MULTIFUNCTION GENERATOR

WF1973/WF1974

Effortless waveform generation via an intuitive graphical user interface

Upcoming general-purpose signal source that is a must for engineers

Various Types of Output Waveforms
- Sine, square, triangle, pulse, sawtooth, and arbitrary waveforms

Useful Programming Function
- The sequence function enables you to easily program signal patterns

Wide Frequency Range
- 0.01 Hz to 30 MHz

Pursuit of Usability
- Flat and lightweight design weighing 2.1 kg, compact and isolated from the housing

NF Corporation
Generate the waveforms you need—effortlessly!

Wide array of functions for a broad range of applications

While the WF1973 and WF1974 can generate standard waveforms such as sine and square waves, application-specific waveforms such as Gaussian pulse and chattering, and arbitrary waveforms, these generators also have a wide array of functions, including sequence, modulation, and sweep. These are up-and-coming general-purpose signal sources that are a must for engineers and should be kept on hand for a wide variety of applications.

Anytime, Anywhere

Handy signal source generates basic functions quickly and reliably

The WF1973 and WF1974 are easy to use as general-purpose signal sources for routine tests. Both standard waveforms and various modifying functions, including sweep, modulation, burst and duty variable, can be operated intuitively. Use of direct digital synthesis (DDS) ensures superior stability and repeatability, and so supports reliable testing.

Three methods allow you to generate or program Any Waveform!

The desired waveform can be quickly found and generated.

Parameter-Variable Waveform

WF has incorporated an innovative waveform library called a parameter-variable waveform function. The parameter-variable waveform offers an easy-to-use waveform system. The appropriate waveform for your purpose can be generated easily just select a preprogrammed waveform and edit it using parameters specific to your requirements. The 20 types of available waveforms include sine, square wave, sawtooth, triangle, and more, all parameter-variable waveforms.

For Example

The CF (cut-off) factor can be set within a range from 1.41 to 10.00 and varied easily using the酪ly knob. Waveforms generated in this way can be treated as standard waveforms with respect to frequency, amplitude, oscillation mode and other parameters.

Names and Variable Parameters of Incorporated Waveforms

<table>
<thead>
<tr>
<th>Waveform Type</th>
<th>Parameter-Variable Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sine wave</td>
<td>Amplitude, Frequency, Phase</td>
</tr>
<tr>
<td>Square wave</td>
<td>Duty, Frequency, Phase</td>
</tr>
<tr>
<td>Sawtooth wave</td>
<td>Duty, Frequency, Phase</td>
</tr>
<tr>
<td>Triangle wave</td>
<td>Duty, Frequency, Phase</td>
</tr>
<tr>
<td>–</td>
<td>–</td>
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</tbody>
</table>

Flexible Program Output Patterns

Sequence Function

The sequence function programs and sequentially outputs parameters such as waveform, frequency and amplitude. Repetition, jump and other such behavior can be programmed, as constantly changing signals such as machine vibration and noise fluctuation—and long complex output patterns can be generated easily. The sequence function allows sudden change to parameters, and can be used with parameter-variable waveforms and sweep functions. The sequence function substantially expands the range of applications for which our function generators are suitable.

Program Example Using the Sequence Function

This example shows the program sequence (left) used to generate the signal on the left. The WF1973 and WF1974 can execute such simple programs automatically. The Sequence Editor can be used to design a number of other processes for more complicated programs.

Up to 512 K words/Waveform, 4 M words

Arbitrary Waveforms

Arbitrary waveforms up to 512 K words can be output. Up to 128 waveforms can be stored in the large 4 M words memory. Highly precise waveforms are generated using high-resolution (14-bit), high-speed (120 MSamples/sec) sampling. Waveforms can be generated easily either via the control panel (drawing interpretation of control points) or in software using the Arbitrary Waveform Editor, which also allows external data to be imported and mathematical expressions to be applied. Preprogrammed parameter-variable waveforms can be retrieved and edited as required.
Fully equipped with the functions and performance that WF1974 are simple to operate and provide high-precision

**Multifunctional**

A variety of oscillation modes and flexible scalability

**Sweep and modulation functions**

- Frequency, phase, amplitude, DC offset and duty sweeps can be performed in one-way or shuttle, linear or logarithmic slope, and continuous, single-shot or gated single-shot modes. Marker and X-drive outputs are available. DC offset modulation and PWM modes are supported as well as FM, PSK, PM, PSK, and AM—both internal and external modulation. These function generators address a wide range of applications, including baseline functional testing for digital communications.
- Logarithmic mode is supported only for frequency sweeping.

**Burst/trigger/gate**

- In the burst oscillation mode, oscillation can be started or stopped at any count.
- WF1973 and WF1974 support four modes:
  - Auto burst: No trigger is needed
  - Trigger burst: Oscillation in sync with the trigger
  - Gate: Oscillation in sync with the gate signal
  - Triggered gate: Gate oscillation switched on/off by gate upon trigger
- The phase where oscillation starts/stops and the level at which oscillation starts/stops can be set.

**External 10 MHz frequency reference input, synchronous operation of multiple generators**

A high-accuracy frequency can be output when an external 10 MHz standard signal is input into the external 10 MHz frequency reference input. A multi-channel (multi-phase) oscillator can be configured.

**As pulse generator**

- With great speed and operability, the WF1973 and WF1974 show excellent performance when used as a pulse generator or signal source for digital circuits. The duty time, rising time, and falling time of pulse waves can be individually set, so these generators are best suited to operation testing of a wide variety of digital equipment and devices, data transmission equipment, and more.

**2 Channels**

- Ideal 2-channel generator

The WF1974 is a dual-channel function generator. Each channel is isolated from the housing and has the same functions and performance as a single-channel WF1972. In addition, the WF1974 offers two phase, constant frequency difference, constant frequency ratio, dual-drive, and differential output—all features that are unique to NF dual-channel function generators.

- Independent output (Ind): Two channels programmed separately.
- Two phase (2-Phase): Same frequency.
- Constant frequency difference: Frequency difference is constant.
- Differential output (DIFF): Reverse phase waveform with identical frequency, amplitude, and DC offset.

**Are required for function generators. The WF1973 and WF1974 waveforms for a wide range of applications.**

**High Accuracy**

High specifications to generate quality waveforms

- Frequency accuracy: ±0.2 ppm at setting +0.2 ppm (External frequency reference of 10 MHz used.)
- Frequency resolution: 0.01 Hz
- Amplitude accuracy: ≤1% of amplitude setting [Vp-p] + 1 mVpp
- Phase accuracy: 0.001° (setting range) +1800.000° to 1800.000°; resolution: 0.0001°.
- Pulse wave rise/falling time: 15 ns to 53.8 µs, 3-bit resolution, 1 ns
- Resolution of arbitrary waveform data amplitude: 10 bits

**Operability**

Thorough pursuit of usability

**WAVE GENERATOR**

- Waveform display
  - The TFT color LCD display with the QVGA high resolution has been adopted. A variety of setup parameters can be seen at a glance and the set waveform is also displayed. Setting errors can be avoided because the waveform to be output can be intuitively checked.
- User-defined function
  - The frequency, period, phase, amplitude, DC offset and duty can be set and displayed in a desired unit (up to four characters), using a specified conversion expression.
- Other features
  - Input/output signal ground independent of housing and signal ground between channels also insulated.
  - Offset voltage under specified load impedance can be set and displayed.
  - Internal signals can be added and output.
  - Up to ten settings can be saved.
  - USB and GPIB interfaces.
  - LabVIEW driver included.
  - Power supply input for 90 V AC to 250 V AC enables variable use.
  - Flat and light body (88 mm high, about 2.1 kg)

**Applications**

We can satisfy a variety of waveform-related needs.

- Electronic equipment and parts
  - Industrial robots and servo system adjustment and testing.
  - Pulse motor driving, building vibration experiments (for incorporating vibration testers), pulse- and events-based wave generation tests, and material fatigue testing
- Communication and audio equipment
  - Testing of echo cancellers which use an ID signal generator/lock source for next-generation mobile communication systems, amplifier and speaker tone burst testing and linear measurement, and wireless communication equipment evaluation testing
- Automotives
  - Gear rotation signal simulation, precision work for turbochargers, inverse evaluation, ABS and power steering device testing, ECU and sensor operation testing
- Machinery, controls, and construction
  - Simulation of blast, electrostatic, electroplating, and battery recharge/discharge testing, breaker testing, three-phase power source simulation, power source modulation testing, a frequency standard for measurement equipment management room, experiments and science projects in universities and technical colleges
- Other applications
  - Power amplifier that boosts output

**High-Speed Bipolar Amplifier — BA/HSA Series**

BA Series (BA4825/BA4850)
- BA4825
  - Wide range: DC to 2 MHz
  - High voltage output: ±300 Vpp-p
  - Output current: 3.5 A
  - Linearity: ±0.05% (at 100 Vpp-p)
  - Rise time: 200 µs

- BA4850
  - Wide range: DC to 50 MHz
  - High voltage output: ±220 V
  - Output current: ±1 A
  - Linearity: ±0.05% (at 100 Vpp-p)
  - Rise time: 600 V/m

**HSA Series (six models)**

Examples when combined with BA Series:
- NF recommends using our high-speed bipolar power amplifiers (BA/HSA Series) as power amplifiers for drive testing and other applications where a high voltage is applied to OLT, such as electronic parts or devices. These power amplifiers allow high-speed response and high voltage output, as well as wide voltage range. In addition, four-quadrant operation enables them to serve as the source (supply and sink) for positive-negative voltage and current. They stably operate (output power) under capacitive or inductive loads such as a piezoelectric element or actuator.
### WAVE FACTORY Lineup/Selection Guide

The following list summarizes the features of each model. For detailed specifications, refer to the respective catalogs, Web pages, or other documents.

<table>
<thead>
<tr>
<th>Model name</th>
<th>30 MHz</th>
<th>15 MHz</th>
<th>50 MHz</th>
<th>100 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product name</td>
<td>Multifunction generator</td>
<td>Multifunction generator</td>
<td>Multifunction generator</td>
<td>Multifunction generator</td>
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<tr>
<td><strong>Appearance</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Number of channels</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Waveform</td>
<td>Square</td>
<td>Square</td>
<td>Square</td>
<td>Square</td>
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<tr>
<td><strong>Waveform parameters</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Frequency range</td>
<td>1 MHz to 10 MHz</td>
<td>50 kHz to 10 MHz</td>
<td>20 MHz to 100 MHz</td>
<td>20 MHz to 100 MHz</td>
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<tr>
<td><strong>Modulation</strong></td>
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</tr>
<tr>
<td>Modulation type</td>
<td>FM, FSK, PM, ASK, AM, DC offset and PWM</td>
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<td>FM, FSK, PM, ASK, AM, DC offset and PWM</td>
<td>FM, FSK, PM, ASK, AM, DC offset and PWM</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
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<tr>
<td>Power</td>
<td>90 to 255 V AC</td>
<td>90/150/220 V AC selectable</td>
<td>90/150/220 V AC selectable</td>
<td>100 V AC or less</td>
</tr>
<tr>
<td><strong>Select the appropriate model</strong></td>
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<tr>
<td>1 CH/30 MHz</td>
<td>10</td>
<td>10</td>
<td>10</td>
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For detailed information on the products and services, please visit [http://www.nfcorp.co.jp/english/](http://www.nfcorp.co.jp/english/)

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