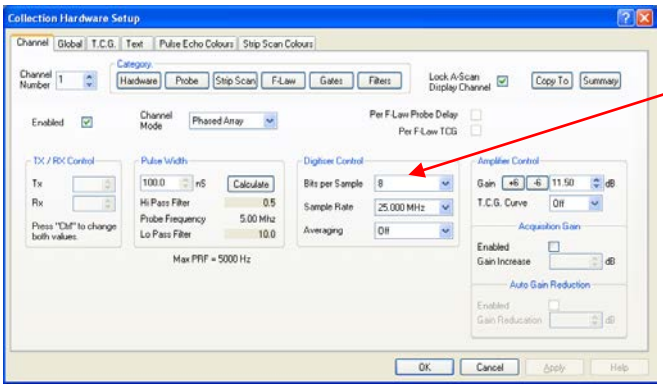
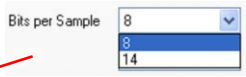
Channel Page – Channel Hardware Category

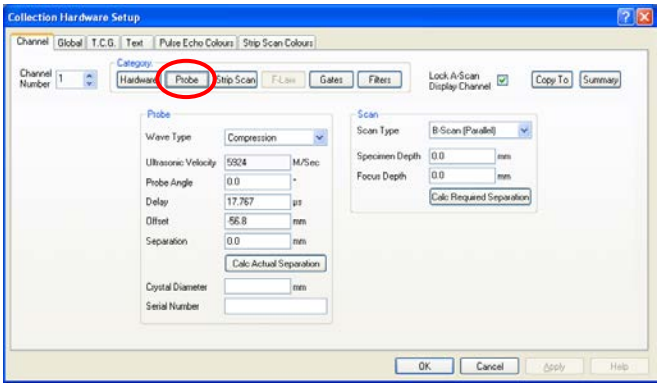


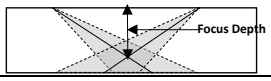


Enabled	Used to Enable/Disable the channel	
Channel Mode	Sets the channel's mode of operation: • ***TOFD*** • ***Pulse Echo*** • ***Phased Array***	
Per F-Law Probe Delay	Checked when per focal law calibration using the wizard has been completed	If manual (theoretical) calibration is carried out, the box will be unchecked.
Per F-Law TCG	Checked when per focal law Time Corrected Gain using the wizard has been completed	If manual (theoretical) TCG is established, the box will be unchecked.
TX/RX Control *(ToFD/Pulse Echo only)*		
TX	This value sets the TX transducer number	The socket to which the probe is connected
RX	This value sets the RX transducer number	The socket to which the probe is connected
Pulse Width		
Pulse Width	Controls the width of the pulse used to excite the TX transducer according to the formula ((1 / TX transducer frequency) / 2)	
Calculate	Opens a dialog box that allows the entry of probe frequency. The software uses this value to select the appropriate pulse width for the transducer	
Hi Pass Filter	Shows the value of the Hi-Pass filter. If the display is RED this indicates that an inappropriate filter has been selected for the transducer frequency If both Hi-Pass & Lo-Pass filter settings are RED, then the filters are crossed i.e. Hi-Pass is set higher than Lo-Pass.	To adjust this value, click the *filters* button.
Probe Frequency	This field shows the appropriate transducer frequency for the selected pulse width. As the pulse width value is modified with the Up/Down keys, this field is updated.	
Lo Pass Filter	Shows the value of the Lo-Pass filter. If the display is RED this indicates that an inappropriate filter has been selected for the transducer frequency.	To adjust this value, click the *filters* button.
Digitiser Control		
Bits per Sample	Sets the bit rate at 8 or 14 bits.	**8 bit**: signal will saturate at 100% FSH **14 bit**: signal will saturate at 400% FSH
Sample Rate	Sets the digitiser frequency along with the Master Clock, which is set in the Global page.	
Averaging	Controls averaging for the channel. For Pulse Echo channels, averaging is performed before peak detection. This gives greatly improved performance for detecting very low amplitude signals.	Signal averaging is software technique used to reduce random noise. Most often used in ToFD applications.
Amplifier Control		
Gain	Controls the channel's gain.	
+6dB / -6dB	Increase / Decreases gain in 6dB steps	
T.C.G. Curve	Used to select an amplitude correction curve for the channel.	The amplitude correction is displayed as a Time Corrected Gain curve (TCG). **See**: *Time Corrected Gain (TCG)* in Appendix A for guidance on setting up TCG and Appendix C for detailed instructions. **Note:** this control is used when the curve is established manually (theoretical). For 'per focal law' TCG, use the wizard.
Acquisition Gain *(Pulse Echo/Phased Array only)*		
Enabled	*Acquisition Gain* allows the user to define an amount of gain that will be added to the base gain during data acquisition. This feature satisfies the requirement of certain inspection procedures to apply additional sensitivity during acquisition.	Also known as **transfer correction.**
Gain Increase	Additional gain to be applied during data collection.	This additional gain may be removed during analysis.

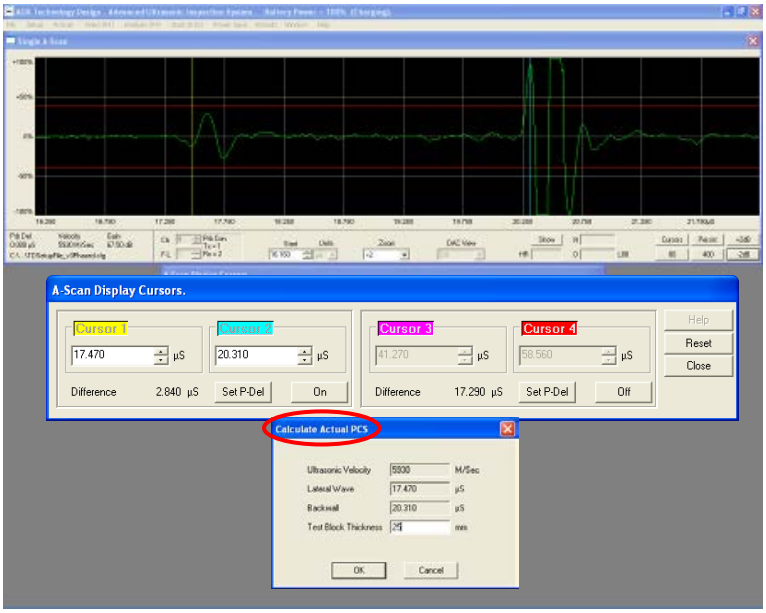
Auto Gain Reduction *(TD Pocket-Scan only)*		
Enabled	*Auto Gain Reduction (AGR)* is a feature that is available to the first 20 Pulse Echo channels. When enabled the currently displayed channel becomes a *Master* channel & a *Slave* channel with the same configuration is automatically created. The channel number of the Slave channel is 1xx, where xx is the channel number of the Master channel. If during data collection, data for the Master channel exceeds 96% FSH, the Slave channel is activated with the specified reduced gain. If the data being collected by the Master is less than 96%, then the slave channel is not activated.	**Example**: If the *Master* is channel **1**, then the *Slave* channel will be **101**.
Gain Reduction	The amount of gain reduction to apply to Slave channels.	

Channel Page – Probe Category - TOFD



Probe		
Wave Type	This field allows the selection of an ultrasonic wave type. Compression or Shear.	**TOFD** inspections are normally performed using **compression** waves.
Ultrasonic Velocity	The programmed velocity for the selected wave type within the material under inspection.	Entered in the Global page.
Probe Angle	The angle at which the ultrasonic energy is imparted into the test material.	Refracted angle.
Delay	The time taken for the ultrasound to travel through the wedge.	This value is normally calculated offline by the software.
Offset	The distance from a datum on the scanner to the subsequent probes.	The datum is usually taken as the centre of the 1st wedge. The offset is the measurement from datum to a subsequent wedge. If the subsequent wedge is trailing the datum then the offset is a **negative** number.
Separation	The distance between the TX and RX transducers.	Probe Centre Separation (**PCS**)
Calc Actual Separation	Opens a dialog box that allows the probe separation to be accurately measured. The TOFD transducers must be placed on a calibration block where the material velocity and thickness are known. Then place the cursors over the lateral wave and backwall signals on the A-Scan display. This method of measuring the separation yields more accurate results in the offline measuring utilities.	If this procedure is executed accurately but errors still occur during analysis, then the material velocity is probably incorrect. **See** '*How to Measure Velocity*' in Appendix A for procedure.
Crystal Diameter	Provides a space to enter the probe crystal diameter	Used by the auto-reporting facility and may be left blank
Serial Number	Provides a space to enter the probe serial number	Used by the auto-reporting facility and may be left blank
Scan		
Scan Type	B-Scan (Parallel) / D-Scan (Non-Parallel). This value controls the mathematical formulae used during off-line data analysis.	In relation to a weld, *Non-Parallel* is when the probes are moved along the **length** of the weld (direction of sound is at 90° to probe movement) and *Parallel* is **across** the weld (direction of sound is the same direction as probe movement)
Specimen Depth	The depth (thickness) of the material under test.	
Focus Depth	The required focus depth. This value is used to calculate the required transducer separation.	The depth at which the lines of highest sound pressure (probe angle) cross. 
Calc Required Separation	Determines the optimum probe separation to focus the ultrasonic energy at the specified focus depth. **(Values for Focus Depth and Probe Angle are needed for the calculation)**	**See** '*Calc Required Separation*' in Appendix A for procedure.

Channel Page – Probe Category – TOFD – Calculate Actual PCS (Separation)



Ultrasonic Velocity	The programmed velocity for the selected wave type within the material under inspection.	Entered in the Global page.
Lateral wave	Move **Cursor 1** (yellow) to the a point on the **lateral** wave signal	The peak (+ or -) of the first deflection is a convenient point
Backwall	Move **Cursor 2** (cyan) to the a point on the **backwall** signal	Use the corresponding opposite phase peak to that chosen for the lateral wave.
Test Block Thickness	The wall thickness of the material through which the sound is travelling.	

Channel Page – Probe Category – TOFD – Calculate Required PCS

Clicking the **Calc Required Separation** button displays the **Result** dialogue. The dialogue box displays the Probe Centre Separation (PCS) using the following formula *2 x (focus depth x Tanθ)*.

iii. Calculate Required Separation (PCS)

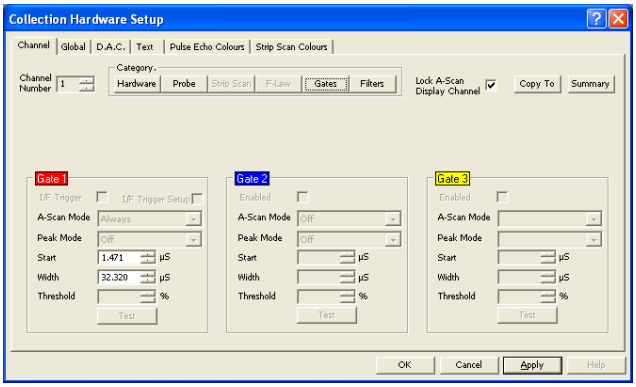
a. On the **Probe** page, *click* the **Calc Required Separation** button.
b. The **A-Scan Display Cursors** window appears. Move the yellow cursor to a point on the lateral wave signal and the cyan cursor to the corresponding opposite phase on the backwall signal.
c. Enter the material thickness.
d. *Click* **OK**.
e. The correct *Probe Centre Separation* (PCS) is now displayed in the **Separation** text box.
f. The following formula is applied:

$$2(t \times \tan\theta)$$

Example:
Focus Depth=25mm
Wedge angle = 60°

2(25 x tan 60)
2(25 x 1.73) = 86.6mm (PCS)

Channel Page – Gates Category - TOFD



TOFD channels only have 1 data collection gate, and are drawn in RED on the A-Scan display.

Start	This is the start of the data collection data	Measured in microseconds(µs)
Width	This is the width of the data collection gate	Measured in microseconds(µs)