Programmable Switch
FPGA-based 32-Port Network Switch

Benefits
- High port-density FPGA-based network appliance for custom switching applications and line-rate packet processing
- 1/10G Ethernet and 1/2/4/8/16G Fibre Channel Out-of-the-box
- Ultra-low latency and high-bandwidth performance
- Programmable FPGA with a powerful development framework
- Wide range of FPGA sizes and memory configuration options

Overview
The Programmable Switch is a high port-density completely FPGA-based network switch built for special purpose switching, bridging, and monitoring applications. The Programmable Switch is based on the next generation of New Wave DV’s programmable networking hardware.

The Programmable Switch is powered by the latest Xilinx Virtex UltraScale+ FPGA technology. Purpose-built for processing network data in real time, the Programmable Switch has been optimized to provide the lowest possible latency and the highest possible performance. This makes it ideal for executing sophisticated algorithms, processing streaming data, and running a wide range of functions as close as possible to the network.

Applications
- Avionics network testing
- In-line packet monitoring
- Network protocol bridging
- On-switch application execution
- Security algorithm implementation

Features
- Thirty-Two SFP28 ports
- Xilinx Virtex UltraScale+ FPGA (VU5P – VU11P)
- PPS time synchronization with nSec resolution
- Thermal sensors for monitoring card temperature
- Robust FPGA development framework

Optional FPGA Switch Cores
- Port Replication - Replicate Ethernet/Fibre Channel traffic from any port to any (or all) other ports on the switch. Traffic rules can be added for selective replication.
- Fibre Channel Layer 2 Implicit Switch - Fibre Channel Layer 2 switch for Implicit networks. Switch does not require any fabric login for operation. Meets the Fibre Channel Switch requirements of the F35 network.
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Simplified Programmability Framework

The Programmable Switch ships with the expressXG Development Framework, a fully integrated and flexible toolset that provides the infrastructure necessary to ensure rapid deployment of applications. The framework abstracts the details of Ethernet/Fibre Channel protocols and interfaces, memory controllers and host fabric interfaces, thereby reducing the development effort and schedule for designers to implement custom solutions.

Operation Customization

The Programmable Switch is an FPGA-based network appliance that can be customized to fit your requirements. New Wave provides access to the FPGA for customers to customize, however New Wave can also modify existing cores or develop new cores for your applications. If you have specific networking requirements, New Wave can help you accomplish your goals.
## Programmable Switch

**FPGA-based 32-Port Network Switch**

### Complete Product Support Program

Our customers can attest to our exceptional support. NewWave DV provides an 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 a positive customer experience.

### Our Commitment

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

### Ordering Information

550-05052-05-00: 32 Port 1U Programmable Switch, Xilinx Virtex UltraScale+ VU9P, 18GB 72-Bit DDR4 SDRAM, 144MBit QDR-IV SRAM

Other product configurations are available. Please contact us.

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### Technical Specifications

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<thead>
<tr>
<th>NETWORK INTERFACE</th>
<th>Thirty-Two SFP28 optical ports</th>
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<tbody>
<tr>
<td>ETHERNET PROTOCOLS</td>
<td>TCP, UDP, ARP, ICMP, Multicast, Broadcast</td>
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<tr>
<td>FIBRE CHANNEL PROTOCOLS</td>
<td>RDMA, AV, ASM</td>
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</table>
| FPGA DEVICE | Xilinx Virtex UltraScale+ (VU5P to VU11P)  
Xilinx Virtex UltraScale (VU080-VU190)  
Xilinx Kintex UltraScale (KU095-KU115) |
| MEMORY | One bank of 4GB to 16GB 72-bit up to 1066MHz DDR SDRAM  
One bank of 36Mbit to 144Mbit 18-bit 1066MHz QDR-IV SRAM |
| FLASH | One 32MB memory for storing a default configuration image |
| HOST PROCESSOR INTERFACE | PCI Express Gen3 x1 |
| EXTERNAL INTERFACE | PPS Interface for time synchronization with μsecond resolution RS-232 serial interface for debug |
| THERMAL SENSORS | 2 digital temperature sensors |
| COMPLIANCE | IEEE 802.3ae 2002  
IEEE 802.3ba 2010  
FC-FS-3 INCITS 470-2011  
FCC 47 CFR Part 15, Subpart B, Class A (USA)  
IEC 60950-1 (International)  
RoHS Directive 2002/95EC |
| POWER REQUIREMENTS | Maximum 75W (preliminary) |
| TEMPERATURE | Operating: 0 to 45°C  
Storage: -40°C to 85°C |

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