AIC Digital Filter

The digital filter function (FLtr) which is standard on many AIC instruments operates as a “weighted averaging” filter. The filter is designed to reduce the effects on the display value of electrical noise interference. A description and examples of the basic operations involved is given below.

Basic operation

The digital filter function compares the value of the new input sample with the previous value displayed and multiplies this by a weighting factor which is dependent upon the filter setting. The resultant value is then displayed. The higher the filter setting, the more it will be calculated that the input change is due to noise and hence the closer the resultant will be to the previous value. Note: A factor which will bias the display more towards the new value is applied if the difference between the old and new values is great. The filter setting can also affect the display update time, as the filter setting increases the display update time increases.

The basic formula used is:

$$Displayed\ value = \frac{((2^n - 1)\ x\ OLD\ VALUE\ ) + NEW\ VALUE}{2^n}$$

Where n = the digital filter (FLtr) setting.

Examples: The 3 examples below show the effect of 3 different filter settings on the displayed value. For these examples the old input value is 100 and the new input value is 120. Decimal points in the result have been rounded.

Example 1 - Filter setting of 1

$$Displayed\ value = \frac{((2^1 - 1)\ x\ 100) + 120}{2^1} = \frac{220}{2} = 110$$

Example 2 - Filter setting of 3

$$Displayed\ value = \frac{((2^3 - 1)\ x\ 100) + 120}{2^3} = \frac{820}{8} = 103$$

Example 3 - Filter setting of 5

$$Displayed\ value = \frac{((2^5 - 1)\ x\ 100) + 120}{2^5} = \frac{3220}{32} = 101$$