

300MS/s Dual-Channel Arbitrary Waveform Generator

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 generators or high-speed function generators. 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.

300MS/s Dual-Channel Arbitrary Waveform Generator

Model 3362



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 warranty. 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.

CORPORATE HEADQUARTERS
9 Hattatia St. P.O.Box404,
Tel Hanan, Israel 20302
T +972 (4) 8213393
F +972 (4) 8213388
www.taborelec.com

EUROPE

Austria
UET-Viena
T +43 15451 588
F +43 15451 464

Benelux (Belgium, The Netherlands and Luxembourg)
BFI Optilas B.V.
T +31 172 44 60 60
F +31 172 44 34 14

Bulgaria
New-Tek Ltd.
T +359 296 25286
F +359 268 7110

Cyprus
Sprel Ltd.
T +357 2237 7159
F +357 2237 7284

Czech Republic & Slovakia
Testovaci Technika s.r.o.
T +420 2 7478 237
F +420 2 7478 1285

Denmark
Altimo AS
T +45 8625 8899
F +45 8625 5889

France
Racial Instruments SAS
T +33 1 3923 2205
F +33 1 3923 2225

Germany
CompuMess Elektronik GmbH
T +49 89 321501-0
F +49 89 321501-11

Greece
American Technical
Enterprises S.A.
T +30 210 5240 740
F +30 210 5249 995

Hungary
ProMet Merestechnika
T +36 24 521 240
F +36 24 521 253

Italy
LP Instruments srl
T +39 2 4840 1713
F +39 2 4840 1852

Norway
Nortelco AS
T +47 2257 6100
F +47 2257 6130

Poland
Helmat
T +48 22 436 3106
F +48 22 436 3110

Romania
InterNET SRL
T +40 21 312 1662
F +40 21 312 1663

Russia
CDIP
T +7 0959 56 2022
F +7 0959 56 2022

Spain & Portugal
Instrumentos De Media SL
T +34 91 300 0191
F +34 91 388 5433

Sweden & Finland
Ferner Elektronik AB
T +46 8 760 8360
F +46 8 760 8341

Switzerland
Eistar Elektronik AG
T +41 56 427 1888
F +41 56 427 1976

United Kingdom & Ireland
SEMATRON UK Ltd.
T +44 1256 812222
F +44 1256 812666

**Yugoslavia (Bosnia, Croatia,
Macedonia, Montenegro, Serbia, Slovenia)**
Mechanic & Electronic
Measurement

T +43 1943 4254
F +43 1943 4251

ASIA PACIFIC & JAPAN

Australia
Trio Test & Measurement
Solutions
T +61 8 8234 0504
F +61 8 8234 0130

India
AAMIL Ltd.
T +91 11 2695 0001
F +91 11 2695 0011

Japan
TOYO Corporation
T +81 3 3279 0771
F +81 3 3246 0645

Korea
ITB Corporation
T +82 2 549 8501
F +82 2 549 8502

New Zealand
Electrotest Ltd.
T +64 9 448 2600
F +64 9 448 2611

Philippines
Sunley Inc.
T +63 2751 1216
F +63 2815 0730

Singapore, Thailand & Vietnam
Gold Lite Engineering Pte Ltd.
T +65 6273 0487
F +65 6273 5006

Taiwan, China & Hong Kong
Precision International Corp.
T +886 2 85124888
F +886 2 85124900

Taiwan
T +886 2 85124888
F +886 2 85124900

China & Hong Kong
T +86 21 64401300
F +86 21 64400524

AFRICA

South Africa
Channels Measurement
T +27 11 254 8362
F +27 11 254 8451

MIDDLE EAST

Israel
Dan-El Technologies Ltd.
T +972 3 9271888
F +972 3 9271666

Turkey
Alfatek Test &
Automation Ltd.
T +90 216 474 7355
F +90 216 474 7357

UNITED STATES
US SALES & SUPPORT OFFICE
T +1 909 7970484
F +1 909 7974955

IL, IN, IA, KS, KY, MN, MO, NE, ND, SD, WI
Base Eight, Inc.
T +1 847 670 1680
F +1 847 670 1737

AZ, CO, ID, MT, NM, TX, EI, Pasco, UT, WY
Berry Technical Sales Inc.
T +1 303 665 9116
F +1 303 833 1294

AR, LA, OK, TX
Data Marketing Associates Inc.
T +1 972 661 0300
F +1 972 490 0836

OH, WV, PA, MI
Dytec EAST
T +1-330 405 8311
F +1 330 405 8313

DC, MD, VA
Eastern Instrumentation Corp.
T +1 410 884 7303
F +1 410 884 7306

PA, NJ
El Philly
T +1 856 231 0668
F +1 856 231 9022

HAW, NV, CA
Sierra Technical Sales
T +1 510 713 9957
F +1 510 713 9958

NJ, NY
Tera Technologies Inc.
T +1 888 921-TERA
F +1 888 449 2799

CT, ME, MA, NH, RI, VT
Test-Rep Associates, Inc.
T +1 978 692 8000
F +1 407 839 0337

AL, FL, GA, MS, NC, SC, TN
W.A. Brown Instruments
T +1 407 648 9660
F +1 407 839 0337

CA, NV
W5 Inc.
T +1 949 212 1199
F +1 714 281 0767

CANADA
Testforce Systems Inc.
T +1 514 856 0970
F +1 514 856 6983

LATIN AMERICAS
SALES & SUPPORT OFFICE
T +1 440 543 7710
F +1 440 543 9681



TABOR ELECTRONICS Ltd.

Specification

300MS/s

Dual-Channel

Arbitrary

Waveform Generator

Model 3362



OUTPUT CHANNELS

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

INTER-CHANNEL CONTROL

PHASE OFFSET

Range in Degrees: 0 to 360°

Range in Waveform Points: 0 to waveform length

RANGE SETTING RESOLUTION

Coarse:	8 points
Fine:	1 point to 128k points, 8 points above 128k.
Accuracy:	$\pm[\text{Resolution} + (3/\text{wave_period}) \times 360^\circ]$, (wave_period in ns)
Initial Skew:	< $\pm 2\text{ns}$

INTER-CHANNEL DEPENDENCY

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

STANDARD WAVEFORMS

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

SINE

Frequency Range:	100µHz to 150MHz
Band Flatness:	5% to 10MHz; 10%, to 37.5MHz; 30%, to 150MHz
Programmable Parameters:	Start phase, 0 to 360°
Harmonics and non-related spurious at 3Vp-p:	< -50dBc for carrier frequencies 1MHz < -40dBc for carrier frequencies 37.5MHz

< -35dBc for carrier frequencies 70MHz
< -28dBc for carrier frequencies 150MHz

Total Harmonic Distortion:

0.5% to 100KHz

TRIANGLE

Frequency Range: 100µHz to 37.5MHz
Start phase: 0 to 360°

SQUARE

Frequency Range: 100µHz to 150MHz
Duty cycle: 1% to 99%
Rise/Fall time: <2.5ns
Aberration: <5%

PULSE

Frequency Range: 100µHz to 18.75MHz
Adjustable Parameters:

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

Rise/Fall time: <2.5ns

Aberration: <5%

RAMP

Frequency Range: 100µHz to 37.5MHz
Adjustable Parameters:

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)

Frequency Range: 100µHz to 9.375MHz
"0" Crossing: 4 to 100 cycles

GAUSSIAN PULSE

Frequency Range: 100µHz to 18.75MHz
Time Constant: 10 to 200

EXPONENTIAL FALL/RISING PULSE

Frequency Range: 100µHz to 37.5MHz
Time Constant: -100 to 100

NOISE

Bandwidth: 37.5MHz

DC

Range: -100% to 100% of amplitude

ARBITRARY WAVEFORMS

SAMPLE CLOCK RANGE

INTERNAL

Range: 100M/s to 300MS/s

EXTERNAL

Connector: Front panel BNC
Range: 100kHz to 300MHz

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

MEMORY SEGMENTATION

No. of Segments: 1 to 4096

Min Segment Size: 16 points

Memory Interleave: 8 (All trace lengths must be multiples of 8)

SEQUENCED ARBITRARY WAVEFORMS

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

ADVANCE MODES

Automatic Sequence

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

Stepped Sequence

Advance: Current segment is sampled continuously, external trigger advances to next programmed segment. Control input is TRIG IN connector.

Single Sequence

Advance: 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.

Specification

300MS/s

Dual-Channel

Arbitrary

Waveform Generator

Model 3362



ADVANCE SOURCE

INTERNAL

Period: From 20 μ s to 1000s
Accuracy: $\pm(1\% + 1\mu\text{s})$

EXTERNAL

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

SOFTWARE

Activate Via: IEEE 488.2 command

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 μ s to 1000s
Accuracy: $\pm(1\% + 1\mu\text{s})$

EXTERNAL

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

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 Ω , $\pm 1\%$
Protection: Protected against temporary short to case ground
Glitch Energy: 100pV-s at 5Vp-p

FREQUENCY

Resolution: 7 digits limited by 1 μ 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 Ω ; Double into open circuit
Resolution: 4 digits
Accuracy (1KHz): 1.000V to 5Vp-p $\pm(1\% + 25\text{mV})$
100mV to 999.9mVp-p $\pm(1\% + 5\text{mV})$
10mV to 99.9mVp-p $\pm(1\% + 2\text{mV})$

OFFSET

Range: 0 to $\pm 2.495\text{V}$, amplitude dependent
Resolution: 5mV
Accuracy: $\pm(2\% + 10\text{mV})$

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 Ω , $\pm 1\%$
Level: 1V typical into 50 Ω
Protection: Protected against temporary short to case ground

SYNC OUTPUT

Connector: Front panel BNC
Impedance: 50 Ω , $\pm 1\%$
Level: $>2\text{V}$ into 50 Ω , 4V nominal into 10K Ω
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 Ω , 5%
Threshold Range: Programmable from -10V to +10V
Threshold Level: 50mV
Sensitivity: 0.2Vp-p
Max Input Voltage: 10 Vrms, 1KHz to DC; $\pm 12\text{V}$ dc above 1KHz
Min Pulse Width: 20ns
Slope: Positive or negative going edge.

EXTERNAL SAMPLE CLOCK INPUT

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

AM INPUT

Modulation Input: Front panel BNC
Impedance: 1M Ω , $\pm 5\%$
Max Input Voltage: $\pm 12\text{V}$
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.

Specification

300MS/s

Dual-Channel

Arbitrary

Waveform Generator

Model 3362



Waveform modulation:

Sine, Triangle, Square, Pulse, Ramp, Sinc ($\text{Sinc}(x)/x$), 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 ($\text{Sinc}(x)/x$), 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

MODEL 3362

300MS/s Dual-Channel Arbitrary Waveform Generator

OPTIONS

16Meg 16 Meg Memory (per channel)

ACCESSORIES

Rails Telescopic Rails for 19" cabinets

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