T3AFG Function / Arbitrary Waveform Generator Data Sheet

Debug with Confidence
5 MHz – 120 MHz

Teledyne Test Tools T3AFG range of generators are a series of single and dual-channel function/arbitrary waveform generators with specifications of up to 120 MHz maximum bandwidth, 1.2GSa/s maximum sampling rate and 14 or 16-bit vertical resolution. The proprietary TrueArb & EasyPulse techniques used on the higher bandwidth models helps to solve the weaknesses inherent in traditional DDS generators when generating arbitrary, square and pulse waveforms. With advantages above the T3AFG generators can provide users with a variety of high fidelity and low jitter signals, which can meet the growing requirements of complex and extensive applications.

Tools for Improved Debugging

|	
Deep Memory – up to 8 Mpts/Ch on 40 MHz to 120 MHz models. 16 kpts on 5 MHz and 10 MHz models.	✓ Generate complex arbitrary waveforms.
Wide Range of Modulation Types – AM, DSB-AM, FM, PM, FSK, ASK, PWM, Sweep, Burst, and PSK on 2 Ch models.	✓ Quickly set up modulated waveforms.
High Resolution – 14 Bit on 5 MHz and 10 MHz models, 16 bit on 40 MHz to 120 MHz models.	✓ Generate waveforms with low noise and spurious signal content.
Bandwidth Models up to 120 MHz	✓ Wide choice of bandwidths.
Built In Arbitrary Waveforms	✓ Load and replay built in Arbitrary Waveforms.
User Defined Waveforms	✓ Store and recall user defined waveforms.

Key Specifications

Bandwidth	5 MHz, 10 MHz, 40 MHz, 80 MHz, 120 MHz
Channels	1 and 2 Channel Models
Memory	16 kpts / Ch, 8 Mpts / Ch
Sample Rate	up to 1.2 GS/s
Display	3.5" – 4.3"
Connectivity	USB Host, USB Device, LAN
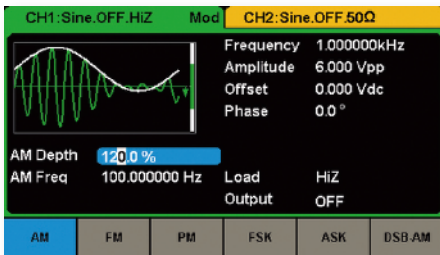
The T3AFG range of Function / Arbitrary Waveform Generators support a wide range of modulation types.
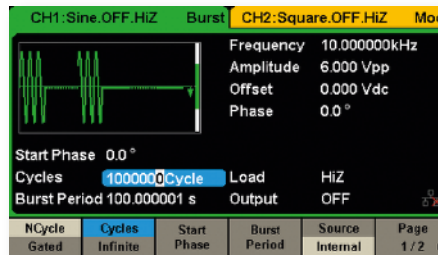
Burst mode supports 'N Cycle' and 'Gated' modes with the Burst source being configured as 'Internal', 'External' or 'Manual'.
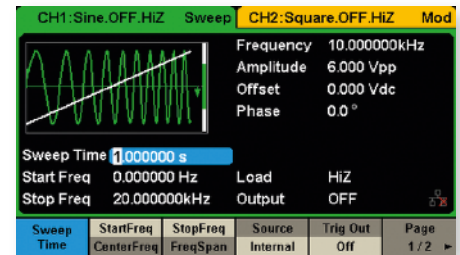
Sweep mode supports 'Linear' and 'Log' sweep, with 'Up' and 'Down' direction, and Sweep source being configured as 'Internal', 'External' or 'Manual'.

Ordering Information

Model	Bandwidth	Channel	Memory per Ch	Sample Rate per Ch
T3AFG5	5 MHz	1	16 kpts	125 MS/s
T3AFG10	10 MHz	1	16 kpts	125 MS/s
T3AFG40	40 MHz	2	8 Mpts	1.2 GS/s
T3AFG80	80 MHz	2	8 Mpts	1.2 GS/s
T3AFG120	120 MHz	2	8 Mpts	1.2 GS/s

Function	T3AFG5, T3AFG10	T3AFG40, T3AFG80, T3AFG120
Built-in Waveforms	5 Standard, 46 Arbitrary	5 Standard, 196 Arbitrary
Input/Output	1 Waveform Output, Synchronous Signal Out, External Trigger In	2 Waveform Outputs, Counter Input, Aux In/Out, 10 MHz Clock In/Out
Modulation Functions	AM, DSB-AM, FM, PM, FSK, ASK, PWM, Sweep, Burst	AM, DSB-AM, FM, PM, FSK, ASK, PSK, PWM. Sweep, Burst, Harmonic
TrueArb and EasyPulse	No	Yes
Maximum Amplitude Output	10 Vpp at 50 Ohms, 20 Vpp at HiZ	< 20 MHz: 10 Vpp at 50 Ohms, 20 Vpp at HiZ > 20 MHz: 5 Vpp at 50 Ohms, 10 Vpp at HiZ
Vertical D/A Resolution	14 Bits	16 Bits
Display Size	3.5" TFT-LCD	4.3" Touch Screen

Excellent Performance

- Bandwidths from 5 MHz to 120 MHz
- 1 or 2 Channel Models
- Up to 8 Mpts/Channel memory

Great Connectivity

- USB host port for mass storage
- USB device port (USBTMC)
- LAN port on 2 channel models

Smart Capabilities

- Sweep output carrier can be Sine, Square, Triangle and Arbitrary waveforms
- Burst output under internal or external signal control
- Waveforms types include DC
- Frequency Resolution 1 uHz
- DSB-AM: Double Sideband AM modulation Function
- Harmonic Function on 2 channel models
- Multi-Language User Interface

Frequency Specification

Model	T3AFG5	T3AFG10	T3AFG40	T3AFG80	T3AFG120
Waveform	Sine, Square, Ramp, Pulse, Noise, Arbitrary				
Sine	1 µHz ~ 5 MHz	1 µHz ~ 10 MHz	1 µHz ~ 40 MHz	1 µHz ~ 80 MHz	1 µHz ~ 120 MHz
Square	1 µHz ~ 5 MHz	1 µHz ~ 10 MHz	1 µHz ~ 25 MHz		
Pulse	500 µHz ~ 5 MHz		1 µHz ~ 25 MHz		
Ramp/Triangular	1 µHz ~ 300 kHz		1 µHz ~ 1 MHz		
Gaussian white noise	> 5 MHz (−3 dB)	> 10 MHz (−3 dB)	> 40 MHz (−3 dB)	> 80 MHz (−3 dB)	120 MHz (−3 dB)
Arbitrary	1 µHz ~ 5 MHz		1 µHz ~ 20 MHz		
Resolution	1 µHz				
Accuracy	Within 90 days ±50 ppm within 1 year ±100 ppm		10-year aging ± 3.5 ppm at 25 Degrees C		

Sine Wave

Harmonic Distortion	DC ~ 1 MHz ≤ 60 dBc 1 MHz ~ 10 MHz ≤ 55 dBc	DC ~ 10 MHz ≤ 65 dBc 10 MHz ~ 20 MHz ≤ 60 dBc 20 MHz ~ 40 MHz ≤ 55 dBc 40 MHz ~ 60 MHz ≤ 50 dBc 60 MHz ~ 80 MHz ≤ 45 dBc 80 MHz ~ 100 MHz ≤ 40 dBc 100 MHz ~ 120 MHz ≤ 38 dBc
Total harmonic waveform distortion	DC ~ 20 kHz, 1 Vpp < 0.2 %	0.075 %, 0 dBm, 10 Hz ~ 20 kHz
Spurious signal(non-harmonic)	DC ~ 1 MHz ≤ 70 dBc 1 MHz ~ 10 MHz ≤ 60 dBc	DC < 50 MHz ≤ 70 dBc > 50 MHz ≤ 65 dBc

Square Wave

Rise/fall time	< 24 ns (10 % ~ 90 %)	9 ns (10 % ~ 90 %)
Overshoot	< 5 % (typical, 1 kHz, 1 Vpp)	3 % (typical, 100 kHz, 1 Vpp, 50 Ohm Load)
Duty Cycle	20 % ~ 80 %	0.001 % ~ 99.999 % Limited By Frequency
Jitter	500 ps + 0.001 % of period	150 ps, 1 Vpp, 50 Ohm Load

Pulse

Pulse width	16 ns, Min. 1 ns resolution	16.3 ns, Min.
Rise/Fall time (10 %~90 %, typical)	20 ns ~ 1.6 ks	8.4 ns ~ 22.4 s
Duty Cycle	0.1 % Resolution	0.001 % ~ 99.999 %, 0.001 % Resolution, Limited by Pulse Width
Overshoot	< 5 %	3 % (typical,100 kHz,1 Vpp, 50 Ohm Load)
Jitter(pk-pk)	500 ps + 0.001 % of period	150 ps, 1 Vpp, 50 Ohm Load

Ramp / Triangle Wave

Linearity	< 0.1 % of Vpp (typical, 1 kHz, 1 Vpp, 100 % symmetric)	≤ 1 % of Vpp (typical, 1 kHz, 1 Vpp, 100 % symmetric)
Symmetry	0 % ~ 100 %	0 % ~ 100 %

Harmonic Output

Order	N/A	10 Maximum
Type	N/A	Even, Odd, All

Arbitrary Wave

Waveform length	16 k points	8 M points
Vertical resolution	14 bits	16 bits
Sample rate	125 MSa/s	75 MSa/s TrueArb Mode, 300 MSa/s DDS Mode
Min. Rise/Fall time	8 ns (typical)	8 ns (typical)
Jitter(pk-pk)	8 ns (typical)	150 ps, 1 Vpp, 50 Ohm Load, TrueArb Mode
Storage in non-volatile RAM memory (10 in total)	10 waveforms	10 waveforms

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The Teledyne Test Tools brand extends the Teledyne LeCroy product portfolio with a comprehensive range of test equipment solutions. This new range of products delivers a broad range of quality test solutions that enable engineers to rapidly validate product and design and reduce time-to-market. Designers, engineers and educators rely on Teledyne Test Tools solutions to meet their most challenging needs for testing, education and electronics validation.

Location and Facilities

Headquartered in Chestnut Ridge, New York, Teledyne Test Tools and Teledyne LeCroy has sales, service and development subsidiaries in the US and throughout Europe and Asia. Teledyne Test Tools and Teledyne LeCroy products are employed across a wide variety of industries, including semiconductor, computer, consumer electronics, education, military/aerospace, automotive/industrial, and telecommunications.

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