TELEDYNE TEST TOOLS
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T3AWG3252 / T3AWG3352 Data Sheet

High Definition Dual Channel Arbitrary Waveform Generator

Accurate and Versatile Waveforms Generation

• 16 Bit Vertical Resolution	✓ Exceptional signal fidelity for developing quality products with a reduced design cycle.
• 24 V_{pp} Output Voltage and ±12 V HW Baseline Offset for a total output voltage window ±24 V or 48 V (50 Ohm into High Impedance)	✓ Unmatched wide output voltage window enables generating challenging in amplitude large-signal waveforms.
• Waveform memory up to 1 Gpoint @Ch	✓ Unmatched deep memory depth allows to store and reproduce complex pseudo-random waveforms for long play time testing.
• Mixed Signal Generation	✓ Combining the 2 analog channels with 8 synchronized Digital Channels for debugging and validating digital design.
• Multifunctional solution instrument (AFG/AWG/DPG)	✓ Arbitrary Function Generator, Arbitrary Waveform Generation and Digital Pattern Generation functionalities combined into one instrument.

Key Specifications

Model	T3AWG3252	T3AWG3352
Frequency Range (Sinewave, AFG mode)	1 µH to 250 MHz	1 µH to 350 MHz
Sample Rate (AWG mode, not interpolated)	1.0 GS/s	1.2 GS/s
Vertical Resolution	16 Bits	
Memory	Up to 1 Gpoint/Ch.	
Output Voltage V_{pp} (peak to peak)	12 V_{pp} (50 Ohm into 50 Ohm), 24 V_{pp} (50 Ohm into High-Impedance)	
Digital Pattern Generator (DPG)	8 Channels @ 1.0 Gbps	8 Channels @ 1.2 Gbps

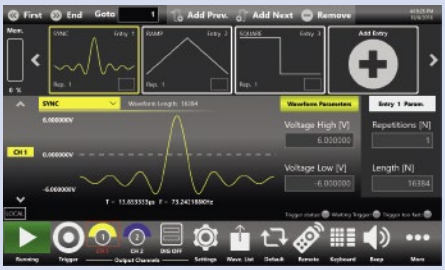
AFG Operational Mode

- Improved Direct Digital Synthesis (DDS) based technology
- Fixed sampling clock

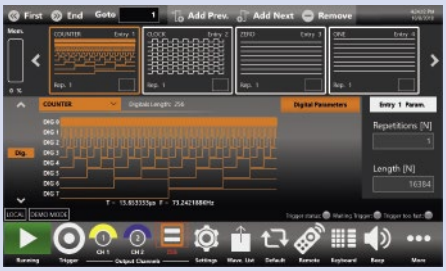
Arbitrary Function Generation (AFG functionality)

AWG Operational Mode

- Variable Clock True-Arbitrary Technology
- Variable Sampling Clock
- Mixed Signal Generation: 2 Analog Channels and 8 Digital Channels



Arbitrary Waveform Generation (AWG functionality)



Digital Pattern Generation (DPG functionality)

A multifunctional generator with an innovative architecture

T3AWG3352-3252 are multifunctional generators that combines many functions in one instrument, including Arbitrary Function Generator, Arbitrary Waveform Generator and Digital Pattern Generator.

These three-different functionalities are leveraging on the HW flexibility adopting two different technologies.

An improved Direct Digital Synthesis (DDS) based technology adopted when using the Function Generator (AFG) lets the user to change glitch free on-the-fly all the parameters preserving the waveform shape.

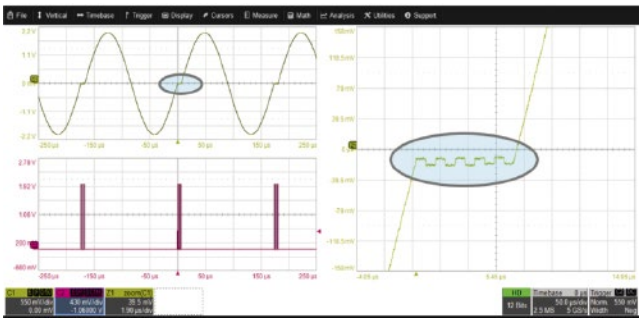
All control and setting are always one touch away: swipe gesture to change the channel, the carrier selection and have access to the modulation parameters, swipe into the waveform gallery to import a signal at a glance and use the touch-friendly virtual numeric keyboard to change parameters values.

The variable clock, true-arbitrary technology adopted when using the Arbitrary Waveform / Digital Pattern Generator lets the user to create complex waveforms of analog and digital pattern, insert them is a sequence, apply loops, jumps and conditional branches. Digital output combined and synchronized with analog output signals represents an ideal tool to troubleshoot and validate digital design.

The waveform memory length of 128 Mpoints (up to 1 Gpoints optional) on each channel combined with number of waveforms entries up to 16,384 and the waveform repeat count higher then 4 10^9 or infinite make the T3AWG3252 and the T3AWG3352 the best-in-class waveform generators for the most demanding technical applications.

This disruptive and innovative hardware architecture provides the possibility to generate unmatched performances, versatile functionality, outstanding usability, making the T3AWG3352-3252 the ideal generator for today's and tomorrows test challenges.

Exceptional Signal Fidelity with 16-bit Vertical Resolution



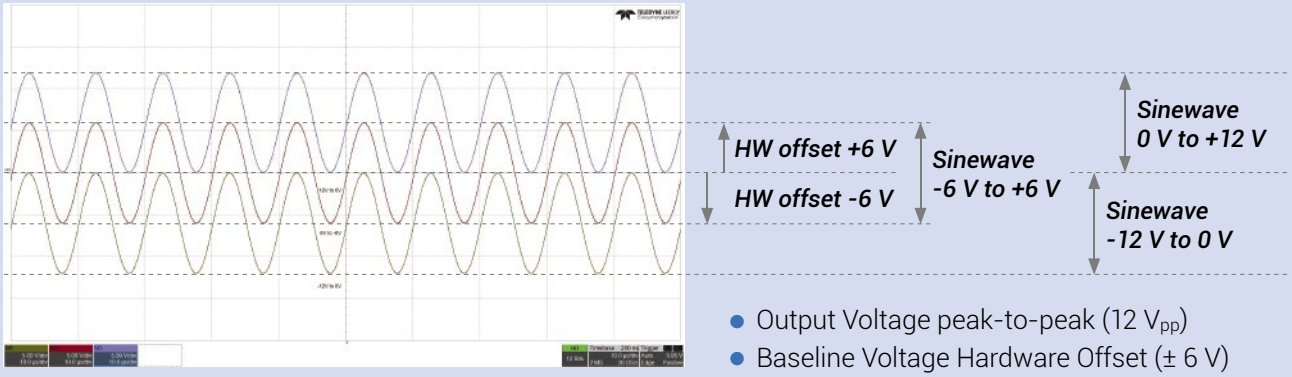
4V_{pp} Sine Wave and 5 x 10 mV_{pp} Square Wave Sequencing

Highest signal accuracy and precise waveform details generation are key contributors for developing quality products with a reduced design time. Indeed, the pressure is to get products to market faster with a shortest design cycle and with the increase of the quality goals. The exceptional Signal Fidelity of the T3AWG3352 and T3AWG3252 with the 16-bit Vertical Resolution give the capability to emulate the thinnest details of your waveform making your testing highly efficient and increasing the confidence in your results as more stable and reliable.

Output Voltage Window ± 12 V (50 Ω into 50 Ω) or ± 24 V (50 Ω into High Impedance)

Output voltage swing is a compulsory requirement for key applications for the IC and Semiconductor Test or Defense marker segment. The T3AWG3252 and T3AWG3352 generators have unmatched outstanding voltage swing capability leveraging on two different combined features. The 12 V_{pp} (50 Ω into 50 Ω) amplitude range and the ±6 V (50 Ω into 50 Ω) hardware offset voltage. The following images show a 12 V_{pp} sinewave (50 Ω into 50 Ω) shifted from -12 V to 0 V to 0 V to +12 V using the hardware base voltage offset setting and a 24 V_{pp} pulse from 0 V to 24 V (50 Ω into high Impedance).

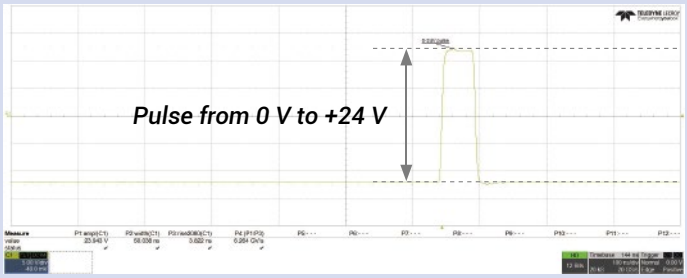
Output Voltage Window: ± 12 V (50 Ω into 50 Ω)



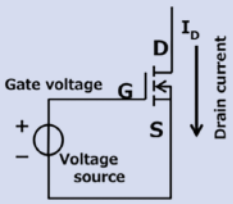
- Output Voltage peak-to-peak (12 V_{pp})
- Baseline Voltage Hardware Offset (± 6 V)

12 V_{pp} waveform can be shifed of ±6 V from -12 V to 0 V to 0 V to +12 V

Output Voltage Window: ± 24 V (50 Ω into High Impedance)



- Output Voltage peak-to-peak (24 V_{pp})
- Baseline Voltage Hardware Offset (± 12 V)



Pulse from 0 V to 24 V

MOSFET gate voltage-driven

High Definition Stimulus-Response model:

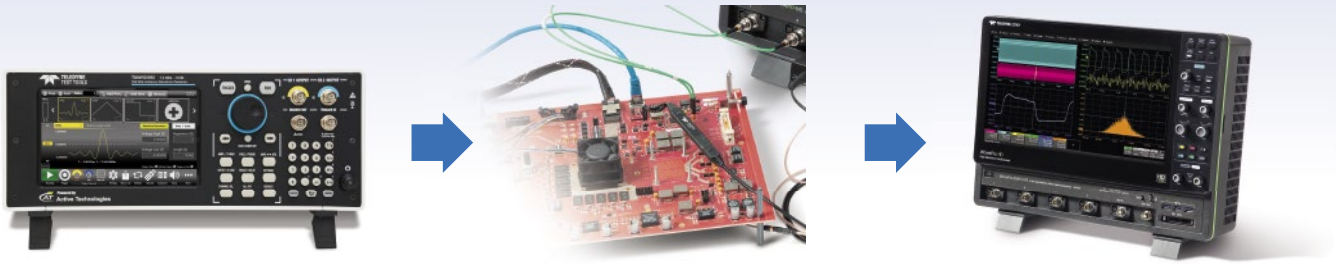
Applying an HD Stimulus with the T3AWG generator to the DUT and analysing the Response using an HD Oscilloscope Different measurements scenarios:

a. Emulation of clean and **"perfect signal"**, so that uncontrolled and unknown distortions are not influencing the DUT response behavior.

b. Emulation of **"real-world signal"** including distortions to test the DUT response behavior before any signal source is available. Playback of signals previously acquired using the oscilloscope and imported into the AWG.

c. Emulation of extreme signal condition **"stress test"**, we can emulate difficult conditions and corner case signals that can be statistically infrequent to test the DUT response behavior.

d. Emulation of noise or interference signal **"noise and interference immunity"**, so we can generate expected interference signal to add to expected signal and test the DUT response behavior.



HD AWG (stimulus) *Device Under Test (DUT)* *HD scope (response)*

Accurate emulate the thinnest waveform details at largest output voltage swings

High Definition T3AWG3352-3252 generators are very powerful and ideal tools for all the High Definition stimulus-response testing scenarios.

There are case when you want to generate an **"ideal signal"** to test your device when uncontrolled and unknown distortions are not influencing the behavior of your device.

In other situation instead, you want to test your device with a **"real-world signal"** previously acquired with the oscilloscope, imported into the HD arbitrary waveform generator and then played-back for all the time needed comfortably testing your device in the lab. Often real-world signals can be accessible to be acquired with an HD oscilloscope only for very short time or in difficult environmental situation like for high energy physics or aero-space applications. This makes impossible to do any design of your device at the place where the real-world signal can be sourced, then the HD arbitrary waveform generator provides an essential indispensable solution.

All the new emerging technologies and applications are requiring verifying the operating margin of your device emulating worst-case and infrequent corner-case conditions.

Your device needs to be tested to its performance limit and **"stress test"** during the product development is vital to avoid the risk of any device malfunction your customer ends up finding.

The High Definition T3AWG3352-3352 generators are ideal for precisely generating degraded or stressed signals thanks to the capability to emulate accurately any waveform details because of the 16-bit vertical resolution and in addition to emulate large voltage swings because of the 12 V_{pp} combined with the ± 6 V HW Voltage baseline.

High Definition T3AWG3352-3252 have unmatched output voltage window ±24 V, 48 V in case of 50 Ω into High Impedance or ±12 V , 24 V in case of 50 Ω into 50 Ω.

Definitively you want your device properly working when in the presence of signals or noise interfering.

Today's technology density, co-existing of many communications systems, highest standard in product reliability make a must to go for **"noise and interference immunity"** testing.

The High Definition T3AWG3352-3352 generators are the perfect arbitrary generator for product noise susceptibility, interference immunity and EMI applications because of the excellent output signal spectral purity, the unmatched deep waveform memory enabling long play-time testing combined with versatile waveforms creation thanks to the intuitive and easy waveform sequencer user interface.

High Definition Generator: Key Applications at a glance

Today's cars are including lots of highly sophisticated electronic control units (ECU) with very sensitive electronic components. The 16-bits vertical resolution combined with the 1.2 GS/s fast sampling rate make the High Definition T3AWG Arbitrary Generators indispensable tools for successfully and efficiency addressing the new testing challenges in automotive.

- CAN, CAN-FD, LIN, Flexray, SENT emulation and trouble-shooting
- 100BASE-T1, 1000BASE-T1, BroadR-Reach emulation and immunity from interference signal and noise
- EMI debugging, troubleshooting and testing
- Electrical standards emulation up to 24 V
- Power MOSFET circuitry in automotive electronics optimization and characterization

Radar test and electronic warfare require to create specific complex true-to-life signals. The spectral purity, the wide voltage swing and the long waveform play-time make the High Definition T3AWG Arbitrary Generators the ideal tools for the military research and development sector.

- Frequency response, intermodulation distortion and noise-figure measurements characterization of components, subsystems and systems
- Phase Locked Loop (PLL) pull-in and hold range characterization
- RF I/Q modulators emulation and characterization
- RADAR base-band signals emulation to improve target resolution and detection and decrease false target return (noise immunity)
- MIL-1553 , ARINC 429 and PRBS long-play time emulation

Researches and Scientists require to emulate pulses adding amplitude and timing variation imperfections in an accurate, detailed and repeatable controlled manner. Physics, electronics, chemistry, mechanics and other disciplines can benefit from the user interface versatility combined with the fast edge generation, the excellent dynamic range and the unmatched accuracy of the High Definition T3 AWG generators.

- Emulation of signal sources adding noise and known modulation distortion
- Modulating and driving laser diode with detailed waveform generation
- Generation/playback of real-world signals previously acquired using an High Definition Oscilloscope and imported into the High Definition T3 AWG generator.
- Emulation of long PRBS sequences with the 8 digital output channels synchronous with analog waveforms
- Generation of multi-level and multi-edge pulses long waveforms with the 1 GSample @Ch memory

Today's IC, components, electronic circuits and sensors are required to be highly reliable extending the operating range in many variables. Stress test need to be performed to confirm the mathematical model used for predicting breaking points or safe usage limits. The output voltage resolution combined with large voltage swing and the mixed mode operation make the High Definition T3AWG the best tool for developing quality components with a reduced design time.

- Clock generation for component overclock behavior and operating range limit and stress test
- Power Integrity testing of electric and electronic components for use in motor vehicles at low voltage
- Sensors signals generation: emulation of ideal signals or generation of real world signals after acquisition with an High Definition Oscilloscope .
- MOSFET gate drive amplitude signal emulation for MOSFET characterization and optimization
- Power up sequences of IC using the low impedance feature (5 Ω output impedance).

T3AWG3252 / T3AWG3352
High Definition Dual Channel Arbitrary Waveform Generators

General Specifications

	T3AWG3252	T3AWG3352
Number of Channels		
Analog	2	
Digital	0–8	
Markers	1	
Operating Modes		
AFG	Improved Direct Digital Synthesizer (DDS) based technology	
AWG	Variable Clock "True Arb" Technology	
Amplitude peak-to-peak		
Voltage Range V_{pp} (50 Ω into 50 Ω)	0 to 6 V_{pp} (12 V_{pp} opt.)	
Accuracy[1)]	±(1% of setting (V_{pp}) + 5 mV)	
Resolution	< 0.5 mV_{pp} or 5 digits	
Output Impedance	Single-ended: 50 Ω and 5 Ω (Low Impedance)	
Amplitude HW Baseline Offset		
Range (50 Ω into 50 Ω)	-6 V to +6 V	
Range (50 Ω into High Impedance)	-12 V to +12 V	
Accuracy (50 Ω into 50 Ω)	±(1.0 % | setting | ± 5 mV)	
Resolution	< 4 mV or 4 digits	
Amplitude DC		
Amplitude Range (50 Ω into 50 Ω)	-6 V to +6 V	
Amplitude Accuracy	±(1.0 % | setting | ± 10 mV)	

[1)] 1 KHz Sine, 0 V offset, > 5 mVpp amplitude , 50 Ω load

AFG Specifications
Arbitrary Function Generator Operating Mode

Waveform Types

	T3AWG3252	T3AWG3352
Ouput Channels		
Connectors	BNC on front panel	
Output Type	Single-ended	
Output Impedance	50 Ω or 5 Ω (Low Impedance) selectable	
General Specifications		
Technonolgy	Direct Digital Synthesizer (DDS)	
Standard Waveforms	Sine, Square, Pulse, Ramp, Noise, DC, Sin(x)/x, Gaussian, Lorentz, Exponential Rise, Exponential Decay, Haversine	
Run Modes	Continuous, Modulation, Sweep, Burst	
Arbirary Waveforms		
Vertical Resolution	16 bits	
Waveform Length	16.384 Points	
Internal Trigger Timer		
Range	13.3 ns to 100 s	
Resolution	104 ps	
Accuracy	±(0.1 % setting + 5 ps)	

7

MODEL SPECIFIC SPECIFICATIONS

	T3AWG3252		T3AWG3352	
Sine Wave Characteristics				
Frequency Range	1 µH to 250 MHz		1 µH to 350 MHz	
Frequency Resolution	1 µH or 15 digits		1 µH or 15 digits	
Output Amplitude (50 Ω into 50 Ω)[2]	0 to ≤ 70 MHz	12 V	0 to ≤ 70 MHz	12 V
	> 70 MHz to ≤ 120 MHz	9 V	> 70 MHz to ≤ 120 MHz	9 V
	> 120 MHz to ≤ 180 MHz	6 V	> 120 MHz to ≤ 180 MHz	6 V
	> 180 MHz to ≤ 250 MHz	3 V	> 180 MHz to ≤ 350 MHz	3 V
Flatness (1 V_{p-p} , relative to 1 KHz)	DC to 250 MHz	± 0.5 dB	DC to 350 MHz	± 0.5 dB
Harmonic Distorsion (1 V_{p-p})	1 µH to ≤ 10 MHz	< -65 dBc	1 µH to ≤ 10 MHz	< -65 dBc
	> 10 MHz to ≤ 50 MHz	< -55 dBc	> 10 MHz to ≤ 50 MHz	< -55 dBc
	> 50 MHz to ≤ 100 MHz	< -45 dBc	> 50 MHz to ≤ 100 MHz	< -45 dBc
	> 100 MHz to ≤ 250 MHz	< 30 dBc	> 100 MHz to ≤ 350 MHz	< 30 dBc
Total Harmonic Distorsion (1 V_{p-p})	10 kHz to 20 KHz	< 0.1 %	10 kHz to 20 KHz	< 0.1 %
Spurious (1 V_{p-p})[3]	1 µH to ≤ 10 MHz	< -60 dBc	1 µH to ≤ 10 MHz	< -60 dBc
	> 10 MHz to ≤ 250 MHz	< -55 dBc	> 10 MHz to ≤ 350 MHz	< -55 dBc
Phase Noise (1 V_{p-p}, 10 KHz offset)	10 MHz	< -120 dBc/Hz typ.	10 MHz	< -120 dBc/Hz typ.
	100 MHz	< -115 dBc/Hz typ.	100 MHz	< -115 dBc/Hz typ.
Square Wave Characteristics				
Frequency Range	1 µH to 120 MHz		1 µH to 150 MHz	
Output Amplitude (50 Ω into 50 Ω)[2]	0 to ≤ 40 MHz	12 V	0 to ≤ 40 MHz	12 V
	> 40 MHz to ≤ 80 MHz	10 V	> 40 MHz to ≤ 80 MHz	10 V
	> 80 MHz to ≤ 120 MHz	7 V	> 80 MHz to ≤ 150 MHz	7 V
Frequency Resolution	1 µH or 15 digits		1 µH or 15 digits	
Rise/Fall time (10 % to 90 %)	2.0 ns		2.0 ns	
Overshoot (1 V_{p-p})	< 2 %		< 2 %	
Jitter (rms)	< 20 ps		< 20 ps	
Pulse Wave Characteristics				
Frequency Range	1 µH to 120 MHz		1 µH to 150 MHz	
Frequency Resolution	1 µH or 15 digits		1 µH or 15 digits	
Output Amplitude (50 Ω into 50 Ω)[2]	0 to ≤ 5 MHz	12 V	0 to ≤ 5 MHz	12 V
	> 5 MHz to ≤ 60 MHz	10 V	> 5 MHz to ≤ 60 MHz	10 V
	> 60 MHz to ≤ 120 MHz	7 V	> 60 MHz to ≤ 150 MHz	7 V
Pulse width	3 ns to (Period-3.0 ns)		2.5 ns to (Period-2.5 ns)	
Resolution	20 ps or 15 digits		20 ps or 15 digits	
Pulse duty cycle	0.1 % o 99.9 % (limitation of pulse width apply)		0.1% o 99.9 % (limitation of pulse width apply)	
Leading/trailing edge transition time	2.5 ns to 1000 ns		2.0 ns to 1000 ns	
Resolution	2 ps or 15 digits		2 ps or 15 digits	
Overshoot (1 V_{p-p})	< 2 %		< 2 %	
Jitter (rms, with rise time and fall time >2 ns)	< 20 ps		< 20 ps	
Ramp Wave Characteristics				
Frequency Range	1 µH to 10 MHz		1 µH to 15 MHz	
Linearity (<10 KHz, 1 V_{p-p}, 100 %)	≤ 0.1 %		≤ 0.1 %	
Symmetry	0 % to 100 %		0 % to 100 %	

[2] Amplitudes double on HiZ load
[3] excluding f_{Sa}-F_{out}, f_{Sa}-2*f_{out}

	T3AWG3252	T3AWG3352
Other Waves Characteristics		
Frequency Range		
Exponential Rise, Exponential Decay	1 µH to 10 MHz	1 µH to 15 MHz
Sin(x)/x, Gaussian, Lorentz, Haversine	1 µH to 20 MHz	1 µH to 30 MHz
Frequency Resolution		
Sin(x)/x	1 µH or 15 digits	1 µH or 15 digits
Gaussian, Lorentz, Exponential Rise, Exponential Decay, Haversine	1 µH or 14 digits	1 µH or 14 digits
Additive Noise		
Bandwitdh (-3 dB)	> 200 MHz	> 200 MHz
Level	0 V to 6 V- | carrier max value(V_{pk}) |	0 V to 6 V- | carrier max value(V_{pk}) |
Resolution	1 mV	1 mV
Arbitrary		
Number of Samples	2 to 16.384	2 to 16.384
Rise/Fall Time	2.0 ns	2.0 ns
Jitter (rms)	< 20 ps	< 20 ps
Frequency Range	1 µH to 125 MHz	1 µH to 150 MHz
Frequency Resolution	1 µH or 15 digits	1 µH or 15 digits
Frequency Accuracy		
Non-Arbitrary	± 2 % x 10^{-6} of setting	
Arbitrary	± 2 % x 10^{-6} of setting ± 1 µH	

Modulations

	T3AWG3252	T3AWG3352
AM (Ampitlude Modulation)		
Carrier Waveforms	Standard Waveforms (except Pulse, DC and Noise) and Arbitrary	
Modulation Source	Internal or External	
Internal Modulating Waveforms	Sine, Square, Ramp, Noise, Arbitrary	
Modulating Frequency		
Internal	500 µHz to 48 MHz	
External	max 8 MHz	
Depth	0.00 % to 120.00 %	
FM (Frequency Modulation)		
Carrier Waveforms	Standard Waveforms (except Pulse, DC and Noise) and Arbitrary	
Modulation Source	Internal or External	
Internal Modulating Waveforms	Sine, Square, Ramp, Noise, Arbitrary	
Modulating Frequency		
Internal	500 µHz to 48 MHz	
External	max 8 MHz	
Depth	0.00 % to 120.00 %	
Peak Deviation	DC to 250 MHz	DC to 350 MHz

MODEL SPECIFIC SPECIFICATIONS

	T3AWG3252	T3AWG3352
PM (Pulse Modulation)		
Carrier Waveforms	Standard Waveforms (except Pulse, DC and Noise) and Arbitrary	
Modulation Source	Internal or External	
Internal Modulating Waveforms	Sine, Square, Ramp, Noise, Arbitrary	
Modulating Frequency		
Internal	500 µHz to 48 MHz	
External	max 8 MHz	
Peak Deviation Range	0° to 360°	
FSK (Frequency Shift Keying)		
Carrier Waveforms	Standard Waveforms (except Pulse, DC and Noise) and Arbitrary	
Modulation Source	Internal or External	
Internal Modulating Waveforms	Square	
FSK Key Rate		
Internal	500 µHz to 48 MHz	
External	max 8 MHz	
Depth	0.00 % to 120.00 %	
Hop Frequency	1 µHz to 250 MHz	1 µHz to 350 MHz
Number of keys	2	
PSK (Phase Shift Keying)		
Carrier Waveforms	Standard Waveforms (except Pulse, DC and Noise) and Arbitrary	
Modulation Source	Internal or External	
Internal Modulating Waveforms	Square	
PSK Key Rate		
Internal	500 µHz to 48 MHz	
External	max 8 MHz	
Depth	0.00 % to 120.00 %	
Hop Phase	0° to +360°	
Number of keys	2	
PWM (Pulse Width Modulation)		
Carrier Waveforms	Pulse	
Modulation Source	Internal or External	
Internal Modulating Waveforms	Sine, Square, Ramp, Noise, Arbitrary	
PSK Key Rate		
Internal	500 µHz to 48 MHz	
External	max 8 MHz	
Deviation Range	0 % to 50 % of pulse period	
PWM (Pulse Width Modulation)		
Carrier Waveforms	Pulse	
Modulation Source	Internal or External	
Internal Modulating Waveforms	Sine, Square, Ramp, Noise, Arbitrary	
PSK Key Rate		
Internal	500 µHz to 48 MHz	
External	max 8 MHz	
Deviation Range	0 % to 50 % of pulse period	

	T3AWG3252	T3AWG3352
Sweep		
Type	Linear, Logarithmic, Staircase and user defined	
Waveforms	Standard Waveforms (except Pulse, DC and Noise) and Arbitrary	
Sweep Time	40 ns to 2000 s	
Hold/Return Times	0 to (2000 s-40 ns)	
Sweep/Hold/Return Time Resolution	20 ns or 12 digits	
Total sweep time accuracy	≤ 0.4 %	
Start/Stop Frequency Range		
Sine	1 µHz to 250 MHz	1 µHz to 350 MHz
Square	1 µHz to 120 MHz	1 µHz to 150 MHz
Trigger Source	Internal/External/Manual	
Burst		
Type	Trigger and Gated	
Waveforms	Standard Waveforms (except Pulse, DC and Noise) and Arbitrary	
Burst Count	1 to 4,294,967,295 cycles or infinite	

AWG Specifications
Variable Clock (True Arbitrary) Operating Mode

	T3AWG3252	T3AWG3352
Sweep		
Ouput Channels		
Connectors	BNC on front panel	
Output Type	Single-ended DC coupled	
Output Impedance	50 Ω or 5Ω (Low Impedance) selectable	
General Specifications		
Technonolgy	Variable Clock (True Arbitrary)	
Run Modes	Continuous, Triggered Continuos, Single/Burst, Stepped	
Vertical Resolution	16 bits	
Waveform Length	16 to 128 MSamples @Channel (up to 1 GSample @Channel)	
Waveform Granularity	16	
Sequence Length	1 to 16384	
Sequence Repeat Counter	1 to 4,294,967,294 or infinite	
Timer		
Range	23.52 ns to 7 s	
Resolution	± 1 sampling clock cycle	
Analog Channel to Channel Skew		
Range	0 to 3.4 µs	
Resolution	≤ 5 ps	
Accuracy	±(1 % | setting | ± 20 ps)	
Initial Skew	< 200 ps	
Bandwidth calculated: (0.35 / rise or fall time)	318 MHz	

	T3AWG3252	T3AWG3352
Harmonic Distorsion Sine Wave 32 points, 1 V_{pp}	< -60 dBc @(1 GS/s and 31.25 MHz)	< -60 dBc @(1.2 GS/s and 37.5 MHz)
Spurious Sine Wave 32 points, 1 V_{pp}	< -60 dBc @(1 GS/s and 31.25 MHz)	< -60 dBc @(1.2 GS/s and 37.5 MHz)
SFDR (Spuriuos Free Dynamic Range) Sine Wave 32 points, 1 V_{pp}	< -60 dBc @(1 GS/s and 31.25 MHz)	< -60 dBc @(1.2 GS/s and 37.5 MHz)
Rise/Fall Time 1 V_{pp}, single-ended 10 % to 90 %	≤ 1.1 ns	≤ 1.1 ns
Overshoot 1 V_{pp}, single-ended	< 2 %	

Time Base and Clock

	T3AWG3252	T3AWG3352
Sampling Rate		
Range	1 S/s to 1 GS/s	1 S/s to 1.2 GS/s
Resolution	16 Hz	
Accuracy	± 2.0 x 10^{-6}	± 2.0 x 10^{-6}
R_j on clock patter (rms)	< 10 ps	< 10 ps

Digital Outputs

	T3AWG3252	T3AWG3352
Output Channels		
Connectors	mini-SAS HD connector on rear panel (not standard pin-out)	
Number of connectors	1	
Number of Outputs	8 channels	
Output Impedance	100 Ω Differential	
Output type	LVDS	
Rise/Fall time (10 % to 90 %)	< 1 ns	
Jitter (rms)	20 ps	
Maximum Update Rate	1 GS/s	1.2 GS/s
Memory Depth	128 MSample @ Ch (up to 1 GSample)	

Auxiliary input and output characteristics

	T3AWG3252	T3AWG3352
Marker Output		
connector type	BNC on Front panel	
Number of connectors	one	
Output impedance	50 Ω	
Output level (into 50 Ω)		
Amplitude	1 V to 2.5 V	
Resolution	10 mV	
Accuracy	± (2 % setting + 10 mV)	
Rise/Fall Ttime (10 % to 90 %, 2.5 V_{pp})	< 700 ps	
Jitter (rms)	20 ps	
Marker out to analog channel skew		
Range	Variable Clock Mode: 0 to 3 µs AFG Mode: 0 to 14 s. in continuos mode, 0 to 3 µs in Trig. Mode	
Resolution	Variable Clock Mode: 78 ps, AFG Mode: 39 ps	
Accuracy	± (1 % setting + 140 ps)	
Initial skew	< 1 ns	
Trigger / Gate Input		
Connector type	BNC on the Front Panel	
Input impedance	50 Ω / 1 KΩ	
Slope / Polarity	Positive or Negative or both	
Input damage level	< -15 V or > +15 V	
Threeshold control level	- 10 V to 10 V	
Resolution	50 mV	
Threshold control accuracy	± (10 % | setting | + 0.2 V)	
Input voltage swing	0.5 V_{p-p} minimum	
Minimum pulse width (1 V_{pp})	3 ns	
Initial trigger/gate delay to Analog Output	Variable Clock Mode: < 240 * DAC clock period +32 ns AFG Mode : < 360 ns (< 420 ns in troggeed sweep mode)	
Trigger in to output jitter	AFG mode : < 40 ps Variable clock mode: 0.29 * DAC clock period	
Maximum frequency	AFG: 65 Mpts on Rising/Falling Edge, 80 MTps on both edges Variable Clock Mode: 42.5 MTps MTps = Mega Transition per second	
Reference clock input		
Connector type	SMA on rear panel	
Input impedance	50 Ω AC coupled	
Input Voltage range	-4 dBm to 11 dBm sine or square wave	
Damage level	+14 dBm	
Frequency range	5 MHz to 100 MHz	
Reference clock output		
Connector type	SMA on rear panel	
Output impedance	50 Ω AC coupled	
Frequency range	10 MHz	
Accuracy	± 2.0 x 10-6	
Aging	± 1.0 x 10-6/year	
Amplitude	1.65 V	
Jitter (rms)	< 20 ps	

	T3AWG3252	T3AWG3352
External modulation Input		
Connector type	SMA on rear panel	
Input impedance	> 2 MΩ	
Number of inputs	One	
Input Voltage Range	-0,5 V to +0.5 V	
Bandwidth	8 MHz with 40 MS/s sampling rate	
Vertical resolution	8 bits	
Power		
Source Voltage and Frequency	100 to 240 VAC ±10 % @ 45–66 Hz	
Max Power Consumption	100 W	
Enviromental Characteristics		
Temperature (operating)	+5 °C to +40 °C (+41°F to 104 °F)	
Temperature (non operating)	-20 °C to +60 °C (-4 °F to 140 °F)	
Humidity (operating)	5 % to 80 % relative humidity with a maximum wet bulb temperature of 29 °C at or below +40 °C, (upper limit de-rates to 20.6 % relative humidity at +40 °C . Non-condensing.	
Humidity (non-operating)	5 % to 95 % relative humidity with a maximum wet bulb temperature of 40 °C at or below +60 °C, (upper limit de-rates to 29.8 % relative humidity at +60 °C. Non-condensing.	
Altitude (operating)	3,000 meters (9,842 feet) maximum at or below 25 °C	
Altitude (non operating)	12,000 meters (39,370 feet) maximum	
EMC and safety		
Safety	EN61010-1	
Main Standards	EN 61326-1:2013 – Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements	
Immunity	EN 61326-1:2013	

System specifications

	T3AWG3252	T3AWG3352
Display	7 inch, 1024 x 600, capacitive touch LCD	
Operative System	Windows 10 IoT – LTSB (Long Term Service Branch)	
External Dimensions	W 362 mm – H 143 mm – D 258 mm	
Weight	6.5 kg	
Front panel connectors	CH1 OUTPUT (BNC)	
	CH2 OUTPUT (BNC)	
	MARKER OUT (BNC)	
	TRIGGER IN (BNC)	
Rear panel connectors	Ref. Clk. IN (SMA)	
	Ref. Clk. Out (SMA)	
	Ext. Mod. IN (SMA)	
	External monitor ports (HDMI, VGA or more)	
	DIGITAL POD A[7..0]	
	1x USB 2.0 and 1x USB 3.0 or more	
	Ethernet port (10/100/1000BaseT Ethernet, RJ45 port)	
	2 PS/2 keyboard and mouse ports	
Hard Disk	240 GB SSD or better	
Processor	Intel® Celeron J1900, 2 GHz (or better)	
Processor Memory	8 GB or better	

T3AWG3-8DIG-TTL
LVDS to LVTTL adapter
(Requires T3AWG3-8 DIG)

	T3AWG3252	T3AWG3352
Output Connector	20 position 2.54 mm 2 Row IDC Header	
Output Type	LVTTL	
Output Impedance	50 Ω nominal	
Output voltage	0.8 V to 3.8 V programmable in group og 8 bits	
Maximum update rate	125 Mbps@0.8 V and 400 Mbps@3.6 V	
Dimension	W 52 mm – H 22 mm – D 76 mm	
Input connectors	proprietary standard	
Cable length	1 meter	
Cable type	proprietary standard	

T3AWG3-8DIG-SMA
Mini-SAS HD to 16x SMA cable (8 LVDS outputs)
(Requires T3AWG3-8 DIG)

	T3AWG3252	T3AWG3352
Output Connector	SMA	
Output Type	LVDS	
Number of SMA	16 (8 bits)	
Cable length	1 meter	
Cable type	proprietary standard	

Ordering information

Product Description	Product Code
Arbitrary Waveform Generator, 2 Ch, 250 MHz, 16 bit, 128 Mpts/Ch, 6 V_{pp} output, AFG/AWG, Wave Sequencing	T3AWG3252
Arbitrary Waveform Generator, 2 Ch, 350 MHz,16 bit, 128 Mpts/Ch, 6 V_{pp} output, AFG/AWG, Wave Sequencing	T3AWG3352
256 Mpt/Ch Memory Option for T3AWG3K-C	T3AWG3-M
512 Mpt/Ch Memory Option for T3AWG3K-C	T3AWG3-X
1024 Mpt/Ch Memory Option for T3AWG3K-C	T3AWG3-XL
High Voltage (12 V_{pp} on 50 Ohm) for T3AWG3K-C	T3AWG3-HV
Digital 8 Ch. Output (incl. Mini-SAS cable)	T3AWG3-8 DIG
LVDS to LVTTL adapter. (Requires T3AWG3-8 DIG)	T3AWG3-8DIG-TTL
Mini-SAS HD to 16x SMA cable (8 LVDS output). (Requires T3AWG3-8 DIG)	T3AWG3-8DIG-SMA
3U - 19" RACKMOUNT KIT for T3AWG3K-C	T3AWG3-RACKMOUNT
Warranty extended to 3 Years	T3AWG3-W3
Cable Mini SAS HD 1m for 8-DIG (spare cable). (Requires T3AWG3-8 DIG)	T3AWG3-8DIG-MSCAB

ABOUT TELEDYNE TEST TOOLS

TELEDYNE TEST TOOLS
Everywhereyoulook™

Company Profile

Teledyne LeCroy is a leading provider of oscilloscopes, protocol analyzers and related test and measurement solutions that enable companies across a wide range of industries to design and test electronic devices of all types. Since our founding in 1964, we have focused on creating products that improve productivity by helping engineers resolve design issues faster and more effectively. Oscilloscopes are tools used by designers and engineers to measure and analyze complex electronic signals in order to develop high-performance systems and to validate electronic designs in order to improve time to market.

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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T3 stands for Teledyne Test Tools.

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