22 bit / 2Msps Precision Arbitrary Waveform Generator
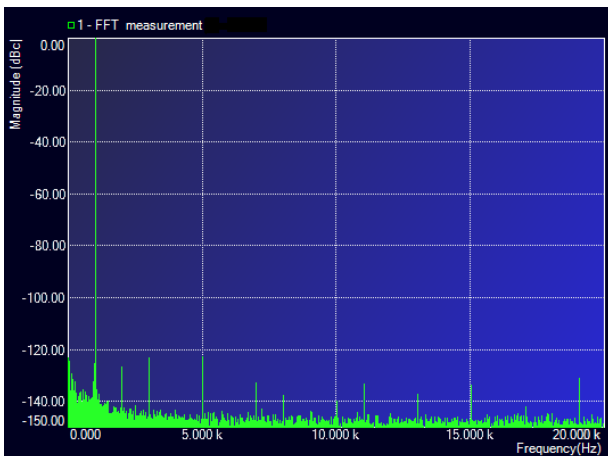
AWG22

- 2 MHz max sample speed
- 22 bit resolution
- Differential or Single ended output
- 8 output ranges from 80mVpp to 10.20Vpp
- Selectable filters to improve signal quality
- THD: -121dB @ 1kHz (typ. with 1.2kHz filter)
- SNR: 98dB, DC-500kHz / 107dB, 20Hz-20kHz
- Programmable common mode voltage
- For ATX series hardware platform

The AWG22 is a 22 bit Arbitrary Waveform Generator for medium-speed / high resolution waveform generation. The module combines an exceptional dynamic performance with an extremely high DC accuracy.

The AWG22 is upwards compatible with the AWG20 and also features differential outputs with a programmable common-mode voltage.

DC to 20kHz spectrum, 1KHz carrier, 1.2kHz filter-on

There are 8 output ranges starting at 80mVpp up to 10.20Vpp, which covers a wide range of Unit Under Test input voltages.
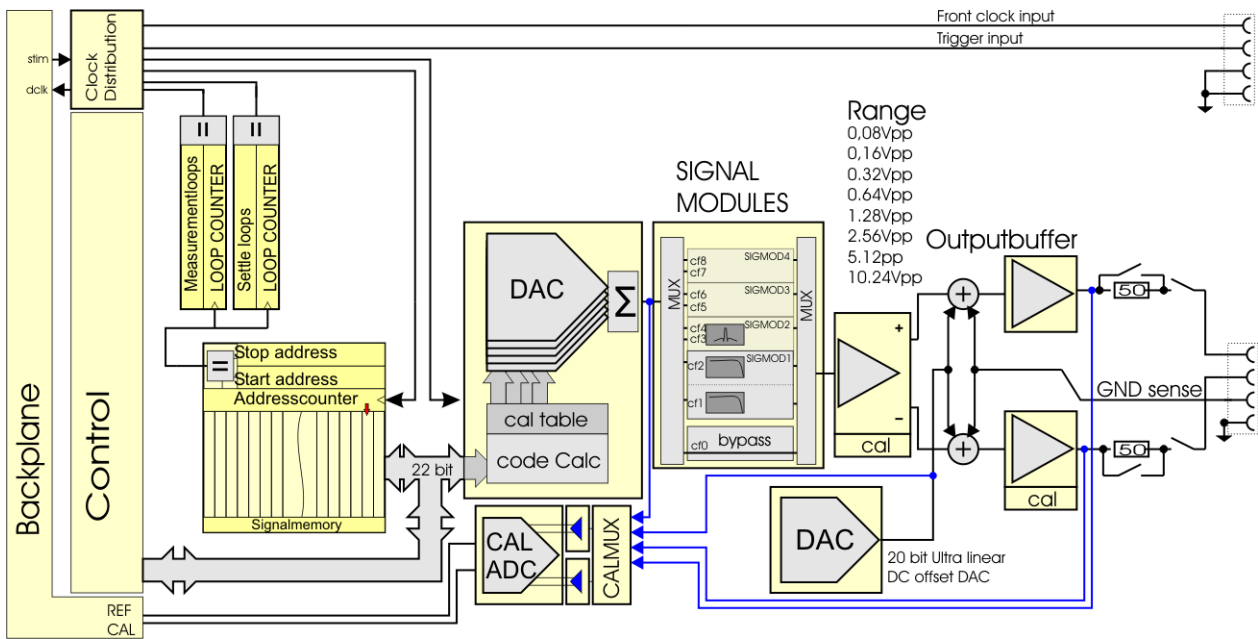
A filter-bank with 4 Low Pass filters (1.2kHz, 12kHz, 40kHz, and 200kHz) provide excellent signal conditioning to obtain the best possible signal integrity. In addition there are 4 software selectable signal paths available for user defined filters.

The Module uses a combination of multiple DACs, sub-ranging and error correction to achieve a full 22 bit performance level. The result is an SNR and THD performance that surpasses 24-bit AWGs. The excellent linearity, step response, and DC accuracy makes it a very general purpose unit suitable for sine wave generation, ultra linear ramp generation and fast stepping signals. With 4M-word (12M-byte) of memory very complex signal shapes can be generated.

All these features ensure extremely accurate results when performing analog measurements. The unit is very suitable for testing ADCs on linearity and dynamic performance.

APPLICOS
MEASUREMENT & CONTROL

22 bit / 2Msps Precision Arbitrary Waveform Generator

Block diagram

Specifications (conditions: after 1 hour warm-up, T_A=25⁰C, filter bypass unless otherwise mentioned)

General

Resolution	22 bit
Update rate	DC - 2MHz
Pattern depth	4M words

Output characteristics

Output impedance	50Ω or Low impedance (< 1Ω)
Ranges Single Ended (Vpp)	80mV, 0.16V, 0.32V, 0.64V, 1.28V, 2.55V, 5.10V, 10.20V
Ranges differential (Vpp)	0.16V, 0.32V, 0.64V, 1.28V, 2.55V, 5.10V, 10.20V, 20.40V
Output filters (4 pole Butterw.)	Bypass, 1.2kHz, 12kHz, 40kHz 200kHz, plus 4 user signal paths
Bandwidth, -3dB (typical)	500kHz (5.10Vpp range)
0.1dB flatness (typical)	DC-100kHz (5.10Vpp range)
Output configuration	Differential, Single Ended, 50Ω
Output operating range	+/- 10.20V

Accuracy (filter bypass)

Absolute accuracy	±(25µV + 8ppm of range)
Non Linearity	±3ppm of range (1.5ppm typical)
Temperature drift (typical)	±(1ppm of range + 2ppm of value)/⁰C

Common mode voltage source

Resolution	20-bit (10µV)
Voltage range	-5.10V to +5.10V
DC-offset accuracy	±(10µV + 6ppm of value)
Non Linearity	±5ppm of range

Dynamic characteristics

(5Vpp output signal, 1.5Msps, BW DC-500kHz)

SNR (fout=1kHz)	97dB
SNR (fout=10kHz)	95dB
SNR (fout=100kHz)	91dB
SNR (fout=1kHz, A-weighted)	107dB (BW 20Hz - 20kHz)
THD (fout=1kHz)	-111dB
THD (1kHz with 1.2kHz filter)	-120dB (typical)
THD (fout=10kHz)	-109dB
THD (fout=100kHz)	-88dB
THD (fout=100kHz, 2Vpp)	-90dB (typical)
SFDR (fout=1kHz)	112dB

Clock & Trigger inputs

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