

# 300MS/s Dual-Channel Arbitrary Waveform Generator

**DISCONTINUED**



## MODEL 3362

- Dual-channel 300 MS/s waveform generators
- Synthesized function generator to 150 MHz
- 12 Bit amplitude resolution
- 4 Meg word waveform memory, 16 Meg word memory, optional (per channel)
- 10 Built-in popular standard waveforms
- Precisely controlled inter-channel phase relationships
- Triggered, gated and burst modes
- Amplitude modulation

- Waveform linking, looping and sequencing with up to 4096 segments and up to 16 sequence tables for generating a sequence of sequences
- GPIB and RS-232 interfaces
- ArbConnection software for easy waveform creation & control

Model 3362 is a dual-channel, high performance waveform generator that can be used as either complex arbitrary waveform generator or extremely high-speed function generator, with up to 12 bits of vertical resolution.

### Arbitrary Waveform Generator

The 3362 is a two-channel Waveform Generator with 4 Meg word (optional 16 Meg word per channel) of waveform memory. Model 3362 is high performance waveform generator and can be used as either arbitrary waveform generator or high-speed function generator. It generates waveforms with 12 bits of vertical resolution, each channel has its own waveform generator with independent amplitude, offset, and amplitude modulation controls. The 3362 have auxiliary outputs on each channel that provide the same waveforms as the main output with a fixed 1 volt output. Model 3362 is ideal for applications requiring complex signal generation such as I & Q signal simulation

### High Speed Function Generator

The 3362 generates standard functions such as sine, square and triangle waves. Sine and square waves can be generated at up to 150 MHz, making the 3362 the fastest function generators available today. The internal reference oscillator provides 1 ppm accuracy and has excellent long term stability. An external frequency reference can be used if better accuracy or stability is required.

### Amplitude Modulation

Amplitude modulation and suppressed carrier modulation is available on all waveforms, and is controlled via an external signal. 0% to 200% modulation is possible at bandwidths up to 1 MHz.

### Extensive Trigger Modes

In addition to continuous waveform generation, operation of the 3362 can be triggered in a number of modes. A single waveform occurrence can be initiated with the trigger function, or a specific number of waveforms (up to 1 million) produced with either internal, external or manual triggers. The gated function will allow waveform generation whenever the gating signal is true.

### Precise Inter-Channel Phase Control

In the 3362, both channels share a common precision sample clock, and both channels are triggered from the same source. This ensures that channel-to-channel timing is tightly synchronized. Precise control over channel-to-channel phase offset is achieved by allowing control over channel start phase with a resolution down to as small as 1 waveform point. This enables extremely accurate timing or phase dependencies to be studied, such as those found in high speed digital communication systems.

### Waveform Sequencing

For long or very complex waveforms, waveform memory can be divided into up to 4096 smaller

segments and different waveforms can be loaded into each segment. The various segments may then be loaded into a sequence table to generate long and complex waveforms. The sequence table can link up to 4096 segments, while each segment can loop up to 1 million times. Model 3362 can store up to 16 different sequence tables, then use these for generating a sequence of sequences. This capability makes it possible to generate even the most complex signals.

### ArbConnection

Unlimited Source of Arbitrary Waveforms. With the ArbConnection software you can control instruments functions, modes and features. You can also create virtually an unlimited variety of test waveforms. Freehand sketch allows you to draw your own custom waveform for quick analysis of analog signals. You can use the built-in equation editor to create your own exotic functions. Add or subtract components of a Fourier series to characterize digital or analog filters or, inject random noise into a signal to test immunity to auxiliary noise.



**TABOR ELECTRONICS Ltd.**

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### Service and Support

Beyond providing precision Test & Measurement instruments, Tabor Electronics provides unparalleled service and support, and is continuously finding new ways to bring added value to its customers.

Our after-sales services are comprehensive. They include all types of repair and calibration, and a single point of contact that you can turn to whenever you need assistance. As part of our extensive support, we offer individualized, personal attention Help Desk, both online and offline, via e-mail, phone or fax.

Tabor Electronics maintains a complete repair and calibration lab as well as a standards laboratory in Israel and USA. Service is also available at regional authorized repair/calibration facilities.

Contact Tabor Electronics for the address of service facilities nearest you.

### Applications

For expert technical assistance with your specific needs and objectives, contact your local sales representative or our in-house applications engineers.

### Manuals, Drivers, and Software Support

Every instrument comes equipped with a dedicated manual, developer libraries, IVI drivers, and software. However, if your specific manual is lost or outdated, Tabor Electronics makes it possible to log-on to its Download Center and get the latest data "in a click".

### Product Demonstrations

If your application requires that you evaluate an instrument before you purchase it, a hands-on demonstration can be arranged by contacting your local Tabor Electronics representative or the Sales Department at our Corporate Headquarters.

### Three-year Warranty

Every Tabor Electronics instrument comes with a three-year warrantee. Each one has full test results, calibration certificate, and CD containing product's manual and complete software package. Our obligation under this warranty is to repair or replace any instrument or part thereof which, within three years after shipment, proves defective upon examination. To exercise this warranty, write or call your local Tabor representative, or contact Tabor Headquarters and you will be given prompt assistance and shipping instructions.

# Specification 300MS/s Dual-Channel Arbitrary Waveform Generator

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### OUTPUT CHANNELS

<b>No. of Channels:</b>	2
Main:	Programmable-level output channels
Auxiliary:	Fixed-level, I and Q channels

### INTER-CHANNEL CONTROL

#### PHASE OFFSET

<b>Range in Degrees:</b>	0 to 360°
<b>Range in Waveform Points:</b>	0 to waveform length

#### RANGE SETTING RESOLUTION

<b>Coarse:</b>	8 points
<b>Fine:</b>	1 point to 128k points, 8 points above 128k.

<b>Accuracy:</b>	$\pm[\text{Resolution} + (3/\text{wave\_period}) \times 360^\circ]$ , (wave_period in ns)
<b>Initial Skew:</b>	< $\pm 2\text{ns}$

### INTER-CHANNEL DEPENDENCY

<b>Separate control:</b>	Amplitude, offset, standard waveforms, user waveforms, amplitude modulation
<b>Common Control:</b>	Sample clock, frequency, trigger modes, user waveform size, user waveform divider, sequence table, SYNC output

### STANDARD WAVEFORMS

<b>Waveforms:</b>	Sine, Triangle, Square, Pulse, Ramp, Sinc (Sine(x)/x), Gaussian Pulse, Exponential Fall, Rising Pulse, Noise, DC.
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<b>Frequency Range:</b>	Waveform dependent
<b>Source:</b>	Internal synthesizer

### SINE

<b>Frequency Range:</b>	100 $\mu$ Hz to 150MHz
<b>Band Flatness:</b>	5% to 10MHz; 10%, to 37.5MHz; 30%, to 150MHz

<b>Programmable Parameters:</b>	Start phase, 0 to 360°
<b>Harmonics and non-related spurious at 3Vp-p:</b>	< -50dBc for carrier frequencies 1MHz < -40dBc for carrier frequencies 37.5MHz

	< -35dBc for carrier frequencies 70MHz < -28dBc for carrier frequencies 150MHz
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### Total Harmonic Distortion:

	0.5% to 100KHz
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### TRIANGLE

<b>Frequency Range:</b>	100 $\mu$ Hz to 37.5MHz
<b>Start phase:</b>	0 to 360°

### SQUARE

<b>Frequency Range:</b>	100 $\mu$ Hz to 150MHz
<b>Duty cycle:</b>	1% to 99%
<b>Rise/Fall time:</b>	<2.5ns
<b>Aberration:</b>	<5%

### PULSE

<b>Frequency Range:</b>	100 $\mu$ Hz to 18.75MHz
<b>Adjustable Parameters:</b>	
Delay	0% to 99.9% of period
Rise Time	0% to 99.9% of period
High Time	0% to 99.9% of period
Fall Time	0% to 99.9% of period
<b>Rise/Fall time:</b>	<2.5ns
<b>Aberration:</b>	<5%

### RAMP

<b>Frequency Range:</b>	100 $\mu$ Hz to 37.5MHz
<b>Adjustable Parameters:</b>	
Delay	0% to 99.9% of period
Rise Time	0% to 99.9% of period
Fall Time	0% to 99.9% of period

### SINC (SINE(X)/X)

<b>Frequency Range:</b>	100 $\mu$ Hz to 9.375MHz
<b>"0" Crossing:</b>	4 to 100 cycles

### GAUSSIAN PULSE

<b>Frequency Range:</b>	100 $\mu$ Hz to 18.75MHz
<b>Time Constant:</b>	10 to 200

### EXPONENTIAL FALL/RISING PULSE

<b>Frequency Range:</b>	100 $\mu$ Hz to 37.5MHz
<b>Time Constant:</b>	-100 to 100

### NOISE

<b>Bandwidth:</b>	37.5MHz
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### DC

<b>Range:</b>	-100% to 100% of amplitude
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### ARBITRARY WAVEFORMS

#### SAMPLE CLOCK RANGE

#### INTERNAL

<b>Range:</b>	100mS/s to 300MS/s
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#### EXTERNAL

<b>Connector:</b>	Front panel BNC
<b>Range:</b>	100kHz to 300MHz

<b>Vertical Resolution:</b>	12bits
<b>Waveform Memory:</b>	4Meg points standard, 16Meg points optional (per channel)

### MEMORY SEGMENTATION

<b>No. of Segments:</b>	1 to 4096
<b>Min Segment Size:</b>	16 points
<b>Memory Interleave:</b>	8 (All trace lengths must be multiples of 8)

### SEQUENCED ARBITRARY WAVEFORMS

<b>Operation:</b>	Permits division of the memory bank into smaller segments. Segments may be linked, and repeated in user-selectable fashion to generate extremely long waveforms.
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### ADVANCE MODES

#### Automatic Sequence

<b>Advance:</b>	No triggers required to step from one segment to the next. Sequence is repeated continuously through a pre-programmed sequence table
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#### Stepped Sequence

<b>Advance:</b>	Current segment is sampled continuously, external trigger advances to next programmed segment. Control input is TRIG IN connector.
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#### Single Sequence

<b>Advance:</b>	Current segment is sampled to the end of the segment including repeats and idles there. Next trigger advances to next segment. Control input is TRIG IN connector.
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### ADVANCE SOURCE

#### INTERNAL

**Period:** From 20 $\mu$ s to 1000s  
**Accuracy:**  $\pm(1\% + 1\mu$ s)

#### EXTERNAL

**Input:** Front panel Trigger input  
**Frequency:** 15MHz to DC

#### SOFTWARE

**Activate Via:** IEEE 488.2 command

**Sequencer steps:** From 1 to 4096  
**Segment loops:** From 1 to 1Meg  
**Segment Duration:** Minimum 1 $\mu$ s for more than one loop.

### SEQUENCED SEQUENCES

**Operation:** Number of sequences may be linked in a multi-sequence table to generate extremely long sequences.

**No. of Sequenced Sequences:** 16  
**Segment Limitation Per Sequence:** 2 sequences, 2048 segments; 4 sequences, 1024 segments; 8 sequences, 512 segments; 16 sequences, 256 segments

### ADVANCE MODES

**Selectable:** GPIB or RS232 command selects an active sequence

**Stepped:** Current sequence is sampled continuously, external trigger advances to next programmed sequence. Control input is TRIG IN connector.

### ADVANCE SOURCE

#### INTERNAL

Internal programmable rate generator

**Period:** From 20 $\mu$ s to 1000s  
**Accuracy:**  $\pm(1\% + 1\mu$ s)

#### EXTERNAL

**Input:** Front panel Trigger input  
**Frequency:** 15MHz to DC

#### SOFTWARE

**Activate Via:** IEEE 488.2 command

### COMMON CHARACTERISTICS

#### CHANNELS 1 AND 2 OUTPUT

**Connector:** Front panel BNC  
**Stand-by:** Output Off or Normal  
**Impedance:** 50 $\Omega$ ,  $\pm 1\%$   
**Protection:** Protected against temporary short to case ground  
**Glitch Energy:** 100pV-s at 5Vp-p

#### FREQUENCY

**Resolution:** 7 digits limited by 1 $\mu$ s/s  
**Accuracy:** 1ppm  
**Stability:** 1ppm  
**Reference:** 0.0001% (1ppm TCXO) initial tolerance over a 19°C to 29°C temperature range; 1ppm/°C below 19°C and above 29°C; 1ppm/year aging rate

#### AMPLITUDE

**Range:** 10mV to 5Vp-p, into 50 $\Omega$ ; Double into open circuit  
4 digits

**Resolution:** 4 digits  
**Accuracy (1KHz):** 1.000V to 5Vp-p  $\pm(1\% + 25$ mV)  
100mV to 999.9mVp-p  $\pm(1\% + 5$ mV)  
10mV to 99.99mVp-p  $\pm(1\% + 2$ mV)

#### OFFSET

**Range:** 0 to  $\pm 2.495$ V, amplitude dependent  
5mV

**Resolution:** 5mV  
**Accuracy:**  $\pm(2\% + 10$ mV)

**FILTERS**  
150MHz Elliptic  
70MHz Elliptic  
5MHz Elliptic  
2.5MHz Elliptic  
800kHz Elliptic

### AUXILIARY OUTPUTS (I & Q)

**Operation:** Outputs the same waveform as the Main output.  
**Connector:** Front panel BNC  
**Impedance:** 50 $\Omega$ ,  $\pm 1\%$   
**Level:** 1V typical into 50 $\Omega$   
**Protection:** Protected against temporary short to case ground

### SYNC OUTPUT

**Connector:** Front panel BNC  
**Impedance:** 50 $\Omega$ ,  $\pm 1\%$   
**Level:**  $>2$  V into 50 $\Omega$ , 4V nominal into 10K $\Omega$   
**Protection:** Protected against temporary short to case ground  
**Validators:** BIT, LCOM, PULSE  
**Position:** Point 0 to n, Programmable  
**Width Control:** From 1% to 99%, programmable when placed in Pulse validator mode

### INPUTS

#### TRIG INPUT

**Connector:** Front panel BNC  
**Impedance:** 10K $\Omega$ , 5%  
**Threshold Range:** Programmable from -10V to +10V  
**Threshold Level:** 50mV  
**Sensitivity:** 0.2Vp-p  
**Max Input Voltage:** 10 Vrms, 1KHz to DC;  $\pm 12$ V dc above 1KHz  
**Min Pulse Width:** 20ns  
**Slope:** Positive or negative going edge.

#### EXTERNAL SAMPLE CLOCK INPUT

**Connector:** Front panel BNC  
**Impedance:** 50 $\Omega$ , AC coupled  
**Range:** 100KHz to 300MHz  
**Sensitivity:** 200mV rms

#### AM INPUT

**Modulation Input:** Front panel BNC  
**Impedance:** 1M $\Omega$ ,  $\pm 5\%$   
**Max Input Voltage:**  $\pm 12$ V  
**Sensitivity:** 0 V to -2V (2Vp-p) produce 100% modulation  
0 V to -4V (4Vp-p) produce 200% modulation

**Source:** External  
**Modulation Range:** 0 to 200%  
**Bandwidth:** DC to 1MHz

**AM MODULATION**  
**Carrier waveform:** Sine, Triangle, Square, Pulse, Ramp, Sinc (Sine(x)/x), Gaussian Pulse, Exponential Fall, Rising Pulse, DC, Arb.  
**Source:** External only.

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### Waveform modulation:

Sine, Triangle, Square, Pulse, Ramp, Sinc (Sine(x)/x), Gaussian Pulse, Exponential Fall, Rising Pulse, DC, Arb.

### TRIGGERING CHARACTERISTICS

#### TRIGGER SOURCES

#### EXTERNAL

**Connector:** Front panel BNC  
**Level:** -10V to +10V  
**Slope:** Positive or negative  
**Frequency:** DC to 15MHz  
**Impedance:** 10kΩ, DC coupled

#### INTERNAL

**Period:** 20μs to 1000s  
**Resolution:** 3 digits  
**Accuracy:** ±(1% + 1μs)

#### SOFTWARE

**Activate Via:** IEEE 488.2 command

#### SYSTEM DELAY

**Trigger to waveform output:** 1 Sample Clock + 150ns

#### GATED MODE

External signal enables generator. First output cycle synchronous with the active slope of the triggering signal. Last cycle of output waveform always completed

### BURST

**Waveforms:** Sine, Triangle, Square, Pulse, Ramp, Sinc (Sine(x)/x), Gaussian Pulse, Exponential Fall, Rising Pulse, Noise, DC, Arb

**Number of cycles per burst:** 1 to 1000000(1Meg)  
**Trigger source:** External, Internal or software command

### GENERAL

**Power requirements:** 90 to 264V, 47 to 63Hz, 150W max

**Operating temperature:** 0°C - 40°C

**Humidity (non-condensing):** 11°C to 30°C: 85 % + 5%  
31°C to 40°C: 75 % + 5%

**Storage temperature:** -40°C to + 70°C.

**Interface:** GPIB and RS232C standard

**Language:** IEEE-488.2 - SCPI – 1993.0

**Dimensions:** 19" x 5.25" x 16" (WxHxD)

**Weight:** Approx 9 kg

**Safety:** EN61010-1

**EMC:** CE marked. Designed to meet VDE 0411/03.81 and UL 1244

**Reliability:** MTBF per MIL-HDBK-217E, 25 C, Ground Benign

**Workmanship Standards:** Conform to IPC-A-610D

**Supplied Accessories:** Power Cord, CD containing Operating Manual, ArbConnection software and developer libraries.

**Warranty:** 3 years standard

### ORDERING INFORMATION

<b>MODEL</b>	<b>3362</b>
300MS/s Dual-Channel Arbitrary Waveform Generator	
<b>OPTIONS</b>	
<b>16Meg</b>	16 Meg Memory (per channel)
<b>ACCESSORIES</b>	
<b>Rails</b>	Telescopic Rails for 19" cabinets

**Note:** Options and Accessories must be specified at the time of your purchase.