

# 100MHz Pulse Generator

## MODEL 8600

- Two independently programmed output channels with standard ECL/TTL auxiliary outputs (Channel B optional)
- High output amplitude level of 10Vp-p, (open circuit), in less than 2ns
- High-Accuracy, high-resolution digital settings, over exceptionally wide ranges. Pulse width/delay are set with 1 ns increments to 79,999ns
- Auto-calibration of output period with the built-in counter. Basic period accuracy is controlled to within 0.1% by an internal counter



- Complete pulse error detection for error-free operation
- Pulse output modes include single, double, delayed, and pulse complements
- Extremely low jitter pulse width and delay specification
- Complete GPIB programmability
- 30 storable, non-volatile, front panel set-ups are available for front panel or bus operation
- Standard built-in universal counter timer measures signals up to 150MHz

Tabor takes pride in providing the ultimate in pulse generator performance. Now available from Tabor, 100 MHz programmable pulse generator.

Model 8600 offers exceptional features, accuracy and value unsurpassed by any other pulse generator in this class. Its performance, programmability and economy assures continuing usefulness for many years to come.

### Versatility

Using the latest in microprocessor technology, the Tabor 8600 provides reliability and ease of operation in either manual or GPIB-IEEE 488 modes. Featuring a non-volatile memory, Model 8600 is capable of storing 30 complete front panel set-ups giving exact duplication of complex tests. Last set-up before power shut down is always retained. Modification of parameters is digitally set over exceptionally wide ranges:

- **Period** - set from 10nS to 1.999S.
- **Amplitude** - set from .5V to 10Vp-p within a window of 10V.
- **Pulse Width** - set from 5nS to 3.999MS.

- **Delay** - set from 0nS to 3.999mS.
- **Fixed Duty Cycle** - set from 1 % to 95%.

Model 8600 may be used as a stand alone -asynchronous generator. Consequently, synchronization to an independent external signal is achieved using one of its built-in triggering modes. Output may then be select between a single pulse, a gated burst or a burst of pre-selected number of output cycles. Alternately, An internal trigger stimulant, having a controllable period, is provided as substitution for an external signal.

### Precision

Model 8600 employs a built-in frequency counter. This counter is incorporated in an internal closed loop which constantly monitors the output frequency. When deviation from programmed frequency is sensed, the counter instantly sends correcting data to the microprocessor thus, enhancing the basic frequency accuracy

to 0.1% -an uncommon figure in such a class of instruments. This counter is also utilized in an internal self calibration routine which corrects the basic accuracy

of the VCO to better than 1 %. The self calibration routine is front panel selectable and is usable anytime. Alternately, the instrument may be used as an independent 7 digits universal reciprocal counter/timer which is capable of measuring, to a high degree of accuracy and resolution, three external parameters:

- **Frequency**: from 20Hz to 150MHz
- **Period averaged**: from 7 nS to 50mS
- **Pulse width averaged**: from 50 nS to 1S.

### Expandability

Standard Model 8600 is supplied with one main output (Channel A) delivering full amplitude and performance and one auxiliary output (AUX A) supplying a fixed voltage level of either TTL or ECL. Optional second output (channel B) is field installable. Only period is common to both channels. All other parameters are independently set.



**TABOR ELECTRONICS Ltd.**

# 100MHz Pulse Generator

## Model 8600



### 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.

### CORPORATE HEADQUARTERS

9 Hattatia St. P.O.Box404,  
Tel Hanan, Israel 20302  
**T**+972 (4) 8213393  
**F**+972 (4) 8213388  
[www.taborelec.com](http://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 2237  
**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

Heimar  
**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

### 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.

### UNITED STATES US SALES & SUPPORT OFFICE

**T**+1 909 7970484  
**F**+1 909 7974955

**IL, IN, IA, KS, KY, MN, MO, NE, ND, WI**  
Base Eight, Inc.

**T**+1 847 670 1680

**F**+1 847 670 1737

**AZ, CO, ID, MT, NM, TX, 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

WA 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.**

# Specifications 100MHz Pulse Generator

## Model 8600



### WAVEFORMS

Pulse, Pulse complement.

### OUTPUT MODES

Single, Delayed, Double, Fixed duty cycle, Disabled.

### OUTPUT CHANNELS

Two Channels. B Channel optional. Only period and trigger modes are common. Other parameters are independently set.

### PULSE PARAMETERS (CHANNELS A&B)

#### PERIOD

**Range:** 10.0ns to 1.999s.  
**Resolution:** 3 1/2 digits  
(1999 counts at full scale).

#### ACCURACY

**Continuous:** 20ns to 1.999s,  $\pm 0.1\%$  of full scale. 10ns to 19.9ns,  $\pm 2\%$  of programmed value  $\pm 0.2\text{ns}$ .

**Gated, and Burst:**  $\pm 2\%$  of programmed value  $\pm 0.2\text{ns}$  (within 1 hour following the self calibration sequence).

**Duty Cycle:** 1% to 99%  
(limited by 5ns off time).

**Jitter (Peak-Peak):** 0.1%  $\pm 50\text{ps}$ .

### WIDTH, DOUBLE PULSE

Measured at 50% of amplitude.

#### RANGE

**Pulse Width, Double Pulse:** 5ns to 79.999 $\mu$ s  
(with 1ns increments); 80.0 $\mu$ s to 4.000s.

**Delay:** 0ns to 79.999 $\mu$ s  
(with 1ns increments); 80.0 $\mu$ s to 3.999s.

**Resolution:** 5 digits maximum to 79.999 $\mu$ s. 4 digits maximum from 80.0 $\mu$ s to 3.999s.

**Accuracy:**  $\pm 1\%$  of programmed value  $\pm 2\text{ns}$ .

### MAXIMUM JITTER (Peak-Peak)

**Below 1 $\mu$ s:** < 0.1% +50ps.  
**1 $\mu$ s to 10 $\mu$ s:** 0.05%.  
**Above 10 $\mu$ s:** 0.005%.

### FIXED DUTY CYCLE MODE

**Mode:** Output pulse is automatically adjusted to the programmed duty cycle parameter. The programmed pulse width parameter is ignored.  
**Range:** 1% to 95%.  
**Accuracy:**  $\pm(3\% \text{ of programmed value} + 2\text{ns})$ .

### OUTPUT LEVELS (CHANNELS A&B)

**High Level Range:** -4.50V to +5.0V, into 50 $\Omega$ ; -9.0V to +10.0V, into open circuit.

**Low Level Range:** -5.0V to +4.5V, into 50 $\Omega$ ; -10.0V to +9.0V, into open circuit.

**Amplitude:** 0.5V to 5V, into 50 $\Omega$ ; 1V to 10V, into open circuit.

**Resolution:** 3 digits.

**Accuracy (1KHz):**  $\pm(2\% \text{ of programmed value} + 2\% \text{ of amplitude} + 20\text{mV})$ .

**Output Protection:** protected against continuous short to case ground.

### PULSE PERFORMANCE (CHANNELS A&B)

**Transition Times:** 2ns.  
**Aberration:** < 5%.  
**Impedance:** 50 $\Omega$ ,  $\pm 2\%$ .

### SYNC OUTPUT

**Output Impedance:** 50 $\Omega$ ,  $\pm 2\%$ .  
**Output Level:** 1V minimum, into 50 $\Omega$ ; 2V minimum, into open circuit.

**Transition Time:** 1ns typical.

**Duty Cycle:** 10ns to 1999ns, 50%; Above 2000ns, Pulse width varies from 100ns to 1 $\mu$ s.

### AUXILIARY OUTPUTS (AUX A & B)

**Period:** 10ns to 1.999s.  
**Operating Mode:** ECL or TTL output, front panel selectable.  
**Output Impedance:** 50 $\Omega$ ,  $\pm 3\%$ .

**Pulse Parameters:** Share parameters with the main outputs except amplitude.

**Output Modes:** Share modes with the main outputs.

**Output Level:** TTL, 0/2.5V, into 50 $\Omega$ ; 0/5V into open circuit; ECL, -0.9V to -1.7V, into 50 $\Omega$ .

**Transition Times:** TTL, 4ns; ECL, 3ns.

### TRIGGERING CHARACTERISTICS

#### EXTERNAL TRIGGER MODES

**External Trigger:** Each input cycle generates a single output pulse.

**External Burst:** As in external trigger for a programmable number of pulses.

**Gated:** External signal enables generator. First output pulse synchronous with the active slope of the gating signal.

**Input Impedance:** 10k $\Omega$ ,  $\pm 5\%$ .  
**Trigger Level:** -10.0V to +10.0V, adjustable.

**Trigger Sensitivity:**  $\pm 500\text{mV}_{\text{p-p}}$ .  
**Slope:** Positive or Negative going leading edge, Selectable.

#### EXTERNAL REPETITION RATE

**Triggered:** 100MHz maximum.  
**Gated:** 25MHz maximum.  
**Burst:** 25MHz maximum.

#### INTERNAL TRIGGER MODES

**Internal Trigger:** An internal timer repeatedly generates a single output pulse. Trigger period is adjustable.

**Internal Burst:** As in internal trigger for a programmable number of pulses.

**Manual:** Simulates an external trigger or gating signal.  
**Manual Burst:** Simulates an external trigger stimulant.

# Specifications 100MHz Pulse Generator

## Model 8600



### INTERNAL TRIGGER PERIOD

**Triggered, Burst:** Continuously adjustable from 0.05 ms to 1000s.

**Burst Count Range:** From 2 to 65,500.

### DELAY TRIGGER MODES

Measured from trigger input to SYNC out

|                   |              |
|-------------------|--------------|
| <b>Triggered:</b> | 50ns, ±10ns; |
| <b>Gated:</b>     | 65ns, ±10ns; |
| <b>Burst:</b>     | 65ns, ±10ns. |

### COUNTER CHARACTERISTICS

#### GENERAL

**Input:** Via EXT FREQ /TRIG IN BNC.

**Measurement Technique:** Reciprocal frequency measurement.

**Gate Time:** 1s, NOMINAL.

**Sensitivity:** 500mVp-p.

**Dimensions:** one digit exponent.

#### FREQUENCY MEASUREMENT

**Range:** 20Hz to more than 150MHz.

**Resolution:** 7 digits, regardless of frequency.

**Accuracy:** ±(0.01% +1 LSD).

**Detectable Pulse Width:** 5ns minimum.

#### PERIOD AVERAGED MEASUREMENT

**Range:** 7ns to 50ms.

**Resolution:** 7 digits, regardless of period.

**Accuracy:** ±(0.002% +1 LSD).

#### PULSE WIDTH AVERAGED MEASUREMENT

**Range:** 50ns to 1s.

**Max Repetition Rate:** 10MHz.

**Resolution:** 100ns

✓F

where F = frequency in Hz  
±(0.002% +3ns +1 LSD)  
(for square shaped signals).

**Dead Time between measured pulses:** 50ns.

### GPIB INTERFACE

**Programmable controls:**

All front panel controls except POWER switch.

**Subsets Implemented:**

SH1 ,AH1 , T6, TE0, L4, LE0, SR1, RL1, PP2, DC1, LJ71, C0.

**Data Output Format:**

Fixed output format consisting of 10 or 14 ASCII characters plus terminators.

**Data Input Format:** ASCII characters lower or upper case. ASCII characters smaller than 20 HEX (32) are ignored except CR (OD HEX).

**Service Request:** Selectable for illegal commands, errors, pulse errors.

**String Termination:** Selectable CR, LF, EOI or combination of all.

#### GENERAL

**Display:** 7 digits, 7 segment LED's 0.5" high.

**Power:** 115/230Vac, ±10%, 50 or 60Hz, 150VA max.

**Stored Set-ups:** 30 complete sets of front panel set-ups. Storage guaranteed for 3 years.

**Operating Temperature:** 0 to 50°C, ambient.

**Specified Accuracy:** +20°C to +28°C.

**Storage:** +20°C to +28°C.

**Temperature:** -40°C to + 70°C.

**Dimensions:** 5.5" x 11.8" x 13.6" (HxWxL).

**Rack Mount Dimensions:** 7" x 19" (HxW).

Approximately 16Lbs.

**Weight:** CE marked

**EMC:** MTBF per MIL-HDBK-217E,

**Reliability:** 25°C, Ground Benign

Designed to meet IEC 1010-1,

UL 3111-1,

CSA 22.2 #1010

**Safety:** Conform to IPC-A-610D

**Workmanship Standards:**

**Supplied Accessories:**

Power Cord, CD containing Operating Manual and developer libraries.

3 years standard.

### ORDERING INFORMATION

**MODEL** 8600

100MHz Pulse Generator

#### OPTIONS

**Option 1:** Channel B. Independent High/Low Levels, Pulse Width, Pulse Delay, Single/Double Pulse, Normal/Complement.

#### ACCESSORIES

**Rack mount:** 19" Single Rack Mounting Kit

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