



- Single / Dual Channel 1.25GS/s,14-Bit waveform generator, configurable as separate or synchronized channels
- Inter-channel control from -3ns to +3ns with 10ps resolution
- 500MHz sine and 350MHz square waves
- · 16M waveform memory, 32M memory optional
- 3 selectable output paths:
 - 2Vp-p into 50Ω with 500MHz bandwidth. Differential DC output
 - 4Vp-p into 50Ω with 350MHz bandwidth, Differential DC output
 - -20 to +10 dBm into 50Ω with >500MHz bandwidth, RF AC output
- · AM, FM, FSK, PSK, ASK, Amp. Hop, Freq. Hop, Sweep & Chirp
- · Powerful pulse composer for analog, digital and mixed signals

1.25GS/s Single/Dual Channel Arbitrary Waveform Generators

- 16 Bit/Ch. LVDS Parallel / Separate Outputs (Option D)
- Smart trigger allows: trigger hold-off, detect <=> pulse width, as well as wait-for-waveform-end or abort waveform and restart
- Advanced sequencer for step, loop, nest and jumps scenarios
- Two differential markers per channel with programmable positions, width and levels
- · Two instrument synchronization to form a four-channel system
- · User friendly 4" color LCD display
- · Remote control through LAN, USB and GPIB
- Store/recall capability on disk-on-key or 4GB internal memory
- · LXI Class C compliant

The WX1281/2B, 1.25GS/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 WX1281/2B can also be used as a full-featured standard, modulation or pulse generator to solve various applications. Equipped with 1.25GS/s 14-bit clock and 16M points (32M optional) memory, the WX1281/2B can generate literally any waveform, short or long, at frequencies up to 500MHz with 8 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 <-100dBc at 500MHz, at 10 kHz carrier offset and with exceptionally good SFDR of <-70dBc at 500MHz carrier, Tabor's WX1281/2B unique platform delivers one of the best quality signals available on the market today, answering the ever-growing demand for clear and precise signals.

Common or Separate Clocks

Need a dual channel unit, a single channel unit... why choose? With the new WX1282B you can have it both ways. The WX1282B 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.

DC or AC Coupled Outputs

Have a requirement for different output paths in your lab? Great! The WX1281/2B offers two single or differential ended DC coupled and one single ended AC coupled output amplifiers: 2Vp-p into 50Ω with bandwidth, 500MHz for applications demanding optimized transitions aberrations; 4Vp-p into 50Ω with 350MHz bandwidth, for applications demanding high voltage or -20 to +10dBm path for applications requiring bandwidth flatness for frequencies as high as 500MHz.



1.25GS/s Single/Dual Channel Arbitrary Waveform Generators



Powerful Segmentation and Seguencing

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 WX1281/2B 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 WX1281/2B 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.

Pulse / Pattern Creation

Generating complex pulse trains has never been easier. The Pulse Composer is a powerful built-in tool that converts the WX1281/2B to a very sophisticated Pulse/ Pattern Generator, allowing to create literally any complex pulse train / pattern, whether it's a single pulse, multi-level, linearpoints, initialization or preamble pattern definition, arbitrary bit design, 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 WX1281/ 2B 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.

Multi-Level and PAM(n) Signals

The WX1281/2B's pulse composer enables up to 1Gbit/s data rate generation, utilizing either NRZ and RZ modes (minimum transition times) which is ideal especially for multi level and PAM(n) applications such as, LED (lightemitting diodes), CAN, QPHY, FlexRay or simulating and testing Ethernet environment, whether it's 100Mbit/s (100BASE-T), the later gigabit Ethernet (1000BASE-T) or even the latest 802.3an standard (10GBASE-T), which utilizes PAM-16.

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 holdoff interval has lapsed, allowing you to solve endless "negotiation" scenarios.

Programmable Deferential Markers

The WX1281/2B is equipped with two programmable deferential 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 up to 16 programmable digital outputs per channel, up to extra 32M 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 WX1282B 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 WX1281/2B 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.



1.25GS/s Single/Dual Channel **Arbitrary Waveform Generators**



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:

10kHz to 500MHz Sine Square, Pulse 10kHz to 350MHz All others 10kHz to 125MHz

SINE

Start Phase: 0 to 360° Phase Resolution: 0.01 Harmonics Distortion (typ.):

 $\mathbf{3Vpp}^{\mathsf{HV}}$ $\mathbf{0dBm}^{\mathsf{AC}}$ 1Vpp^t 5MHz to 200MHz <-44dBc <-40dBc <-40dBc 200MHz to 325MHz <-50dBc⁽¹⁾<-50dBc 325MHz to 425MHz <-60dBc⁽¹⁾<-60dBc⁽¹⁾<-70dBc

<-80dBc

425MHz to 500MHz <-70dBc⁽¹⁾<-70dBc⁽¹⁾<-70dBc (1) Measured with 500MHz lowpass fiter

Non-Harmonics Distortion (typ.):

100MHz to 250MHz <-75dBc

250MHz to 500MHz <-70dBc SSB Phase Noise (10kHz offset): 1MHz Carrier <-120dBc/Hz 10MHz Carrier <-118dBc/Hz 100MHz Carrier <-115dBc/Hz 250MHz Carrier <-108dBc/Hz

500MHz Carrier <-100dBc/Hz Flatness (AC Path):

1MHz to 100MHz

Cross Range

PULSE

Pulse Mode: Single or double, programmable Polarity: Normal, inverted or complement

Period: 4ns to 1.6s Resolution: 1ns Pulse Width: 2ns to 1.6s

Rise/Fall Time:

Fast

DC Path 700ps (typical < 600ps) HV Path 1ns (typical < 900ps)

Linear 2ns to 1.6s Delay: 2ns to 1.6s Double Pulse Delay: 2ns to 1.6s

Amplitude: Range

DC Path 50 mVp-p to 2 Vp-p into 50Ω HV Path 100mVp-p to 4Vp-p into 50Ω

Levels

Low Level -2V to +1.95V High Level -1.95V to +2V

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 Time:** 1ns to 1s Memory: 100k Amp. Resolution: 4 digits Time Resolution: 1ns

PATTERN

Pattern Source: PRBS or user-defined PRBS Type: PRBS7, PRBS9, PRBS11,

PRBS15, PRBS23, PRBS31,

Data Rate: 10Bit/s to 250MBit/s

Number of Levels: 2, 3, 4, 5 High/Low Levels: ±2.5V Resolution: 4 digits Loops: 1 to 1e6 Preamble: 1 to 16e6 1 to 16e6 Length:

PAM (PULSE AMPLITUDE MODULATION)

Data Rate: 10Mbit/s to 1Gbit/s

PAM Range: 2 to 1000 Pattern Memory: 16Mbit Resolution: 1 bit (TBD)

ARBITRARY WAVEFORMS

Sample Rate: 10MS/s to 1.25GS/s

Vertical Resolution: 14 bits

Waveform Memory: 16M points standard,

32M points optional

Min. Segment Size: 384 points

Resolution: 32 points (16 point with opt. 1) No. of Segments: 1 to 16k

Waveform Granularity: 1 point

Dynamic control: Software command or rear panel segment control port

Jump Timing: Coherent or asynchronous

SEQUENCED WAVEFORMS

Multi Sequence: 1 to 1,000 unique scenarios

Sequencer Steps: 1 to 16k steps. Segment Duration: 32ns, min.

Segment Loops: 1 to 1M cycles, each segment Sequence Loops: 1 to 1M ("Once" mode only) Step Advance Modes: Continuous, once (x "N") and

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

Carrier Frequency: 10kHz to 500MHz

Modulation Source: Internal

Modulation Shape: Sine, square, triangle, ramp Modulation Freq.: $(CW/6) > (M.F) > (30e^{-6}xCW)$

Deviation Range: CW/2

FSK / FREQUENCY HOPPING

2 to 10,000 (<CWx10.24e⁻³) Hop Table Size:

Hop Type: Fast or Linear

Dwell Time Mode: Fixed or programmable per step

Dwell Time: 4ns to 10s

Dwell Time Res.:

SWEEP / CHIRP

Sweep Type: Linear or log Sweep Direction: Up or down

Sweep Time: (9/High Freq.)>(S.T)>(50e³/High Freq.)

Modulation Shape: Pulse

Pulse Repetition:

Range 100ns to 2s Resolution 3 digits Accuracy 100ppm

AM

Modulation Shape: Sine, square, triangle, ramp Modulation Freq.: $(CW/9) > (M.F) > (CW/50e^3)$ Modulation Depth: 0.1 to 100%

ASK / AMPLITUDE HOPPING

2 to 10,000 (<CWx10.24e⁻³) Hop Table Size: Resolution Maximum amplitude/4096

Hop Type: Fast or Linear

Dwell Time Mode: Fixed or programmable per step

Dwell Time: 4ns to 10s Resolution 4ns



1.25GS/s Single/Dual Channel Arbitrary Waveform Generators



Specification

(n)PSK and (n)QAM

Modulation Type: PSK, BPSK, QPSK, OQPSK,

PI/4 DQPSK, 8PSK, 16PSK, 16QAM, 64QAM, 256QAM

and User Defined

Carrier Control: On/Off

Carrier Frequency: 100kHz to 65MHz

Symbol Rate Range:

Carrier On 100kHz to 65MHz
Carrier Off 100kHz to 500MHz

Symbol Accuracy: 1ppm
Table Size: 2 to 10,000

I-Q Parameters:

Gain imbalance TBD Offset imbalance TBD Phase imbalance TBD

COMMON CHARACTERISTICS

FREQUENCY

Resolution: 8 digits

Accuracy/Stability: Same as reference

ACCURACY REFERENCE CLOCK

Internal 1 ppm from 19°C to 29°C; 1ppm/°C below 19°C or

above 29°C; 1 ppm/year

short to case ground

aging rate

External Same as accuracy and stability of the external ref.

OUTPUTS

MAIN OUTPUTS

Coupling:DC-coupled, or AC-coupledConnectors:Front panel SMAsImpedance: 50Ω nominal, each outputProtection:Protected against temporary

DC-COUPLED

Type: Single-ended or differential

Resolution: 4 digits

Accuracy: $\pm (3\% + 5 \text{ mV})$, offset = 0V

Overshoot: 5%, typical

DC PATH

Rise/Fall Time: <700ps (typical <600ps)

Amplitude Range:

Single-ended 50mVp-p to 2Vp-p * 100mVp-p to 4Vp-p

HV PATH

Rise/Fall Time: 1ns (typical < 900ps)

Amplitude Range:

Single-ended 50mVp-p to 4Vp-p* to 8Vp-p to 8Vp-p*

* Double into high impedance

OFFSET

Offset Range: -1.5V to + 1.5V into 50Ω

Offset Resolution: 4 digits
Offset Accuracy: ±(5% +5mV)

RF, AC-COUPLED

Bandwidth:

Type: Single-ended

Amplitude Range: -20dBm to +10dBm into 50Ω,

500MHz

Resolution: 4 digits
Accuracy: (3% +0.5dBm)

MARKER OUTPUTS

Number of Markers: Two markers per channel Type: Differential (+) and (-) outputs

Connectors: SMI

Skew Between Markers: 10

Markers: 100ps, typical Impedance: 50Ω

Impedance: 50Ω
Amplitude Voltage:

Window 0V to 1.25V, single-ended; 0V to 2.5V, differential Low level 0V to 0.8V, single-ended;

OV to 1.6V, differential High level 0.5 V to 1.25V, single-ended;

OV to 2.5V, differential 10mV

Accuracy: 10% of setting

Width control: 4 SCLK to segment length; 2 SCLK with opt. 1/D

Position control:

Range 0 to segment length
Resolution 4 points (2 point with opt. 1/D)
Initial delay: 4ns±½ clock (Output to marker)

Variable delay:

Control Separate for each channel

Range 0 to 3ns Resolution 10ps

Accuracy $\pm (10\% \text{ of setting } +20\text{ps})$

Rise/Fall Time: <1ns, typical

DIGITAL OUTPUTS (OPTION D)**

Number of Bits: Up to 32 (16 per analog channel)
Type: Differential (+) and (-) outputs
Connectors: High speed I/O receptacle,

68-pin VRDPC Channel 1 or channel 2

Skew Between Bits: 100ps, typical Level: IVDS

Level:LVDSImpedance: 100Ω Max. Data Rate:625Mb/s

Pattern Memory:

Source:

Dedicated Up to 16MWord per channel Parallel Up to 16MWord per channel

arbitrary memory

** Replaces the markers

SYNC OUTPUT

Connector: Front panel SMA Channel 1 or channel 2

Type: Single ended Waveform Type:

Pulse 32 points width;

16 points with opt. 1/D WCOM Waveform complete

Impedance: 50Ω

Amplitude: 1V; doubles into high impedance

Variable Position Control:

Range 0 to segment length

Resolution 32 points (16 point with opt. 1/D)

Rise/Fall Time 2ns, typical

Variable Width control:

Range 32 points (16 points with opt.

1/D) to segment length
32 points (16 point with opt, 1/D)

INPUTS

TRIGGER INPUT

Resolution

Connector: Front panel SMA

Input Impedance: 10kΩ

Polarity: Positive, negative, or both

Damage Level: ±20Vdc
Frequency Range: 0 to 15MHz
Trigger Level Control:
Range -5V to 5V

Resolution 12 bit (2.5mV)

Accuracy \pm (5% of setting + 2.5mV) Sensitivity 0.2Vp-p

Min. Pulse Width: 10 ns

EVENT INPUT

Connector: Rear panel BNC

Input Impedance: $10k\Omega$

Polarity: Positive, negative or either

Damage Level: ±20Vdc Frequency Range: 0 to 15MHz Trigger Level Control:

Range -5V to 5V Resolution 12 bit (2.5mV)

Accuracy ±(5% of setting + 2.5mV) Sensitivity 0.2 Vp-p minimum

Min. Pulse Width: 10 ns

SEQUENCE/SEGMENT CONTROL INPUT

Connectors: Rear panel D-sub, 8 bit lines Input Impedance: $10k\Omega$

Input Impedance: 10kΩ Input Level: TTL

Damage Level:

EXTERNAL REFERENCE INPUT

Connector: Rear panel BNC Input Frequency: 10MHz to 100MHz

 $\begin{array}{lll} \mbox{Input Impedance:} & 50\Omega \\ \mbox{Voltage Swing:} & -5\mbox{dBm to } 5\mbox{dBm} \\ \end{array}$



10dBm

1.25GS/s Single/Dual Channel **Arbitrary Waveform Generators**



Specification

EXTERNAL SAMPLE CLOCK INPUT

Connector: Rear panel SMA

Input Impedance: 50Ω

Voltage Swing: 0dBm to 10dBm Input Frequency: 1GHz to 2.5GHz (Double the

internal clock)

Clock Divider: 1/1, 1/2, 1/4, 1/256, separate for each channel

Damage Level: 15dBm

RUN MODES

Continuous: A selected output function

shape is output continuously. Self armed: No start commands are required to generate waveforms.

Armed: The output dwells 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.

A trigger signal activates a Triggered: 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 de-asserted. Last period is always completed. Upon trigger, outputs a Dual

or multiple pre-programmed number of waveform cycles

from 1 through 1M.

TRIGGER CHARACTERISTICS

EXTERNAL

Burst:

Source: Channel 1, channel 2, or both

Connector: **SMA** Input Impedance: 10kΩ

Positive, negative, or both Polarity:

Damage Level: ±20Vdc Frequency Range: 0 to 15MHz



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Trigger Level Control:

Range -5V to 5V Resolution 12 bit (2.5mV)

 \pm (5% of setting + 2.5mV) Accuracy

Sensitivity 0.2Vp-p

Pulse Width: 10 ns, minimum

System Delay: 200 SCLK periods + 50ns Trigger Delay: Separate for each channel Range 0 to 8,000,000 SCLK periods Resolution 8 points (4 point with opt. 1/D) Same as SCLK accuracy 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

±(5% of setting +20ns) Accuracy Trigger Hold-off: Ignores triggers for a hold-off

Hold-off range 100ns to 2s

Resolution

Accuracy ±(5% of setting +20ns) Trigger jitter:

8 SCLK periods; 4 SCLK periods with opt. 1/D

INTERNAL

Source: Common or separate Modes:

Timer Waveform start to waveform start Delaved Waveform stop to waveform start

Timer: Range 400ns to 2s Resolution 3 digits

Accuracy 100ppm Delay

Range 152 to 8,000,000 SCLK periods Resolution Even numbers, divisible by 8

(4 with opt. 1/D)

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 8 points (4 point with opt. 1/D) Same as SCLK accuracy Accuracy:

200ps

FINE TUNING

Initial skew: Control: Range

-3ns to +3ns

Resolution 10ps

Accuracy: (10% of setting + 20ps)

TWO INSTRUMENTS SYNCHRONIZATION

Initial Skew: 20ns + 0 to 16 SCLK

(8 SCLK with opt. 1/D)

0 to Waveform length Offset Control: Offset Resolution: 8 SCLK increments (4 SCLK with opt. 1/D)

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) 315 x 88 x 395 mm (WxHxD) Without Feet

Weight:

Without Package 4.5kg Shipping Weight 6kg

Temperature:

0°C to 40°C Operating 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 (1): 5 years standard

ORDERING INFORMATION

MODEL	DESCRIPTION
WX1281B	1.25GS/s Single Channel Arbitrary Waveform Generator
WX1282B	1.25GS/s Dual Channel Arbitrary Waveform Generator
OPTIONS	

Option 1(2): 32M Memory (per channel) Option D⁽²⁾: 16 Bit/Ch. Digital Outputs

(2) Improves timing characteristics as well

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.

