100MS/s Single-Channel Arbitrary Waveform Generator

DISCONTINUED

MODEL 8025

- **Single-channel 100 MS/s waveform generator**
- **Multi-Instrument synchronization**
- **14 Bit amplitude resolution, 18 Bit offset resolution**
- **1 Meg word waveform memory, 4 Meg word memory, optional**
- **1 ppm clock accuracy and stability**
- **Extensive modulation capabilities AM, FM, Arbitrary FM, FSK, Ramped FSK and Sweep**
- **Waveform sequencing with up to 4096 segments and sequences**

- **10 Built-in popular standard waveforms**
- **DDS technology delivers extremely low phase noise signals**
- **GPIB and RS-232 interfaces**
- **ArbConnection software for easy waveform creation & control**

The 8025 system breaks new ground in arbitrary waveform generator design. With its unprecedented combination of arbitrary generator and synthesizer, its versatility, its high resolution and wide frequency range, and its extremely good performance-to-price ratio, the 8025 offers a range of benefits that will facilitate work in many fields.

100 MS/s Sample Rate
The 100 MS/s sample rate allows the vertical accuracy to be converted into excellent performance at high frequencies. This opens up many applications in communication, video and television, telecommunication, radar, and ultrasonics, for example.

14 Bit Resolution
The 14-bit resolution provides 16,384 output levels. This means that even audio waveforms can be generated with excellent fidelity. It also allows video-and other complex waveforms-to be generated with small details superimposed on large signals, in order to test the response of receiving systems.

Bench Operation
Looking at the instrument as a simple function generator, there are eleven basic waveforms with adjustable parameters. These are sine, triangle, square, pulse, ramp, sinc, Gaussian, exponential up, exponential down, noise, as well as DC. All are accessible from the front panel.

4 Meg Memory
The 8025 offers 1 Meg word (4Meg word optional) memory for arbitrary waveforms. Given the 14-bit resolution, the generator offers enormous power. In addition, the memory can be divided into as many as 4096 segments, which can be looped and linked in many different ways. Using 1 Meg word at 25 MS/s to generate a video signal, for example, the duration is 0.04 s, 25 Hz, even without any looping of repetitive elements.

Sequence Generator
When the sequencing facilities are invoked, the 8025 becomes truly unique. The memory segments can be linked and repeated in any

combination both manually and under programmed control.

In the automatic advanced mode, the complete sequence runs continuously and automatically under the control of a pre-programmed table. In the stepped sequence-advance mode, the current segment is looped continuously until a trigger is received, when the next segment is invoked. The single sequence advance mode runs the current segment once only, and then idles until the next trigger is received. There is even a mixed sequence mode in which each segment can be preprogrammed to run under either automatic-advance mode or in stepped advance mode.

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Fast Data Transfer
Arbitrary waveform data may be quickly transferred to the 8025 via RS-232C or GPIB - IEEE 488.2 - using a very fast DMA mode.

Sample Clock Modulation
One of the many attractive features of the 8025 is the sample clock modulation function. In a normal arbitrary waveform generator, to make a frequency modulated sinewave, you have to enter the complete mathematical function. Not so with the 8025: all you need to do is to generate the carrier signal, and then modulate the clock to obtain the required result. The sample clock modulation can be done by internal waveforms - sine, square, triangle, and ramp. Using downloaded arbitrary modulating waveforms, you can generate signals that would be difficult or impossible to define using an equation.

Frequency Shift Keying
Frequency shift keying could be accomplished by using the facilities already mentioned, but the 8025 includes an FSK function to simplify operations. A TTL input is used to control the shifting.

As a further refinement, the 8025 offers a ramped FSK function, in which the rate of change of frequency is controlled by the ramp time parameter.

Linear Logarithmic Frequency Sweep
A linear or logarithmic frequency sweep is offered, and of course the FM functions can be used to define more complicated variations.

Triggering Facilities
However versatile the waveform generation systems are made, the need for external control of generation is vital. The triggering facilities of the 8025 match the generation functions in versatility.

In the simplest mode, signals are output continuously. The 8025 also offers the triggered mode, gated mode, external burst mode, and internal burst mode, all of which can use an external trigger signal or an internal trigger. The use of external sources to prompt the switching of segments has already been mentioned.

Any point in a wave can be designated as a start point. On receipt of a trigger, the wave starts at this point, runs to the end, restarts seamlessly at the beginning, and stops at the point before the trigger point.
Separate breakpoints are programmable in each channel, triggerable from SCPI commands via GPIB or RS-232C, or by signals at the trigger input.

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.

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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.

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Specification
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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 50MHz
Band Flatness:	5% to 10MHz; 20%, to 50MHz
Programmable Parameters:	Start phase, 0 to 360°
Harmonics and non-related spurious at 5Vp-p:	<-55dBc
	for carrier frequencies 1MHz
	<-45dBc
	for carrier frequencies 5MHz
	<-40dBc
	for carrier frequencies 10MHz
	<-22dBc
	for carrier frequencies 50MHz
Total Harmonic Distortion:	0.1% to 100kHz

TRIANGLE

Frequency Range:	100µHz to 12.5MHz
Start phase:	0 to 360°

SQUARE

Frequency Range:	100µHz to 50MHz
Duty cycle:	1% to 99%
Rise/Fall time:	<10ns
Aberration:	<5%

PULSE

Frequency Range:	100µHz to 6.25MHz
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:	<10ns
Aberration:	<5%

RAMP

Frequency Range:	100µHz to 12.5MHz
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 3.125MHz
"0" Crossing:	4 to 100 cycles

GAUSSIAN PULSE

Frequency Range:	100µHz to 3.125MHz
Time Constant:	10 to 200

EXPONENTIAL FALL/RISING PULSE

Frequency Range:	100µHz to 6.25MHz
Time Constant:	-20 to 20

NOISE

Bandwidth:	25MHz

DC

Range:	-100% to 100% of amplitude

ARBITRARY WAVEFORMS

SAMPLE CLOCK SOURCE

INTERNAL

Range:	100mS/s to 100MS/s

EXTERNAL

Connector:	Rear panel BNC
Range:	DC to 100MHz
Level:	ECL 100k compatible

Vertical Resolution:	14Bits
Waveform Memory:	1Meg points standard, 4Meg points optional

MEMORY SEGMENTATION

Number of Segments:	1 to 4096
Min Segment Size:	16 points
Memory Interleave:	4 (All trace lengths must be multiples of 4)

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.
Mixed Sequence Advance:	Each step of a sequence can be programmed to advance either a) automatically (Automatic Sequence Advance), or b) with a trigger (Stepped Sequence Advance)
Advance Source:	External, rear panel BNC; Internal; GPIB
Sequencer steps:	From 1 to 4096
Segment loops:	From 1 to 1Meg
Segment Duration:	Minimum 1µs for more than one loop.

COMMON CHARACTERISTICS

MAIN OUTPUT

Connector:	Front panel BNC
Stand-by:	Output Off or Normal
Impedance:	50Ω, ±1%
Protection:	Protected against temporary short to case ground

Frequency Resolution:	7 digits limited by 1µS/s
Accuracy:	1ppm
Stability:	1ppm
Reference:	
Internal	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
External	10MHz TTL, 50% ±2% duty cycle

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AMPLITUDE

Range:	10 mV to 10Vp-p, into 50Ω; Double into open circuit
Resolution:	4 digits
Accuracy (1kHz):	
1.000V to 10Vp-p	±(1% + 25 mV)
100 mV to 999.9 mVp-p	±(1% + 5 mV)
10 mV to 99.99 mVp-p	±(1% + 2 mV)

OFFSET

Range:	0 to ±4.5V, amplitude dependent
Resolution:	2.2mV
Accuracy:	±1%
FILTERS	50MHz Elliptic 25MHz Elliptic

SYNC/MARKER OUTPUT

Connector:	Front panel BNC
Impedance:	50Ω, ±1%
Level:	>2V into 50Ω, 4V nominal into 10kΩ
Protection:	Protected against temporary short to case ground
Validators:	BIT, LCOM
Position:	Point 0 to n, Programmable with 4-point resolution
Width Control:	Programmable
Range:	4 to 100000 waveform points
Resolution:	4 points
Source:	Main output

SINEWAVE OUTPUT

Connector:	Rear panel BNC
Impedance:	50Ω, ±1%
Level:	1V into 50Ω
Protection:	Protected against temporary short to case ground
Source:	Sample clock frequency
Frequency Range and Resolution:	Same as Sample clock
Total Harmonic Distortion:	0.05% to 100kHz
Harmonics and non-related spurious:	< -30dBc

INPUTS

TRIG INPUT

Connector:	Rear panel BNC
Impedance:	10kΩ, ±5%

Threshold Level:	TTL
Min Pulse Width:	20ns
Slope:	Positive or negative going edge.

10 MHz REFERENCE INPUT

Connector:	Rear panel BNC
Impedance:	10kΩ, ±5%
Threshold Level:	TTL
Duty Cycle:	50%, ±5%

AM Input

Modulation Input:	Rear panel BNC
Impedance:	1MΩ, ±5%
Max Input Voltage:	12V
Sensitivity:	0V to +5V (5Vp-p) produce 100% modulation
Source:	External
Modulation Range:	0 to 100%
Bandwidth:	DC to 500kHz

MODULATION

FM

Waveform Modulation:	Sine, Triangle, Square, Pulse, Ramp, Sinc (Sine(x)/x), Gaussian Pulse, Exponential Fall, Rising Pulse, Noise, DC, Arb
Source:	Internal
Resolution:	7 digits
Accuracy:	0.1%
Frequency Distortion:	<0.1%
Deviation Range:	100mS/s to 100MS/s
Trigger Advanced Mode:	Automatic, Triggered, Gated or Software Command
Marker	
Output & Level:	Same as SYNC output.
Position:	Programmable for selected frequency

FM – BUILT-IN STANDARD WAVEFORMS

Carrier Waveforms:	Sine, Square, Triangle and Ramp
Modulation Frequency Range:	1mHz to 100kHz

FM – DOWNLOADED ARBITRARY WAVEFORMS

Modulation Source:	User waveform, any shape, 10 to 20000 waveform points
SCLK Range:	1mS/s to 2MS/s

FSK

Carrier Sample Clock Range:	100mS/s to 100MS/s
Source:	External, Rear panel Trigger input BNC.
Low level:	Carrier sample clock
High level:	Hop frequency
Frequency Range:	From 10MHz to DC
FSK Delay:	Minimum 1 waveform cycle + 50ns

RAMPED FSK

Ramp Time Range:	10µs to 1s, 3 digits, ±0.1%

SWEEP

Carrier Waveforms:	Sine, Square, Triangle, Ramp, Arb
Type:	Linear or Logarithmic
Direction:	Up or down, depending on the start and stop setting
Sweep Time:	1ms to 1000s, 7 digits, ±0.1%
Range:	100mS/s to 100MS/s
Trigger Advanced Mode:	Automatic, Triggered, Gated or Software Command
Marker:	
Output & Level:	Same as SYNC output.
Position:	Programmable for selected frequency

TRIGGERING CHARACTERISTICS

TRIGGER SOURCES

EXTERNAL

Connector:	Rear panel BNC
Level:	TTL
Slope:	Positive or negative
Frequency:	DC to 2MHz
Impedance:	10kΩ, DC coupled

INTERNAL

Range:	100mHz to 2MHz
Resolution:	7 digits
Accuracy:	0.1%
MANUAL	Single trigger (front panel push-button) simulates an external trigger signal.

TRIGGER START PHASE

Description:	Waveform starts from point n and completes at point n-1.
Range:	0 to 999999 waveform points (1Meg, 4Meg optional)
Resolution:	4 points

START/STOP CONTROL (BREAKPOINT)

Range:	0 to 999999 waveform points (1Meg, 4Meg optional)
Source:	External (Rear Panel Trigger Input BNC), Manual, or software command through RS232 or GPIB
Resolution:	4 points
Breakpoint Error:	±4 points

SYSTEM DELAY

Trigger to waveform output:	1 Sample Clock+150ns
GATED MODE	External signal enables generator. First output cyclesynchronous 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
Trigger source:	Manual, External or Internal

MULTI-INSTRUMENT SYNCHRONIZATION

Description:	Multiple instruments can be connected together and synchronized to provide multi-channel synchronization.

PHASE (LEADING EDGE) OFFSET

Description:	Leading edge of master output trails the leading edge of the slave output by a programmable number of points. Each slave can be programmed to have individual offset.

Range:	0 to 999999 points (1Meg, 4Meg optional)
Resolution and Accuracy:	4 point
Initial Skew:	< ±15ns, depending on cable length and quality, typically with 1 meter coax cables

GENERAL

Power requirements:	90 to 264V, 47 to 63Hz, 50W max
Display:	4 lines, 80 characters, backlit LCD.
Operating temperature:	0 - 40°C
Humidity (non-condensing):	11°C to 30°C: 85 % 31°C to 40°C: 75 %
Storage temperature:	-40°C to + 70°C.
Interface:	GPIB and RS232C standard
Language:	IEEE-488.2 - SCPI – 1993.0
Dimensions:	212 x 88 x 415 mm (WxHxD)
Weight:	Approx 4kg
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   8025

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OPTIONS

4Meg	4 Meg Memory

ACCESSORIES

Sync cable	Sync cable for multi instrument synchronization
S-Rack mount	19" Single Rack Mounting Kit
D-Rack mount	19" Dual Rack Mounting Kit
Case Kit:	Professional Carrying Bag

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

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