# Arbitrary Waveform/Function Generator

Product No : TFG3500A_Series

## *Product Description*

The TFG3500A series are arbitrary waveform/function generators with maximum frequency of 10MHz, 20MHz and 40MHz, based on Direct Digital Synthesis (DDS) technology providing outstanding performance and system features for basic scientific and industrial requirements.

The 10 bits resolution, 180MSa/s sampling rate, 16k pts memory length, 32 built-in waveforms and 8 user-defined arbitrary waveforms create various waveforms for different needs. Free PC software for USB and RS-232 interfaces control. The TFG3500A series have additional functions of multiple modulations FM, AM, FSK and PSK, 200MHz external frequency counter, 40 sets memories and multiple protections. Stable output frequency, high accuracy and low distortion make TFG3500A series an ideal solution for an accurate and affordable signal source for industrial, scientific research and educational applications.

★ Max. output frequency 10MHz/20MHz/40MHz
★ 2 output channels
★ 3.5-inch TFT LCD display
★ Direct Digital Synthesis technology (DDS)
★ Min. output amplitude 1mV, high resolution1μVpp
★ Sampling rate 180MSa/s, vertical resolution 10 bits, waveform length 16000 points
★ 32built-in waveformsand 8 user-defined arbitrary waveforms from CHB
★ 40 sets save & recall for panel settings
★ Modulations: FM, AM, FSK, PSK
★ Frequency sweep, amplitude sweep, burst and CHA&CHB ADD functions
★ Over voltage, over current, short circuit and reverse voltage protections
★ High speed rotary dial and keypad input
★ StandardUSB and RS-232 interface for PC remote control
★ Standard 200MHz external frequency counter
★ Optional power amplifier

| Model | | TFG-3510A | TFG-3520A | TFG-3540A |
|---|---|---|---|---|
| **Output frequency** | | **40μHz~10MHz** | **40μHz~20MHz** | **40μHz~40MHz** |
| **Waveform** | | | | |
| Output waveform | | Sine, Square, Pulse, DC | | |
| Waveform length | | 4~16000 points | | |
| Verticalresolution | | 10 bits | | |
| Sampling rate | | 180MSa/s | | |
| Sine | Harmonic distortion | ≥50dBc (<1MHz); ≥45dBc(1~10MHz); ≥40dBc (10~20MHz); ≥30dBc (>20MHz) | | |
| | Total distortion | ≤0.1% (20Hz~200kHz) | | |
| Square | Rise/fall time | ≤20ns | | |
| | Overshoot | ≤5% | | |
| | Duty cycle | 50.0% | | |
| Pulse | Rise/fall time | ≤20ns | | |
| | Overshoot | ≤5% | | |
| | Duty cycle | 1%~99% (≤1MHz) | | |
| **Frequency** | | | | |
| Range | Sine | 40μHz~10MHz | 40μHz~20MHz | 40μHz~40MHz |
| | Square | 40μHz~10MHz | 40μHz~10MHz | 40μHz~20MHz |
| | Pulse | 40μHz~10MHz | | |
| Internal standard frequency | | Temperature compensation 26MHz | | |
| Resolution | | 40μHz (40μHz~2kHz); 40mHz (>2kHz) | | |
| Accuracy | | ±(5x10$^{-5}$+40mHz) | | |
| Stability | | ±1x10$^{-6}$ /3hours (small TCXO) | | |
| **Output characteristics** | | | | |
| Amplitude | Range | 1mVpp~10Vpp (into 50Ω, ≤10MHz) | | |
| | | 1mVpp~7Vpp (into 50Ω, 10MHz~40MHz) | | |
| | | 1mVpp~20Vpp (open circuit, ≤10MHz) | | |
| | | 1mVpp~14Vpp (open circuit, 10MHz~40MHz) | | |
| | Resolution | 1μVpp (open circuit) | | |
| | Accuracy | ±(1%+1mVrms) (open circuit, 1kHz, sine) | | |
| | Stability | ±0.5% /3hours | | |
| | Flatness | ±5% (<5MHz); ±10% (5~10MHz); ±20% (>10MHz) | | |
| | Output impedance | 50Ω | | |
| Offset | Range | ±10V (open circuit, attenuation 0 dB) | | |
| | Resolution | 20mVdc | | |

| | | |
|---|---|---|
| | Accuracy | ±(1%+20mVdc) |
| **Sweep** | | |
| Parameter | | Frequency, Amplitude |
| Range | | Free to set start and stop point |
| Time | | 100ms~600s |
| Direction | | Up, Down, Up-Down |
| Mode | | Linearity, Logarithmic |
| Control | | Auto sweep or manual sweep |
| **Frequency Modulation (FM)** | | |
| Carrier signal | | Sineor square, frequency range same as mainsignal |
| Modulating signal | | CHB or external signal |
| Modulatingfrequency | | Same as CHB signal |
| Deviation | | 0%~20% |
| Source | | Internal or external |
| **Amplitude Modulation (AM)** | | |
| Carrier signal | | Sineor square, frequency range same as mainsignal |
| Modulating signal | | CHB or external signal |
| Modulatingfrequency | | Same as CHB signal |
| Distortion | | ≤2% |
| Depth | | 0%~120% |
| Source | | Internal or external |
| Relative modulating error | | ≤±5% |
| **Shift Keying** | | |
| FSK | | Free to set the hop frequency and the carrier frequency |
| PSK | | Hop phase: 0~360°, resolution: 11.25° |
| Control | | Internal |
| Alternative rate | | 10ms~60s |
| **CHB output characteristics** | | |
| Output waveform | | 32 built-in waveforms, including Sine, Square, Triangle, Saw tooth, Ladder, etc.<br>8 user-defined arbitrary waveforms |
| Waveform length | | 1024 points |
| Vertical resolution | | 8 bits |
| Sampling rate | | 100MSa/s |
| Frequency range | | Sine: 10mHz~1MHz; Other: 10mHz~50kHz |
| Frequency resolution | | 40mHz |

| | |
|---|---|
| Frequency accuracy | ±(1x10$^{-5}$+40mHz) |
| Amplitude range | 100mVpp~20Vpp (open circuit) |
| Amplitude resolution | 2mVpp |
| Output impedance | 50Ω |
| CHB signal is used as the harmonic signal of CHA | |
| Harmonic times | 0.1~250.0 times |
| Harmonic frequency | <1MHz |
| Phase adjustment | 1°/step |
| CHB signal is used as burst signal | |
| Frequency of CHB | 40mHz~1MHz |
| Burst frequency | 10mHz~50kHz |
| Burst count | 1~65000 cycles |
| Trigger source | Internal, Single, TTL |
| **Frequency counter** | |
| Frequency range | 1Hz~200MHz |
| Input amplitude | 100mVpp~20Vpp |
| **General** | |
| Operation characteristics | Key operation for all functions, Menu display, Rotary dial adjustment |
| Display | 3.5-inch TFT LCD |
| Language | English, Chinese (simplified), Chinese (traditional) |
| Interface | USB interface, RS-232 interface |
| Operating environment | 0~40℃,<80%RH |
| Power source | AC110V/220V±10% selectable, 50/60Hz, Max. 45VA |
| Accessories | Power cord x1, Operation manual x1, Software CD x1, USB cable x1, RS-232 cable x1, BNC-BNC cable x1, Test lead x1 |
| Dimension(WxHxD) | 260x110x385mm |
| Weight | 4kg |