

Read the minimum time constant for this entry. For example, if the slope is 12 dB/oct, the reserve is 64 dB, and the X expand is 10 (20 dB), then the DC gain is 84 dB and the min time constant is 100  $\mu$ s.

Time constant is a low priority parameter. If the sensitivity, dynamic reserve, filter slope, or expand is changed, and the present time constant is below the new minimum, the time constant WILL change to the new minimum. Remember, changing the sensitivity may change the reserve and thus change the time constant.

The message 'tc chnG' will be displayed to indicate that the time constant has been changed, either by increasing the detection frequency above 200 Hz, or by changing the sensitivity, dynamic reserve, filter slope, or expand.

The time constant also determines the equivalent noise bandwidth (ENBW) of the low pass filter. This is the measurement bandwidth for X and Y noise and depends upon the time constant and filter slope. (See the Noise discussion in the SR830 Basics section.)

## FILTER OVLD

The OVLD led in the Time Constant section indicates that the low pass filters have overloaded. Increase the time constant or filter roll-off, or decrease the dynamic reserve.

### Analog Outputs with Short Time Constants

When using short time constants below 10 ms, the X and Y analog outputs from the rear panel or the CH1 and CH2 outputs configured to output X or Y should be used. These outputs have a 100 kHz bandwidth and are accurate even with short time constants. CH1 or CH2 outputs proportional to the Displays (even if X or Y is displayed) are updated at a 512 Hz rate. These outputs do not accurately reflect high frequency outputs.

## [Slope /oct]

This key selects the low pass filter slope (number of poles). Each pole contributes 6 dB/oct of roll off. Using a higher slope can decrease the required time constant and make a measurement faster. The filter slope affects the minimum time constant (see above). Changing the slope may change the time constant if the present time constant is shorter than the minimum time constant at the new filter slope.

## [Sync Filter]

Pressing this key selects no synchronous filtering or synchronous filtering on below 200 Hz. In the second case, the synchronous filter is switched on whenever the detection frequency decreases below 199.21 Hz and switched off when the detection frequency increases above 203.12 Hz. The detection frequency is the reference frequency times the harmonic detect number. The SYNC indicator in the CH1 display is turned on whenever synchronous filtering is active.

When the synchronous filter is on, the phase sensitive detectors (PSD's) are followed by 2 poles of low pass filtering, the synchronous filter, then 2 more poles of low pass filtering. The low pass filters are set by the time constant and filter slope. If the filter slope requires less than 4 poles (<24 dB/oct), then the unused poles are set to a minimum time constant.