CLAIMS

~~What is claimed is:~~

1. A frequency monitor comprising:

an input for receiving a signal to be measured;

a signal feature extractor identifying a regular feature of the signal related to the signal's period;

a timer system including a clock providing a periodic clock signal communicating with a counter counting the periodic clock signal between detection signals from the signal feature extractor identifying a regular feature of the signal, the timer system communicating with the signal feature extractor to provide an output being a function of the period of the signal; ~~and~~

an inverter receiving the output and converting the period of the signal to a frequency to provide a measured frequency output; and

a low pass filter receiving the measured frequency output to reduce high frequency fluctuations in the measured frequency output ~~value~~ to provide a ~~measurement~~ corrected frequency output for monitoring frequency of the signal, wherein the low pass filter is in communication with the clock to sample the measured frequency output at the same rate as the clock, and wherein the low pass filter includes an input for adjusting a corner frequency of the low pass filter.

2. The frequency monitor of claim 1 wherein the signal is a square wave and the feature extractor is an edge detector.

~~3. The frequency monitor of claim 1 or 2 wherein the timer system includes a timer measuring the period of the signal and an inverter converting the period to frequency.~~

~~4. The frequency monitor of claim 3 wherein the timer is a clock providing a periodic clock signal communicating with a counter counting the periodic clock signal between detection signals from the signal feature extractor identifying a regular feature of the signal.~~

~~5~~3. The frequency monitor of claim ~~4~~ 1 or 2, wherein the output of the clock is a digital word and the low pass filter is a digital low pass filter.

~~6~~4. The frequency monitor of claim ~~4~~ 1 or 2, wherein the output of the clock is an analog voltage and ~~a~~ the low pass filter is an analog low pass filter.

~~7. The frequency monitor of any of the preceding claims further including an input to the low pass filter adjusting a corner frequency of the low pass filter.~~

85. The frequency monitor of any of the preceding claims wherein the low pass filter is a four-pole infinite impulse response filter.

96. A method of monitoring frequency comprising the steps of:

(a) receiving at an input of an electrical circuit an electricala signal to be measured;

(b) extracting from the electrical signal, by a signal feature extractor circuit of the electrical circuit, regular features of the signal related to the signal's period;

(c) measuring a the period of the electrical signal, by a timer system communicating with the signal feature extractor circuit and including a clock providing a periodic clock signal communicating with a counter counting the periodic clock signal between detection signals from the signal feature extractor circuit extracting regular features of the signal, as demarcated by the regular features and outputting an output being a function of the period of the signal; and

(d) inverting the output and converting the period of the signal to a frequency to provide a measured frequency output;

(de) filtering the measured frequency output with a low pass filter to reduce high frequency fluctuations in the measured frequency output to provide a measurementcorrected frequency output representing a frequency of the signal, wherein the low pass filter communicates with the clock to sample the measured frequency output at the same rate as the clock; and

(f) adjusting a corner frequency of the low pass filter.

107. The method of claim 9 6, wherein the signal is a square wave and the regular feature is an edge of the square wave.

11. The method of claim 9 or 10 wherein the output signal being a function of the period of the signal is a frequency of the measured signal derived from an inversion of the period of the measured signal.

~~12. The method of any of claim 9–11 wherein the period of the signal is obtained by providing a periodic clock signal to a counter counting the periodic clock signal's regular features of the signal.~~

~~13~~8. The method of claim ~~12~~ 6 or 7, wherein the output of the ~~clock~~ counter is a digital word and the filtering is done with a digital low pass filter.

~~14~~9. The method of claim ~~12~~ 6 or 7, wherein the output of the ~~clock~~ counter is an analog voltage and the filtering is done with an analog low pass filter.

~~15. The method of any of claim 9–14 wherein the filtering is done with a low pass filter including the step of adjusting a corner frequency of the low pass filter.~~

~~16~~10. The method of any one of claims ~~15~~6 to 9, wherein the low pass filter is a four-pole infinite impulse response filter.

~~17~~11. An input module for an industrial control system providing a housing with a backplane providing power to and data communication between multiple modules fitting within the housing; the input module comprising:

an input for receiving a signal to be measured;

a signal feature extractor circuit identifying a regular feature of the signal related to the signal's period;

a timer system circuit including a clock providing a periodic clock signal communicating with a counter counting the periodic clock signal between detection signals from the signal feature extractor identifying a regular feature of the signal, the timer system circuit communicating with the signal feature extractor to provide an output being a function of the period of the signal;

an inverter receiving the output and converting the period of the signal to a frequency to provide a measured frequency output;

a low pass filter circuit receiving the measured frequency output to reduce high frequency fluctuations in the measured frequency output ~~value~~ to provide a ~~measurement~~ corrected frequency output for monitoring frequency of the signal, wherein the low pass filter is in communication with the clock to sample the measured frequency output at the same rate as the clock, and wherein the low pass filter includes an input for adjusting a corner frequency of the low pass filter; and

an output terminal communicating with ~~a~~ the backplane of the housing of the industrial controller for transmitting the ~~measurement~~ corrected frequency output thereon.