



- **1 μ Hz – 40 MHz Sine and Square Waveforms**
- **Output Amplitude up to 20 V_{PP}**
- **14 Bit, 1 000 000 Point Arbitrary Waveforms with up to 80 MS/s Sampling Rate**
- **Flash Memory for 1 000 000 Sample Points**
- **A Wide Choice of build-in Standard Waveforms helps creating Arbitrary Waveforms**
- **Modulation Capabilities**
- **Sweep Generator for Standard Waveforms**
- **Store Memory for 50 full Panel Settings**
- **Remote Control by USB-^[1], GPIB, and RS-232-Interface**

The Arbitrary Function Generator TOE 7761 uses the direct digital synthesis (DDS) technique to create sine waves of high quality and accuracy. Square waveforms are provided with fast rise and fall times. The sampling rate of up to 80 MS/s can be controlled by an external clock.

Arbitrary signals can have up to 1 000 000 sample points with a vertical resolution of 14 bits, thus allowing a good emulation of natural signals. A wide choice of build-in standard waveforms, such as sine,

triangle, square, ramp, etc., simplifies the creation of new arbitrary waveforms.

The output amplitude can be set to a maximum extent of 20 V_{PP} (10 V_{PP} into 50 Ω). An offset generator allows generation of signals with offsets of ± 10 V maximum (± 5 V into 50 Ω). A full range of triggering capabilities is available with internal or external trigger source. Gated and burst modes of operation allow for a user-selected number of cycles to be generated. A sweep generator for standard signals and several modulation methods round out the instrument.

A 10 MHz external clock reference lets you synchronise the unit for precise phase adjustment.

Operation is easy and comfortable with the graphic LCD and a multi-function rotary knob. All settings can be changed with a few keystrokes. Furthermore up to 50 configurations can be stored in non-volatile memory.

The included PC software **Arbsoft** allows easy creation, editing and download of complex waveforms. Data can be imported from several sources. Multiple waveforms can be stored in the flash memory of the instrument ready for execution.

Technical Data

Frequency Characteristics

- Sine: 1 μ Hz – 40 MHz
- Square: 1 μ Hz – 40 MHz
- Triangle: 1 μ Hz – 5 MHz
- Pulse: 0.5 mHz – 10 MHz
- Accuracy: 0.002% (20 ppm)
- Resolution: 12 digits or 1 μ Hz

Waveform Characteristics

Sine:

- Harmonic Distortion:
 - DC – 20 kHz –65 dBc
 - 20 kHz – 100 kHz –60 dBc
 - 100 kHz – 5 MHz –45 dBc
 - 5 MHz – 40 MHz –30 dBc
- Spurious:
 - DC – 1 MHz < –65 dBc

Triangle:

- Variable Symmetry: 10% to 90%

Square:

- Rise/Fall Time :
 - < 8 ns at full amplitude into 50 Ω
- Duty Cycle:
 - < 10 MHz: 20% – 80%, $\pm 1\%$ max.
 - < 30 MHz: 40% – 60%, $\pm 5\%$ max.
 - < 40 MHz: fixed at 50%
- Asymmetry: < 0.5% at 50% duty cycle
- Overshoot: < 3% typical of peak to peak amplitude ± 50 mV

Pulse:

- Pulse Width: > 50 ns or 0.0001% of repetition rate
- Overshoot: < 3% typical of peak to peak amplitude ± 50 mV

Arbitrary Characteristics

- Resolution
 - horizontal: up to 1 000 000 points
 - vertical: 14 Bit (–8191 to +8191)
- Point Execution Rate:
 - 12.5 ns to 100 s (80 MS/s max.) with 4 digits or 0.1 ns resolution
- Accuracy: 0.002% (20 ppm)
- Predefined Waveforms:
 - Sine, Triangle, Square, Noise, Ramp Up, Ramp Down, Sin(x)/x, Exponential Rise, Exponential Fall, Gaussian Pulse

Output Characteristics

Amplitude:

Range: 20 mV_{PP} – 20 V_{PP} max.,
10 mV_{PP} – 10 V_{PP} into
50 Ω

Resolution: 3 digits or 10 mV

Units: V_{PP}, V_{rms}, dBm

Accuracy: ±2% ±10mV
of the programmed
output into 50 Ω

Flatness: 0.1 dB to 10 MHz
1 dB to 40 MHz

Offset:

Range: up to ±10 V max.,
up to ±5 V into 50 Ω,
depending on amplitude
setting

Resolution: 3 digits or 10 mV

Accuracy: ±2% ±10 mV from -4.8 V
to 4.8 V into 50 Ω

Main Output:

Impedance: 50 Ω

Filters: 9 pole Elliptic and 5 pole
Bessel filters

Protection: The instrument is protec-
ted against short-circuit
and external voltage up
to ±15 V. The output dis-
connects automatically
in case of overload.

Operating Modes

Continuous: Output continuous at pro-
grammed parameters.

Trigger: Output quiescent at last
output value until trigger-
ed by an internal or ex-
ternal trigger, then one
waveform cycle is gene-
rated to programmed
parameters.

Gate: Same as triggered mode
except waveform is exe-
cuted for the duration of
the gate signal. The last
cycle started is comple-
ted.

Burst: Same as triggered mode
but the waveform is exe-
cuted the programmed
number of 2 – 999 999
times.

Trigger Characteristics

Source: internal, external, manual,
or remote controlled

Start Phase: –360° to +360° with 0.1°
resolution

Repetition Rate

internal: 0.01 Hz – 1 MHz with
±0.002% accuracy

external: < 10 MHz (DDS signal)
< 20 MHz (arbitrary)

Pulse Width: > 20 ns, TTL

Modulation Characteristics

AM:

internal: 0.01 Hz – 20 kHz sine
wave, square, or triangle,
variable modulation
depth from 0% to 100%

external: 5 V_{PP} for 100% modula-
tion

FM:

internal: 0.01 Hz – 20 kHz sine
wave, square, or triangle,
variable frequency de-
viation from 0% to 100%

external: 5 V_{PP} for 100%
frequency deviation

FSK:

Rate

internal: 0.01 Hz – 1 MHz

external^[2]: TTL signal, 1 MHz max.

Sweep Characteristics

Shape: linear, logarithmic, or
linear up and down

Sweep Time: 10 ms to 500 s

Trigger: internal or external,
all trigger modes

Inputs and Outputs

Summing In: Analog input signal can
be added to the output
waveform. 5 V_{PP} for full
scale output,
DC to > 10 MHz band-
width,
500 Ω input impedance

Modulation In: 5 V_{PP} for 100% modu-
lation,
DC to > 50 kHz band-
width,
10 kΩ input impedance

Trigger In: TTL compatible,
max. rate 20 MHz,
pulse width > 20 ns,
nom. impedance: 10 kΩ

Reference In: 10 MHz square signal for
synchronisation pur-
poses, TTL compatible,
1 kΩ input impedance

Reference Out: 10 MHz or ARB clock for
synchronisation pur-
poses, TTL compatible,
50 Ω output impedance

Marker Out: Positive TTL pulse in
ARB mode with pro-
grammable position and
width, 50 Ω impedance

Sync Out: Positive TTL pulse at
selected frequency,
50 Ω impedance

General

Configuration Memory:

50 full panel settings at
power-off, including last
working setup

Arbitrary Memory:

1 000 000 points in
internal flash memory

Remote Interface:

IEEE 488.2 (GPIB),
RS-232 (57.6 kB max.),
USB^[1],
SCPI compatible

Dimensions: (W x H x D)

224 x 88 x 357 mm,
224 x 104 x 357 mm with
feet

Weight: 3.2 kg

Power Requirements:

90 – 264 V~, 47 – 63 Hz
< 40 VA max.

Humidity: up to 95% RH,
0°C to 30°C

Operating Temperature:

0°C to +50°C

Storage Temperature:

–20°C to +70°C

EMC: According to EN 55011,
Class B,
and EN 55082-2

Safety: EN 61010-1,
CE labelled

^[1] Connect to USB with the provided RS-232
converter

^[2] External FSK-Modulation uses Trigger In

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