M3202A/M3201A
PXIe Arbitrary Waveform Generators with Optional Real-Time Sequencing and FPGA Programming

1 GSa/s, 14 Bits, 4 Channels
500 MSa/s, 16 Bits, 4 Channels
Generate High-Precision, Complex, Real-World Signals

The M3202A/M3201A high-performance, high-bandwidth arbitrary waveform generators combine an advanced waveform generation system with embedded function generators and modulators (frequency/phase/amplitude) for broadband and IF signal generation. Performance meets simplicity thanks to easy-to-use programming libraries, real-time sequencing technology (HVI), and graphical FPGA programming technology.

Features

Options
- 1 GSa/s, 14 bits, 4 channels, 400 MHz BW (800 MHz IQ)
- 500 MSa/s, 16 bits, 4 channels, 200 MHz BW (400 MHz IQ)

Embedded advanced arbitrary waveform generators (AWGs)
- Advanced triggering and marking (up to 8 reconfigurable I/Os)
- waveform queue system with cycles, delays and prescalers

Embedded high-precision function generators (FGs)
- Sinusoidal, triangular, square, DC, and more
- 45-bit frequency resolution (up to ~ 5.68 µHz)
- 24-bit phase resolution (up to ~ 21.5 µdeg)

Embedded ultra-flexible amplitude and angle modulators

High-quality output signal with low phase noise
- SFDR: ~65 dBC at 20 MHz
- Average noise density: down to ~–145 dBm/Hz

Optional features
- Simultaneous amplitude and angle modulations

Optional HW programming for high-performance applications
- Real-time sequencing (HVI technology)
- FPGA programming
  - Xilinx Kintex-7 325T or 410T FPGA

Up to 2 GB of onboard RAM (~ 1 Gsamples)

Mechanical/interface
- 1 slot 3U (PXIe)
- Up to 1.6 GB/s transfer BW with P2P capabilities (PCIe Gen 2)
- Independent DMA channels for fast and efficient data transfer

Applications

Quantum computing, 5G research
Manufacturing in wireless devices, automated test equipment (ATE)
MIMO, beam forming and other multi-channel coherent signal generation
General purpose, RF/arbitrary waveform generation
R&D/scientific research equipment, aerospace and defense (A/D)
Programming technology and software tools

Software programming
- Easy-to-use native programming libraries for most common languages: C, C++, Visual Studio, LabVIEW, MATLAB, Python, and more

Hardware programming (optional)
- Real-time sequencing (Hard Virtual Instrumentation or HVI technology)
  - Graphical flowchart-style M3601A design environment (-HV1 option required on HW)
  - Ultra-fast, fully-parallelized, hard real-time execution
  - Ultra-fast, time-deterministic decision-making
  - Off-the-shelf inter-module synchronization and data exchange
- FPGA programming
  - Graphical M3602A FPGA design environment (-FP1 option required on HW)
  - No FPGA know-how required
  - Include from high-level to low-level design elements: off-the-shelf DSP blocks, MATLAB/Simulink designs, Xilinx CORE Generator IP cores, Xilinx VIVADO/ISE projects, VHDL or Verilog code
  - Ultra-fast, one-click compiling and on-the-fly programming

No programming
- Ready-to-use SD1 SPF (software front panels)

M31XX/M32XX/M33XX family product table

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Outputs (AWGs)</th>
<th>Inputs (Digitizers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>Speed (MSa/s)</td>
<td>Bits</td>
</tr>
<tr>
<td>M3202A AWG</td>
<td>1000</td>
<td>14</td>
</tr>
<tr>
<td>M3201A AWG</td>
<td>500</td>
<td>16</td>
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<tr>
<td>M3102A Digitizer</td>
<td>500</td>
<td>14</td>
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<tr>
<td>M3100A Digitizer</td>
<td>100</td>
<td>14</td>
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<tr>
<td>M3302A Combo</td>
<td>500</td>
<td>16</td>
</tr>
<tr>
<td>M3300A Combo</td>
<td>500</td>
<td>16</td>
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</tbody>
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