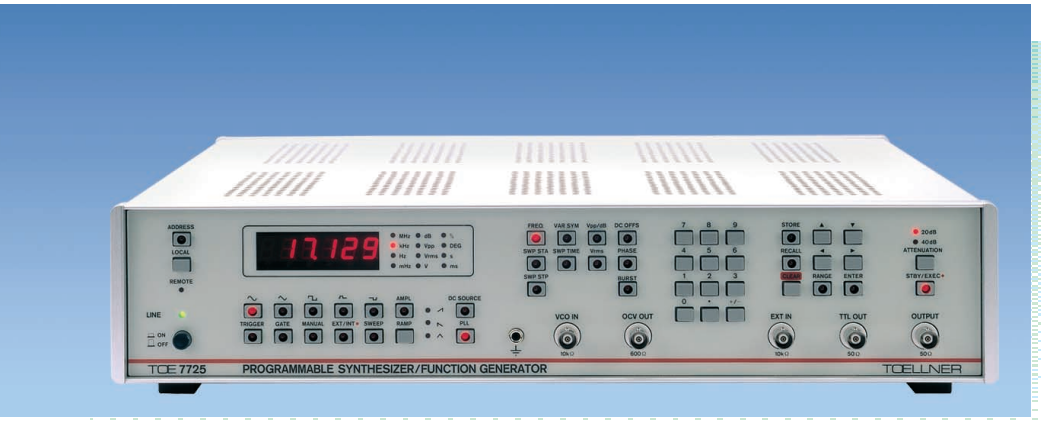
Programmable synthesizers/function generators from TOELLNER®

TOE 7720 · TOE 7723 · TOE 7725



- Programmable 10 MHz or 20 MHz synthesizers/ function generators
- 6 signal waveforms
- 20 V_{pp} output voltage
- Trigger/gate/burst
- Synthesizer stability
- Saving of 10 setting combinations
- IEEE bus as standard

Owing to their standard, integral IEEE bus interfaces, the programmable TOELLNER synthesizers/function generators of the TOE 7720 range are suitable for use in computer-based automatic test and measuring systems. Because they are so easy to operate, the range is also eminently suited to standard laboratory applications. The microprocessor technology on which the whole design is based greatly supports simple operation and repeatably accurate settings and has led to improvements in the entire design.

OVERVIEW

	TOE 7720	TOE 7723	TOE 7725
Frequency Min Max	1 mHz 10 MHz	1 mHz 10 MHz	2 mHz 20 MHz
Synthesizer	-	●	●
Signal waveforms Sine, triangle, square, TTL	●	●	●
Pos./neg. pulse	●	●	●
Var. symmetry	●	●	●
Output (V_{pp})	> 20 V	> 20 V	> 20 V
Feedback voltage protection	opt.	opt.	opt.
Operating modes Trigger/gate	-	●	●
Burst	-	●	●
Internal sweep oscillator	-	●	●
VCO, ext.	●	●	●
IEEE 488	●	●	●

The TOE 7720 and TOE 7723 models have a wide frequency range from 1 mHz to 10 MHz, the TOE 7725 model from 2 mHz to 20 MHz. They also have an high output voltage of up to 20 Vpp with a DC offset of 0 to ± 10 V, a precisely adjustable variable symmetry from 10 % to 90 %, a variety of output functions, and an amplifier operating mode.

In addition, the TOE 7723 and TOE 7725 models are provided with an internal sweep oscillator with a sweep period of 1 ms to 1000 s that can be programmed for various sweep characteristics. They also feature a trigger/gate function that can be triggered internally, externally or manually with an adjustable start phase within ± 90°. In trigger mode, counted burst is adjustable for up to 106 periods. Finally, the PLL operating mode extends the functional range of the TOE 7725 and TOE 7723 by turning the devices into a synthesizer whose output frequency can be set with crystal accuracy in the range from 10 Hz to 20 MHz.

Manual operation is carried out using a keypad of clear and functional design. All operating data can be entered directly on the numeric keypad or indirectly by continuously pressing the increment or decrement key to vary the data at a constant step rate within the visible operating range.

The 6-digit LED display allows exact and reproducible input and display of all operating data. The essential operating parameters for any particular setting are permanently displayed on individual LEDs. Besides the current setting of the device, 10 additional complete sets of settings can be saved in a non-volatile memory. This feature enables extremely fast manual or programmed changes from one device setting to another.

Specifications
function generators from TOELLNER®

TOE 7720 - 7725

Specifications
Functions: sine, triangle, square, positive/negative pulse, variable symmetry

Operating modes:
TOE 7720: free-running oscillator, external sweep-frequency control, amplifier mode, bipolar DC voltage source,

TOE 7723, TOE 7725: free-running oscillator, internal and external sweep-frequency control, amplifier mode, bipolar DC voltage source, trigger/gate and burst modes, PLL

Frequency characteristics
Frequency range:

TOE 7720: 1 mHz to 10 MHz, 3 digits resolution

TOE 7723: 1 mHz to 10 MHz, 3 digits resolution
10 Hz to 10 MHz in PLL mode, 4 digits resolution

TOE 7725: 2 mHz to 20 MHz, 3½ digits resolution
10 Hz to 20 MHz in PLL mode, 4½ digits resolution

Frequency error:
2 % of f.s.v., 5 % of f.s.v. above 100 kHz; 10^{-5} of f.s.v. in PLL mode (TOE 7723, TOE 7725)

Drift:
TOE 7720: 10^{-3}/K up to 1 MHz, 3 x 10^{-3}/K above 1 MHz and 5 x 10^{-3} within 8 hours; in each case following 30 min warm-up time.

TOE 7723, TOE 7725: 10^{-6}/K and 5 x 10^{-6} within 8 hours in PLL mode.

10^{-3}/K up to 1 MHz, 3 x 10^{-3}/K above 1 MHz. 5 x 10^{-3} within 8 hours; in each case following 30 min warm-up time. The crystal frequency is 10 MHz ± 0.002 %; aging 2 ppm/year.

Variable symmetry
TOE 7720, TOE 7723, TOE 7725:
(frequency range 1 mHz to 1/10 f_{max}) 10 % to 90 %, 2 digits resolution, error ± 2 digits.

Function output at OUTPUT

Amplitude: 20 mV_{pp} to 20 V_{pp}
10 mV_{pp} to 10 V_{pp} in pulse mode, 3 digits resolution.

Accuracy: ± 5 % (at 1 kHz for sine and triangle)

Drift: ± 0.05% of f.s.v. within 10 minutes, ± 0.3% of f.s.v. within 8 hours

Frequency response (sine)

TOE 7720, TOE 7723: ± 0,5 dB, ± 1 dB above 1 MHz

TOE 7725: ± 0,5 dB, ± 2 dB above 1 MHz

Frequency response (triangle)

TOE 7720, TOE 7723: ± 0,5 dB, ± 1,5 dB above 1 MHz

TOE 7725: ± 0,5 dB, ± 2,5 dB above 1 MHz

Offset and DC mode: 0.0 V to ± 10.0 V, 2 digits resolution

Accuracy: 1 % ± 50 mV

Output impedance: 50 Ohm ± 5 %. The output is no-load and short-circuit proof.

Display of output voltage:
In Vpp for sine, triangle, square and pulse; additionally in Vrms for sine.

Standby: directly switchable, $R_i = \infty$

Function specification
At max. output voltage into 50 Ohm load.

Sine: Distortion factor < 0.5 % to up 50 kHz, all harmonics are 26 dB below the fundamental wave up to 10 MHz (TOE 7720/TOE 7723) or up to 20 MHz (TOE 7725)

Triangle: Linearity error < 1 % up to 100 kHz, symmetry error < 1% up to 100 kHz

Square:

TOE 7720, TOE 7723: Transition time < 18 ns, overshoots < 5 %

TOE 7723: Transition time < 12 ns, overshoots < 5 %

Impuls: See square

Specifications
function generators from TOELLNER®

TOE 7720 - 7725

Broadband amplifier

Gain: - 46 dB to 14 dB, 3 digits resolution

Frequency range:
DC up to approx. 10 MHz

Distortion factor:
< 0.2 % up to 100 kHz

Input resistance: 10 kOhm Internal sweep oscillator (TOE 7723, TOE 7725)

Sweep period: 1 ms to 1000 s, 2 digits resolution. Separate adjustment of sweep limits

Sweep range: 2 decades, linear characteristic, sweep voltage shape, triangle, positive and negative sawtooth

Gate, trigger, burst

(TOE 7723, TOE 7725)
Frequency range: 1 mHz to 10 MHz, all output functions

Start phase: -90° to +90°, 2 digits resolution
Burst: 1 to 999 999 periods

Internal trigger: tripping by internal sweep oscillator; pulse duty factor 50 % in gate mode

External trigger: TTL level at EXT IN socket, or manually.

Other signal inputs and outputs
Synchronizing signal output TTL OUT; TTL-compatible

Source impedance: 50 Ohm

Modulation input VCO IN: approx. 5 V at a frequency variation ratio of 1000:1, Ri = 10 kOhm

OCV OUT: 0 to 5 V output voltage at a frequency variation of 1:1000

EXT IN: amplifier, gate, trigger/burst input. Input voltage ± 40 V max., Ri = 10 kOhm
IEEE 488 bus interface.

With the exception of the cursor functions, all manually adjustable functions and parameters are programmable via the bus interface. The device address (0 to 30) is set using the keyboard, and is shown on the display.

Interface: IEEE 488

Functions: AH1, SH1, L4, T6, SR1, PP1, RL1, DC1, DT1, E1, C0

Response times:
Frequency 10 ms
PLL 100 ms to 5 s
Function 8 ms
Amplitude 12 ms
DC offset 10 ms
Gain 20 ms
Gate/trigger 25 ms
Clear (gate/trigger) 15 ms
Store/recall 5 ms
Reset 100 ms
Other < 10 ms

General data

Non-volatile storage:
1 storage location for current instrument setting. 10 storage locations for programmable setting combinations.

Mains voltage: 115/230 V ± 10 %, 48 to 60 Hz.

Power consumption: 60 VA

Operating temperature: 5 °C to 50 °C

Storage temperature: - 20 °C to 70 °C

Reference temperature: 23 °C

Dimensions:
422.5 x 88.5 x 320 mm (WxHxD)
19“ rack compatible, 2HU

Weight: 6.5 kg, 7.5 kg incl. packaging

Housing: Aluminium

Ordering data:

Function generator	TOE 7720
Synthesizer/ function generator	TOE 7723 TOE 7725

Options

Feedback voltage protection	TOE 7720/110
TCXO (TOE 7723, TOE 7725)	TOE 7720/111
Rear panel output	TOE 7720/112
19“ adapter, 2HU	TOE 9506