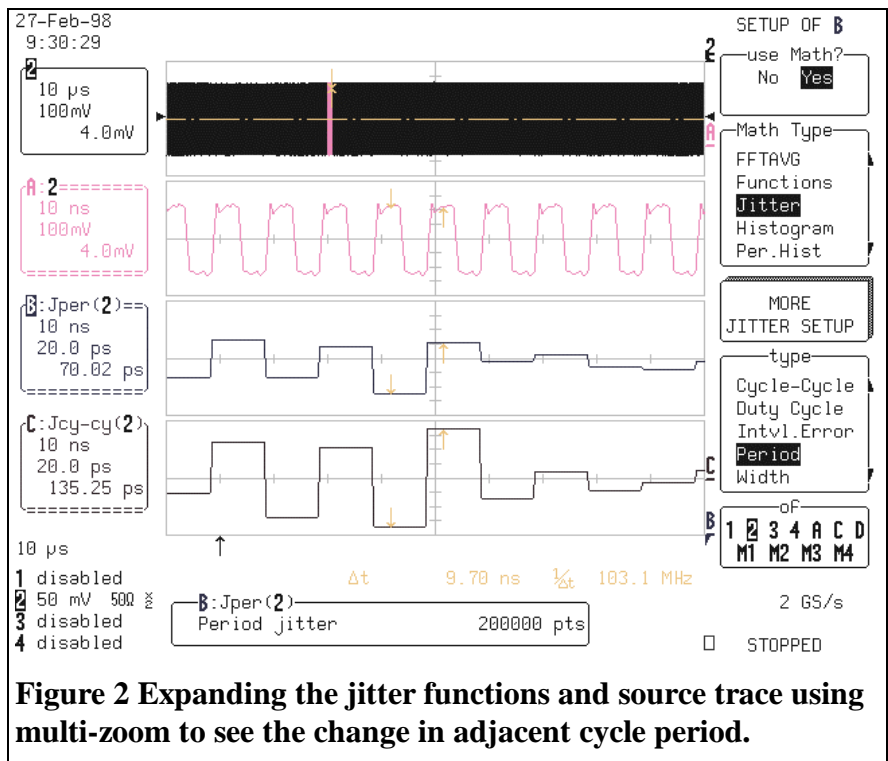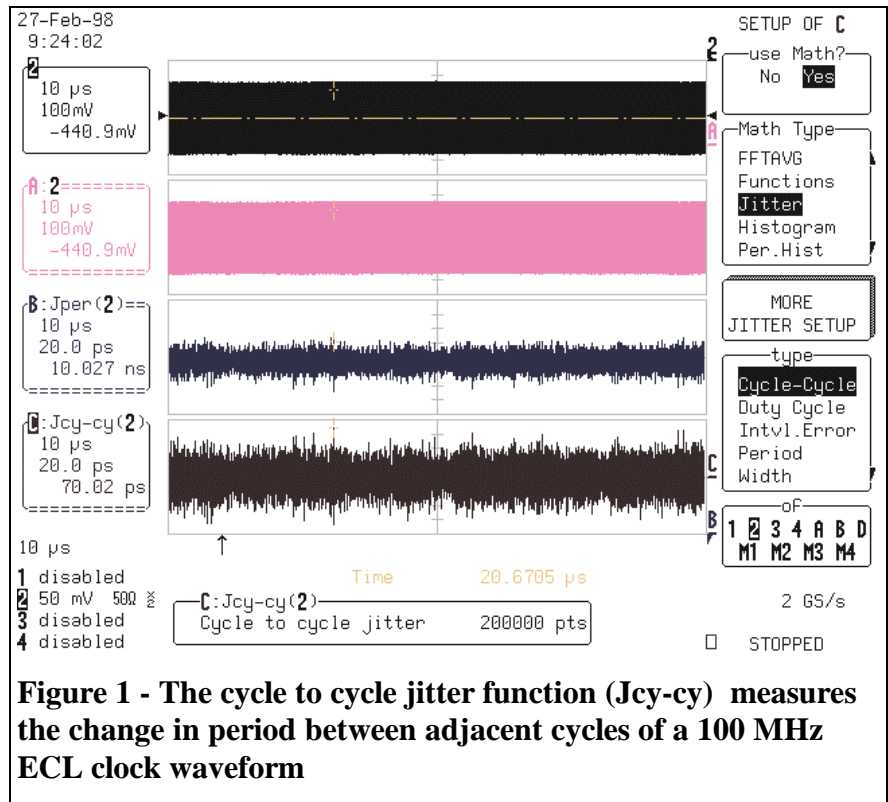# *Finding Maximum Incremental Jitter*

Locate Largest Cycle To Cycle Timing Changes

The jitter functions in LeCroy's new jitter and timing analysis option provide a fast way to locate timing errors in long data records. It can measure the incremental changes in timing on a cycle to cycle basis. This makes it possible to measure and locate the minimum and maximum incremental changes in the width, period, or duty cycle on a timing signal.

Consider the 100 MHz ECL clock waveform shown in the top trace of figure 1. Trace B, third from top, is the jitter function of period. The plot shows the variation in period on a cycle by cycle basis for 10,000 cycles of the clock. The number of cycles of the clock analyzed using the jitter functions is limited only by memory availability in the scope

The bottom plot of cycle to cycle jitter function (Trace C) shows the differences in the period value from the previous cycle. The absolute time cursor marks the highest peak in the derivative plot and reads the value as 70.0 ps in the trace label box to the left of the display.

By expanding the jitter function about the maximum adjacent cycle difference using the multi-zoom function it is possible to locate the two cycles which contain the maxima. The result

Figure 1 - The cycle to cycle jitter function (Jcy-cy) measures the change in period between adjacent cycles of a 100 MHz ECL clock waveform

Figure 2 Expanding the jitter functions and source trace using multi-zoom to see the change in adjacent cycle period.

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of this operation, shown in figure 2, where trace A, the expansion of the source trace, is expanded in step with the jitter functions trace B and C.

The relative time cursors are used to read the period change on the jitter period function in trace B. The cursor readout, shown in the trace annotation box for Trace B is 70 ps. Note that the jitter functions are plotted as a function of time and there is a one to one correspondence between the jitter functions and the source trace.

In figure 3 the parameter cursors were used to show the two cycles with the maximum difference in period.

The parameter maximum (C) reads the actual difference in period between the adjacent cycles as 70 ps. The maximum difference can also be derived from the minimum and maximum parameter readouts for trace B, the plot of the jitter period function.

In this example the maximum adjacent cycle difference in period was found using the cycle to cycle jitter function. The other jitter functions, available in the jitter and timing analysis option provide measurements of duty cycle, period, width, and interval error. In addition these same functions, available as parameters, can be histogrammed or trended for additional analysis.
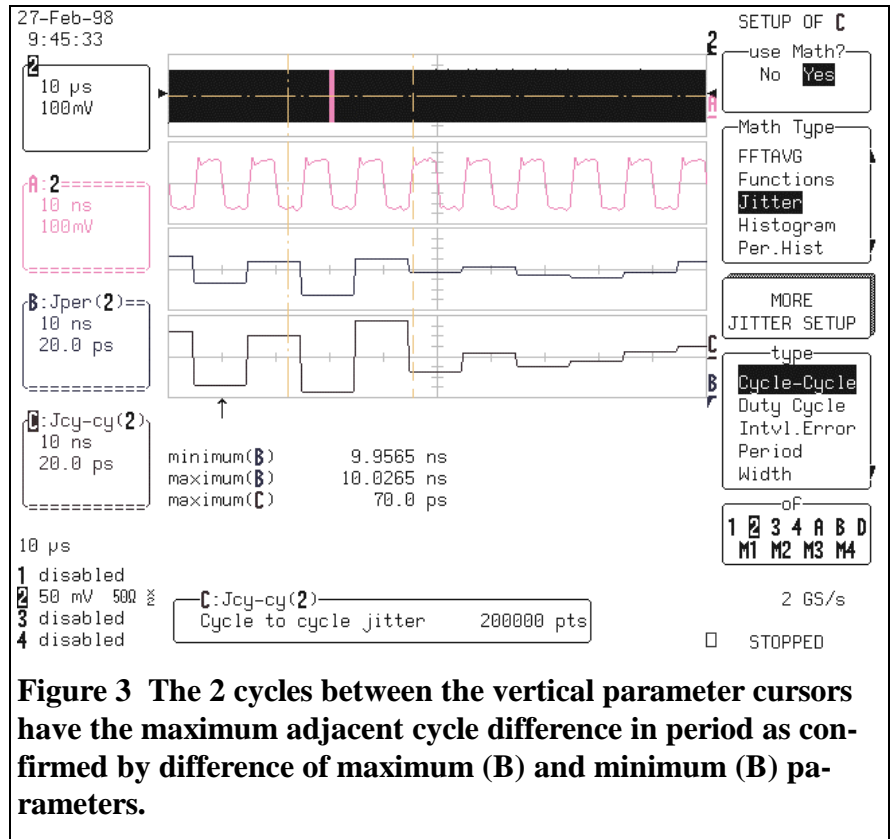
Figure 3 The 2 cycles between the vertical parameter cursors have the maximum adjacent cycle difference in period as confirmed by difference of maximum (B) and minimum (B) parameters.