SUMMARY

[0008] In a first aspect, the present disclosure provides an analog signal source comprising two or more digital-to-analog converters (DAC) combined to generate one or more frequency components. The analog signal source comprises a first path for generating substantially low frequency signals, the first path comprising a first one of the DACs. The analog signal source comprises a second path for generating substantially high frequency signals, the second path comprising a second one of the DACs. The analog signal source also comprises a data processor for processing an input signal and providing the processed input signal to the first and second paths. The analog signal source comprises a combining circuit configured to combine outputs of the first and second paths into the source signal. The analog signal source comprises a feedback portion configured to sense the source signal. The analog signal source comprises a servo loop configured to use the sensed source signal to adjust as need to maintain the source signal to substantially agree with the input signal.

[0009] In some embodiments, the data processor providing the processed input signal to the first and second paths comprises at least one of: feeding a DC input to the first path; feeding a low frequency input to at least one of the first path and the second path; and feeding a high frequency input to at least one of the first path and the second path. The servo loop maintaining the source signal to substantially agree with the input signal may comprise at least one of: removing DC errors; removing low frequency errors; and maintaining an integrity of the high frequency signals. A bandwidth of the feedback portion may be substantially higher than a bandwidth of the first path. The feedback portion sensing the source signal may comprise comparing the input signal to the output signal. The data processor processing an input signal may comprise at least one of: removing high frequency signals that are higher than a bandwidth of the first path but within a bandwidth of the feedback portion; and removing high frequency signals that are higher than a bandwidth of the feedback portion and higher than a bandwidth of the first path.

[0010] The first path may be configured for direct current (DC). The feedback portion may comprise at least one analog-to-digital converter (ADC). The data processor may comprise ADC feedback and the data processor processing an input signal may comprise: comparing the input signal to the source signal; and removing from the input signal high frequency signals that are higher than a bandwidth of the

configured to generate harmonic signals. The second path may be configured to generate harmonic signals. The signal source may comprise a third path configured to generate harmonic signals.

[0012] The signal source may be used in conjunction with at least one of a voltage source, a current source, a power supply, a source measure unit, a temperature controller, a materials parameter measurement system, and a radio frequency (RF) source. The combining circuit may be configured to combine outputs of the first and second paths into more than one source signal. The signal source may be configured to operate as a controller for a source measure unit. The combining circuit may be configured to combine outputs of the first and second paths into at least one harmonic signal.

[0013] In a second aspect, the present disclosure provides a method of sourcing a signal, the method comprising providing an input signal to a data processor and processing the input signal via the data processor. The method also comprises sending the processed input signal via the data processor to a first and second path, the first and second paths each comprising two or more DACs to generate two or more frequency components. The method also comprises generating, via the first path, a first path output of substantially low frequency signals; generating, via the second path, a second path output of substantially high frequency signals; combining the first and second path outputs into a source signal via a combining circuit; and sensing the source signal via a feedback portion. The method further comprises providing, via the feedback portion, the sensed source signal to a servo loop; and using the sensed source signal to maintain, via the servo loop, the source signal to substantially agree with the input signal.

BRIEF DESCRIPTION OF DRAWINGS

[0014] FIG. 1A illustrates a non-hybrid source signal chain 100 that applies the same gain chain to both AC and DC components.

[0015] FIG. 1B shows a 100 mV AC signal superimposed on a 5V DC signal to illustrate the difficulty of configuring gain in signal chain 100 for both signals.

[0016] FIG. 1C is an inset of the 100 mV AC signal shown in FIG. 1B.