Model WW2571/2A is a single/dual channel frequency agile waveform synthesizer that combines industry leading performance, frequency agility and modulation capability in a stand-alone, bench-type product. Having 1.5Hz to 250MHz clock and 16-bit vertical DAC resolution provides the test stimuli required for the decades to come. It can be used as an arbitrary waveform generator, modulating generator, as well as function and pulse generator.

250MS/s Performance
Higher performance test equipment and systems are needed as products which use increasing signal bandwidths are developed. The sample rate generator can be programmed from frequencies as low as 1.5Hz to 250MHz with superior waveform quality and purity. For example, phase noise is typically below 120dB/Hz at 10kHz offset for a 10MHz sine wave.

High Speed Function Generator
Interested in standard functions? There are 10 built-in functions that cover most routine requirements. These are sine, triangle, square, ramp, sinh/x, Gaussian, exponential, noise, as well as DC. Sine and square waves can be generated from frequencies as low as 100µHz to frequencies as high as 100MHz. All functions and their respective parameters are accessible via the front panel.

Waveform Memory
Longer waveform memory minimizes test duration by allowing multiple waveforms to be loaded simultaneously and retrieved as needed for the specific test. Each channel comes with 1M points of memory as standard. Optional 2M or 4M memory is available for applications requiring longer memory.

Digital Outputs
16-bits are available as digital patterns from a rear-panel VHDC connector. Output level is LVDS which is efficient and sufficient for high speed digital data transmissions. Digital patterns are built the same way as arbitrary waveforms; thus the immense power of the waveform generator with all its functions and features is harnessed behind this output turning the WW2571/2A into the most powerful pattern generator in its class.

Frequency Agility
Decrypting radio transmission often employs frequency hopping. The WW2571/2A provides breakthrough technology that allows simulation of 12-bit decrypted code as easy as writing a simple hop table. The frequency hop mode is fast, coherent and provides a great tool for simulating code transmission without losing speed and integrity.

Accurate Output
As standard, the instrument is equipped with an internal frequency reference that has 1ppm accuracy and stability over a period of 1 year. An external frequency reference is provided on the rear panel for applications requiring greater accuracy or stability, supported by the instrument's up to 14 digits resolution from remote.
Memory Segmentation and Sequencing
Solving almost every complex application, powerful segmentation and sequencing produce an endless variety of complex waveforms. The waveform memory can be divided into multiple waveform segments and sequenced in user-selectable fashion to create complex waveforms that have repeatable segments and thus saving precious memory space. Five different advance modes are available for the WW2571/2A series to step through the sequence table, including stepped and mixed advance modes and thus increasing efficiency of the test system. To solve even the toughest application, the products allow generation of up to 10 different sequences, each capable of linking 10k waveform fragments and looping each waveform up to 1M times.

Modulation Capability
Agility and modulation capabilities open the door to diverse applications. In addition to the capability of generating any shape and style of waveform with the arbitrary waveform generation power, the products can also do standard modulation schemes such as FM, AM, FSK, ASK, (n)PSK, (n) QAM, amplitude and frequency hops, 3D and sweep without sacrificing the power of the instrument control and output run modes.

Automated External Self-Calibration
Normal calibration cycles in the industry range from one to three years where instruments are sent to a service center, opened to allow access to trimmers, calibrated and certified for repeated usage. Leading-edge technology was implemented to allow calibration from any interface, USB, GPIB or LAN. Calibration factors are stored in a flash memory thus eliminating the need to open instrument covers.

Easy to use
Large and user-friendly 3.8” back-lit color LCD display facilitates browsing through menus, updating parameters and displaying detailed and critical information for your waveform output. Combined with numeric keypad, cursor position control and a dial, the front panel controls simplify the often complex operation of an arbitrary waveform generator.

High Speed Access
Access speed is an increasingly important requirement for test systems. Included with the instrument is a variety of interfaces: LAN, USB and GPIB so one may select the interface most compatible to individual requirements. Using any of the external interfaces, controlling instrument functions and features as well as downloading waveforms and sequences is fast, time saving and easily tailored to every system regardless if it is just a laptop to instrument or full-featured ATE system. IVI drivers and factory support will speed up system integration thus minimizing time-to-market and reduce system development costs significantly.

Multiple Environments to Write Your Code
Model WW2571/2A comes with a complete set of drivers, allowing you to write your application in various environments such as: Labview, CVI, C++, VB, MATLAB. You may also link the supplied dll to other Windows based API’s or, use low level SCPI commands (Standard Commands for Programmable Instruments) to program the instrument, regardless if your application is written for Windows, Linux or Macintosh operating systems.

Phase Control (WW2571/2A)
In the WW2572A, both channels share a common sample clock, and both channels are triggered from the same source assuring tightly synchronized channel-to-channel timing. Precise control over channel-to-channel phase offset is achieved by allowing control over channel start phase with a resolution down to as small as 1 waveform point. This enables extremely accurate timing or phase dependencies to be studied, such as those found in high speed digital communication systems.

Multi-Instrument Synchronization
Multiple WW2571/2As can be synchronized using a Master-Slave arrangement allowing users to benefit from the same high quality performance in their multi-channels needs.

ArbConnection
The ArbConnection software provides you with full control of instrument functions, modes and features. ArbConnection is a powerful editorial tool that allows you to easily design any type of waveform. Whether it is the built in wave, pulse or serial data composers, or the built in equation editor with which you can create your own exotic functions, with ArbConnection virtually any application is possible.
## Specification

### CONFIGURATION
- Output Channels: 1/2, semi-independent

### STANDARD WAVEFORMS
- **Waveforms:** Sine, Triangle, Square, Pulse, Ramp, Sine(x)/x, Gaussian, Exponential, Repetitive Noise and DC
- **Frequency Range:**
  - Sine: 100µHz to 100MHz
  - Square, Pulse: 100µHz to 62.5MHz
  - All others: 100µHz to 31.25MHz

### EXONENTIAL PULSE
- **Time Constant:** -100 to 100
- **DC Range:** -8V to 8V, standard
- **Pulse Range:** -10V to 10V (with option 3)
- **Pulse Mode:** Single or double, programmable
- **Pulse Resolution:** 4ns (typ.)
- **Rise/Fall Time:**
  - Fast: <4ns (typ.)
  - Linear: 4ns to 1000s
- **High Time, Delay & Impedance:** 50Ω
- **Amplitude Window:** (20mVp-p to 20Vp-p (opt. 3))
  - Low Level: -8V to +5V
  - High Level: -5V to +10V
- **Delay Resolution:** 20ns

### SINE
- **Start Phase:** 0-360°
- **Harmonics Distortion, 3Vp-p (typ.):**
  - DC to 2.5MHz: <65dBc
  - 2.5MHz to 25MHz: <50dBc
  - 25MHz to 40MHz: <40dBc
  - 40MHz to 50MHz: <35dBc
  - 50MHz to 100MHz: <28dBc
- **Phase Resolution:** 0.01°
- **Non-Harmonic Distortion:**
  - DC to 50MHz: <70dBc
  - 50MHz to 100MHz: <65dBc

### PULSE
- **DC Range:** -8V to 8V, standard
- **Pulse Width:** 0-360°
- **Polarity:** Normal, inverted or complement
- **Period:** 16ns to 1000s
- **Resolution:** 4ns
- **Pulse Width:** 8ns to 1000s
- **Rise/Fall Time:**
  - Fast: <4ns (typ.)
  - Linear: 4ns to 1000s
- **High Time, Delay & Impedance:** 50Ω
- **Amplitude Window:** (20mVp-p to 20Vp-p (opt. 3))
  - Low Level: -8V to +5V
  - High Level: -5V to +10V
- **Delay Resolution:** 20ns

### TRIANGLE
- **Start Phase Range:** 0-360°
- **Phase Resolution:** 0.01°
- **Timing Ranges:** 0%-99.9% of period

### SQUARE
- **Duty Cycle Range:** 0% to 99.9%
- **Timing Ranges:** 0%-99.9% of period
- **Rise/Fall Time:** <4ns (typ.)
- **Aberration:** <3%+10mV
- **SIN (Sine(x)/x):**
  - 0 Crossings: 4-100

### GAUSSIAN
- **Time Constant:** 10-200

### ARBITRARY WAVEFORMS
- **Sample Rate:** 1.55/s to 250MS/s (typ. 300MS/s)
- **Vertical Resolution:** 16 Bits
- **Waveform Memory:** 1M points (2M/4M optional)
- **Min. Segment Size:** 16 points
- **Resolution:** 4 points
- **No. of Segments:** 1 to 10k

### SEQUENCED WAVEFORMS
- **Operation:** Segments may be linked and repeated in a user-selectable order to generate extremely long waveforms. Segments are advanced using either a command or a trigger
- **Multi Sequence:** 1 to 10, Selectable
- **Sequence Steps:** 1 to 4k
- **Segment Duration:** 600ns min.
- **Segment Loops:** 1 to 1M

### ADVANCE MODES
- **Automatic:** No triggers required to step from one segment to the next. Sequence is repeated continuously through a pre-programmed sequence table
- **Stepped:** Current segment is sampled continuously, external trigger advances to next programmed segment
- **Single:** Current segment is sampled to the end of the segment including repeats and idles there. Next trigger advances to next segment
- **Mixed:** Each step of a sequence can be programmed to advance either: a) automatic (Automatic mode), or b) with a trigger (Stepped mode)

### MODULATION

### COMMON CHARACTERISTICS
- **Carrier Waveform:** Sine wave
- **Carrier Frequency:** 10Hz to 100MHz
- **Modulation Source:** Internal
- **Run Modes:** Off (Outputs CW), Continuous, Triggered, Delayed Trigger, Burst, Timer and Gated
- **Advance Source:** Front panel button, Software commands, TRIG IN
- **Carrier Idle Mode:** On or Off, programmable
- **Marker Position:** TTL, Programmable at selectable frequency

---

Visit our website at www.taborelec.com
SPECIFICATION

FM
Modulating Shape: Sine, square, triangle, ramp
Modulation Freq.: 10mHz to 100kHz
Deviation Range: Up to 50MHz

ARBITRARY FM
Modulating Shape: Arbitrary waveform
Modulating SCLK: 1S/s to 2.5MS/s
Freq. Array Size: 4 to 10,000 frequencies

AM
Envelope Freq.: 10mHz to 100kHz
Envelope Shape: Sine, square, triangle, ramp
Modulation Depth: 0% to 100%

FSK
Baud Rate Range: 1bits/sec to 10Mbits/sec
Data Bits Length: 2 to 4,000

ASK
Carrier Phase: 0 to 360°
Baud Rate Range: 1bits/sec to 10Mbits/sec
Data Bits Length: 2 to 4,000

FREQUENCY HOPPING
Hop Table Size: 2 to 1,000
Dwell Time Mode: Fixed / Programmable per step
Dwell Time: 200ns to 20s
Time Resolution: 20ns

AMPLITUDE HOPPING
Range: 16mVp-p to 16Vpp into 50Ω
Resolution: Maximum amplitude/4096
Baud Rate Range: 1bits/s to 10Mbits/s
Data Bits Length: 2 to 4,000

ARBITRARY 3D
Modulating Shape: Arbitrary waveform
Modulating Type: Amplitude CH1, Amplitude CH2, Frequency and Phase
Modulating SCLK: 1S/s to 2.5MS/s
Memory Size: 4 to 30,000

(n)PSK and (n)QAM
Carrier Frequency: 1Hz to 75MHz
Carrier Control: On/Off
Modulation Type: PSK, BPSK, QPSK, OQPSK, P/4 QDPSK, 8PSK, 16PSK, 16QAM, 64QAM, 256QAM and User Defined

Symbol Rate: 1S/s to 1MS/s
Carrier Control: On/Off
Symbol Accuracy: ±(500ns + Carrier Period)
Table Size: 2 to 4096

SWEEP
Sweep Step: Linear or log
Sweep Direction: Up or Down
Sweep Range: 10Hz to 100MHz
Sweep Time: 1µs to 40s

COMMON CHARACTERISTICS
Resolution:
Display: 11 digits (limited by 1µHz)
Remote: 14 digits (limited by 1µHz)
Accuracy/Stability: Same as reference

ACCUACY REFERENCE CLOCK
Internal: 0.0001% (1 ppm TCXO)
Initial tolerance over a 19°C to 29°C temperature range; 1ppm/°C below 19°C and above 29°C; 1ppm/year aging rate
External: 10MHz TTL, 50% ±2%, or 50Ω ±5% 0dBm (jumper)

FREQUENCY
Resolution:
Display: 11 digits (limited by 1µHz)
Remote: 14 digits (limited by 1µHz)
Accuracy/Stability: Same as reference

AMPLITUDE
Range:
Standard: 16mV to 16Vpp, into 50Ω
Option 3: 21mV to 20Vpp, into 50Ω
Option 4: 32mV to 20Vpp, into 0Ω

Resolution:
Accuracy (1kHz):
16mV to 160mVp-p ±(1% + 5mV)
160mV to 1.6Vp-p ±(1% + 10mV)
1.6V to 12Vp-p ±(1% + 70mV)
12V to 16Vp-p ±2%
16V to 20Vp-p ±5%

OFFSET
Range:
Standard: 0 to ±7.992V, into 50Ω
Option 3: 0 to ±9.981V, into 50Ω
Option 4: 0 to ±9.992V, into 50Ω

Resolution:
Accuracy: ±(1%+1% of Amplitude +5mV)

FILTERS
Type:
Bessel: 25MHz or 50MHz
Elliptic: 60MHz or 120MHz

OUTPUTS
MAIN OUTPUT
Coupling: DC coupled
Connector: Rear panel BNC
Impedance: 50Ω ±1%
Protection: Short Circuit to Case

SYNC OUTPUT
Connector: Rear panel BNC
Level: TTL
Sync Type: Pulse
LCOM: Arbitrary and Standard waves
Sequence and Burst modes
Position: 0 to 1M (2M or 4M optional)
Resolution: 4 points

SAMPLE CLOCK OUTPUT
Connector: Rear panel SMB
Level: 400mVp-p
Impedance: 50Ω

COUPLE OUTPUT
Connector: Rear panel SMB
Level: LVPECL
Impedance: 50Ω, terminated to +1.3V

DIGITAL PATTERN OUTPUTS
Connector: Rear panel SCSI-2, 68-pin VHDC
Pattern Width: 16-bits, differential
Source: Channel 1 only
Output Level: LVDS
Pattern Length:
Dedicated Memory: 1 to 128k
Arbitrary Memory: 16 to 1M (2M or 4M optional)
Update Frequency: 100upps to 250Mpps

INPUTS
TRIGGER INPUT
Connector: Rear panel BNC
Input Impedance: 10kΩ
Polarity: Positive or negative, selectable
Level: ±5V
Sensitivity: 100mV
Damage Level: ±12V
Min. Pulse Width: 10ns

EXTERNAL REFERENCE INPUT
Connector: Rear panel SMB
Frequency: 10MHz
Impedance & Level:
Default: 10kΩ ±5%, TTL, 50% ±2%
Option: 50Ω ±5%, 0dBm Sinewave

Visit our website at www.taborelec.com
**MODELS WW2571/2A**

250MS/s Single/Dual Channel
Arbitrary Waveform Generators

### Specification

**SAMPLE CLOCK INPUT**
- **Connector:** Rear panel SMB
- **Input Level:** 300mVp-p to 1Vp-p
- **Impedance:** 50kΩ
- **Range:** 1.5Hz to 250MHz
- **Min. Pulse Width:** 4 ns

**SAMPLE CLOCK INPUT**
- **Connector:** Rear panel SMB
- **Input Level:** 300mVp-p to 1Vp-p
- **Impedance:** 50kΩ
- **Range:** 1.5Hz to 250MHz
- **Min. Pulse Width:** 4 ns

**COUPLE INPUT**
- **Connector:** Rear panel SMB
- **Input Level:** LVPECL
- **Impedance:** 50Ω, terminated to +1.3V
- **Range:** 10ns to 50ns
- **Min. Pulse Width:** 4 ns

**RUN MODES**
- **Continuous:** Free-run output of a waveform.
- **Triggered:** Upon trigger, outputs one waveform cycle. Last cycle always completed.
- **Gated:** External signal transition enables or disables generator output. Last cycle always completed.
- **Burst:** Upon trigger, outputs a Dual or multiple pre-programmed number of waveform cycles from 1 through 1M.
- **Mixed:** First output cycle is initiated by a software trigger. Consequent output requires external triggers through the rear panel TRIG IN.

**TRIGGER CHARACTERISTICS**
- **System Delay:** 6 SCLK+150ns
- **Trigger Delay:** 0 to 200ns to 20ns (system delay)
- **Trigger Resolution:** 20ns
- **Trigger Delay Error:** 6 SCLK+150ns

**EXTERNAL**
- **Source:** Rear panel BNC
- **Trigger Level:** ±5V
- **Resolution:** 1mV
- **Input Frequency:** DC to 2.5MHz
- **Min. Pulse Width:** 10ns
- **Slope:** Positive/Negative, selectable
- **Trigger Jitter:** ±1 sample clock period

**INTER-CHANNEL DEPENDENCY (WW2572A)**

**SEPARATE CONTROLS:**
- Output on/off, amplitude, offset, standard waveforms, user waveforms, user waveform size, sequence table

**COMMON CONTROLS:**
- Sample clock (Arb), frequency (Std), period (Pulse) reference source, trigger modes, trigger advance source, SYNC OUT.

**PHASE OFFSET (LEADING EDGE)**
- **Range:** 0 to 1M points, 2M/4M optional
- **Resolution:** 1 point
- **Initial Skew:** <1ns
- **Error:** 1 SCLK

**MULTI-INSTRUMENT SYNCHRONIZATION**
- **Initial Skew:** <25 ns + 1 SCLK
- **Waveform Types:** Standard, Arbitrary and Sequenced using the automatic sequence advance mode only
- **Run Modes:** Continuous, Triggered, Gated and Counted Burst

**PHASE OFFSET (LEADING EDGE)**
- **Run Mode:** Continuous run mode only
- **Offset Range:** 200ns to 20s
- **Resolution:** 20ns

### FREQUENCY COUNTER / TIMER

**Measurements:**
- Frequency, Period, Averaged
- Frequency, Pulse Width & Totalize

**Source:** Trigger Input

**Range:** 10Hz to 100MHz (typ.120MHz)

**Sensitivity:** 50mVpp

**Accuracy:** 1ppm

**Slope:** Positive/Negative transitions

**Gate Time:** 100μSec to 1 Sec

**Input Range:** ±5V

**Trigger Modes:** Continuous, Hold and Gated

**Period Averaged:**
- Range: 10ns to 50ms
- Resolution: 7 digits / Sec

**Trigger:**
- **Range:** 10ns to 50ms
- **Resolution:** 100ns

**Overflow:** Led indication

### GENERAL

**Voltage Range:** 85 to 265V

**Frequency Range:** 48 to 63Hz

**Power Consumption:** 60W

**Display Type:** Color LCD, back-lit

**Size:** 3.8” reflective

**Resolution:** 320 x 240 pixels,

**Interfaces:**
- USB Device: 1 x rear, USB device, (A type)
- LAN: 100/10 BASE-T
- GPIB: IEEE 488.2 standard interface

**Dimensions:**
- With Feet: 212 x 102 x 415mm (WxHxD)
- Without Feet: 212 x 88 x 415mm (WxHxD)

**Weight:**
- Without Package: 3.5Kg
- Shipping Weight: 4Kg

**Temperature:**
- Operating: 0°C - 50°C
- Storage: -40°C to + 70°C.

**Humidity:**
- 11°C - 30°C: 85%
- 31°C - 40°C: 75%
- 41°C - 50°C: 45%

**Safety:**
- EN61010-1, 2nd revision

**Calibration:**
- 1 year

**Warranty:**
- 5 years standard

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>WW2571A</td>
<td>250MS/s Single Channel Arbitrary Waveform Generator</td>
</tr>
<tr>
<td>WW2572A</td>
<td>250MS/s Dual Channel Arbitrary Waveform Generator</td>
</tr>
</tbody>
</table>

**OPTIONS**

| Option 1: | 2M Memory (per channel) |
| Option 2: | 4M Memory (per channel) |
| Option 3: | 20Vp-p into 50Ω |

**ACCESSORIES**

| Sync Cable: | Multi-instrument synchronization |
| S-Rack Mount: | 19” Single Rack Mounting Kit |
| D-Rack Mount: | 19” Dual Rack Mounting Kit |
| Case Kit: | Professional Carrying Bag |

**Note:**
Options and Accessories must be specified at the time of your purchase.

---

(1) Standard warranty in India is 1 year.

Visit our website at www.taborelec.com