

# V6061

## 3U VPX Versal® ASoC FPGA + Ethernet Offload Optical I/O Module

### Benefits

Heterogeneous computing card combining FPGA fabric, hard ARM processor cores, AI/ML engines, and high-bandwidth networking

Designed specifically for sensor interfaces, data processing, and data distribution in VPX systems

Programmable interface solution that leverages off-the-shelf world-class network performance with customizable application processor and data distribution

HPEC focus, 3U VPX, VITA 47 compliance, SOSA aligned options

Versatile design supports electrical or optical interfaces, optical options for both backplane or front-panel I/O

Modular optics for flexibility in supporting 1-25Gbs per lane

### Features

Xilinx® Versal® ASoC (FPGA): VM1502/VM1802/VC1902

NVIDIA® Mellanox® ConnectX®-5 Network Interface Device Hardware offloads for UDP, TCP, RoCE v2, DPDK, GPUDirect, NVMeoF, +more

Up to eight (8) 1G to 25G optical ports via MPO front panel I/O or VITA 66 optical backplane I/O

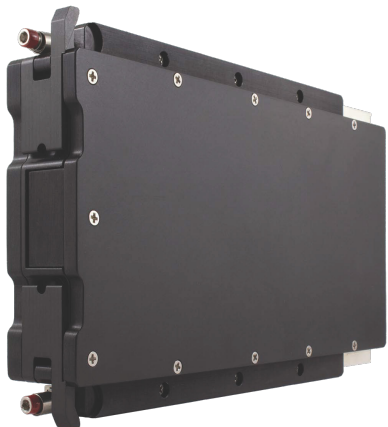
2 banks of 4GB up to 1866MHz LPDDR4 SDRAM

PCIe Gen3/Gen4 support

Onboard embedded PCIe Switch device

Advanced APIs that support multi-core and multi-processor architectures

Wide range of operating system software support



### Overview

The V6061 is a next generation high-performance embedded computing 3U VPX module featuring the Xilinx® Versal® Adaptive System-on-Chip (ASoC), the NVIDIA® Mellanox® ConnectX®-5 (MC-X5) network interface device, rugged optical and electrical I/O, and SOSA aligned profile options. The V6061 is specifically targeted at applications requiring a combination of high-speed data interfaces, network protocol offloads, onboard processing resources, and optional data distribution to adjacent processing resources (CPUs/ GPUs) in the system.

The V6061 is a proven high-bandwidth and low-latency performance leader in 10/25/40/50/100Gbs Ethernet applications. Use cases include sensor interfacing, data processing, data distribution, and FPGA co-processing applications. Radar, signals intelligence, electronic warfare, video, storage, medical imaging, and embedded communications systems all can benefit from the V6061 module. The V6061 includes hardware offloads for UDP, TCP, RoCE v2, DPDK, GPUDirect, NVMeoF, among many other protocol stacks, and excels at high-bandwidth interface applications where data can be processed locally and/or distributed efficiently across the VPX backplane.

The combination of the MC-X5 device and the ASoC device allows for system designers to leverage the off-the-shelf world-class Ethernet performance of the MC-X5 while deploying unique data processing and security algorithms in the onboard ASoC device. This combination maximizes the effectiveness of the deployed applications and algorithms while eliminating design efforts required to establish truly high-bandwidth and low-latency Ethernet, PCIe controllers, PCIe switches, efficient DMA engines, or low overhead software drivers.

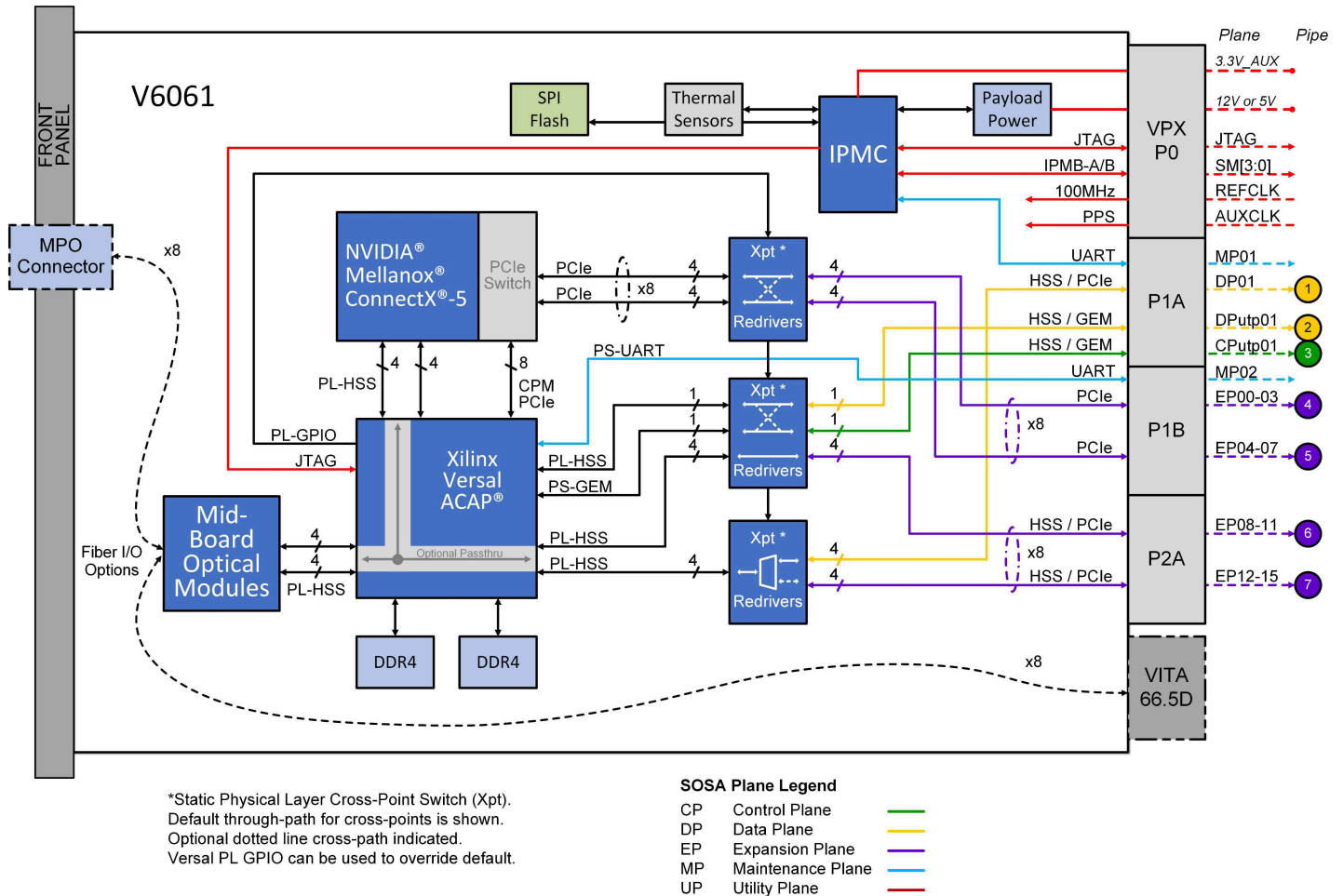
In addition to the Ethernet interfaces described, the FPGA fabric provided within the ASoC part is capable of hosting New Wave IP cores for Fibre Channel, ARINC-818, sFPDP, Aurora, and others. This makes the V6061 an ideal hardware platform for mixed interface protocol needs or protocol bridging applications.

The V6061 is a standout sensor interface and heterogeneous computing solution whether used standalone or adjacent to other processing elements.



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## 3U VPX Versal® ASoC FPGA + Ethernet Offload Optical I/O Module



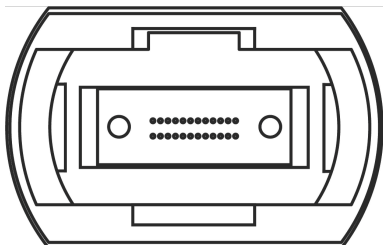
> V6061 Block Diagram

### Optical Connector Options

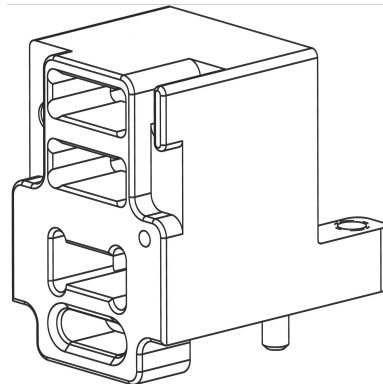
The V6061 offers three different optical I/O options:

1. Optical Front Panel MPO Connector
2. Optical Backplane MT Connector for VITA 66.5
3. No optics

#### 1. Front Panel MPO (Female) I/O



#### 2. VITA 66.5 Backplane MT I/O 1



1 Termination: VITA 66.5 Style D (pictured)

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## 3U VPX Versal® ASoC FPGA + Ethernet Offload Optical I/O Module

### Multi-Processor Multi-Core Support

The V6061 is uniquely suited for system architectures involving multiple processing cards on a common switched data plane. Specifically, the V6061 supports shared access from multiple host processors, enabling it to function as a cost-effective, high-performance gateway. This feature enables a single high-speed pipe to carry multiple virtual channels in systems that need to spread or load-balance sensor data across processor arrays.

### Complete Product Support Program

New Wave prides itself on its excellent customer support, a fact that is echoed by our customers. New Wave DV provides industry standard warranty on its products, but it is the human factor that makes our support so valuable to our customers. Our team takes the time and effort to ensure that the customer experience with our products is a positive one.

### Our Commitment

New Wave is committed to providing the latest innovations in technology, architectures, and techniques to keep our customers one step ahead of the rest. Our products, complete with the Development Framework, are intended to offer our customers an entirely unique out-of-the-box experience.

### Technical Specifications

#### PHYSICAL CHARACTERISTICS

##### Dimensions:

170.75mm length: Face of carrier to back edge of Guide pin connectors  
 189.22mm length: MPO flip door to back edge of Guide pin connectors  
 100mm width: Edge of guide rail to guide rail  
 24.64mm height: From primary cover to secondary cover

##### Weight:

<1.764 lbs (800g)

#### POWER CHARACTERISTICS

Power Draw: 75W  
 Power Supply: 12V. 5V available upon request.

#### TEMPERATURE

Operating: -40° C to 85° C (conduction-cooled)  
 Storage: -55° C to 105° C

### Technical Specifications

#### NETWORK INTERFACE

Up to eight (8) 1G to 25G optical ports (front & backplane options)  
 • 850nm multi-mode optics  
 16 lanes of electrical high-speed network IO available to backplane  
 Dual 10/25/40/50/100Gbps Ethernet port to MC-X5

#### ETHERNET PROTOCOLS

TCP, UDP, ARP, ICMP, RoCE v2, Multicast, Broadcast, + more  
 Visit [NVIDIA® Mellanox® Datasheet1](#)

#### OPTIONAL ADDITIONAL PROTOCOLS

Fibre Channel, sFPDP, ARINC 818, Aurora

#### ASoC (FPGA)DEVICE

Xilinx® Versal® VM1502, VM1802, VC1902  
 Visit [Xilinx® Versal® Datasheet3](#)

#### ETHERNETDEVICE

NVIDIA® Mellanox® ConnectX®-5 EN IC  
 Visit [NVIDIA® Mellanox® Datasheet1](#)

#### MEMORY

2 banks of 4GB up to 1866MHz LPDDR4 SDRAM

#### PCIe INTERFACE

Two PCI Express Gen4/Gen3 x8 Interfaces  
 Four PCI Express Gen4/Gen3 x4 Interfaces

#### THERMAL SENSORS

2 digital temperature sensors

#### COMPLIANCE

VITA 47, 48.2, 65, 66.5  
 NVIDIA® Mellanox® ConnectX®-5 EN IC  
 Visit [NVIDIA® Mellanox® Datasheet1](#)

#### SOFTWARE SUPPORT

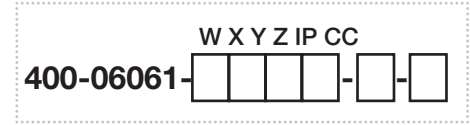
Software drivers available from NVIDIA® Mellanox®2  
 NWDV Maintained x86 OS's:  
<https://newwavedv.com/wordpress/wp-content/uploads/2022/11/V6061-Software-Info.pdf>

*This hardware can also support InfiniBand.  
 Please reach out for more information.*

1NVIDIA® Mellanox® ConnectX®-5 EN IC Datasheet: [https://newwavedv.com/wordpress/wp-content/uploads/2023/01/pb\\_connectx-5\\_en\\_ic.pdf](https://newwavedv.com/wordpress/wp-content/uploads/2023/01/pb_connectx-5_en_ic.pdf)  
 2NVIDIA® Mellanox® Ethernet Software Support/Datasheet: <https://developer.nvidia.com/networking/ethernet-software>  
 3Xilinx® Versal® ASoC Datasheet: <https://www.xilinx.com/products/silicon-devices/acap/versal.html>

## V6061 Hardware Part Number Configuration

**400** - **06061**  
Series Model



**W**

| Config # | Description               |
|----------|---------------------------|
| 4+       | Reserved                  |
| 3        | Xilinx Versal VC1902 ACAP |
| 2        | Reserved                  |
| 1        | Xilinx Versal VM1802 ACAP |
| 0        | Xilinx Versal VM1502 ACAP |

**Y**

| Config # | Description                 |
|----------|-----------------------------|
| 0        | Conduction cooled, 1" pitch |

**Z**

| Config # | Description  |
|----------|--|
| 3+       | Reserved   |
| 2        | PCIe Gen3, industrial temp, single-host, PCIe switch enabled |
| 1        | Reserved   |
| 0        | PCIe Gen4, commercial temp, single-host, PCIe switch enabled |

**X**

| Config # | Slot Profile Description  | VITA 65 Compatible Profile | VITA 65 Aperture Style |
|----------|---|----------------------------|------------------------|
| I+       | Reserved  | n/a                        | n/a                    |
| H        | No optics populated, P2A not populated  | 14.6.11-0                  | J*                     |
| D-G      | Reserved  | n/a                        | n/a                    |
| C        | 8-lane 1-10Gbps front panel MPO optics, P2A not populated                     | 14.6.11-0                  | J*                     |
| B        | 8-lane 1-25Gbps front panel MPO optics, P2A not populated                     | 14.6.11-0                  | J*                     |
| A        | 8-lane 1-10Gbps backplane VITA 66 optics, MTB-MM24-6.5.3.5, P2A not populated | 14.6.11-14                 | J*                     |
| 9        | 8-lane 1-25Gbps backplane VITA 66 optics MTB-MM24-6.5.3.5, P2A not populated  | 14.6.11-14                 | J*                     |
| 8        | No optics populated, P2A populated  | 14.6.13-0                  | J                      |
| 4-7      | Reserved  | n/a                        | n/a                    |
| 3        | 8-lane 1-10Gbps front panel MPO optics, P2A populated                         | 14.6.13-0                  | J                      |
| 2        | 8-lane 1-25Gbps front panel MPO optics, P2A populated                         | 14.6.13-0                  | J                      |
| 1        | 8-lane 1-10Gbps backplane VITA 66 optics MTB-MM24-6.5.3.5, P2A populated      | 14.6.13-8                  | J                      |
| 0        | 8-lane 1-25Gbps backplane VITA 66 optics MTB-MM24-6.5.3.5, P2A populated      | 14.6.13-8                  | J                      |

\*14.6.11 Specifies an H style aperture with 2 style C fiber connectors, or an alternative style connector(s) that fit with the aperture space. 14.6.11 options 9 and A and 14.6.13 options 0, and 1 are delivered with a single style D connector thus meeting the specification of Style H or Style J.

**IP**

| Config # | Description            |
|----------|------------------------|
| 1+       | Reserved               |
| 00       | Example design package |

**CC**

| Config # | Description             |
|----------|-------------------------|
| AR       | Acrylic conformal coat  |
| UR       | Urethane conformal coat |
| ER       | Epoxy conformal coat    |
| SR       | Silicone conformal coat |
| XY       | Parylene conformal coat |
| BLANK    | No conformal coat       |

## V6061 “Go-Fast” Hardware Part Numbers

Part Numbers from Tables 2 & 3 are available with the shortest lead times.

**Table 2**

| Config #              | Slot Profile Description  |
|-----------------------|---|
| <b>“.11” Profiles</b> |   |
| 400-06061-1900-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VM1802 ACAP, 8-lane 1-25Gbps backplane VITA 66 optics MTB-MM24-6.5.3.5, P2A not populated, conduction cooled, 1” pitch, PCIe Gen4, commercial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core |
| 400-06061-1902-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VM1802 ACAP, 8-lane 1-25Gbps backplane VITA 66 optics MTB-MM24-6.5.3.5, P2A not populated, conduction cooled, 1” pitch, PCIe Gen3, industrial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core |
| 400-06061-1B00-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VM1802 ACAP, 8-lane 1-25Gbps front panel MPO optics, P2A not populated, conduction cooled, 1” pitch, PCIe Gen4, commercial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core                    |
| 400-06061-1B02-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VM1802 ACAP, 8-lane 1-25Gbps front panel MPO optics, P2A not populated, conduction cooled, 1” pitch, PCIe Gen3, industrial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core                    |
| 400-06061-3900-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VC1902 ACAP, 8-lane 1-25Gbps backplane VITA 66 optics MTB-MM24-6.5.3.5, P2A not populated, PCIe Gen4, commercial temp, single-host, PCIe switch enabled, network pass-through FPGA IP core                             |
| 400-06061-3902-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VC1902 ACAP, 8-lane 1-25Gbps backplane VITA 66 optics MTB-MM24-6.5.3.5, P2A not populated, conduction cooled, 1” pitch, PCIe Gen3, industrial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core |
| 400-06061-3B00-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VC1902 ACAP, 8-lane 1-25Gbps front panel MPO optics, P2A not populated, conduction cooled, 1” pitch, PCIe Gen4, commercial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core                    |
| 400-06061-3B02-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VC1902 ACAP, 8-lane 1-25Gbps front panel MPO optics, P2A not populated, conduction cooled, 1” pitch, PCIe Gen3, industrial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core                    |

“.13” Profiles Part Numbers on next page.

## V6061 “Go-Fast” Hardware Part Numbers

Part Numbers from Tables 2 & 3 are available with the shortest lead times.

### Table 3

| Config #              | Slot Profile Description  |
|-----------------------|---|
| <b>“.13” Profiles</b> |   |
| 400-06061-1000-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VM1802 ACAP, 8-lane 1-25Gbps backplane VITA 66 optics MTB-MM24-6.5.3.5, P2A populated, conduction cooled, 1” pitch, PCIe Gen4, commercial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core   |
| 400-06061-1002-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VM1802 ACAP, 8-lane 1-25Gbps backplane VITA 66 optics MTB-MM24-6.5.3.5, P2A populated, conduction cooled, 1” pitch, PCIe Gen3, industrial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core   |
| 400-06061-1200-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VM1802 ACAP, 8-lane 1-25Gbps front panel MPO optics, P2A populated, conduction cooled, 1” pitch, PCIe Gen4, commercial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core                      |
| 400-06061-1202-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VM1802 ACAP, 8-lane 1-25Gbps front panel MPO optics, P2A populated, conduction cooled, 1” pitch, PCIe Gen3, industrial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core                      |
| 400-06061-3000-00     | "V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VC1902 ACAP, 8-lane 1-25Gbps backplane VITA 66 optics MTB-MM24-6.5.3.5, P2A populated, conduction cooled, 1” pitch, PCIe Gen4, commercial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core" |
| 400-06061-3002-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VC1902 ACAP, 8-lane 1-25Gbps backplane VITA 66 optics MTB-MM24-6.5.3.5, P2A populated, conduction cooled, 1” pitch, PCIe Gen3, industrial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core   |
| 400-06061-3200-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VC1902 ACAP, 8-lane 1-25Gbps front panel MPO optics, P2A populated, conduction cooled, 1” pitch, PCIe Gen4, commercial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core                      |
| 400-06061-3202-00     | V6061 FPGA + Ethernet NIC 3U VPX Module, Xilinx Versal VC1902 ACAP, 8-lane 1-25Gbps front panel MPO optics, P2A populated, conduction cooled, 1” pitch, PCIe Gen3, industrial temp, single-host, PCIe switch enabled, network passthrough FPGA IP core                      |

#### FOR MORE INFORMATION

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