

# SDG3000X Series Arbitrary Waveform Generator



## Data Sheet EN01A



**SIGLENT TECHNOLOGIES CO., LTD.**

# SDG3082X SDG3162X SDG3202X

## Product Overview

The SDG3000X series dual-channel function/arbitrary waveform generator has a maximum bandwidth of 200MHz, an excellent sampling system specifications of 1.2 GSa/s sampling rate and 16-bit vertical resolution. Based on the traditional DDS technology, it adopts the innovative TrueArb and EasyPulse technologies, which overcome the inherent defects of DDS technology in outputting arbitrary waves and square waves/pulses, and can provide users with high-fidelity, low-jitter signals. In addition, the SDG3000X also provides PRBS pattern generation, sequence, dual pulse, and vector signal output functions to meet a wider range of application needs.

## Key Features

- Dual channels, maximum output frequency 200 MHz, maximum output amplitude 20 Vpp
- 1.2 GSa/s sampling rate, 16-bit vertical resolution
- Using TrueArb technology, arbitrary waveforms can be output point by point. Under the premise of not losing waveform details, low-jitter waveforms can be output at a sampling rate of 10 mSa/s ~ 600 MSa/s
- Supports sequence wave playback function, with a maximum waveform memory of 40 Mpts per channel
- Using EasyPulse technology, it can output low-jitter square waves/pulses, and the pulse wave can achieve fine adjustment of pulse width, rising/falling edges, with extremely high adjustment resolution and adjustment range
- Supports dual pulse output function, which can be used to measure the switching parameters of power devices and evaluate their dynamic characteristics
- Supports PRBS up to 120 Mbps
- Rich analog and digital modulation functions: AM, DSB-SC, FM, PM, FSK, ASK, PSK and PWM
- Sweep and Burst functions
- Harmonic function
- Waveform Combining function
- High precision Frequency Counter
- 196 built-in arbitrary waveforms
- Standard interfaces: USB Host, USB Device (USBTMC), LAN (VXI-11); optional GPIB
- Built-in WebServer supports instrument control via web browser
- 7-inch display touch screen

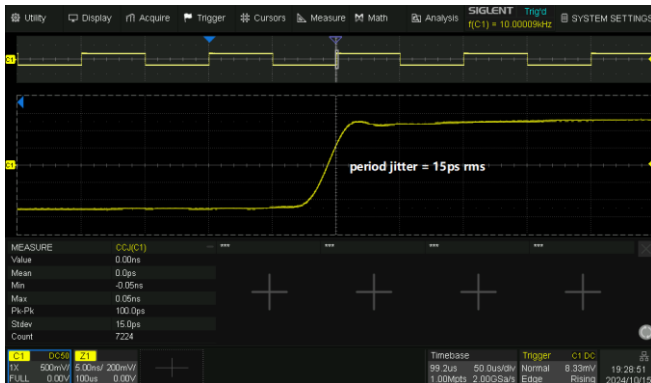


## Models and Key Specifications

| Model                     | SDG3082X                                                                                                                                           | SDG3162X | SDG3202X |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|
| Max output frequency      | 80 MHz                                                                                                                                             | 160 MHz  | 200 MHz  |
| Number of channels        | 2                                                                                                                                                  |          |          |
| Sampling rate             | 1.2 GSa/s (2X Interpolation)                                                                                                                       |          |          |
| Vertical resolution       | 16 bits                                                                                                                                            |          |          |
| Arbitrary waveform length | 20 Mpts/ch (40 Mpts/ch Optional)<br>Support sequence                                                                                               |          |          |
| Vector signal (Optional)  | 50 MS/s max symbol rate; Includes modulation modes such as ASK, PSK, FSK and QAM.<br>SigIQPro software provides vector signal creation and editing |          |          |
| Max. amplitude            | $\pm 10$ V                                                                                                                                         |          |          |
| Display                   | 7" touch screen                                                                                                                                    |          |          |
| Interface                 | Standard: USB Host, USB Device, LAN<br>Optional: GPIB (USB-GPIB adaptor)                                                                           |          |          |

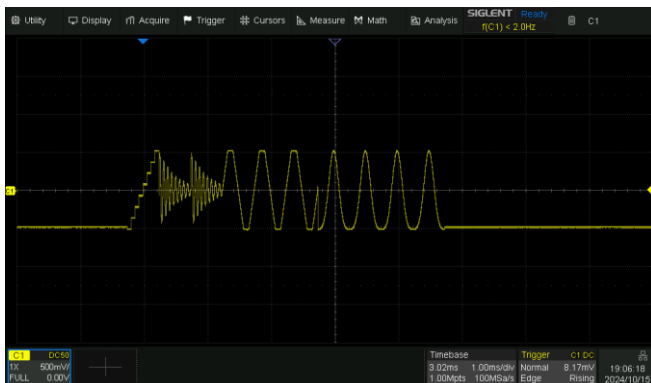
## Characteristics

### Innovative EasyPulse Technology

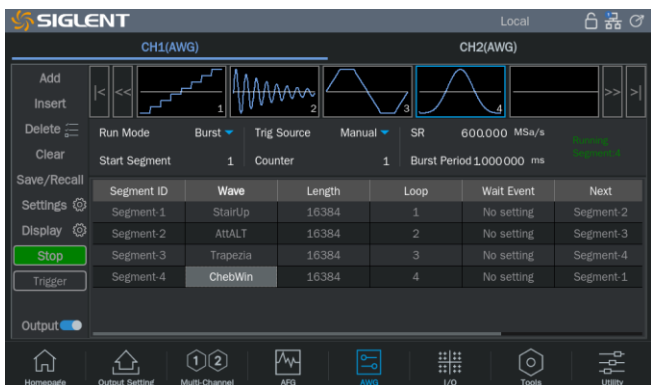


When a Square/Pulse waveform is generated by DDS, there will be a one-clock-jitter if the sampling rate is not an integer-related multiple of the output frequency. EasyPulse technology successfully overcomes this weakness in DDS designs and helps to produce low jitter Square/Pulse waveforms.

### Powerful sequence playback function



Provides flexible sequence playback function to easily cope with various scenario tests. The maximum waveform storage depth of each channel is 40 Mpts.



Easily set the number of cycle times for each waveform and the order of waveform playback.

It supports up to 1024 segments. During playback, it can also indicate the segment currently being played, allowing you to control the test.

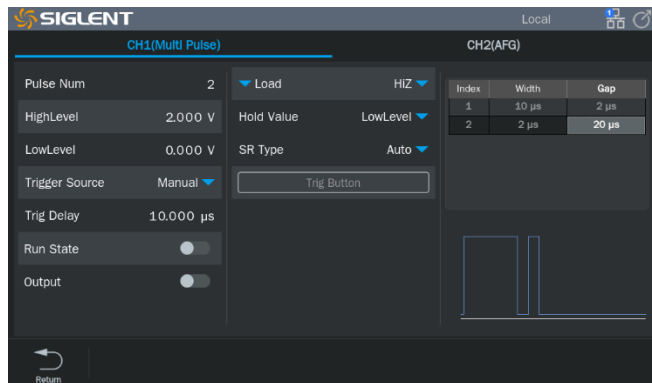
Five operating modes: continuous, triggered, burst, single, and advanced. The advanced operating mode allows you to set the trigger mode for each segment.

Four trigger sources are available: "Auto", "External", "Manual" and "Timer".

## Built-in multi-pulse function



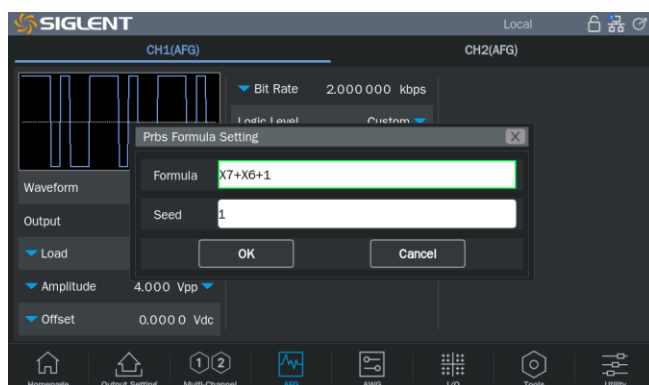
Built-in dual pulse output function, combined with siglent's oscilloscope, can quickly measure the switching parameters and dynamic characteristics of power devices without the need for host computer software.



Supports up to 30 pulses, and can set each pulse width and pulse interval.

Four trigger sources are available: "Internal", "External", "Manual" and "Timer".

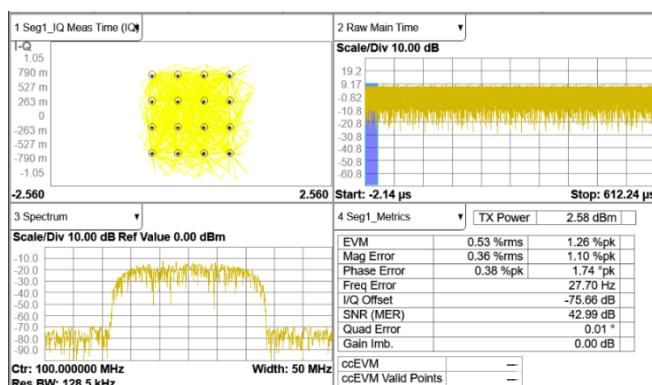
## Customizable polynomial PRBS pattern output



Provides PRBS3 ~ PRBS32 multiple pattern outputs, with a maximum bit rate of up to 120 Mbps. In addition to outputting single-ended signals, the two channels can also be set to differential output.

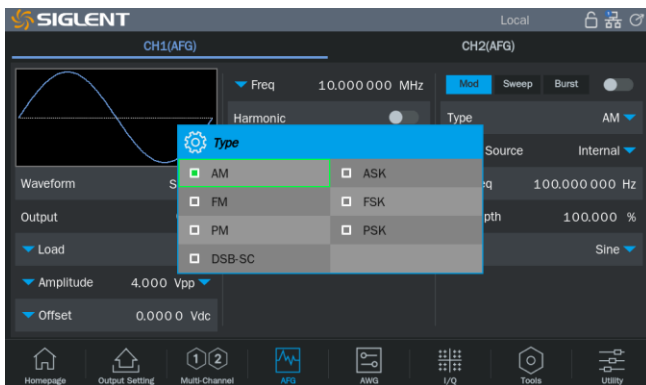
In addition to using the built-in PRBS generator polynomial, you can also customize the PRBS generator polynomial to make the test more flexible.

## Vector signal output



SDG3000X supports baseband or IF signals and can generate IQ signals of commonly used modulation types such as ASK, FSK, PSK, QAM, etc. SDG3000X can achieve excellent EVM performance at any symbol rate in the range of 250 Symb/s ~ 50 MSymb/s. The built-in digital orthogonal modulator can modulate the IQ signal to any frequency in the range of 200 MHz.

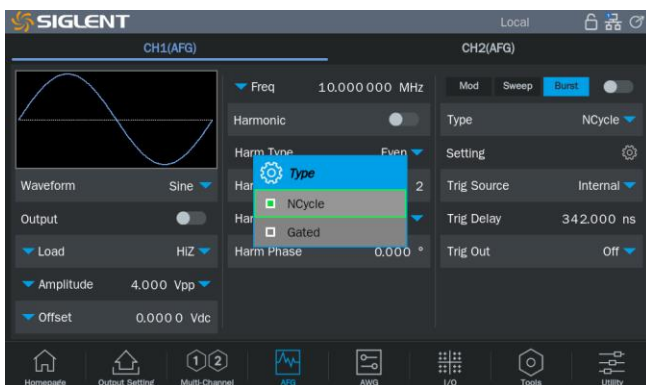
## Modulation



Rich modulation functions, supporting commonly used AM/DSB-SC/ FM/ PM/ ASK/ FSK/ PSK/ PWM modulation methods.

Two modulation sources are available: internal and external.

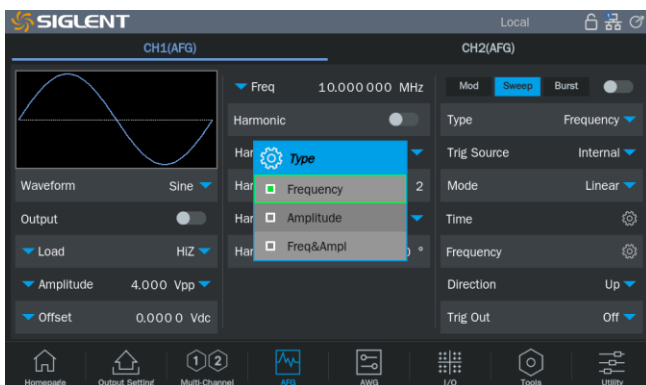
## Burst



Supports two Burst modes: N cycle and Gating.

Three trigger sources are available: internal, external and manual.

## Sweep

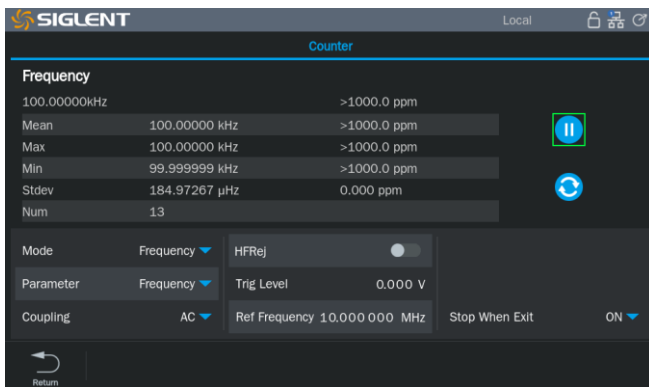


Supports three sweep modes: frequency, amplitude, and frequency and amplitude, making it easy to implement frequency sweep and amplitude sweep tests.

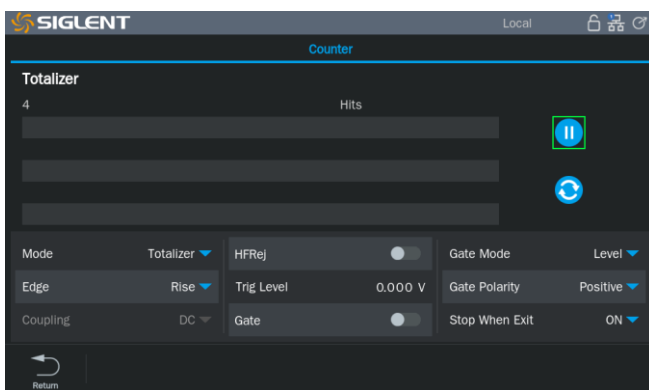
Supports three sweep type: linear, log and step, and three sweep directions of up, down and up\_down.

Three trigger sources are available: internal, external and manual.

## Counter

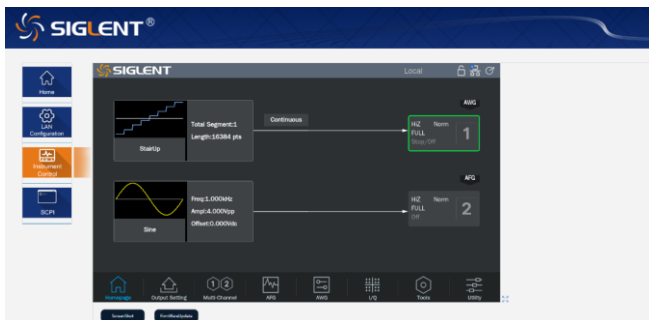


When the counter is in frequency counter mode, it can be used to measure the frequency, period, and duty cycle of a signal. The measurement range is 0.1 Hz ~ 200 MHz.



When operating in totalizer mode, the specified trigger events can be counted.

## Built-in WebServer



Supports instrument control through a web browser, allowing testing tasks to be completed remotely.

## Specifications

Unless otherwise specified, all specifications can be guaranteed to meet the following conditions:

- Within the validity period of product calibration.
- Within the ambient temperature range of 18 °C ~ 28 °C.
- The instrument is powered on and operating for more than 30 minutes.

| Frequency Characteristics |         |      |      |      |           |
|---------------------------|---------|------|------|------|-----------|
| Parameter                 | Min.    | Typ. | Max. | Unit | Condition |
| Resolution                | 1 $\mu$ |      |      | Hz   |           |
| Initial accuracy          | -1      |      | +1   | ppm  | 25 °C     |
|                           | -2      |      | +2   |      | 0 ~ 40 °C |
| 1st-year aging            | -1      |      | +1   | ppm  | 25 °C     |
| 10-year aging             | -3.5    |      | +3.5 | ppm  | 25 °C     |

| Sine Characteristics                               |         |      |       |      |                              |
|----------------------------------------------------|---------|------|-------|------|------------------------------|
| Parameter                                          | Min.    | Typ. | Max.  | Unit | Condition                    |
| Frequency                                          | 1 $\mu$ |      | 200 M | Hz   | SDG3202X                     |
|                                                    | 1 $\mu$ |      | 160 M |      | SDG3162X                     |
|                                                    | 1 $\mu$ |      | 80 M  |      | SDG3082X                     |
| Harmonic distortion<br>(0 dBm, 50 $\Omega$ Load)   |         |      | -65   | dBc  | $\leq 1$ MHz                 |
|                                                    |         |      | -60   |      | 1 MHz ~ 60 MHz (included)    |
|                                                    |         |      | -50   |      | 60 MHz ~ 100 MHz (included)  |
|                                                    |         |      | -40   |      | 100 MHz ~ 200 MHz (included) |
| Total Harmonic Distortion                          |         |      | 0.075 | %    | 0 dBm, 10 Hz ~ 20 kHz        |
| Non-harmonic spurious<br>(0 dBm, 50 $\Omega$ Load) |         |      | -70   | dBc  | $\leq 50$ MHz                |
|                                                    |         |      | -65   |      | 50 MHz ~ 120 MHz (included)  |
|                                                    |         |      | -60   |      | 120 MHz ~ 200 MHz (included) |

| Square Characteristics |         |      |        |      |                                    |
|------------------------|---------|------|--------|------|------------------------------------|
| Parameter              | Min.    | Typ. | Max.   | Unit | Condition                          |
| Parameter              | 1 $\mu$ |      | 60 M   | Hz   |                                    |
| Frequency              |         | 3    | 4.5    | ns   | 10% ~ 90%, 1 Vpp, 50 $\Omega$ Load |
| Rise/fall times        |         | 3    | 5      | %    | 100 kHz, 1 Vpp, 50 $\Omega$ Load   |
| Overshoot              | 0.001   |      | 99.999 | %    | Limited by frequency setting       |
| Duty cycle             |         |      | 150    | ps   | 1 Vpp, 50 $\Omega$ Load            |

| Pulse Characteristics        |         |      |                               |      |                                                                                                                                                                                                                                 |
|------------------------------|---------|------|-------------------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter                    | Min.    | Typ. | Max.                          | Unit | Condition                                                                                                                                                                                                                       |
| Frequency                    | 1 $\mu$ |      | 60 M                          | Hz   |                                                                                                                                                                                                                                 |
| Pulse width                  | 8       |      |                               | ns   |                                                                                                                                                                                                                                 |
| Pulse width accuracy         |         |      | $\pm (0.01\%+0.5 \text{ ns})$ |      |                                                                                                                                                                                                                                 |
| Rise/fall times              | 3 n     |      | 22.4                          | s    | 10% ~ 90%, 1 Vpp, 50 $\Omega$ Load<br>Specifications such as overshoot, jitter, output range, and pulse width accuracy can only be met within this range. The minimum value that can be set is limited by the output amplitude. |
| Rise/fall times accuracy     |         |      | $\pm 1$                       | ns   | 10% ~ 90%, 1 Vpp, 50 $\Omega$ Load                                                                                                                                                                                              |
| Overshoot                    |         | 3    | 5                             | %    | 100 kHz, 1 Vpp, 50 $\Omega$ Load                                                                                                                                                                                                |
| Duty cycle                   | 0.001   |      | 99.999                        | %    | Limited by frequency setting                                                                                                                                                                                                    |
| Jitter (rms), Cycle to cycle |         |      | 150                           | ps   | 1 Vpp, 4 ns edge, 50 $\Omega$ Load                                                                                                                                                                                              |

| Noise Characteristics      |      |      |       |      |           |
|----------------------------|------|------|-------|------|-----------|
| Parameter                  | Min. | Typ. | Max.  | Unit | Condition |
| -3 dB bandwidth            |      | 200  |       | MHz  |           |
| Adjustable bandwidth range | 20 M |      | 200 M | Hz   |           |

| Ramp Characteristics |         |      |      |      |                                                             |
|----------------------|---------|------|------|------|-------------------------------------------------------------|
| Parameter            | Min.    | Typ. | Max. | Unit | Condition                                                   |
| Frequency            | 1 $\mu$ |      | 5 M  | Hz   |                                                             |
| Symmetry             | 0       |      | 100  | %    |                                                             |
| Linearity            |         | 1    | 1.5  | %    | Percentage of peak-peak output, 1 kHz, 1 Vpp, 100% symmetry |

| Arbitrary Wave characteristics (AFG Mode) |         |      |      |      |                                         |
|-------------------------------------------|---------|------|------|------|-----------------------------------------|
| Parameter                                 | Min.    | Typ. | Max. | Unit | Condition                               |
| Frequency                                 | 1 $\mu$ |      | 60 M | Hz   | Sampling rate 600 M Sa/s                |
| Waveform length                           | 16384   |      |      | pts  |                                         |
| Rise/fall times                           |         | 3    |      | ns   | 10% ~ 90%, 1 Vpp step, 50 $\Omega$ Load |

| Sequence characteristics (AWG Mode) |                                                    |      |       |      |                                                                                                                                          |
|-------------------------------------|----------------------------------------------------|------|-------|------|------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter                           | Min.                                               | Typ. | Max.  | Unit | Condition                                                                                                                                |
| Sampling rate                       | 10 m                                               |      | 600 M | Sa/s |                                                                                                                                          |
| Waveform length                     | 64                                                 |      | 40 M  | pts  | When the waveform length is less than 256 points, the waveform length must be an integer multiple of 16 points.<br>1 Mpts = $2^{20}$ pts |
| Number of segments                  |                                                    |      | 1024  |      |                                                                                                                                          |
| jitter (rms)                        |                                                    |      | 150   | ps   | Cycle to cycle, "010101" pattern, 1 Vpp, 50 $\Omega$ Load, 600 MSa/s                                                                     |
| Interpolation mode                  | 0-order hold, linear, sinc, sinc27, sinc13         |      |       |      |                                                                                                                                          |
| Run mode                            | Continuous, Triggered, Single/Burst, Step, Advance |      |       |      |                                                                                                                                          |

| PRBS characteristics |                      |      |         |      |                                    |
|----------------------|----------------------|------|---------|------|------------------------------------|
| Parameter            | Min.                 | Typ. | Max.    | Unit | Condition                          |
| Bit rate             | 2 $\mu$              |      | 120 M   | bps  |                                    |
| Pattern length       | 2m-1, m = 3,4,...,32 |      |         |      |                                    |
| Rise/fall time       | 2.5 n                |      | 1 $\mu$ | s    | 10% ~ 90%, 1 Vpp, 50 $\Omega$ Load |

| DC characteristics |                         |      |      |      |                                 |
|--------------------|-------------------------|------|------|------|---------------------------------|
| Parameter          | Min.                    | Typ. | Max. | Unit | Condition                       |
| Output Range       | -10                     |      | +10  | V    | Hiz Load. Final option disable. |
| Accuracy           | $\pm(1\%+2 \text{ mV})$ |      |      |      | Hiz Load                        |

| Harmonic Output characteristics |                |      |      |      |           |
|---------------------------------|----------------|------|------|------|-----------|
| Parameter                       | Min.           | Typ. | Max. | Unit | Condition |
| Order                           |                |      | 20   |      |           |
| Type                            | Even, Odd, All |      |      |      |           |

| Output Characteristics                                                                    |            |      |      |      |                              |
|-------------------------------------------------------------------------------------------|------------|------|------|------|------------------------------|
| Parameter                                                                                 | Min.       | Typ. | Max. | Unit | Condition                    |
| Range (HiZ Load)<br>(The specification will be divided by 2 while applied to a 50 Ω load) | 2m         |      | 20   | Vpp  | ≤60 MHz                      |
|                                                                                           | 2m         |      | 10   |      | 60 MHz ~ 150 MHz (included)  |
|                                                                                           | 2m         |      | 5    |      | 150 MHz ~ 200 MHz (included) |
| Accuracy                                                                                  | ±(1%+1 mV) |      |      |      | 10 Hz sine , 0 V offset      |

|                    |      |     |      |          |                                              |
|--------------------|------|-----|------|----------|----------------------------------------------|
| Amplitude flatness | -0.3 |     | +0.3 | dB       | 50 $\Omega$ , 0.5 Vpp, compare to 1 MHz sine |
| Output impedance   |      | 50  |      | $\Omega$ | 10 kHz sine                                  |
| Output current     | -200 |     | +200 | mA       |                                              |
| Crosstalk          |      | -60 |      | dBc      |                                              |

| Vector (I/Q) signal (optional) |                                                                                                                                                            |      |       |          |                                    |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|----------|------------------------------------|
| Parameter                      | Min.                                                                                                                                                       | Typ. | Max.  | Unit     | Condition                          |
| Symbol rate                    | 250                                                                                                                                                        |      | 50 M  | Symbol/s | Limited by oversampling multiple   |
| Waveform length                |                                                                                                                                                            |      | 40 M  | pts      |                                    |
| Carrier frequency              | 0                                                                                                                                                          |      | 200 M | Hz       | Limited by the bandwidth parameter |
| Modulation type                | 2ASK, 4ASK, 8ASK, BPSK, QPSK, 8PSK, DBPSK, DQPSK, OQPSK, D8PSK, 8QAM, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 2FSK, 4FSK, 8FSK, 16FSK, MSK, MultiTone, Custom |      |       |          | Supported by EasyIQ software       |
| Data type                      | PN7, PN9, PN15, PN23, User files, Custom constellation                                                                                                     |      |       |          | Supported by EasyIQ software       |
| Data source                    | Built-In, external file                                                                                                                                    |      |       |          |                                    |
| IQ compensation                | Gain Balance, Offset, Angle                                                                                                                                |      |       |          |                                    |

| Modulation Characteristics |                                |      |        |      |                                                               |
|----------------------------|--------------------------------|------|--------|------|---------------------------------------------------------------|
| <b>AM</b>                  |                                |      |        |      |                                                               |
| Parameter                  | Min.                           | Typ. | Max.   | Unit | Condition                                                     |
| Carrier                    | Sine, Square, Ramp, Arb        |      |        |      |                                                               |
| Modulation source          | Internal/External              |      |        |      |                                                               |
| Modulating wave            | Sine, Square, Ramp, Noise, Arb |      |        |      |                                                               |
| Modulation depth           | 0                              |      | 120    | %    | 10 kHz sine                                                   |
| Modulation frequency       | 1 m                            |      | 1 M    | Hz   | Source = Internal                                             |
| <b>FM</b>                  |                                |      |        |      |                                                               |
| Parameter                  | Min.                           | Typ. | Max.   | Unit | Condition                                                     |
| Carrier                    | Sine, Square, Ramp, Arb        |      |        |      |                                                               |
| Modulation source          | Internal/External              |      |        |      |                                                               |
| Modulating wave            | Sine, Square, Ramp, Noise, Arb |      |        |      |                                                               |
| Frequency deviation        | 0                              |      | 0.5*BW |      | BW is the max. output frequency. Limited by frequency setting |
| Modulation frequency       | 1 m                            |      | 1 M    | Hz   | Source = Internal                                             |
| <b>PM</b>                  |                                |      |        |      |                                                               |

| Parameter                        | Min.                           | Typ. | Max. | Unit | Condition         |
|----------------------------------|--------------------------------|------|------|------|-------------------|
| Carrier                          | Sine, Square, Ramp, Arb        |      |      |      |                   |
| Modulation source                | Internal/External              |      |      |      |                   |
| Modulating wave                  | Sine, Square, Ramp, Noise, Arb |      |      |      |                   |
| Phase deviation                  | 0                              |      | 360  | °    |                   |
| Modulation frequency             | 1 m                            |      | 1 M  | Hz   | Source = Internal |
| <b>ASK</b>                       |                                |      |      |      |                   |
| Parameter                        | Min.                           | Typ. | Max. | Unit | Condition         |
| Carrier                          | Sine, Square, Ramp, Arb        |      |      |      |                   |
| Modulation source                | Internal/External              |      |      |      |                   |
| Modulating wave                  | Square with 50% duty cycle     |      |      |      |                   |
| Keying frequency                 | 1 m                            |      | 1 M  | Hz   | Source = Internal |
| <b>FSK</b>                       |                                |      |      |      |                   |
| Parameter                        | Min.                           | Typ. | Max. | Unit | Condition         |
| Carrier                          | Sine, Square, Ramp, Arb        |      |      |      |                   |
| Modulation source                | Internal/External              |      |      |      |                   |
| Modulating wave                  | Square with 50% duty cycle     |      |      |      |                   |
| Keying frequency                 | 1 m                            |      | 1 M  | Hz   | Source = Internal |
| <b>PSK</b>                       |                                |      |      |      |                   |
| Parameter                        | Min.                           | Typ. | Max. | Unit | Condition         |
| Carrier                          | Sine, Square, Ramp, Arb        |      |      |      |                   |
| Modulation source                | Internal/External              |      |      |      |                   |
| Modulating wave                  | Square with 50% duty cycle     |      |      |      |                   |
| Keying frequency                 | 1 m                            |      | 1 M  | Hz   | Source = Internal |
| <b>PWM</b>                       |                                |      |      |      |                   |
| Parameter                        | Min.                           | Typ. | Max. | Unit | Condition         |
| Carrier                          | Pulse                          |      |      |      |                   |
| Modulation source                | Internal/External              |      |      |      |                   |
| Modulating wave                  | Sine, Square, Ramp, Noise, Arb |      |      |      |                   |
| Modulation frequency             | 1 m                            |      | 1 M  | Hz   | Source = Internal |
| Pulse width deviation resolution | 8                              |      |      | ns   |                   |

| Burst Characteristics |                                           |      |      |      |                                                     |
|-----------------------|-------------------------------------------|------|------|------|-----------------------------------------------------|
| Parameter             | Min.                                      | Typ. | Max. | Unit | Condition                                           |
| Carrier               | Sine, Square, Ramp, Pulse, Noise, Arb     |      |      |      |                                                     |
| Type                  | Count (1-1000000 Cycles), Infinite, Gated |      |      |      |                                                     |
| Carrier frequency     | 2 m                                       |      | BW   | Hz   | BW is the max. output frequency                     |
| Phase                 | -360                                      |      | 360  | °    |                                                     |
| Internal period       | 1 $\mu$                                   |      | 1000 | s    |                                                     |
| Trigger source        | Internal, External, Manual                |      |      |      |                                                     |
| Gated source          | Internal/External                         |      |      |      |                                                     |
| Trigger delay         |                                           |      | 100  | s    | The min. delay is limited by waveform and frequency |

| Sweep Characteristics |                                               |      |      |      |                                 |
|-----------------------|-----------------------------------------------|------|------|------|---------------------------------|
| Parameter             | Min.                                          | Typ. | Max. | Unit | Condition                       |
| Carrier               | Sine, Square, Ramp, Arb                       |      |      |      |                                 |
| Sweep mode            | Frequency, Amplitude, Frequency and Amplitude |      |      |      |                                 |
| Sweep type            | Linear, Log, Step                             |      |      |      |                                 |
| Direction             | Up, Down, Up_Down                             |      |      |      |                                 |
| Carrier frequency     | 1 $\mu$                                       |      | BW   | Hz   | BW is the max. output frequency |
| Sweep time            | 1 m                                           |      | 500  | s    |                                 |
| Trigger source        | Internal, External, Manual                    |      |      |      |                                 |

| Frequency Counter Characteristics |                                                              |      |             |          |                             |
|-----------------------------------|--------------------------------------------------------------|------|-------------|----------|-----------------------------|
| Parameter                         | Min.                                                         | Typ. | Max.        | Unit     | Condition                   |
| Mode                              | Totalizer, Frequency                                         |      |             |          |                             |
| Measurement Parameters            | Frequency, Period, Positive/Negative Pulse Width, Duty Cycle |      |             |          |                             |
| Coupling mode                     | AC, DC, HF REJ                                               |      |             |          |                             |
| Frequency range                   | 100 m                                                        |      | 200 M       | Hz       | DC coupling                 |
|                                   | 10                                                           |      | 200 M       |          | AC coupling                 |
| Input amplitude                   | 0.1 Vrms                                                     |      | $\pm 2.5$ V |          | DC coupling, $\leq 100$ MHz |
|                                   | 0.2 Vrms                                                     |      | $\pm 2.5$ V |          | DC coupling, $> 100$ MHz    |
|                                   | 0.1 Vrms                                                     |      | 5 Vpp       |          | AC coupling, $\leq 100$ MHz |
|                                   | 0.2 Vrms                                                     |      | 5 Vpp       |          | AC coupling, $> 100$ MHz    |
| Input impedance                   |                                                              | 1M   |             | $\Omega$ |                             |

## Reference Clock Input/Output

## Reference Clock Input

| Parameter       | Min. | Typ. | Max. | Unit            | Condition   |
|-----------------|------|------|------|-----------------|-------------|
| Frequency       |      | 10   |      | MHz             |             |
| Amplitude       | 1.4  |      |      | V <sub>pp</sub> |             |
| Input impedance | 5    |      |      | k $\Omega$      | AC coupling |

## Reference Clock Output

| Parameter        | Min. | Typ. | Max. | Unit            | Condition                                |
|------------------|------|------|------|-----------------|------------------------------------------|
| Frequency        |      | 10   |      | MHz             | Synchronized to internal reference clock |
| Amplitude        | 2    | 3.3  |      | V <sub>pp</sub> | Hiz Load                                 |
| Output impedance |      | 50   |      | $\Omega$        |                                          |

## Auxiliary In/Out Characteristics

## Trigger Input

| Parameter       | Min. | Typ. | Max. | Unit       | Condition   |
|-----------------|------|------|------|------------|-------------|
| V <sub>IH</sub> | 2    |      | 5.5  | V          |             |
| V <sub>IL</sub> | -0.5 |      | 0.8  | V          |             |
| Input impedance |      | 100  |      | k $\Omega$ | 10 kHz sine |
| Pulse width     | 100  |      |      | ns         |             |
| Response time   |      |      | 620  | ns         |             |

## Trigger Output

| Parameter        | Min. | Typ. | Max. | Unit     | Condition               |
|------------------|------|------|------|----------|-------------------------|
| V <sub>OH</sub>  | 3.8  |      |      | V        | I <sub>OH</sub> = -8 mA |
| V <sub>OL</sub>  |      |      | 0.44 | V        | I <sub>OL</sub> = 8 mA  |
| Output impedance |      | 50   |      | $\Omega$ |                         |
| Frequency        |      |      | 1    | MHz      |                         |

## Sync Output

| Parameter        | Min. | Typ. | Max. | Unit     | Condition               |
|------------------|------|------|------|----------|-------------------------|
| V <sub>OH</sub>  | 3.8  |      |      | V        | I <sub>OH</sub> = -8 mA |
| V <sub>OL</sub>  |      |      | 0.44 | V        | I <sub>OL</sub> = 8 mA  |
| Output impedance |      | 50   |      | $\Omega$ |                         |
| Pulse width      |      | 26.7 |      | ns       |                         |
| Frequency        |      |      | 5    | MHz      |                         |

## Modulation Input (AM/PM/FM/PWM)

| Parameter                             | Min. | Typ. | Max. | Unit            | Condition   |
|---------------------------------------|------|------|------|-----------------|-------------|
| Frequency                             | 0    |      | 50   | kHz             |             |
| Input impedance                       | 10   |      |      | k $\Omega$      |             |
| Amplitude @ 100% Modulation depth     | 11   | 12   | 13   | V <sub>pp</sub> |             |
| <b>Modulation Input (ASK/PSK/FSK)</b> |      |      |      |                 |             |
| Parameter                             | Min. | Typ. | Max. | Unit            | Condition   |
| V <sub>IH</sub>                       | 2    |      | 5.5  | V               |             |
| V <sub>IL</sub>                       | -0.5 |      | 0.8  | V               |             |
| Input impedance                       |      | 100  |      | k $\Omega$      | 10 kHz sine |
| Pulse width                           | 100  |      |      | ns              |             |

### General Characteristics

#### Power

| Parameter         | Min.                                                | Typ. | Max. | Unit | Condition |
|-------------------|-----------------------------------------------------|------|------|------|-----------|
| Voltage           | 100 – 240 V <sub>rms</sub> ( $\pm 10\%$ ), 50/60 Hz |      |      |      |           |
|                   | 100 – 120 V <sub>rms</sub> ( $\pm 10\%$ ), 400 Hz   |      |      |      |           |
| Power consumption |                                                     | 30   | 50   | W    |           |

#### Display

|                     |                                        |  |  |  |  |
|---------------------|----------------------------------------|--|--|--|--|
| Display type        | 7 TFT LCD with capacitive touch screen |  |  |  |  |
| Resolution          | 1024 x 600                             |  |  |  |  |
| Contrast (typical)  | 500:1                                  |  |  |  |  |
| Backlight (typical) | 500 nit                                |  |  |  |  |

#### Environment

| Parameter              | Min.                                         | Typ. | Max.  | Unit | Condition                         |
|------------------------|----------------------------------------------|------|-------|------|-----------------------------------|
| Operating temperature  | 0                                            |      | 40    | °C   |                                   |
| Storage temperature    | -20                                          |      | 60    | °C   |                                   |
| Operating humidity     | 5                                            |      | 90    | %    | $\leq 30\text{ }^{\circ}\text{C}$ |
|                        | 5                                            |      | 50    |      | $40\text{ }^{\circ}\text{C}$      |
| Non-operating humidity | 5                                            |      | 95    | %    |                                   |
| Operating altitude     |                                              |      | 3048  | m    | $\leq 30\text{ }^{\circ}\text{C}$ |
| Non-operating altitude |                                              |      | 15000 | m    |                                   |
| EMC/EMI                | EMC directive (2014/30/EU), IEC 61326-1:2021 |      |       |      |                                   |

|                      |                                                                          |      |      |      |           |
|----------------------|--------------------------------------------------------------------------|------|------|------|-----------|
| Safety               | UL 61010-1:2012/R: 2024-11;<br>CAN/CSA-C22.2 No. 61010-1:2012/U4:2024-11 |      |      |      |           |
| RoHS                 | EU 2015/863                                                              |      |      |      |           |
| Calibration          |                                                                          |      |      |      |           |
| Parameter            | Min.                                                                     | Typ. | Max. | Unit | Condition |
| Calibration interval |                                                                          | 1    |      | year |           |
| Mechanical           |                                                                          |      |      |      |           |
| Parameter            | Min.                                                                     | Typ. | Max. | Unit | Condition |
| Dimensions           | W×H×D = 312.02 mm × 162.29 mm × 126.4 mm                                 |      |      |      |           |
| Net weight           |                                                                          | 2.73 |      | kg   |           |
| Gross weight         |                                                                          | 3.7  |      | kg   |           |

## Ordering Information

| Product Model | Description                                                  |
|---------------|--------------------------------------------------------------|
| SDG3082X      | 80 MHz, 2 CH, 1.2 GSa/s, 16-bit, 20 Mpts, Sequence playback  |
| SDG3162X      | 160 MHz, 2 CH, 1.2 GSa/s, 16-bit, 20 Mpts, Sequence playback |
| SDG3202X      | 200 MHz, 2 CH, 1.2 GSa/s, 16-bit, 20 Mpts, Sequence playback |

| Standard Configurations | Quantity |
|-------------------------|----------|
| Quick Start             | 1        |
| Power Cord              | 1        |
| USB Cable               | 1        |
| BNC Cable               | 1        |
| Calibration Certificate | 1        |

| Optional Configurations      | Model            |
|------------------------------|------------------|
| IQ Signal Generator Function | SDG-3000X-IQ     |
| 40 Mpts Waveform Memory      | SDG-3000X-40MPTS |
| 20 dB Attenuator             | ATT-20 dB        |
| USB-GPIB Adapter             | USB-GPIB         |
| BNC Coaxial Cable            | SDG-BNC          |
| 10W Power Amplifier          | SPA1010          |



## About SIGLENT

SIGLENT is an international high-tech company, concentrating on R&D, sales, production and services of electronic test & measurement instruments.

SIGLENT first began developing digital oscilloscopes independently in 2002. After more than a decade of continuous development, SIGLENT has extended its product line to include digital oscilloscopes, isolated handheld oscilloscopes, function/arbitrary waveform generators, RF/MW signal generators, spectrum analyzers, vector network analyzers, digital multimeters, DC power supplies, electronic loads and other general purpose test instrumentation. Since its first oscilloscope was launched in 2005, SIGLENT has become the fastest growing manufacturer of digital oscilloscopes. We firmly believe that today SIGLENT is the best value in electronic test & measurement

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