

HF2LI 锁相放大器



产品描述:

瑞士苏黎世仪器 (Zurich Instruments) 的 HF2LI锁相放大器 (高频, 双通道) 是可以测量从直流到 50 MHz 频率范围的数字锁相放大器。它具备双输入通道, 可以替代许多需要用到2台单通道锁相放大器的情况。128位的数字信号处理提供卓越的精确度, 因而提高噪声性能和动态储备。通过这些前所未有的功能, HF2LI把锁相放大器提高到了新的水平, 并能够应用到频率要求更高的更多的场合, 以前模拟仪器的频率范围受到了极大的限制。高速数据采集可通过高速USB连接计算机来实现。HF2LI具有强大的图形用户界面和多种编程接口, 使用非常方便。

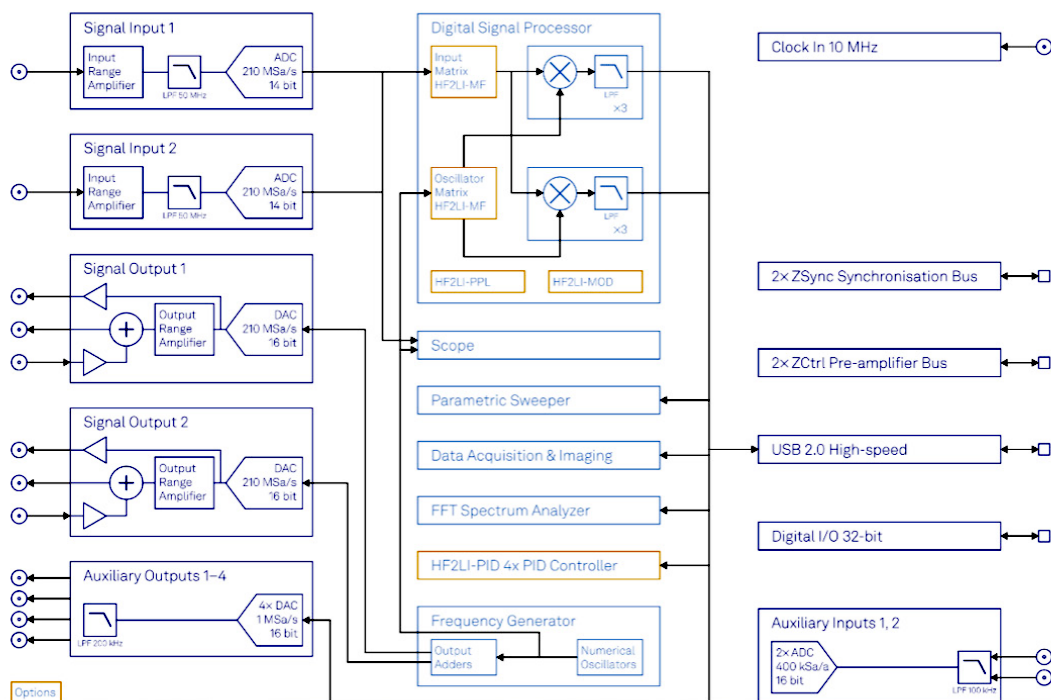
产品特点:

- ★ 采样率210 MSa/s, 频率范围DC - 50 MHz
- ★ 2 个独立锁相通道, 2 个信号源
- ★ 每通道提供基波和 2 个谐波测量
- ★ 4 个辅助输出, 2 个辅助输入
- ★ 高速 USB 2.0, 480 Mbit/s
- ★ LabOne 软件包: 示波器, 参数扫描仪, 频谱分析仪等等

产品应用:

- ★ 传感和驱动: MEMS陀螺仪, 加速度计微流体
- ★ 非线性成像: CARS, SRS, 太赫兹等
- ★ 激光光谱原子力显微镜 (AFM)
- ★ 扫描探针显微镜 (SPM)
- ★ 无损检测医疗技术

功能图解:



高精度输入

HF2LI 的双输入通道经优化设计达到超低噪声水平。高达模拟输入带宽 4 倍的 210 MSa/s 采样率充分保证信号的完全捕获信号并避免混叠。

信号输出

HF2LI 的 2 路高频输出来源于最多 6 个直流到 50 MHz 的正弦波线性组合。当启用 HF2LI-MF 多频选件时，即可以为每个正弦波分量设置振幅、频率和相移。

解调器和滤波器

HF2LI 提供 6 个双相解调器。每个解调器都可通过自带的滤波器做独立设置，包括从 1 μ s 到 500s 的时间常数（相当于 80 μ Hz 到 200kHz 的解调信号带宽）和 1 到 8 阶滤波器。滤波器基于先进的 128 位数字架构。相对普通模拟仪器来说，优势是具备更高的动态储备、零点漂移、精确相移和正交性。

集成工具组

2048 点存储深度的集成示波器提供直观的输入信号时域和频域视图。用户可以随时看到输入的和生成的信号，由此可迅速找到正确的设置。频率响应分析仪可提供精确的频响图。FFT 频谱分析仪可提供由锁相放大器解调出的高分辨率频谱图。



锁定操作模式:

内部参考模式	Single and dual lock-in
外部参考模式	Single and dual lock-in
自动参考模式	Single and dual lock-in
三谐波频率模式	1 fundamental + 2 harmonics (simultaneous)
多谐波频率模式	1 fundamental + 5 harmonics (simultaneous), with HF2LI-MF
任意频率模式	6 frequencies, with HF2LI-MF

高频模拟输入:

Frequency range	DC - 50 MHz
Input impedance	50 Ω or 1 M Ω 20 pF
Input noise voltage	5 nV/ $\sqrt{\text{Hz}}$ (above 10 kHz)
Dynamic reserve	120 dB
Input range	± 3.3 V
Input AC range	± 1.5 V (with DC coupling)
Input full range sensitivity	1 nV to 1.5 V
A/D conversion	14 bits, 210 MSa/s

HF analog output:

Frequency range	DC - 50 MHz
Output ranges	± 10 mV, ± 100 mV, ± 1 V, ± 10 V
Signal adder	± 10 V, DC to 50 MHz bandwidth
D/A conversion	16 bits, 210 MSa/s



Demodulator and reference:

Number of demodulators	6 dual-phase
Output sample rate	On USB: up to 460 kSa/s On auxiliary outputs: 1 MSa/s
Filter time constant	1 μ s - 500 s
Filter bandwidth	80 μ Hz - 220 kHz
Filter slope	6, 12, 18, 24, 30, 36, 42, 48 dB/Oct
X, Y, R, Theta	64-bit full range
Reference frequency resolution	0.7 μ Hz
Reference phase angle resolution	1.0 μ°

Scope:

Input channels	Signal inputs, signal outputs
Scope modes	Time domain, frequency domain (FFT)
Number of display channels	1
Trigger channels	Signal inputs, signal outputs, oscillator phases, DIOs
Trigger modes	Edge
Sampling rates	6.4 kSa/s to 210 MSa/s
Vertical resolution	14 bits
Maximum number of samples per shot	2048
Bandwidth limit mode, vertical resolution increase	Sample decimation, averaging
Cursor math	Location, area, wave, peak, tracking, histogram



Spectrum Analyzer:

Center frequency range	0 - 50 MHz
Spectrum modes	FFT($X+iY$), FFT(R), FFT(Θ), FFT(f) and FFT($(d\Theta/dt)/2\pi$)
Statistical options	Amplitude, spectral density, power
Averaging modes	None, exponential moving average
Maximum number of samples per spectrum	8.4 MSa
Maximum span	460 kHz
Window functions	Rectangular, Hann, Hamming, Blackman Harris
Cursor math	Location, area, wave, peak, tracking, histogram

Sweeper:

Scan parameters	Oscillator frequency, demodulator phase shift, auxiliary offset, signal output amplitudes, etc.
Parameter sweep ranges	Full range, linear, logarithmic
Parameter sweep resolution	Arbitrary, defined by start/stop value, number of sweep points
Display parameters	Demodulator output (X , Y , R , Θ , f), auxiliary input
Display options	Single plot, dual plot (e.g., Bode plot), multi-trace
Statistical options Preset measurement modes	Amplitude, spectral density, power Parameter sweep, noise amplitude measurement, frequency response analyzer, 3-omega-sweep

Auxiliary signals:

High-speed outputs	4 channels, ± 10 V, amplitude, phase, frequency, X/Y, or user-defined
D/A converter	16 bits, 1 MSa/s
D/A analog bandwidth	200 kHz
High-speed inputs	2 channels, ± 10 V
A/D converter	16 bits, 400 kSa/s
A/D analog bandwidth	100 kHz

Other interfaces:

Host connection	USB 2.0, 480 Mbit/s
Pre-amplifier control bus	ZCtrl proprietary bus to control external pre-amplifiers
Synchronization bus	ZSync proprietary bus to locally interconnect ZI instruments
Digital I/O	32 bits, general purpose

一般规格:

Dimensions	45 x 35 x 10 cm (19" rack)
Weight	6.2 kg
Power supply	110-120 V, 220-240 V, 50/60 Hz
Operating temperature	+5 ° C to +40 ° C
Operating environment	IEC61010, indoor location, installation category II, pollution degree 2
Operating altitude	Up to 2000 m
Internal oscillator output	Sine, ± 1 V, 10 MHz
Internal oscillator initial accuracy	± 1.5 ppm
Internal oscillator temperature coefficient	0.05 ppm/C