the streak camera triggers the CCD to capture. Selecting this prompts you to connect a BNC from the ‘Monitor Out’ on the back of the streak camera to the ‘Trigger in’ on the back of the CCD controller.

If you wish to trigger the CCD in focus mode a separate trigger has to be applied to the back of the CCD controller from another source. In this circumstance this menu does not apply.

Setup>Device Control Options

The only box that should be selected is the *Auto delay (delay box)*. Selecting this option allows the computer to remember the time delay of each sweep rate on the DG535.

Only applicable if a DG535 is used.