22 bit / 1Msps Waveform Digitizer

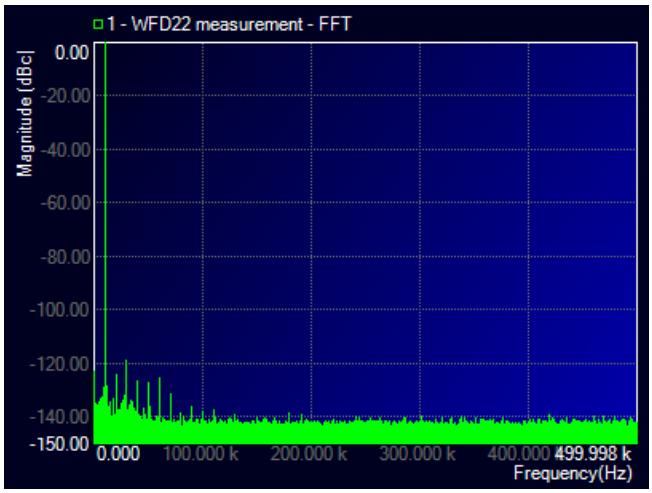
WFD22

- 1 MHz sample rate with 22 bit resolution
- Fully differential input with 10 ranges
- 100MΩ low I-bias, 1MΩ Ultra-low noise input
- 1.5ppm typical linearity
- ±(25µV + 10ppm of range) absolute accuracy
- Selectable filters to reduce out-of-band noise
- -122dB THD typical (f-in=1kHz)
- 105dB SNR typical (DC-500kHz)
- Programmable DC-offset voltage
- For ATX series hardware platform

The WFD22 is a 22 bit Waveform Digitizer for medium-speed / high resolution waveform capturing and analyzing. It combines superior dynamic performance with a very high DC accuracy.

The module features fully differential inputs to reduce common-mode level disturbances. It can also be used in Single Ended mode where an internal DC-offset source sets the midscale level. In this mode the negative input can be used as a GND Sense input, so the DC performance won't be compromised due to ground currents.

The user can select between a 100MΩ low bias current input for highest absolute accuracy, or a 1MΩ ultra-low noise input for highest dynamic performance.



DC to 500kHz spectrum, 10kHz carrier, no filtering

There are 10 input ranges from 0.425Vpp to 10.2Vpp, which allows easy adaptation to a wide range of Device Under Test output voltages.

A filter-bank with 3 Low Pass filters (40kHz, 250kHz and 500kHz) provides excellent signal conditioning resulting in lower noise and proper anti-aliasing.

Our proprietary technology combines four 20 bit ADCs to create an advanced 22 bit converter. This results in excellent SNR and linearity with a resolution down to 0.1µV. The large capture memory of 32M-word (96MB) allows capturing long waveforms. This can be very useful when a high number of averages is required.

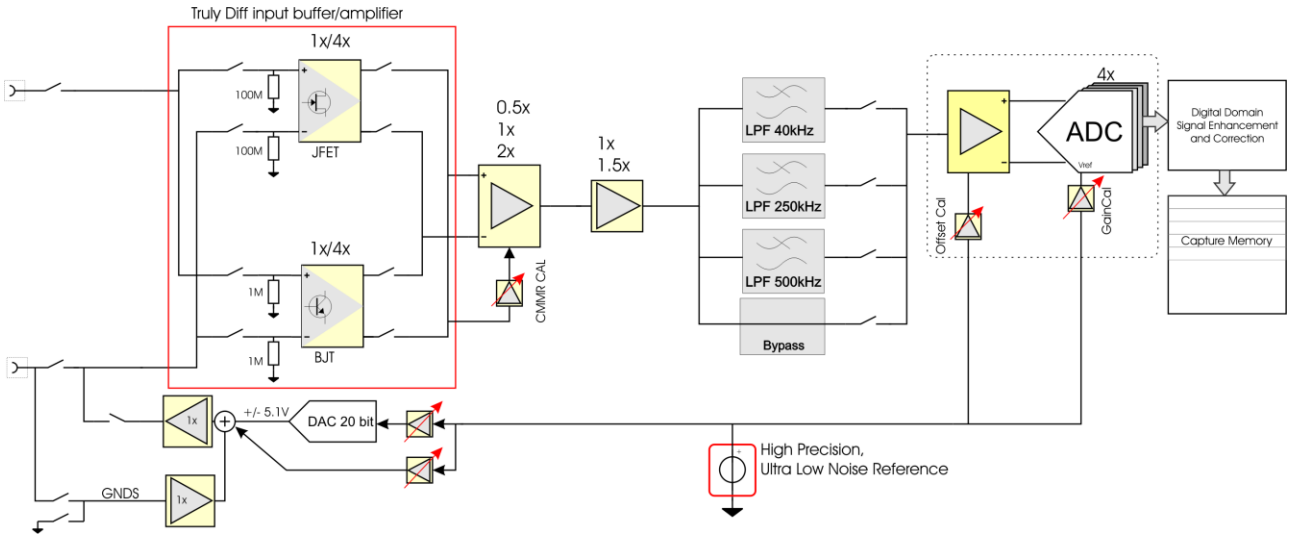
All these features together result in the highest accuracy available when performing analog measurements. DAC linearity and dynamic performance measurements are a breeze with the WFD22 in the ATX7006 system.

Also applications like: Power meter testing, MRI amplifier test, Quantum effect research, etc. will benefit from the outstanding analog performance of the WFD22.

APPLICOS
MEASUREMENT & CONTROL

22 bit / 1Msps Waveform Digitizer

Block diagram



Specifications (conditions: after 1 hour warm-up, T_A=25ºC, filter bypass unless otherwise mentioned)

General

Resolution	22 bit
Sample rate	0 - 1MHz,
Pattern depth	32M words

Input characteristics

Input impedance / mode	100MΩ low bias current mode 1MΩ low noise mode
Input configuration	Differential / Single Ended (-Input to Gnd, Gnd-sense or DC offset)
Input ranges (Vpp)	0.425, 0.637, 0.850, 1.275, 1.70, 2.55, 3.40, 5.10, 6.80, 10.20
Input filters	Bypass, 40kHz (4-pole Butterw.), 250kHz (5-pole Butterworth), 500kHz (7-pole elliptic)
Bandwidth -3dB (typical)	1.1MHz (5.10Vpp range)
0.1dB flatness (typical)	200kHz (5.10Vpp range)
Input Common mode range	+/- 10.2V

Accuracy (DC-offset off, 100ksps)

Abs. accuracy; 1.70-10.20Vp	±(25µV + 10ppm of range)
ranges; 0.425-1.275Vp	±(25µV + 15ppm of range)
Non Linearity error	±3ppm of range (1.5ppm typical)
Input bias current (typical)	1pA in 100MΩ mode 50nA in 1MΩ mode

DC-offset source

Resolution	20-bit (10µV)
Voltage range	-5.1V to +5.1V
DC-offset accuracy	±(10µV + 6ppm of value)
Non Linearity error	±3ppm of range

Dynamic characteristics

(conditions: 1MΩ input mode, 1Msps, 500kHz Bandwidth)

SNR (5Vpp, 1kHz input)	99dB (105dB typical)
SNR (5Vpp, 10kHz input)	97dB
SNR (5Vpp, 100kHz input)	93dB
SNR (1kHz input, A-weighted)	110dB (BW 20Hz - 20kHz)
THD (5Vpp, 1kHz input)	-115dB (-122dB typical)
THD (5Vpp, 10kHz input)	-110dB
THD (5Vpp, 100kHz input)	-94dB
SFDR (5Vpp, 1kHz input)	112dB
CMRR (typical)	110dB

Clock & Trigger inputs

Input impedance	>1MΩ
Input levels	3.3V CMOS/TTL (5V tolerant)

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