The WX2181/2C, 2.3GS/s Single / Dual Channel Arbitrary Waveform Generator, offers unrivaled performance, even when compared to instruments designed to generate fewer types of signals or higher sampling rates. Its affordable footprint saves space and cost without compromising bandwidth and signal integrity.

**Universal Waveform Source**
Aside from its natural ability to generate arbitrary shapes with waveform granularity of 1 point, the WX2181/2C can also be used as a full-featured standard, modulation or pulse generator to solve various applications. Equipped with 2.3GS/s 14-bit DAC and 16M points (32M optional) memory, the WX2181/2C can generate literally any waveform, short or long, at frequencies up to 1GHz with 12 digits of resolution, resulting in the highest precision signal creation and regeneration without compromising signal fidelity or system integrity.

**Signal Integrity and Purity**
One of the most important requirement in today's testing and measurement applications is high signal quality. With a typical SSB phase noise of <-115dBc at 100MHz, and <-95dBc at 1GHz, at 10 kHz carrier offset and with exceptionally good SFDR of <-70dBC at 1GHz carrier, Tabor's WX2181/2C unique platform delivers one of the best quality signals available on the market today, answering the ever-growing demand for clear and precise signals.

**IQ Generation**
The ability to generate IQ signals is fundamental for any RF or communication engineer. With the advanced arbitrary capabilities and highly synchronized channels, the WX is ideal for generating digital modulations. The new WX C-Series offers excellent EVM performance even at 1.8GHz IQ bandwidth with less than 1% EVM for a 16QAM modulation, making it, by far, the best performance for price IQ source available in the market today.

**Common or Separate Clocks**
Need a dual channel unit, a single channel unit... why choose? With the new WX2182C you can have it both ways. The WX2182C has two output channels, which can either operate independently, or synchronized to share the same sample clock source. As two separate channels, one has the advantage of having two separate instruments in one box, with each having the ability to be programmed to output different function shapes, frequency, amplitude levels and/or to operate in different run modes. Alternatively, the advantage of having two synchronized channels with less than 10ps skew and skew control is very significant in applications that require an accurate and controlled phase between the two channels, which is ideal for many X-Y modes and I&Q output applications.

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DC or AC Coupled Outputs
Have a requirement for different output paths in your lab? Great! The WX2181/2C offers two single or differential ended DC coupled and one single ended AC coupled output amplifiers: 2Vp-p into 50Ω with 700MHz bandwidth, for applications demanding optimized transitions and aberrations; 4Vp-p into 50Ω with 350MHz bandwidth, for applications demanding high voltage or -20 to +10dBm path for applications requiring bandwidth and flatness for frequencies as high as 1GHz.

Powerful Segmentation and Sequencing
Solving almost every complex application, powerful segmentation and sequencing produces a nearly 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, jump and nest, saving you precious memory space. The WX2181/2C also allows you to generate up to 1000 sequence scenarios and sequence between them to generate an even higher level of flexibility in waveform creation.

Dynamic Segment / Sequence Control
Working in the real-time world and need fast waveform switching? The WX2181/2C has a rear panel control designed specifically for that. Having the dynamic control feature, in effect, can serve as replacement of the sequence table where the real-time application can decide when and for how long a waveform will be generated. For much more complex applications, this same input may serve as a dynamic switch for complete sequences, creating real-life scenarios for real-time applications.

Smart Trigger
Until now, you’ve been forced to trigger on a specific event. Tabor’s all-new SmarTrigger feature was designed to enhance the trigger capability and facilitate wider flexibility of a specific pulse event. It allows triggering on either a pulse having a larger pulse width than a programmed time value (<time), a pulse having a smaller pulse width than a programmed time value (>time), or even on a pulse having a pulse width between two limits (<>time). In addition, the SmarTrigger has a hold-off function, in which the output is held idle after the first trigger and starts a waveform cycle only with the first valid trigger after a hold-off interval has lapsed, allowing you to solve endless "negotiation" scenarios.

Pulse / Pattern Creation
Generating complex pulse trains has never been easier. The Pulse Composer is a powerful built-in tool that converts the WX2181/2C to a very sophisticated Pulse/Pattern Generator, allowing to create literally any complex pulse train / pattern, whether it’s a single pulse, multi-level, linear-points, initialization or preamble pattern definition, user-defined or even standard random patterns with programmable resolution, so it doesn’t matter if your application is radar communications, nanotechnology or serial bus testing, the pulse/pattern composer is the right tool for your application. Moreover, all the WX2181/2C advanced trigger modes are applicable, hence one can choose to use the “step” mode to advance every bit independently or the “once” mode to advance a complete data block in one trigger event, enabling even more applications, such as trigger, clock and data protocols.

Programmable Differential Markers
The WX2181/2C is equipped with two programmable differential markers for each output channel. Differential simply means outstanding signal integrity for high frequencies, whereas the programmability allows you to set position, width, delay and amplitude for any required peripheral triggering need. While bench usage enables setting only one marker position, you can set multiple markers and program different marker properties for each transition instance remotely, allowing various triggering profiles.

Digital Outputs (Option D)
In today’s world, many applications require multiple digital outputs or a parallel digital interpretation of the analog outputs. With the new digital option the WX now offers 32 programmable digital outputs, up to extra 16M of digital memory, up to 1.15Gb/s of data rate and controllable skew between outputs. Combined with Tabor’s dedicated digital signal amplifier, WXD1, the WX is, by far, the best mixed signal source on the market to meet all of today’s requirements.

4-Channel Capability
Need more than two channels to drive your application? With two WX2182C you can reach up to 4 synchronized channels system using a Master-Slave arrangement, allowing users to benefit from the same high quality performance even for multi-channel needs.

Easy to Use
Large and user-friendly 4” backlit color LCD display facilitates browsing through menus, updating parameters and displaying detailed and critical information for your waveform output. Combined with numeric keypad, ten quick-link function & run mode buttons, cursor position control and a dial, the front panel controls simplify the often complex operation of an arbitrary waveform generator.

Multiple Environments to Write Your Code
Model WX2181/2C comes with a complete set of drivers, allowing you to write your application in various environments such as: Labview, CVI, C++, VB, and 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.
SPECIFICATION

CONFIGURATION

Output Channels: 1/2, Synchronized/fully separated

STANDARD WAVEFORMS

Type: Sine, triangle, square, ramp, pulse, sin(x)/x, exponential rise, exponential decay, gaussian, noise and DC.

Frequency Range:
- Sine: 1 µHz to 1 GHz
- Square, Pulse: 1 µHz to 500 MHz
- All others: 1 µHz to 250 MHz

PULSE

- Rise/Fall Time:
- Pulse Width:
- Resolution:
- Period:
- Polarity:

PU

Cross Range ±0.5 dB

Flatness (AC Path): ±0.5 dB

NOTES:
1. All pulse parameters, except rise and fall times, may be freely programmed within the selected pulse period provided that the ratio between the period and the smallest incremental unit does not exceed the ratio of 16,000,000 to 1.
2. Rise and fall times, may be freely programmed provided that the ratio between the rise/fall time and the smallest incremental unit does not exceed the ratio of 1,000,000 to 1.
3. The sum of all pulse parameters must not exceed the pulse period setting.

PULSE / PATTERN COMPOSER

MULTI-LEVEL / LINEAR-POINTS

Number of Levels: 1 to 1000
Dwell/Low Levels: 500ps to 1s
Transition type: Fast or Linear
Memory: 100k
Amp. Resolution: 4 digits
Time Resolution: 500ps to 100ns (auto or user)

PATTERN

Pattern Source: PRBS or user-defined
PRBS Type: PRBS7, PRBS9, PRBS11, PRBS15, PRBS23, PRBS31, USER
Data Rate: 1Bit/s to 500Mb/s
Number of Levels: 2, 3, 4, 5
High/Low Levels: ±2V
Resolution: 4 digits
Loops: 1 to 16
Preamble: 1 to 16
Length: 2 to 16

ARBITRARY WAVEFORMS

Sample Rate: 10M/s to 2.3Gs/s
Vertical Resolution: 14 bits
Waveform Memory: 16M points standard, 32M points optional
Min. Segment Size: 192 points
Resolution: 16 points
No. of Segments: 1 to 32k
Waveform Granularity: 1 point
Dynamic control: Software command or rear panel segment control port
Jump Timing: Coherent or asynchronous

SEQUENCED SEQUENCES

Sequence Scenarios: 1 Scenario
Dynamic Control: Software command or rear panel sequence control port
Table Length: 1 to 1k steps
Advance Control: Continuous, once and stepped
Sequence Loops: 1 to 1,000,000 cycles

MODULATION

COMMON CHARACTERISTICS

Carrier Waveform: Sine, square, triangle
Carrier Frequency: 10kHz to 1GHz
Modulation Source: Internal

FM

Modulation Shape: Sine, square, triangle, ramp
Modulation Freq.: 100Hz to 100MHz
Deviation Range: 10MHz to 500MHz

FSK / FREQUENCY HOPPING

FSK Baud Rate: 10Mbps to 500Mbps
Hop Table Size: 2 to 256
Hop Type: Fast or Linear
Dwell Time Mode: Fixed or programmable per step
Dwell Time: 2ns to 10s
Dwell Time Res.: 2ns

SWEEP / CHIRP

Sweep Type: Linear or log
Sweep Direction: Up or down
Sweep Time: 1.4 µs to 10ms
Modulation Shape: Pulse
Pulse Repetition: Range 200ns to 20s
Resolution 3 digits
Accuracy 100ppm

AM

Modulation Shape: Sine, square, triangle, ramp
Modulation Freq.: 100Hz to 1MHz
Modulation Depth: 0.1 to 200%

ASK / AMPLITUDE HOPPING

ASK Baud Rate: 10Mbps to 500Mbps
Hop Table Size: 2 to 256
Hop Type: Fast or Linear
Dwell Time Mode: Fixed or programmable per step
Dwell Time: 2ns to 10s
Dwell Time Res.: 2ns

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SPECIFICATION

(n)PSK and (n)QAM

Modulation Type: PSK, BPSK, QPSK, QOQPSK, PI/4 DQPSK, 8PSK, 16PSK, 16OAM, 64QAM, 256QAM and User Defined

Symbol Rate Range: 100Mbps to 500Mbps
Symbol Accuracy: 1ppm
Table Size: 2 to 256

COMMON CHARACTERISTICS

FREQUENCY

Resolution: 12 digits
Accuracy/Stability: Same as reference

ACCURACY REFERENCE CLOCK

Internal: 1 ppm from 19°C to 29°C; 1ppm/°C above 29°C; 1 ppm/year aging rate
External: Same as accuracy and stability of the external ref.

OUTPUTS

MAIN OUTPUTS

Coupling: DC-coupled, or AC-coupled
Connectors: Front panel SMAs
Impedance: 50Ω nominal, each output
Protection: Protected against temporary short to case ground

DC-COUPLED

Type: Single-ended or differential
Resolution: 4 digits
Accuracy: ±(2% +2 mV), offset = 0V

DC PATH

Rise/Fall Time: <700ps
Amplitude Range:
Single-ended: 50mV-p-p to 2Vp-p *
Differential: 100mV-p-p to 4Vp-p

HV PATH

Rise/Fall Time: 1ns (typical < 900ps)
Amplitude Range:
Single-ended: 50mV-p-p to 4Vp-p *
Differential: 100mV-p-p to 8V-p-p

OFFSET

Offset Range: -1.5V to +1.5V into 50Ω
Offset Resolution: 4 digits
Offset Accuracy: ±2% + 15mV

RF, AC-COUPLED

Type: Single-ended
Amplitude Range: -20dBm to +10dBm into 50Ω
Resolution: 4 digits
Accuracy: ±(3% +0.5dBm)
Bandwidth: 1GHz

MARKER OUTPUTS

Number of Markers: Two markers per channel
Type: Differential (+) and (-) outputs
Connectors: SMB
Skew Between Markers: 100ps, typical
Impedance: 50Ω
Amplitude Voltage:
Window: 0V to 1.25V, single-ended; 0V to 2.5V, differential
Low level: 0V to 0.8V, single-ended; 0V to 1.6V, differential
High level: 0.5V to 1.25V, single-ended; 0V to 2.5V, differential
Resolution: 10mV
Accuracy: 10% of setting
Width control: 2 SCLK to segment length;
Position control: Range 0 to segment length
Resolution: 2 points
Initial delay: <1ns, typical
Variable delay:
Resolution 16 points
Range 0 to segment length
Variable Width control:
Resolution 16 points
Range 0 to segment length
Variable Position Control:
Resolution 16 points

DIGITAL OUTPUTS (OPTION D)

Number of Bits: 32 output channels
Type: Differential (+) and (-) outputs
Connectors: High speed I/O receptacle, 68-pin VRDPC
Skew Between Bits: 100ps, typical
Level: LVDS
Impedance: 100Ω
Max. Data Rate: 1.15Gb/s
Pattern Memory: Up to 16MWord
Source: Dedicated or parallel

SYNC OUTPUT

Connector: Front panel SMA
Source: Channel 1 or channel 2
Type: Single ended
Waveform Type: Pulse 16 points width
WCOM Waveform complete
Impedance: 50Ω

Amplitude: 1V doubles into high impedance
Variable Position Control:
Range: 0 to segment length
Resolution: 16 points
Rise/Fall Time: 2ns, typical
Variable Width control:
Range: 16 points to segment length
Resolution: 16 points

INPUTS

TRIGGER INPUT

Connector: Rear panel BNC
Input Impedance: 1kΩ or 50Ω, selectable
Polarity: Positive, Negative, or both
Damage Level: ±20Vdc
Frequency Range: 0 to 15MHz
Trigger Level Control:
Range: -5V to 5V into 50Ω;
-10V to 10V into 1kΩ
Resolution: 12 bit (2.5mV)
Accuracy: ±(5% of setting + 2.5mV)
Sensitivity: 0.2Vp-p
Min. Pulse Width: 10 ns

SEQUENCE/SEGMENT CONTROL INPUT

Connectors: Rear panel D-sub, 8 bit lines
Input Impedance: 10kΩ
Input Level: TTL

EXTERNAL REFERENCE INPUT

Connector: Rear panel BNC
Input Frequency: 10 MHz to 100 MHz, programmable
Input Impedance: 50Ω
Voltage Swing: -5dBm to 5dBm
Damage Level: 10dBm

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**SPECIFICATION**

**EXTERNAL SAMPLE CLOCK INPUT**
- **Connector:** Rear panel SMA
- **Input Impedance:** 50Ω
- **Voltage Range:** 0dBm to 10dBm
- **Input Frequency:** 10MHz to 2.3GHz
- **Clock Divider:** 1/1, 1/2, 1/4, 1/256, separate for each channel
- **Damage Level:** 15dBm
- **Input Voltage Range:** AC 0.25Vp-p to 1Vp-p, DC ±10V max.

**RUN MODES**
- **Continuous:** A selected output function shape is output continuously.
- **Self Armed:** No start commands are required to generate waveforms.
- **Armed:** The output dwell on a DC level and waits for an enable command and then the output waveform is output continuously; an abort command turns off the waveform.
- **Triggered:** An output signal activates a single-shot or counted burst of output waveforms and then the instrument waits for the next trigger signal.
- **Normal Mode:** The first trigger signal activates the output; consecutive triggers are ignored for the duration of the output waveform.
- **Override Mode:** The first trigger signal activates the output; consecutive triggers restart the output waveform regardless if the current waveform has been completed or not.
- **Gated:** A waveform is output when a gate signal is asserted. The waveform is repeated until the gate signal is deasserted. Last period is always completed.
- **Burst:** Upon trigger, outputs a Dual or multiple pre-programmed number of waveform cycles from 1 through 1M.

**EXTERNAL TRIGGER CHARACTERISTICS**
- **Source:** Channel 1, channel 2, or both
- **Input Impedance:** 1kΩ or 50Ω, selectable
- **Polarity:** Positive, negative, or both
- **Damage Level:** ±20Vdc
- **Frequency Range:** 0 to 15MHz

**TRIGGER CHARACTERISTICS**
- **Source:** Channel 1, channel 2, or both
- **Input Impedance:** 1kΩ or 50Ω, selectable
- **Polarity:** Positive, negative, or both
- **Damage Level:** ±20Vdc
- **Frequency Range:** 0 to 15MHz

**TRIGGER LEVEL CONTROL**
- **Range:** -5V to 5V into 50Ω; -10V to 10V into 1kΩ
- **Resolution:** 12 bit (2.5mV)
- **Accuracy:** ±(5% of setting + 2.5mV)
- **Sensitivity:** 0.2Vp-p
- **Pulse Width:** 10 ns, minimum
- **System Delay:** 200 SCLK periods + 50ns
- **Trigger Delay:** Separate for each channel
- **Resolution:** 4 points
- **Accuracy:** Same as SCLK accuracy
- **Smart Trigger:** Detects a unique pulse width
- **Conditioned Trigger:** < pulse width, > pulse width or < > pulse width
- **Pulse Width Range:** 50ns to 2s
- **Resolution:** 2ns
- **Accuracy:** ±(5% of setting ±20ns)
- **Trigger Hold-off:** Ignores triggers for a hold-off
- **Hold-off Range:** 100ns to 2s
- **Resolution:** 2ns
- **Accuracy:** ±(5% of setting ±20ns)
- **Trigger Jitter:** 4 SCLK periods

**INTERNAL**
- **Source:** Common or separate
- **Modes:** Timer
- **Timer:** Waveform start to waveform start
- **Delayed Timer:** Waveform stop to waveform start
- **Range:** 200ns to 10s
- **Resolution:** 3 digits
- **Accuracy:** 1000ppm
- **Delay:** 152 to 8,000,000 SCLK periods
- **Resolution:** Even numbers, divisible by 4

**MANUAL**
- **Source:** Soft trigger command from the front panel or remote

**INTER-CHANNEL SKEW CONTROL**
- **COURSE TUNING**
  - **Initial skew:** 200ps
- **Control:** Range: 0 to waveform-length points
- **Resolution:** 4 points
- **Accuracy:** Same as SCLK accuracy
- **FINE TUNING**
  - **Initial skew:** 200ps
- **Control:** Range: -3ns to +3ns
- **Resolution:** 10ps
- **Accuracy:** (10% of setting + 20ps)

**TWO INSTRUMENTS SYNCHRONIZATION**
- **Initial Skew:** 20ns + 0 to 8 SCLK
- **Offset Control:** 0 to Waveform length
- **Offset Resolution:** 4 SCLK increments
- **Skew Control:** -5ns to 5ns
- **Skew Resolution:** 10ps

**GENERAL**
- **Voltage Range:** 100VAC to 240VAC
- **Frequency Range:** 50Hz to 60Hz
- **Power Consumption:** 150VA
- **Display Type:** TFT LCD, 4", 320 x 240 pixels
- **Interfaces:**
  - USB: 1 x front, USB host, (A type); 1 x rear, USB device, (B type)
  - LAN: 1000/100/10 BASE-T
  - GPIB: IEEE 488.2 standard interface
  - Segment control: 2 x D-sub, 9 pin
- **Dimensions:**
  - With Feet: 315 x 102 x 395 mm (WxHxD)
  - Without Feet: 315 x 88 x 395 mm (WxHxD)
- **Weight:**
  - Without Package: 4.5kg
  - Shipping Weight: 6kg
- **Temperature:**
  - Operating: 0°C to 40°C
  - Storage: -40°C to 70°C
- **Humidity:** 85% RH, non condensing
- **Safety:** CE Marked, IEC61010-1
- **EMC:** IEC 61326-1:2006
- **Calibration:** 2 years
- **Warranty:** 5 years standard

**ORDERING INFORMATION**
- **MODEL**
  - WX2181C: 2.3GS/s Single Channel Arbitrary Waveform Generator
  - WX2182C: 2.3GS/s Dual Channel Arbitrary Waveform Generator

**OPTIONS**
- **Option 1:** 32M Memory (per channel)
- **Option D:** 32 Bits / Digital Outputs
- **Option 520D:** Tek AWG520 Hardware and Firmware Emulator

**ACCESSORIES**
- **Sync Cable:** Multi-instrument synchronization
- **S-Rack Mount:** 19" Single Rack Mounting Kit
- **Case Kit:** Professional Carrying Bag

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

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(1) Standard warranty in India is 1 year.