



PROTEUS

Infinite possibilities

AWG&AWT Models



Proteus AWG Models & Options Selection Guide

| PXIe Modules | | Pages |
|--------------|--|-------|
| P1282M | 1.25GS/s 16Bit 1GS/s Mem 2CH 4 Markers | 4-8 |
| P1284M | 1.25GS/s 16Bit 1GS/s Mem 4CH 4 Markers | 4-8 |
| P2582M | 2.5GS/s 16Bit 2GS/s Mem 2CH 8 Markers | 4-8 |
| P2584M | 2.5GS/s 16Bit 2GS/s Mem 4CH 8 Markers | 4-8 |
| P9082M | 9GS/s 16Bit 4GS/s Mem 2CH 8 Markers | 4-8 |

| Desktop | | Pages |
|---------|--|-------|
| P1282D | 1.25GS/s 16Bit 1GS/s Mem 2CH 4 Markers | 9-13 |
| P1284D | 1.25GS/s 16Bit 1GS/s Mem 4CH 4 Markers | 9-13 |
| P1288D | 1.25GS/s 16Bit 1GS/s Mem 8CH 8 Markers | 9-13 |
| P12812D | 1.25GS/s 16Bit 1GS/s Mem 12CH 12 Markers | 9-13 |
| P2582D | 2.5GS/s 16Bit 2GS/s Mem 2CH 8 Markers | 9-13 |
| P2584D | 2.5GS/s 16Bit 2GS/s Mem 4CH 8 Markers | 9-13 |
| P2588D | 2.5GS/s 16Bit 2GS/s Mem 8CH 16 Markers | 9-13 |
| P25812D | 2.5GS/s 16Bit 2GS/s Mem 12CH 24 Markers | 9-13 |
| P9082D | 9GS/s 16Bit 4GS/s Mem 2CH 8 Markers | 9-13 |
| P9084D | 9GS/s 16Bit 4GS/s Mem 4CH 16 Markers | 9-13 |
| P9086D | 9GS/s 16Bit 4GS/s Mem 6CH 24 Markers | 9-13 |

| Benchtop | | Pages |
|----------|--|-------|
| P1282B | 1.25GS/s 16Bit 1GS/s Mem 2CH 4 Markers | 14-18 |
| P1284B | 1.25GS/s 16Bit 1GS/s Mem 4CH 4 Markers | 14-18 |
| P1288B | 1.25GS/s 16Bit 1GS/s Mem 8CH 8 Markers | 14-18 |
| P12812B | 1.25GS/s 16Bit 1GS/s Mem 12CH 12 Markers | 14-18 |
| P2582B | 2.5GS/s 16Bit 2GS/s Mem 2CH 8 Markers | 14-18 |
| P2584B | 2.5GS/s 16Bit 2GS/s Mem 4CH 8 Markers | 14-18 |
| P2588B | 2.5GS/s 16Bit 2GS/s Mem 8CH 16 Markers | 14-18 |
| P25812B | 2.5GS/s 16Bit 2GS/s Mem 12CH 24 Markers | 14-18 |
| P9082B | 9GS/s 16Bit 4GS/s Mem 2CH 8 Markers | 14-18 |
| P9084B | 9GS/s 16Bit 4GS/s Mem 4CH 16 Markers | 14-18 |
| P9086B | 9GS/s 16Bit 4GS/s Mem 6CH 24 Markers | 14-18 |

Modular, scalable and compact

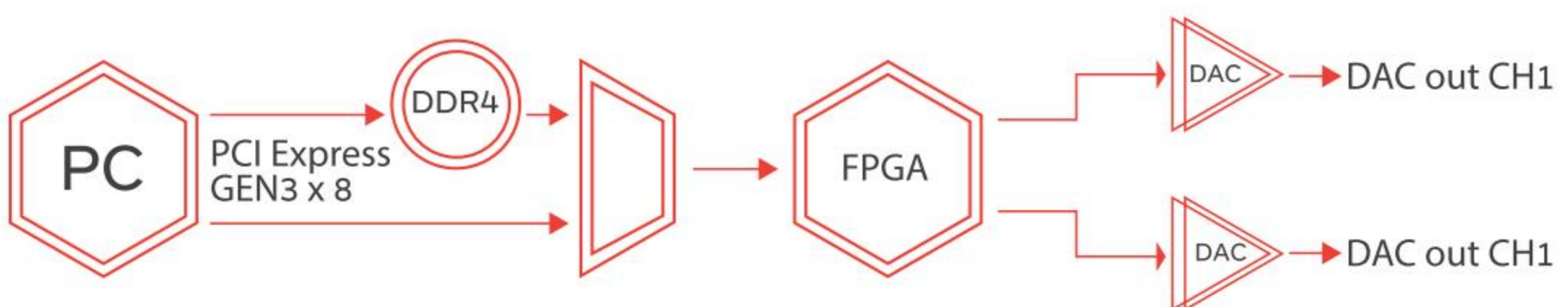
Based on PXI Express industry standard the modular architecture can easily scale to hundreds of channels, while keeping the required space to a minimum. The compact form size enables up to 4 generator output channels and 2 digitizer input channels to occupy only 3 PXI slots. So for synchronized, phase coherent, multi-channel applications such as quantum physics and radar applications the Proteus arbitrary waveform transceiver is an ideal, space efficient and cost effective solution.

Ultra-fast communication interface

Spending more time setting up your generated scenario than actually running it? The PCI Express Gen 3 x8 lanes connection enables up to 64Gb/s of data transfer speed. This enables the Proteus arbitrary waveform transceiver to offer the fastest waveform download available on the market today, saving you one of your most valuable resources, time.

Feedback control system

Many of today's applications, require conditional waveform generation depending on input signals from the environment. The Proteus arbitrary waveform transceiver flawlessly integrates both DAC and ADC in one system, controlled by a single FPGA for optimal synchronization and minimum latency. This high speed control system provides a feedback loop for fast decision making on the fly with minimum latency.



Generate any imaginable scenario

The new series offers an innovative task oriented sequence programming where user can change the full instrument set up at every line of the task table. In addition, not only can users of the Proteus series instruments generate and download waveforms simultaneously, they can stream data directly to the FPGA without the need to use the built in memory. This enables generating random, unique and infinitely long scenarios directly from the controlling PC at DAC speeds of up to 9GS/s. So no matter whether your scenario is extremely complex, infinite or even dynamic you can generate it with the Proteus series model



PROTEUS

Infinite possibilities

Module Platform

Based on a PXIe platform, the system integrates the ability to transmit, receive and perform digital signal processing all in a single instrument. The modular, compact and cost effective system offers industry leading performance, various configuration options, an innovative task oriented programming, and user programmable FPGA. So whether it is for aerospace and defense, telecommunications, automotive, medical or high-end physics applications Proteus opens the door to a world of infinite possibilities.

Leading Features:



Dual or Four channel 1.25GS/s & 2.5GS/s 16 bit, or Dual channel 9GS/s having 16 bit AWG & AWT configurations

Real time data streaming directly to the FPGA for continuous and infinite waveform generation.



Excellent phase noise and spurious performance



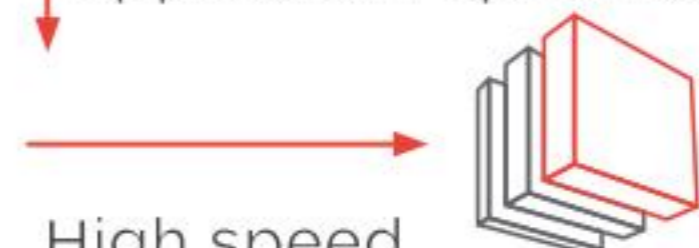
Integrated NCO for digital upconverting to microwave frequencies

8GHz Bandwidth, 2.7GS/s 12 bit digitizer option for feedback control system and conditional waveform generation



User customizable FPGA for demodulation, digital filtering and application specific

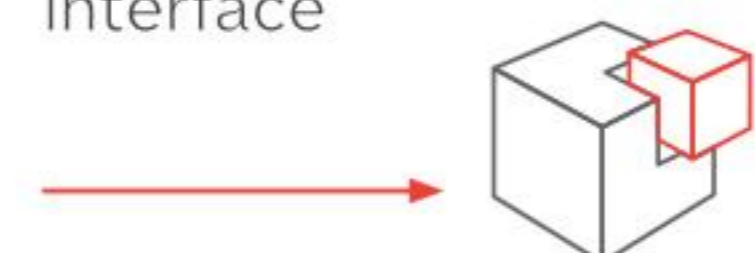
Innovative task oriented sequence programming for maximum flexibility to generate any imaginable scenario



High speed PCIe GEN3x8 lanes communication interface



Up to 16GS/s waveform memory with the ability to simultaneously generate and download waveforms.



Modular and space efficient PXI Express platform, easily scalable to hundreds of channels.

| CHANNELS CHARACTERISTICS | P9082M | P2582M P2584M | P1282M 1284M |
|--------------------------|-----------------|-----------------|----------------|
| NUMBER OF CHANNELS | 2 | 2 4 | 2 4 |
| INITIAL SKEW | <20ps | | |
| FINE DELAY | | | |
| RANGE | 0 to 5 ns | | |
| RESOLUTION | 5ps | | |
| ACCURACY | ±5ps | | |
| COARSE DELAY | | | |
| RANGE | 0 to wavelength | | |
| RESOLUTION | 1 sample point | | |

| ARBITRARY MODE | P9082M | P2582M P2584M | P1282M 1284M |
|--|--|--------------------------|------------------------|
| MAX. SAMPLE RATE | 9GS/s | 2.5GS/s | 1.25GS/s |
| RESOLUTION | Up to 16-bit (Depending on model and mode) | | |
| MAX. MEMORY SIZE | Up to 16GS | Up to 8GS | |
| NUMBER OF SEGMENTS | 64k | | |
| MINIMUM SEGMENT LENGTH NORMAL FAST SEGMENT | 2048 points 224 points | 1024 points 64 points | |
| WAVEFORM GRANULARITY STANDARD OPTIONAL | 64 points 32 points | 32 points 16 points | 32 points 16 points |
| INTERPOLATION MODES | x1 | x1, x2 and x4 | |

| TASK MODE | |
|--------------------------|--|
| TASK TABLE LENGTH | 64K tasks per channel |
| TASK LOOPS | 1M |
| SEQUENCE | A sequence is defined as a continuous and looped series of tasks |
| MAX. NUMBER OF SEQUENCES | 32K sequences |
| SEQUENCE LOOPS | 1M |
| SCENARIO | A scenario is defined as a continuous series of tasks/sequences |
| MAX. NUMBER OF SCENARIOS | 1K scenarios |

| STREAMING (STM OPTION) | |
|-------------------------|-----------------|
| MAX. STREAM RATE | 6GS/s |
| MINIMUM PC REQUIREMENTS | |
| CPU | i7 |
| MEMORY | 32G |
| OPERATING SYSTEM | WINDOWS 10 |
| SOURCE | PXI Express Bus |

| SIGNAL PURITY | DC OUTPUT | DIRECT OUTPUT |
|---|-----------------|-----------------|
| HARMONIC DISTORTION ⁽¹⁾ | | |
| f _{out} = 10 MHz - 200 MHz, Measured @ DC to 2 GHz | <-70 dBc (typ.) | <-70 dBc (typ.) |
| f _{out} = 200 MHz ... 1.5 GHz, Measured @ DC to 4.5 GHz | <-60 dBc (typ.) | <-60 dBc (typ.) |
| f _{out} = 1.5 GHz ... 4.5 GHz, Measured @ DC to 4.5 GHz | <-50 dBc (typ.) | <-50 dBc (typ.) |
| SFDR ⁽²⁾ | | |
| f _{out} = 10 MHz...500 MHz, Measured @ DC to 1.5 GHz | -80 dBc (typ) | <-85 dBc (typ) |
| f _{out} = 500 MHz...4.5 GHz , Measured @ DC to 4.5 GHz | -70 dBc (typ) | <-75 dBc (typ) |
| PHASE NOISE (@10kHz offset) | | |
| f _{out} = 140.625MHz | -134 dBc/Hz | |
| f _{out} = 280.25MHz | -128 dBc/Hz | |
| f _{out} = 562.5MHz | -122 dBc/Hz | |
| f _{out} = 1.125GHz | -116 dBc/Hz | |
| f _{out} = 2.25GHz | -110 dBc/Hz | |
| f _{out} = 4.5GHz | -104 dBc/Hz | |

⁽¹⁾ SCLK=Max sample rate, amplitude = 400mVpp, Direct mode, measured using balun

⁽²⁾ SCLK=Max sample rate, amplitude = 400mVpp, excluding SCLK/2-fout, measured using balun

| DC OUTPUT | |
|---|--|
| OUTPUT TYPE | Single-ended or differential, DC-coupled |
| IMPEDANCE | 50Ω (nom) |
| AMPLITUDE | 50 mVp-p to 1.3 Vp-p |
| AMPLITUDE RESOLUTION | 1mV |
| DC AMPLITUDE ACCURACY | ±(3% of amplitude ±2 mV) |
| VOLTAGE WINDOW | ±1.15V |
| DC OFFSET | ±0.5V |
| OFFSET RESOLUTION | 10mV |
| DC OFFSET ACCURACY | ±(3% of setting ±15 mV) |
| SKEW BETWEEN NORMAL AND COMPLEMENT OUTPUTS | 0ps |
| RISE/FALL TIME (20% TO 80%) | < 130 ps (typ) |
| INSTANTANEOUS BANDWIDTH P128xM P258xM P9082M | 625MHz 2.25GHz 4.5GHz |
| MAX. USABLE FREQUENCY P128xM P258xM P9082M | 2nd Nyquist 1.25GHz 2.5GHz 4.5GHz |
| JITTER (PEAK-PEAK) | < 15 ps (typ) |
| OVERSHOOT | < 5% (typ) |
| CONNECTOR TYPE | SMA |

| DIRECT OUTPUT (OPTIONAL) | |
|---|--|
| OUTPUT TYPE | Single-ended or differential, AC coupled |
| IMPEDANCE | 50Ω (nom) |
| AMPLITUDE | 600mVpp, single-ended into 50Ω |
| AMPLITUDE RESOLUTION | 1mV |
| AMPLITUDE ACCURACY | ±(3% of amplitude ±2 mV) |
| RISE/FALL TIME (20% TO 80%) | < 60 ps (typ) |
| INSTANTANEOUS BANDWIDTH P128xM P258xM P9082M | 625MHz 2.25GHz 4.5GHz |
| MAX. USABLE FREQUENCY P128xM P258xM P9082M | 2nd Nyquist 1.25GHz 2.5GHz 9GHz |
| CONNECTOR TYPE | SMA |

| SAMPLE CLOCK OUTPUT | |
|---------------------|--|
| SOURCE | Selectable, internal synthesizer or sample clock input |
| FREQUENCY RANGE | SCLK Range |
| OUTPUT AMPLITUDE | 0.5V to 1V depending on SCLK |
| IMPEDANCE | 50Ω (nom), AC coupled |
| CONNECTOR | SMA |

| SYNC CLOCK OUTPUT | |
|---------------------------------------|-------------------|
| AMPLITUDE | 500mVpp, typ. |
| FREQUENCY P9082M P128xM, P258xM | SCLK/32 SCLK/8 |
| WAVEFORM | Square |
| RISE/FALL TIME (20% TO 80%) | < 150ps |
| IMPEDANCE | LVC MOS |
| CONNECTOR | SMP |

| MARKER OUTPUTS | |
|---|--|
| NUMBER OF MARKERS P1282M, P1284M P2582M, P2584M, P9082M | 4 (extra 8 Optional) 8 (extra 8 Optional) |
| OUTPUT TYPE | Single Ended |
| OUTPUT IMPEDANCE | 50Ω (nom) |
| AMPLITUDE | |
| VOLTAGE WINDOW | ±1.15V |
| LEVEL | 32mVpp to 1.2Vpp (32 discrete levels) |
| RESOLUTION | 10mVpp |
| ACCURACY | ±7% |
| OFFSET | |
| RANGE | ±0.5V |
| RESOLUTION | 10mV |
| ACCURACY | ±(3% of setting ±15 mV) |
| RISE/FALL TIME (20% TO 80%) | < 200ps |
| RANGE | 0 - waveform length |
| RESOLUTION P128xM, P258xM P9082M | 2 pts 8 pts |
| MARKER DELAY | |
| COARSE DELAY | |
| RANGE | 0 to 2048 points |
| RESOLUTION P128xM, P258xM P9082M | 8 points 32 points |
| FINE DELAY | |
| RANGE | 0 to 1.2ns |
| RESOLUTION | 1ps |
| ACCURACY | 15ps |
| CONNECTOR TYPE | SMP |

| REFERENCE CLOCK OUTPUT | |
|------------------------|------------------------------|
| SOURCE | Internal TCXO |
| WAVEFORM | Square |
| FREQUENCY | 100MHz or REF IN |
| STABILITY | +/- 2.5 PPM |
| AGING | +/- 1 PPM @ +25°C (per year) |
| CONNECTOR | SMP |

| REFERENCE CLOCK INPUT | |
|-----------------------|---------------------------|
| INPUT FREQUENCIES | 10MHz / 100MHz selectable |
| LOCK RANGE | ± 1MHz |
| INPUT LEVEL | 0.6 Vp-p to 1.7 Vp-p |
| IMPEDANCE | 50Ω, AC coupled (nom) |
| CONNECTOR TYPE | SMP |

| SAMPLE CLOCK INPUT | |
|--------------------|---------------------|
| FREQUENCY RANGE | SCLK Range |
| INPUT POWER RANGE | 0 to 1V |
| DAMAGE LEVEL | <0.5V or >1.5V |
| INPUT IMPEDANCE | 50Ω nom, AC coupled |
| CONNECTOR TYPE | SMA |

| TRIGGER INPUTS | |
|---|---|
| INPUT RANGE | ±5 V |
| THRESHOLD | ±5 V |
| RANGE | -5 V to +5 V |
| RESOLUTION | 100 mV |
| SENSITIVITY | 200 mV |
| JITTER Standard P128xM, P258xM P9082M Low Trigger Jitter Opt. | 8 SCLK periods 32 SCLK periods SQRT(SCLK period ² + 150e-12 ²) |
| LATENCY / SYSTEM DELAY P128xD, P258xD P908xD | <900SCLK periods <2700 SCLK Periods |
| POLARITY | Pos or Neg |
| SOURCE | Selectable between channels |
| INPUT IMPEDANCE | 10 kΩ or 50Ω (nom), DC coupled, factory configured |
| MAX TOGGLE FREQUENCY | 50MHz |
| MINIMUM PULSE WIDTH | 5ns |
| CONNECTOR TYPE | SMP |

| FAST SEGMENT DYNAMIC CONTROL INPUT (OPTIONAL) | |
|---|---|
| INPUT SIGNALS | Data 10bit, Channel select 2 bit, Valid 1 bit |
| SEGMENTS / SEQUENCES | 1024 (128 fast) |
| DATA RATE | 35MHz |
| (MINIMUM LATENCY (Dynamic control input to direct out | |
| FAST SEGMENT | <250ns |
| NORMAL SEGMENT | <1μ |
| INPUT LEVEL | LVTTTL |
| CONNECTOR | Mini D-SUB |

| DIGITIZER CHARACTERISTICS (AWT OPTION) | |
|--|--|
| NUMBER OF CHANNELS | 1 or 2 |
| INPUT VOLTAGE RANGE | 500 mVpp (full scale) |
| INPUT VOLTAGE OFFSET | -2V to +2V |
| INPUT FREQUENCY RANGE | 9GHz |
| RESOLUTION | 12 bits |
| ACQUISITION MEMORY | <2GS/ch |
| SAMPLE CLOCK SOURCES | Internal or external |
| INTERNAL CLOCK SOURCE | Internal, external reference |
| MAX SAMPLING RATE | 5.4GS/s in Single channel mode 2.7Gs/s in Dual channel mode |
| MIN SAMPLING RATE | 1GS/s |
| CLOCK ACCURACY | <2 ppm |
| IMPEDANCE | 50Ω |
| COUPLING | DC or AC (factory configured) |
| CONNECTOR | SMA |
| TRIGGER SYSTEM | |
| TRIGGER MODES | Positive, negative edge |
| TRIGGER SOURCES | External, Software, Channel |
| COUPLING | DC |
| IMPEDANCE | 50Ω (nominal) |
| LEVEL RANGE | >± 2.5 V (nominal) |
| FREQUENCY RANGE | DC to 65MHz |
| CONNECTOR | SMA |

| FPGA PROGRAMMING | |
|------------------|--|
| FPGA TYPE | Xilinx Kintex UltraScale XCKU060 upgradeable to XCKU115 |
| MODES | |
| STANDARD | Tabor standard built-in functionality |
| DECISION BLOCKS | Built-in library of mathematical functions, modulation & digital Filters |
| SHELL | Open core providing all interfaces and configuration path to the user |

PROTEUS

Infinite possibilities

| DIGITAL UPCONVERTER | |
|--------------------------|--------------------------------|
| MODES | NCO Only / Digital Upconverter |
| SAMPLING RATE | 1GS/s to Max sample rate |
| CARRIER FREQUENCY | |
| RANGE | 0 to 40% of Sampling rate |
| RESOLUTION | 48 bit |
| PHASE RANGE | 0 to 360° |
| PHASE RESOLUTION | 16 bit |
| ALL IQ PARAMETERS | Same as Arbitrary mode |

| GENERAL | |
|---|---|
| Interface: | PXle Gen3 x8 Lanes |
| Power Consumption: | 50W max per slot |
| Current Consumption: | +3.3V 4A max. +12V 4A max. |
| Dimensions: | Base – 8HP PXle (2 Slots) AWT/MRK Opt. add 4HP ea. |
| Weight: Without Package Shipping WeightApprox. | Approx. 1 Kg 1.5 Kg |
| Temperature: Operating Storage | 0°C to +40°C -40°C to +70°C |
| Warm up time: | 15 minutes |
| Humidity: | 85% RH, non-condensing |
| Safety: | CE Marked, EC61010-1:2010 |
| EMC: | IEC 61326-1:2013 |
| Calibration: | 2 years |
| Warranty: | 1/3year warranty plan |

| ORDERING INFORMATION | |
|----------------------|---|
| MODEL | DESCRIPTION |
| P1282M | 1.25GS/s, AWG, 1GS Memory, 2CH, 4 Markers |
| P1284M | 1.25GS/s, AWG, 1GS Memory, 4CH, 4 Markers |
| P2582M | 2.5GS/s, AWG, 2GS Memory 2CH, 8 Markers |
| P2584M | 2.5GS/s, AWG, 2GS Memory, 4CH, 8 Markers |
| P9082M | 9GS/s, AWG, 4GS Memory 2CH, 8 Markers |
| OPTIONS | |
| 4M1 | 4GS Memory option for models P1282M & P2582M |
| 4M2 | 4GS Memory option for models P1284M & P2584M |
| 8M1 | 8GS Memory option for models P1282M & P2582M |
| 8M2 | 8GS Memory option for models P1284M, P2584M & P9082M |
| 16M1 | 16GS Memory option for models P9082M |
| DO1 | 9GHz BW Direct Output option for models P1282M & P2582M |
| DO2 | 9GHz BW Direct Output option for models Pxx84M & P9082M |
| FS1 | Fast Segment Control option for models P1282M & P2582M |
| FS2 | Fast Segment Control option for P1284M, P2584M & P9082M |
| MRK1 | x8 Extra Markers option for models P1282M and P2582M |
| MRK2 | x8 Extra Markers option for models P1284M, P2584M and P9082M |
| LTJ1 | Ultra Low Trigger Jitter (200ps typ.) option for models P1282M & P2582M |
| LTJ2 | Ultra Low Trigger Jitter (200ps typ.) option for models P1284M, P2584M & P9082M |
| G1 | Low Waveform Granularity option for models P1282M & P2582M |
| G2 | Low Waveform Granularity option for P1284M, P2584M & P9082M |
| AWT | 5.4GS/s Single, 2.7GS/s Dual Channel 12 Bit Digitizer option for models P1284M, P2584M & P9082M |
| STM | 6GS/s Streaming option |
| PROG | High level FPGA programming capability through desicion blocks of built-in Demodulation & digital Filters |
| Shell | Open core integration to allow simple FPGA control & programming |



PROTEUS

Infinite possibilities

Desktop Platform

In a compact desktop platform, the system integrates the ability to transmit, receive and perform digital signal processing all in a single instrument. The small footprint system, that can generate up to 12 channels in a single box, offers industry leading performance, various configuration options, an innovative task oriented programming, and user programmable FPGA. So whether it is for aerospace and defense, telecommunications, automotive, medical or high-end physics applications Proteus opens the door to a world of infinite possibilities.

Leading Features:



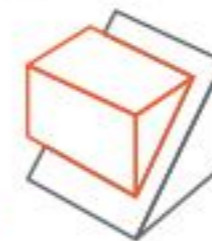
Dual, four, eight or twelve channel 1.25GS/s & 2.5 GS/s 16 bit, or dual, four or six channel 9GS/s 16 bit, AWG & AWT configurations



Integrated NCO for digital up-converting to microwave frequencies



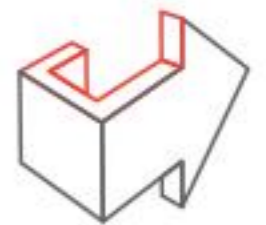
Real time data streaming directly to the FPGA for continuous and infinite waveform generation



8GHz Bandwidth, 2.7GS/s 12 bit digitizer option for feedback control system and conditional waveform generation

Innovative task oriented sequence programming for maximum flexibility to generate any imaginable scenario

Up to 16GS/s waveform memory with the ability to simultaneously generate and download waveforms.



Excellent phase noise and spurious performance

User customizable FPGA for application specific solutions



Space efficient desktop platform, with USB 3.0, 10G Ethernet and thunderbolt high speed interfaces.



PROTEUS

Infinite possibilities

| CHANNELS CHARACTERISTICS | P9082/4/6D | P2582/4/8/12D | P1282/4/8/12D |
|--------------------------|-----------------|---------------|---------------|
| NUMBER OF CHANNELS | 2/4/6 | 2/4/8/12 | 2/4/8/12 |
| INITIAL SKEW | <20ps | | |
| FINE DELAY | | | |
| RANGE | 0 to 5 ns | | |
| RESOLUTION | 5ps | | |
| ACCURACY | ±5ps | | |
| COARSE DELAY | | | |
| RANGE | 0 to wavelength | | |
| RESOLUTION | 1 sample point | | |

| ARBITRARY MODE | P9082/4/6D | P2582/4/8/12D | P1282/4/8/12D |
|--|--|--------------------------|------------------------|
| MAX. SAMPLE RATE | 9GS/s | 2.5GS/s | 1.25GS/s |
| RESOLUTION | Up to 16-bit (Depending on model and mode) | | |
| MAX. MEMORY SIZE | Up to 16GS | Up to 8GS | |
| NUMBER OF SEGMENTS | 64k | | |
| MINIMUM SEGMENT LENGTH NORMAL FAST SEGMENT | 2048 points 224 points | 1024 points 64 points | |
| WAVEFORM GRANULARITY STANDARD OPTIONAL | 64 points 32 points | 32 points 16 points | 32 points 16 points |
| INTERPOLATION MODES | x1 | x1, x2 and x4 | |

| TASK MODE | |
|--------------------------|--|
| TASK TABLE LENGTH | 64K tasks per channel |
| TASK LOOPS | 1M |
| SEQUENCE | A sequence is defined as a continuous and looped series of tasks |
| MAX. NUMBER OF SEQUENCES | 32K sequences |
| SEQUENCE LOOPS | 1M |
| SCENARIO | A scenario is defined as a continuous series of tasks/sequences |
| MAX. NUMBER OF SCENARIOS | 1K scenarios |

| STREAMING (STM OPTION) | |
|-------------------------|----------------------------------|
| MAX. STREAM RATE | 6GS/s |
| MINIMUM PC REQUIREMENTS | |
| CPU | i7 |
| MEMORY | 32G |
| OPERATING SYSTEM | WINDOWS 10 |
| SOURCE | Internal / Rear panel interfaces |

| SIGNAL PURITY | DC OUTPUT | DIRECT OUTPUT |
|---|-----------------|-----------------|
| HARMONIC DISTORTION ⁽¹⁾ | | |
| f _{out} = 10 MHz - 200 MHz, Measured @ DC to 2 GHz | <-70 dBc (typ.) | <-70 dBc (typ.) |
| f _{out} = 200 MHz ... 1.5 GHz, Measured @ DC to 4.5 GHz | <-60 dBc (typ.) | <-60 dBc (typ.) |
| f _{out} = 1.5 GHz ... 4.5 GHz, Measured @ DC to 4.5 GHz | <-50 dBc (typ.) | <-50 dBc (typ.) |
| SFDR ⁽²⁾ | | |
| f _{out} = 10 MHz...500 MHz, Measured @ DC to 1.5 GHz | -80 dBc (typ) | <-85 dBc (typ) |
| f _{out} = 500 MHz...4.5 GHz, Measured @ DC to 4.5 GHz | -70 dBc (typ) | <-75 dBc (typ) |
| PHASE NOISE (@10kHz offset) | | |
| f _{out} = 140.625MHz | -134 dBc/Hz | |
| f _{out} = 280.25MHz | -128 dBc/Hz | |
| f _{out} = 562.5MHz | -122 dBc/Hz | |
| f _{out} = 1.125GHz | -116 dBc/Hz | |
| f _{out} = 2.25GHz | -110 dBc/Hz | |
| f _{out} = 4.5GHz | -104 dBc/Hz | |

(1) SCLK=Max sample rate, amplitude = 400mVpp, Direct mode, measured using balun

(2) SCLK=Max sample rate, amplitude = 400mVpp, excluding SCLK/2-fout, measured using balun

| DC OUTPUT | |
|---|--|
| OUTPUT TYPE | Single-ended or differential, DC-coupled |
| IMPEDANCE | 50Ω (nom) |
| AMPLITUDE | 50 mVp-p to 1.3 Vp-p |
| AMPLITUDE RESOLUTION | 1mV |
| DC AMPLITUDE ACCURACY | ±(3% of amplitude ±2 mV) |
| VOLTAGE WINDOW | ±1.15V |
| DC OFFSET | ±0.5V |
| OFFSET RESOLUTION | 10mV |
| DC OFFSET ACCURACY | ±(3% of setting ±15 mV) |
| SKEW BETWEEN NORMAL AND COMPLEMENT OUTPUTS | 0ps |
| RISE/FALL TIME (20% TO 80%) | < 130 ps (typ) |
| INSTANTANEOUS BANDWIDTH P128xD P258xD P908xD | 625MHz 2.25GHz 4.5GHz |
| MAX. USABLE FREQUENCY P128xD P258xD P908xD | 2nd q 1.25GHz 2.5GHz 4.5GHz |
| JITTER (PEAK-PEAK) | < 15 ps (typ) |
| OVERSHOOT | < 5% (typ) |
| CONNECTOR TYPE | SMA |

| DIRECT OUTPUT (OPTIONAL) | |
|---|--|
| OUTPUT TYPE | Single-ended or differential, AC coupled |
| IMPEDANCE | 50Ω (nom) |
| AMPLITUDE | 600mVpp, single-ended into 50Ω |
| AMPLITUDE RESOLUTION | 1mV |
| AMPLITUDE ACCURACY | ±(3% of amplitude ±2 mV) |
| RISE/FALL TIME (20% TO 80%) | < 60 ps (typ) |
| INSTANTANEOUS BANDWIDTH P128xD P258xD P908xD | 625MHz 2.25GHz 4.5GHz |
| MAX. USABLE FREQUENCY P128xD P258xD P908xD | 2nd nyquist 1.25GHz 2.5GHz 9GHz |
| CONNECTOR TYPE | SMA |

| SAMPLE CLOCK OUTPUT | |
|---------------------|--|
| SOURCE | Selectable, internal synthesizer or sample clock input |
| FREQUENCY RANGE | SCLK Range |
| OUTPUT AMPLITUDE | 0.5V to 1V depending on SCLK |
| IMPEDANCE | 50Ω (nom), AC coupled |
| CONNECTOR | SMA |

| SYNC CLOCK OUTPUT | |
|---------------------------------------|-------------------|
| AMPLITUDE | 500mVpp, typ. |
| FREQUENCY P908xD P128xD, P258xD | SCLK/32 SCLK/8 |
| WAVEFORM | Square |
| RISE/FALL TIME (20% TO 80%) | < 150ps |
| IMPEDANCE | LVC MOS |
| CONNECTOR | SMP |

| MARKER OUTPUTS | |
|--|--|
| NUMBER OF MARKERS P1282D, P1284D P1288, P2582, P2584, P9082D P12812D P2588D, P9084D P25812D, P9086D | 4 8 12 16 24 |
| OUTPUT TYPE | Single Ended |
| OUTPUT IMPEDANCE | 50Ω (nom) |
| AMPLITUDE | |
| VOLTAGE WINDOW | ±1.15V |
| LEVEL | 32mVpp to 1.2Vpp (32 discrete levels) |
| RESOLUTION | 10mVpp |
| ACCURACY | ±7% |
| OFFSET | |
| RANGE | ±0.5V |
| RESOLUTION | 10mV |
| ACCURACY | ±(3% of setting ±15 mV) |
| RISE/FALL TIME (20% TO 80%) | < 200ps |
| RANGE | 0 - waveform length |
| RESOLUTION P128xD, P258xD P908xD | 2 pts 8 pts |
| MARKER DELAY | |
| COARSE DELAY | |
| RANGE | 0 to 2048 points |
| RESOLUTION P128xD, P258xD P908xD | 8 points 32 points |
| FINE DELAY | |
| RANGE | 0 to 1.2ns |
| RESOLUTION | 1ps |
| ACCURACY | 15ps |
| CONNECTOR TYPE | SMP |

PROTEUS

Infinite possibilities

REFERENCE CLOCK OUTPUT

| | |
|-----------|------------------------------|
| SOURCE | Internal TCXO |
| WAVEFORM | Square |
| FREQUENCY | 100MHz or REF IN |
| STABILITY | +/- 2.5 PPM |
| AGING | +/- 1 PPM @ +25°C (per year) |
| CONNECTOR | SMP |

REFERENCE CLOCK INPUT

| | |
|-------------------|---------------------------|
| INPUT FREQUENCIES | 10MHz / 100MHz selectable |
| LOCK RANGE | ± 1MHz |
| INPUT LEVEL | 0.6 Vp-p to 1.7 Vp-p |
| IMPEDANCE | 50Ω, AC coupled (nom) |
| CONNECTOR TYPE | SMP |

SAMPLE CLOCK INPUT

| | |
|-------------------|---------------------|
| FREQUENCY RANGE | SCLK Range |
| INPUT POWER RANGE | 0 to 1V |
| DAMAGE LEVEL | <0.5V or >1.5V |
| INPUT IMPEDANCE | 50Ω nom, AC coupled |
| CONNECTOR TYPE | SMA |

TRIGGER INPUTS

| | |
|---|---|
| INPUT RANGE | ±5 V |
| THRESHOLD | ±5 V |
| RANGE | -5 V to +5 V |
| RESOLUTION | 100 mV |
| SENSITIVITY | 200 mV |
| JITTER Standard P128xD, P258xD P908xD Low Trigger Jitter Opt. | 8 SCLK periods 32 SCLK periods SQRT(SCLK period ² + 150e-12 ²) |
| LATENCY / SYSTEM DELAY P128xD, P258xD P908xD | <900SCLK periods <2700 SCLK Periods |
| POLARITY | Pos or Neg |
| SOURCE | Selectable between channels |
| INPUT IMPEDANCE | 10 kΩ or 50Ω (nom), DC coupled, factory configured |
| MAX TOGGLE FREQUENCY | 50MHz |
| MINIMUM PULSE WIDTH | 5ns |
| CONNECTOR TYPE | SMP |

FAST SEGMENT DYNAMIC CONTROL INPUT (OPTIONAL)

| | |
|---|---|
| INPUT SIGNALS | Data 10bit, Channel select 2 bit, Valid 1 bit |
| SEGMENTS / SEQUENCES | 1024 (128 fast) |
| DATA RATE | 35MHz |
| MINIMUM LATENCY (Dynamic control input to direct out) | |
| FAST SEGMENT | <250ns |
| NORMAL SEGMENT | <1μ |
| INPUT LEVEL | LVTTL |
| CONNECTOR | Mini D-SUB |

DIGITIZER CHARACTERISTICS (AWT OPTION)

| | |
|-----------------------|--|
| NUMBER OF CHANNELS | 1 or 2 |
| INPUT VOLTAGE RANGE | 500 mVpp (full scale) |
| INPUT VOLTAGE OFFSET | -2V to +2V |
| INPUT FREQUENCY RANGE | 9GHz |
| RESOLUTION | 12 bits |
| ACQUISITION MEMORY | <2GS/ch |
| SAMPLE CLOCK SOURCES | Internal or external |
| INTERNAL CLOCK SOURCE | Internal, external reference |
| MAX SAMPLING RATE | 5.4GS/s in Single channel mode 2.7Gs/s in Dual channel mode |
| MIN SAMPLING RATE | 1GS/s |
| CLOCK ACCURACY | <2 ppm |
| IMPEDANCE | 50Ω |
| COUPLING | DC or AC (factory configured) |
| CONNECTOR | SMA |
| TRIGGER SYSTEM | |
| TRIGGER MODES | Positive, negative edge |
| TRIGGER SOURCES | External, Software, Channel |
| COUPLING | DC |
| IMPEDANCE | 50Ω (nominal) |
| LEVEL RANGE | >± 2.5 V (nominal) |
| FREQUENCY RANGE | DC to 65MHz |
| CONNECTOR | SMA |

FPGA PROGRAMMING

| | |
|-----------------|--|
| FPGA TYPE | Xilinx Kintex UltraScale XCKU060 upgradeable to XCKU115 |
| MODES | |
| STANDARD | Tabor standard built-in functionality |
| DECISION BLOCKS | Built-in library of mathematical functions, modulation & digital Filters |
| SHELL | Open core providing all interfaces and configuration path to the user |

| DIGITAL UPCONVERTER | |
|--------------------------|--------------------------------|
| MODES | NCO Only / Digital Upconverter |
| SAMPLING RATE | 1GS/s to Max sample rate |
| CARRIER FREQUENCY | |
| RANGE | 0 to 40% of Sampling rate |
| RESOLUTION | 48 bit |
| PHASE RANGE | 0 to 360° |
| PHASE RESOLUTION | 16 bit |
| ALL IQ PARAMETERS | Same as Arbitrary mode |

| GENERAL | |
|-----------------------------|---|
| VOLTAGE RANGE: | |
| FREQUENCY RANGE: | 47Hz to 63Hz |
| POWER CONSUMPTION: | 550W max. |
| INTERFACE: | |
| USB | 1 x front panel USB host (type A) 2 x rear panel USB host, (type A) 1 x front panel USB Device (type C) |
| Thunderbolt (Optional) | 1 x rear panel Thunderbolt3 |
| LAN (BASE-T) | 1 x rear panel RG45 1000/100/10 |
| SFP+ (LAN replacement Opt.) | 1 x rear panel SFP+ 10G Optical |
| GPIB (Option) | IEEE 488.2 – GPIB |
| STORAGE | 120GB removable |
| WEIGHT | |
| Without Package | 7.5 Kg |
| Shipping Weight | 9 Kg |
| DIMENSIONS: | |
| With feet | 175 X 221 x 316 mm (W x H x D) |
| Without feet | 175 X 235 x 316 mm (W x H x D) |
| TEMPERATURE: | |
| OPERATING | 0°C to +40°C |
| STORAGE | -40°C to +70°C |
| WARM UP TIME | 15 minutes |
| HUMIDITY: | 85% RH, non-condensing |
| SAFETY: | CE Marked, EC61010-1:2010 |
| EMC: | IEC 61326-1:2013 |
| CALIBRATION: | 2 years |
| WARRANTY: | 1/3 year warranty plan |

| ORDERING INFORMATION | |
|----------------------|--|
| MODEL | DESCRIPTION |
| P1282D | 1.25GS/s, 16Bit, AWG, 1GS Memory, 2CH, 4 Markers |
| P1284D | 1.25GS/s, 16Bit, AWG, 1GS Memory, 4CH, 4 Markers |
| P1288D | 1.25GS/s, 16Bit, 2GS Memory, 8CH 8 Markers |
| P12812D | 1.25GS/s, 16Bit, 2GS Memory, 12CH 12 Markers |
| P2582D | 2.5GS/s, 16Bit, 2GS Memory 2CH, 8 Markers |
| P2584D | 2.5GS/s, 16Bit, 2GS Memory, 4CH, 8 Markers |
| P2588D | 2.5GS/s, 16Bit, 2GS Memory, 8CH 16 Markers |
| P25812D | 2.5GS/s, 16Bit, 2GS Memory, 12CH, 24 Markers |
| P9082D | 9GS/s 16Bit, 4GS Memory 2CH, 8 Markers |
| P9084D | 9GS/s 16Bit, 4GS Memory 4CH, 16 Markers |
| P9086D | 9GS/s 16Bit, 4GS Memory 6CH, 24 Markers |

| OPTIONS | |
|---------|---|
| 4M1 | 4GS Memory option for models P1282x & P2582x |
| 4M2 | 4GS Memory option for models P1284x & P2584x |
| 4M3 | 4GS Memory option for models P1288x, P2588x & P9084x |
| 4M4 | 4GS Memory option for models P12812x, P25812x&P9086x |
| 8M1 | 8GS Memory option for models P1282x & P2582x |
| 8M2 | 8GS Memory option for models P1284x, P2584x & P9082x |
| 8M3 | 8GS Memory option for models P1288x, P2588x & P9084x |
| 8M4 | 8GS Memory option for models P12812x, P25812x & P9086x |
| 16M1 | 16GS Memory option for models P9082x |
| 16M2 | 16GS Memory option for models P9084x |
| 16M3 | 16GS Memory option for models P9086x |
| DO1 | 9GHz BW Direct Output option for models P1282x & P2582x |
| DO2 | 9GHz BW Direct Output option for models Pxx84x & P9082x |
| DO3 | 9GHz BW Direct Output option for models Pxx88x & P9084x |
| DO4 | 9GHz BW Direct Output option for models Pxx812x & P9086x |
| FS1 | Fast Segment Control option for models P1282x & P2582x |
| FS2 | Fast Segment Control option for P1284x, P2584x & P9082x |
| FS3 | Fast Segment Control option for P1288x, P2588x & P9084x |
| MRK1 | x8 Extra Markers option for models P1282D and P2582D |
| MRK2 | x8 Extra Markers option for models P1284D, P2584D and P9082D |
| MRK3 | x16 Extra Markers option for models P1288D, P2588D and P9084D |
| LTJ1 | Ultra Low Trigger Jitter (200ps typ.) option for models P1282x & P2582x |
| LTJ2 | Ultra Low Trigger Jitter (200ps typ.) option for models P1284x, P2584x & P9082x |
| LTJ3 | Ultra Low Trigger Jitter (200ps typ.) option for models P1288x, P2588x & P9084x |
| LTJ4 | Ultra Low Trigger Jitter (200ps typ.) option for models P12812x, P25812x & P9086x |
| G1 | Low Waveform Granularity option for models P1282x & P2582x |
| G2 | Low Waveform Granularity option for P1284x, P2584x & P9082x |
| G3 | Low Waveform Granularity option for P1288x, P2588x & P9084x |
| G4 | Low Waveform Granularity option for P12812x, P25812x&P9086x |
| AWT | 5.4GS/s Single, 2.7GS/s Dual Channel 12 Bit Digitizer option for models P1284M, P2584M & P9082M |
| STM | 6GS/s Streaming option |
| PROG | High level FPGA programming capability through decision blocks of built-in Demodulation & digital Filters |
| Shell | Open core integration to allow simple FPGA control & programming |
| TBolt | Rear panel Thunderbolt3 USB (type C) |
| SFP+ | Rear panel 10G optical SFP+ connectivity (replace the LAN) |



PROTEUS

Infinite possibilities

Benchtop Platform

Introducing Tabor's all new Proteus series, the world's first Arbitrary Waveform Transceiver. In its benchtop platform, with a 9" touch display and on-board PC the system integrates the ability to transmit, receive and perform digital signal processing all in a single instrument. The fully standalone operated system, offers industry leading performance, various configuration options, an innovative task oriented programming, and user programmable FPGA. So whether it is for aerospace and defense, telecommunications, automotive, medical or high-end physics applications Proteus opens the door to a world of infinite possibilities.

Leading Features:



Dual, four, eight or twelve channel 1.25GS/s & 2.5 GS/s 16 bit, or dual, four or six channel 9GS/s 16 bit, AWG & AWT configurations



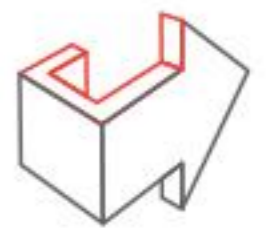
Integrated NCO for digital up-converting to microwave frequencies

Real time data streaming directly to the FPGA for continuous and infinite waveform generation



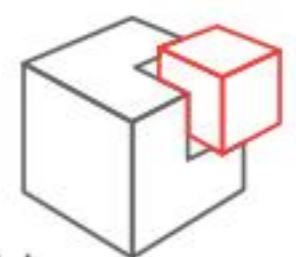
8GHz bandwidth, 2.7GS/s 12 bit digitizer option for feedback control system and conditional waveform generation

Innovative task oriented sequence programming for maximum flexibility to generate any imaginable scenario



Excellent phase noise and spurious performance

User customizable FPGA for application specific solutions



Standalone 4U, 19" wide benchtop platform, with 9" touch display, USB 3.0, 10G Ethernet and thunderbolt high speed interfaces

Up to 16GS/s waveform memory with the ability to simultaneously generate and download waveforms.



| CHANNELS CHARACTERISTICS | P9082/4/6B | P2582/4/8/12B | P1282/4/8/12B |
|--------------------------|-----------------|---------------|---------------|
| NUMBER OF CHANNELS | 2/4/6 | 2/4/8/12 | 2/4/8/12 |
| INITIAL SKEW | <20ps | | |
| FINE DELAY | | | |
| RANGE | 0 to 5 ns | | |
| RESOLUTION | 5ps | | |
| ACCURACY | ±5ps | | |
| COARSE DELAY | | | |
| RANGE | 0 to wavelength | | |
| RESOLUTION | 1 sample point | | |

| ARBITRARY MODE | P9082/4/6B | P2582/4/8/12B | P1282/4/8/12B |
|--|--|--------------------------|------------------------|
| MAX. SAMPLE RATE | 9GS/s | 2.5GS/s | 1.25GS/s |
| RESOLUTION | Up to 16-bit (Depending on model and mode) | | |
| MAX. MEMORY SIZE | Up to 16GS | Up to 8GS | |
| NUMBER OF SEGMENTS | 64k | | |
| MINIMUM SEGMENT LENGTH NORMAL FAST SEGMENT | 2048 points 224 points | 1024 points 64 points | |
| WAVEFORM GRANULARITY STANDARD OPTIONAL | 64 points 32 points | 32 points 16 points | 32 points 16 points |
| INTERPOLATION MODES | x1 | x1, x2 and x4 | |

| TASK MODE | |
|--------------------------|--|
| TASK TABLE LENGTH | 64K tasks per channel |
| TASK LOOPS | 1M |
| SEQUENCE | A sequence is defined as a continuous and looped series of tasks |
| MAX. NUMBER OF SEQUENCES | 32K sequences |
| SEQUENCE LOOPS | 1M |
| SCENARIO | A scenario is defined as a continuous series of tasks/sequences |
| MAX. NUMBER OF SCENARIOS | 1K scenarios |

| STREAMING (STM OPTION) | |
|-------------------------|----------------------------------|
| MAX. STREAM RATE | 6GS/s |
| MINIMUM PC REQUIREMENTS | |
| CPU | i7 |
| MEMORY | 32G |
| OPERATING SYSTEM | WINDOWS 10 |
| SOURCE | Internal / Rear panel interfaces |

| SIGNAL PURITY | DC OUTPUT | DIRECT OUTPUT |
|---|-----------------|-----------------|
| HARMONIC DISTORTION ⁽¹⁾ | | |
| f _{out} = 10 MHz - 200 MHz, Measured @ DC to 2 GHz | <-70 dBc (typ.) | <-70 dBc (typ.) |
| f _{out} = 200 MHz ... 1.5 GHz, Measured @ DC to 4.5 GHz | <-60 dBc (typ.) | <-60 dBc (typ.) |
| f _{out} = 1.5 GHz ... 4.5 GHz, Measured @ DC to 4.5 GHz | <-50 dBc (typ.) | <-50 dBc (typ.) |
| SFDR ⁽²⁾ | | |
| f _{out} = 10 MHz...500 MHz, Measured @ DC to 1.5 GHz | -80 dBc (typ) | <-85 dBc (typ) |
| f _{out} = 500 MHz...4.5 GHz , Measured @ DC to 4.5 GHz | -70 dBc (typ) | <-75 dBc (typ) |
| PHASE NOISE (@10kHz offset) | | |
| f _{out} = 140.625MHz | -134 dBc/Hz | |
| f _{out} = 280.25MHz | -128 dBc/Hz | |
| f _{out} = 562.5MHz | -122 dBc/Hz | |
| f _{out} = 1.125GHz | -116 dBc/Hz | |
| f _{out} = 2.25GHz | -110 dBc/Hz | |
| f _{out} = 4.5GHz | -104 dBc/Hz | |

(1) SCLK=Max sample rate, amplitude = 400mVpp, Direct mode, measured using balun

(2) SCLK=Max sample rate, amplitude = 400mVpp, excluding SCLK/2-fout, measured using balun

DC OUTPUT

| | |
|---|--|
| OUTPUT TYPE | Single-ended or differential, DC-coupled |
| IMPEDANCE | 50Ω (nom) |
| AMPLITUDE | 50 mVp-p to 1.3 Vp-p |
| AMPLITUDE RESOLUTION | 1mV |
| DC AMPLITUDE ACCURACY | ±(3% of amplitude ±2 mV) |
| VOLTAGE WINDOW | ±1.15V |
| DC OFFSET | ±0.5V |
| OFFSET RESOLUTION | 10mV |
| DC OFFSET ACCURACY | ±(3% of setting ±15 mV) |
| SKEW BETWEEN NORMAL AND COMPLEMENT OUTPUTS | 0ps |
| RISE/FALL TIME (20% TO 80%) | < 130 ps (typ) |
| INSTANTANEOUS BANDWIDTH P128xB P258xB P908xB | 625MHz 2.25GHz 4.5GHz |
| MAX. USABLE FREQUENCY P128xB P258xB P908xB | 2nd Nyquist 1.25GHz 2.5GHz 4.5GHz |
| JITTER (PEAK-PEAK) | < 15 ps (typ) |
| OVERSHOOT | < 5% (typ) |
| CONNECTOR TYPE | SMA |

DIRECT OUTPUT (OPTIONAL)

| | |
|---|--|
| OUTPUT TYPE | Single-ended or differential, AC coupled |
| IMPEDANCE | 50Ω (nom) |
| AMPLITUDE | 600mVpp, single-ended into 50Ω |
| AMPLITUDE RESOLUTION | 1mV |
| AMPLITUDE ACCURACY | ±(3% of amplitude ±2 mV) |
| RISE/FALL TIME (20% TO 80%) | < 60 ps (typ) |
| INSTANTANEOUS BANDWIDTH P128xB P258xB P908xB | 625MHz 2.25GHz 4.5GHz |
| MAX. USABLE FREQUENCY P128xB P258xB P908xB | 2nd Nyquist 1.25GHz 2.5GHz 9GHz |
| CONNECTOR TYPE | SMA |

SAMPLE CLOCK OUTPUT

| | |
|------------------|--|
| SOURCE | Selectable, internal synthesizer or sample clock input |
| FREQUENCY RANGE | SCLK Range |
| OUTPUT AMPLITUDE | 0.5V to 1V depending on SCLK |
| IMPEDANCE | 50Ω (nom), AC coupled |
| CONNECTOR | SMA |

SYNC CLOCK OUTPUT

| | |
|---------------------------------------|-------------------|
| AMPLITUDE | 500mVpp, typ. |
| FREQUENCY P908xB P128xB, P258xB | SCLK/32 SCLK/8 |
| WAVEFORM | Square |
| RISE/FALL TIME (20% TO 80%) | < 150ps |
| IMPEDANCE | LVC MOS |
| CONNECTOR | SMP |

MARKER OUTPUTS

| | |
|--|--|
| NUMBER OF MARKERS P1282B, P1284B P1288, P2582, P2584, P9082B P12812B P2588B, P9084B P25812B, P9086B | 4 8 12 16 24 |
| OUTPUT TYPE | Single Ended |
| OUTPUT IMPEDANCE | 50Ω (nom) |
| AMPLITUDE | |
| VOLTAGE WINDOW | ±1.15V |
| LEVEL | 32mVpp to 1.2Vpp (32 discrete levels) |
| RESOLUTION | 10mVpp |
| ACCURACY | ±7% |
| OFFSET | |
| RANGE | ±0.5V |
| RESOLUTION | 10mV |
| ACCURACY | ±(3% of setting ±15 mV) |
| RISE/FALL TIME (20% TO 80%) | < 200ps |
| RANGE | 0 - waveform length |
| RESOLUTION P128xB, P258xB P908xB | 2 pts 8 pts |
| MARKER DELAY | |
| COARSE DELAY | |
| RANGE | 0 to 2048 points |
| RESOLUTION P128xB, P258xB P908xB | 8 points 32 points |
| FINE DELAY | |
| RANGE | 0 to 1.2ns |
| RESOLUTION | 1ps |
| ACCURACY | 15ps |
| CONNECTOR TYPE | SMP |

| REFERENCE CLOCK OUTPUT | |
|------------------------|------------------------------|
| SOURCE | Internal TCXO |
| WAVEFORM | Square |
| FREQUENCY | 100MHz or REF IN |
| STABILITY | +/- 2.5 PPM |
| AGING | +/- 1 PPM @ +25°C (per year) |
| CONNECTOR | SMP |

| REFERENCE CLOCK INPUT | |
|-----------------------|---------------------------|
| INPUT FREQUENCIES | 10MHz / 100MHz selectable |
| LOCK RANGE | ± 1MHz |
| INPUT LEVEL | 0.6 Vp-p to 1.7 Vp-p |
| IMPEDANCE | 50Ω, AC coupled (nom) |
| CONNECTOR TYPE | SMP |

| SAMPLE CLOCK INPUT | |
|--------------------|---------------------|
| FREQUENCY RANGE | SCLK Range |
| INPUT POWER RANGE | 0 to 1V |
| DAMAGE LEVEL | <0.5V or >1.5V |
| INPUT IMPEDANCE | 50Ω nom, AC coupled |
| CONNECTOR TYPE | SMA |

| TRIGGER INPUTS | |
|---|---|
| INPUT RANGE | ±5 V |
| THRESHOLD | ±5 V |
| RANGE | -5 V to +5 V |
| RESOLUTION | 100 mV |
| SENSITIVITY | 200 mV |
| JITTER Standard P128xB, P258xB P908xB Low Trigger Jitter Opt. | 8 SCLK periods 32 SCLK periods SQRT(SCLK period ² + 150e-12 ²) |
| LATENCY / SYSTEM DELAY P128xB, P258xB P908xB | <900SCLK periods <2700 SCLK Periods |
| POLARITY | Pos or Neg |
| SOURCE | Selectable between channels |
| INPUT IMPEDANCE | 10 kΩ or 50Ω (nom), DC coupled, factory configured |
| MAX TOGGLE FREQUENCY | 50MHz |
| MINIMUM PULSE WIDTH | 5ns |
| CONNECTOR TYPE | SMP |

| FAST SEGMENT DYNAMIC CONTROL INPUT (OPTIONAL) | |
|---|---|
| INPUT SIGNALS | Data 10bit, Channel select 2 bit, Valid 1 bit |
| SEGMENTS / SEQUENCES | 1024 (128 fast) |
| DATA RATE | 35MHz |
| (MINIMUM LATENCY (Dynamic control input to direct out | |
| FAST SEGMENT | <250ns |
| NORMAL SEGMENT | <1μ |
| INPUT LEVEL | LVTTL |
| CONNECTOR | Mini D-SUB |

| DIGITIZER CHARACTERISTICS (AWT OPTION) | |
|--|--|
| NUMBER OF CHANNELS | 1 or 2 |
| INPUT VOLTAGE RANGE | 500 mVpp (full scale) |
| INPUT VOLTAGE OFFSET | -2V to +2V |
| INPUT FREQUENCY RANGE | 9GHz |
| RESOLUTION | 12 bits |
| ACQUISITION MEMORY | <2GS/ch |
| SAMPLE CLOCK SOURCES | Internal or external |
| INTERNAL CLOCK SOURCE | Internal, external reference |
| MAX SAMPLING RATE | 5.4GS/s in Single channel mode 2.7Gs/s in Dual channel mode |
| MIN SAMPLING RATE | 1GS/s |
| CLOCK ACCURACY | <2 ppm |
| IMPEDANCE | 50Ω |
| COUPLING | DC or AC (factory configured) |
| CONNECTOR | SMA |
| TRIGGER SYSTEM | |
| TRIGGER MODES | Positive, negative edge |
| TRIGGER SOURCES | External, Software, Channel |
| COUPLING | DC |
| IMPEDANCE | 50Ω (nominal) |
| LEVEL RANGE | >± 2.5 V (nominal) |
| FREQUENCY RANGE | DC to 65MHz |
| CONNECTOR | SMA |

| FPGA PROGRAMMING | |
|------------------|--|
| FPGA TYPE | Xilinx Kintex UltraScale XCKU060 upgradeable to XCKU115 |
| MODES | |
| STANDARD | Tabor standard built-in functionality |
| DECISION BLOCKS | Built-in library of mathematical functions, modulation & digital Filters |
| SHELL | Open core providing all interfaces and configuration path to the user |

PROTEUS

Infinite possibilities

| DIGITAL UPCONVERTER | |
|--------------------------|--------------------------------|
| MODES | NCO Only / Digital Upconverter |
| SAMPLING RATE | 1GS/s to Max sample rate |
| CARRIER FREQUENCY | |
| RANGE | 0 to 40% of Sampling rate |
| RESOLUTION | 48 bit |
| PHASE RANGE | 0 to 360° |
| PHASE RESOLUTION | 16 bit |
| ALL IQ PARAMETERS | Same as Arbitrary mode |

| GENERAL | |
|-----------------------------|---|
| VOLTAGE RANGE: | |
| FREQUENCY RANGE: | 47Hz to 63Hz |
| POWER CONSUMPTION: | 550W max. |
| INTERFACE: | |
| USB | 1 x front panel USB host (type A) 2 x rear panel USB host, (type A) 1 x front panel USB Device (type C) |
| Thunderbolt (Optional) | 1 x rear panel Thunderbolt3 |
| LAN (BASE-T) | 1 x rear panel RG45 1000/100/10 |
| SFP+ (LAN replacement Opt.) | 1 x rear panel SFP+ 10G Optical |
| GPIB (Option) | IEEE 488.2 – GPIB |
| STORAGE | 120GB removable |
| WEIGHT | |
| Without Package | 7.5 Kg |
| Shipping Weight | 9 Kg |
| DIMENSIONS: | |
| With feet | 440 X 175 x 330 mm (W x H x D) |
| Without feet | 440 X 190 x 330 mm (W x H x D) |
| TEMPERATURE: | |
| Operating | 0°C to +40°C |
| Storage | -40°C to +70°C |
| Warm up time | 15 minutes |
| HUMIDITY: | 85% RH, non-condensing |
| SAFETY: | CE Marked, EC61010-1:2010 |
| EMC: | IEC 61326-1:2013 |
| CALIBRATION: | 2 years |
| WARRANTY: | 1/3 year warranty plan |

| ORDERING INFORMATION | |
|----------------------|--|
| MODEL | DESCRIPTION |
| P1282B | 1.25GS/s, 16Bit, AWG, 1GS Memory, 2CH, 4 Markers |
| P1284B | 1.25GS/s, 16Bit, AWG, 1GS Memory, 4CH, 4 Markers |
| P1288B | 1.25GS/s, 16Bit, 2GS Memory, 8CH 8 Markers |
| P12812B | 1.25GS/s, 16Bit, 2GS Memory, 12CH 12 Markers |
| P2582B | 2.5GS/s, 16Bit, 2GS Memory 2CH, 8 Markers |
| P2584B | 2.5GS/s, 16Bit, 2GS Memory, 4CH, 8 Markers |
| P2588B | 2.5GS/s, 16Bit, 2GS Memory, 8CH 16 Markers |
| P25812B | 2.5GS/s, 16Bit, 2GS Memory, 12CH, 24 Markers |
| P9082B | 9GS/s 16Bit, 4GS Memory 2CH, 8 Markers |
| P9084B | 9GS/s 16Bit, 4GS Memory 4CH, 16 Markers |
| P9086B | 9GS/s 16Bit, 4GS Memory 6CH, 24 Markers |

| OPTIONS | |
|---------|---|
| 4M1 | 4GS Memory option for models P1282x & P2582x |
| 4M2 | 4GS Memory option for models P1284x & P2584x |
| 4M3 | 4GS Memory option for models P1288x, P2588x & P9084x |
| 4M4 | 4GS Memory option for models P12812x, P25812x&P9086x |
| 8M1 | 8GS Memory option for models P1282x & P2582x |
| 8M2 | 8GS Memory option for models P1284x, P2584x & P9082x |
| 8M3 | 8GS Memory option for models P1288x, P2588x & P9084x |
| 8M4 | 8GS Memory option for models P12812x, P25812x & P9086x |
| 16M1 | 16GS Memory option for models P9082x |
| 16M2 | 16GS Memory option for models P9084x |
| 16M3 | 16GS Memory option for models P9086x |
| DO1 | 9GHz BW Direct Output option for models P1282x & P2582x |
| DO2 | 9GHz BW Direct Output option for models Pxx84x & P9082x |
| DO3 | 9GHz BW Direct Output option for models Pxx88x & P9084x |
| DO4 | 9GHz BW Direct Output option for models Pxx812x & P9086x |
| FS1 | Fast Segment Control option for models P1282x & P2582x |
| FS2 | Fast Segment Control option for P1284x, P2584x & P9082x |
| FS3 | Fast Segment Control option for P1288x, P2588x & P9084x |
| MRK1 | x8 Extra Markers option for models P1282B and P2582B |
| MRK2 | x8 Extra Markers option for models P1284x, P2584B and P9082B |
| MRK3 | x16 Extra Markers option for models P1288B, P2588B and P9084B |
| LTJ1 | Ultra Low Trigger Jitter (200ps typ.) option for models P1282x & P2582x |
| LTJ2 | Ultra Low Trigger Jitter (200ps typ.) option for models P1284x, P2584x & P9082x |
| LTJ3 | Ultra Low Trigger Jitter (200ps typ.) option for models P1288x, P2588x & P9084x |
| LTJ4 | Ultra Low Trigger Jitter (200ps typ.) option for models P12812x, P25812x & P9086x |
| G1 | Low Waveform Granularity option for models P1282x & P2582x |
| G2 | Low Waveform Granularity option for P1284x, P2584x & P9082x |
| G3 | Low Waveform Granularity option for P1288x, P2588x & P9084x |
| G4 | Low Waveform Granularity option for P12812x, P25812x&P9086x |
| AWT | 5.4GS/s Single, 2.7GS/s Dual Channel 12 Bit Digitizer option for models P1284M, P2584M & P9082M |
| STM | 6GS/s Streaming option |
| PROG | High level FPGA programming capability through decision blocks of built-in Demodulation & digital Filters |
| Shell | Open core integration to allow simple FPGA control & programming |
| TBolt | Rear panel Thunderbolt3 USB (type C) |
| SFP+ | Rear panel 10G optical SFP+ connectivity (replace the LAN) |



All rights reserved to Tabor Electronics Ltd. Tabor makes no representations nor warranties with respect to the accuracy or completeness of the contents and reserves the right to make changes at any time without notice. ver2_20



PROTEUS

Infinite possibilities

MODULE PLATFORM Modular, scalable and compact

Based on PXI Express industry standard the modular architecture can easily scale to hundreds of channels, while keeping the required space to a minimum. The compact form size enables up to 4 generator output channels and 2 digitizer input channels to occupy only 3 PXI slots. So for synchronized, phase coherent, multi-channel applications such as quantum physics and radar applications the Proteus arbitrary waveform transceiver is an ideal, space efficient and cost effective solution.

DESKTOP PLATFORM Compact and space efficient

The desktop version of the Proteus series offers up to 12 channels in a 4U, half 19" dedicated chassis. The compact form size and small footprint saves valuable bench space. So for synchronized, phase coherent, multi-channel applications such as quantum physics and radar applications the Proteus arbitrary waveform transceiver is an ideal, space efficient and cost effective solution.

BENCHTOP PLATFORM Standalone and easy to use

The benchtop version of the Proteus series offers up to 12 channels in a 4U, 19" benchtop box. With a 9" touch display and on-board PC the benchtop platform enables users to program the instrument without the need of an external PC. Users can program the instrument from the on-board PC using various programming environments such as Matlab, LabView, Python, and more. So for synchronized, phase coherent, multi-channel applications such as quantum physics and radar applications the Proteus arbitrary waveform transceiver is an ideal, high performance and cost effective solution.



Contact Us

For Information: info@taborelec.com

For Service & Support: support@taborelec.com

Website: www.taborelec.com