

**BittWare**  
a molex company

**520N-MX**  
PCIe FPGA Board



## Stratix 10 FPGA Board with 16GB HBM2

Powerful solution for accelerating memory-bound applications

Designed for compute acceleration, the 520N-MX is a PCIe board featuring Intel's Stratix 10 MX2100 FPGA with integrated HBM2 memory. The size and speed of HBM2 (16GB at up to 512GB/s) enables acceleration of memory-bound applications. The board's 100G QSFP28s are ideal for clustering, and OCuLink connectors allow expansion.



Both traditional HDL and higher abstraction C, C++ and OpenCL-based tool flows are supported. Deliverables include an optimized board support package (BSP) for the Intel OpenCL SDK.

The 520N-MX features a Board Management Controller (BMC) for advanced system monitoring and control, which greatly simplifies platform integration and management.

## Tool Flow Flexibility for Software- or Hardware-Based Development



- OpenCL support for software-orientated customers
- Abstraction for faster development
- Push-button flow for FPGA executable, driver, and API
- Add optimized HDL IP cores to OpenCL designs as libraries



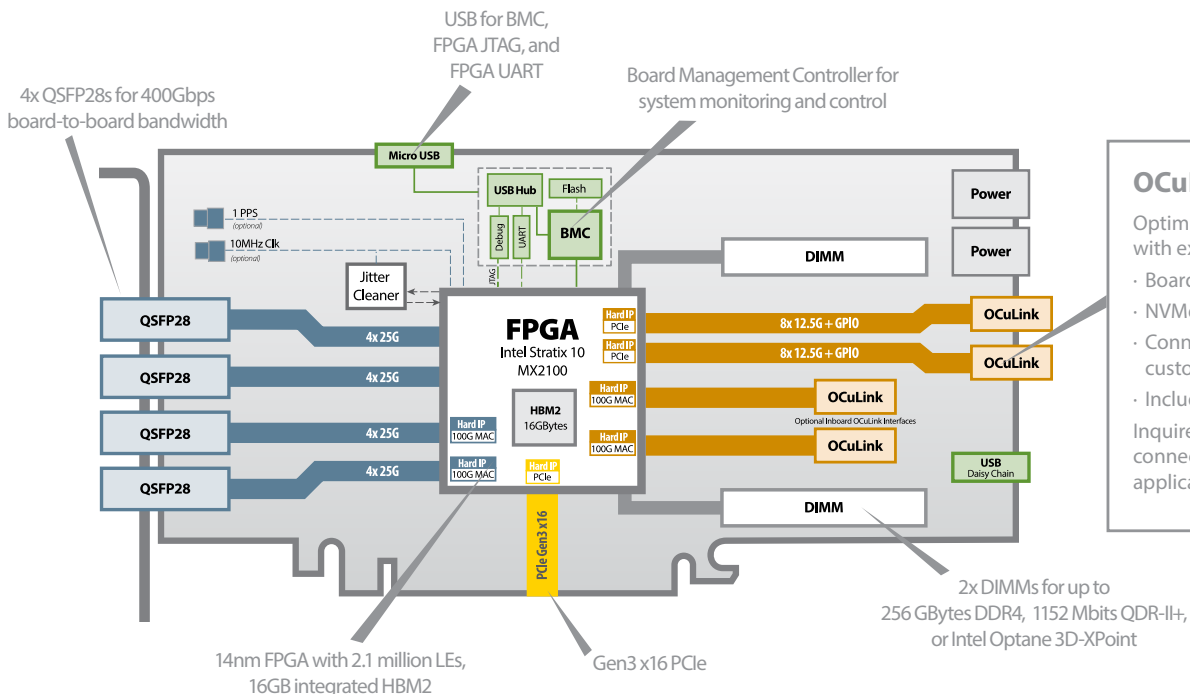
- Traditional VHDL/Verilog support for hardware-orientated customers
- Hand-code for ultimate performance
- High-Level Synthesis (HLS) available for rapid development
- FPGA card designed to support standard Intel IP cores for Stratix 10

## key features

Intel Stratix 10  
MX2100

16GB HBM2  
up to 512GB/s

OpenCL  
BSP



### OCuLink Expansion Ports

Optimize the 520N-MX for your application with expansion:

- Board-to-board interconnect
- NVMe access for storage acceleration
- Connect to accessory boards for customization options
- Includes GPIO

Inquire about customized Molex connectors/cables as required for your application.

# Additional Services

Take advantage of BittWare's range of design, integration, and support options



## Customization

Additional specification options or accessory boards to meet your exact needs.



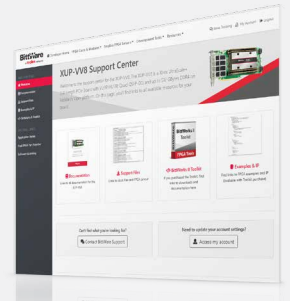
## Server Integration

Available pre-integrated in our [TeraBox servers](#) in a range of configurations.



## Application Optimization

Ask about our services to help you port, optimize, and benchmark your application.



## Service and Support

BittWare Developer Site provides online documentation and issue tracking.

## Board Specifications

FPGA	<ul style="list-style-type: none"> <li>Intel Stratix 10 MX             <ul style="list-style-type: none"> <li>MX2100 in an F2597 package</li> <li>16GBytes on-chip High Bandwidth Memory (HBM2) DRAM, 410 GB/s (speed grade 2)</li> <li>Core speed grade -2: I/O speed grade -2</li> </ul> </li> <li>Contact BittWare for other Stratix 10 MX options</li> </ul>
On-board Flash	<ul style="list-style-type: none"> <li>2Gbit Flash memory for booting FPGA</li> </ul>
External memory	<ul style="list-style-type: none"> <li>2x 288-pin DIMM slots each fitted with 16GB modules by default, i.e., 32GB total on board (options up to 256GB total)</li> <li>Contact BittWare for QDR-II+ &amp; Intel Optane (3D-Xpoint) DIMM options</li> </ul>
Host interface	<ul style="list-style-type: none"> <li>x16 Gen3 interface direct to FPGA, connected to PCIe hard IP</li> </ul>
QSFP cages	<ul style="list-style-type: none"> <li>4 QSFP28 cages on front panel connected directly to FPGA via 16 transceivers</li> <li>User programmable low jitter clocking supporting 10/25/40/100GbE</li> <li>Each QSFP28 can be independently clocked</li> <li>Jitter cleaner for network recovered clocking</li> <li>2 QSFP28s have available 100GbE MAC hard IP</li> </ul>
OCuLink	<ul style="list-style-type: none"> <li>2x edge connectors (A, B) @ 12.5G per lane (default); each supports PCIe Gen 3 x8 hard IP, GPIO, and PCIe master and optional input clocking</li> <li>2x inner connectors (C, D) @ 25G per lane (optional); 1x 100GbE MAC hard IP per OCuLink</li> </ul>
Board Management Controller	<ul style="list-style-type: none"> <li>Voltage, current, temperature monitoring</li> <li>Power sequencing and reset</li> <li>Field upgrades</li> <li>FPGA configuration and control</li> <li>Clock configuration</li> <li>Low bandwidth BMC-FPGA comms with SPI link</li> <li>USB 2.0</li> <li>PLDM support</li> <li>Voltage overrides</li> </ul>

Cooling	<ul style="list-style-type: none"> <li>Standard: double-width active heatsink (with fan)</li> <li>Optional: double-width passive heatsink</li> <li>Optional: double-width liquid cooling</li> </ul>
Electrical	<ul style="list-style-type: none"> <li>On-board power derived from 12V PCIe slot &amp; two AUX connectors (one 8-pin, one 6-pin)</li> <li>Power dissipation is application dependent</li> <li>Typical max power consumption 225W</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>Operating temperature: 5°C to 35°C</li> </ul>
Quality	<ul style="list-style-type: none"> <li>Manufactured to ISO9001:2015 IPC-A-610-Class III</li> <li>RoHS compliant</li> <li>CE, FCC &amp; ICES approvals</li> </ul>
Form factor	<ul style="list-style-type: none"> <li>Standard-height PCIe dual-slot board</li> <li>4.376 x 10.5 inches (111 x 266.7 mm)</li> </ul>

## Development Tools

FPGA development	<b>BIST</b> - Built-In Self-Test for CentOS 7 provided with source code (pinout, gateway, PCIe driver & host test application)
Application development	<b>Supported design flows</b> - Intel FPGA OpenCL SDK, Intel High-Level Synthesis (C/C++) & Quartus Prime Pro (HDL, Verilog, VHDL, etc.)

## Deliverables

- 520N-MX FPGA board
- USB cable (front panel access)
- Built-In Self-Test (BIST)
- OpenCL HPC Board Support Package (BSP)
- 1-year access to online Developer Site
- 1-year hardware warranty

To learn more, visit [www.BittWare.com](http://www.BittWare.com)

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Platinum

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