AMC529 / AMC529C – AMC Dual DAC 14-bit @ 5.7 GSPS Module

**KEY FEATURES**

- Dual AD9129 DAC, 14-bit at 5.7 GSPS (2.85 GSPS direct RF synthesis)
- Conduction cooled version available
- Single module, mid-size per AMC.0
- Xilinx Virtex-7 690T FPGA in FFG-1761 package
- Triple bank QDR-II+ memory (432 Mb total) and 1GB DDR3
- AMC Ports 4-11 are routed to FPGA per AMC.1, AMC.2 and AMC.4 (PCIe, SRIO, XAUI, etc. are FPGA programmable)
- AMC Ports 12-15 and 17-20 optionally routed to the FPGA
- Internal, external or backplane clock with on-board wide-band PLL
- IPMI 2.0 compliant

**Benefits of Choosing VadaTech**

- Ultra-high speed DAC speed in compact modular format
- Excellent dynamic and direct RF synthesis performance
- Ideal for communications systems, automatic test equipment, RADAR/Jamming
- Strong mil/aero support – conduction cooled variant available
- Electrical, mechanical, software, and system-level expertise in house
- Full system supply from industry leader
- AS9100 and ISO9001 certified company

The AMC529 provides two Analog Devices AD9129. Each chip core is based on a quad-switch architecture that enables dual-edge clocking operation, effectively increasing the DAC update rate to 5.7 GSPS when configured for Mix-Mode™ or 2x interpolation. The high dynamic range and bandwidth enable multi-carrier generation up to 4.2 GHz. The on-board Virtex-7 690T provides signal processing capability for complex waveform generation, appropriate for applications such as SDR, ATE and jamming.

The AMC ports 12-15 and 17-20 are optionally routed to the FPGA from the AMC connector, providing the user with flexibility to support custom high-bandwidth interconnects between compatible FPGA modules (depending on backplane capabilities). The FPGA is supported by FLASH memory for boot image storage, four banks of QDR-II+ for fast data buffering and a further bank of DDR3 for local data.

TCLKA-D are routed to the FPGA via an on-board clock and jitter cleaner while FCLK is routed directly. The module includes a very flexible clocking sub-system, supporting internal or external (backplane or FMC connector) clock source with internal PLL/jitter cleaner.

The AMC529 is available in both air-cooled (MTCA.0 and MTCA.1) and rugged conduction-cooled (MTCA.2 or MTCA.3) versions.
REFERENCE DESIGN

VadaTech provides a reference design implementation for our FPGAs complete with VHDL source code and configuration binaries. The reference design focuses on the I/O ring of the FPGA to demonstrate low-level operation of the interconnections between the FPGA and other circuits on the board and/or backplane. It is geared to prove out the hardware for engineering/factory diagnostics and customer acceptance of the hardware, but it does not strive to implement a particular end application.

AMC529

BLOCK DIAGRAM

FRONT PANEL

Figure 1: Block Diagram

Figure 2: AMC529 Front Panel
AMC529 / AMC529C – AMC Dual DAC 14-bit@ 5.7 GSPS Module

AMC529C

BLOCK DIAGRAM

Figure 3: AMC59C Block Diagram

FRONT PANEL

Figure 4: AMC529C Front Panel
## SPECIFICATIONS

### Architecture

<table>
<thead>
<tr>
<th>Physical</th>
<th>Dimensions</th>
<th>Single module, mid-size (full-size optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Width 2.89&quot; (73.5 mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depth 7.11&quot; (180.6 mm)</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>AMC FPGA Carrier</td>
<td>Xilinx Virtex-7 device</td>
</tr>
<tr>
<td></td>
<td>Dual Port DAC</td>
<td></td>
</tr>
</tbody>
</table>

### Standards

- **AMC** Type: AMC.1, AMC.2 and/or AMC.4
- **Module Management** IPMI: IPMI version 2.0
- **PCIe** Lanes: Dual x4 via FPGA to AMC or x8
- **Ethernet** GbE: Dual GbE

### Configuration

- **Power** AMC529: ~35W (FPGA code dependent)
- **Environmental** Temperature: Operating temperature: -5° to 45° C (55°C for limited time, performance restrictions may apply), industrial and military versions also available (See environmental spec sheet)
  - Storage Temperature: -40° to +85° C
- **Vibration** 1G, 5 to 500 Hz on each axis
- **Shock** 30Gs each axis
- **Relative Humidity** 5 to 95 percent, non-condensing

### Front Panel

- **Interface Connectors**
  - Front panel DAC, CLK/TRIGIN, MGT RS-232, FPGA RS-232 and User I/O
- **LEDs**
  - IPMI Management Status: 4 user defined LEDs, 5 general status LEDs
  - Mechanical: Hot swap ejector handle (AMC529); wedgelocks (AMC529C)

### Software

- **Operating System** Linux (consult VadaTech for other options)

### Conformal Coating

- Humiseal 1A33 Polyurethane (Optional)
- Humiseal 1B31 Acrylic (Optional)

### Other

- **MTBF** MIL Hand book 217-F @ TBD Hrs
- **Certifications** Designed to meet FCC, CE and UL certifications where applicable
- **Standards** VadaTech is certified to both the ISO9001:2000 and AS9100B:2004 standards
- **Warranty** Two (2) years

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**INTEGRATION SERVICES AND APPLICATION-READY PLATFORMS**

VadaTech has a full ecosystem of ATCA and µTCA products including chassis platforms, shelf managers, AMC modules, Switch and Payload Boards, Rear Transition Modules (RTM), Power Modules, and more. The company also offers integration services as well as pre-configured Application-Ready Platforms. Please contact VadaTech Sales for more information.

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# AMC529 / AMC529C – AMC Dual DAC 14-bit@ 5.7 GSPS Module

## ORDERING OPTIONS

### AMC529 – ABC – DEF – G0J

<table>
<thead>
<tr>
<th>A = RF Direct Clock sampling</th>
<th>D = FPGA</th>
<th>G = Clock Holdover Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 = Front panel</td>
<td>0 = Reserved</td>
<td>0 = Standard (XO)</td>
</tr>
<tr>
<td>1 = On board wide-band PLL</td>
<td>1 = Reserved</td>
<td>1 = Stratum-3 (TCXO)</td>
</tr>
<tr>
<td></td>
<td>2 = XC7VX690T</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B = Ports 12-15 and 17-20</th>
<th>E = FPGA Speed</th>
<th>J = Temperature Range and Coating</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 = To FPGA</td>
<td>1 = Reserved</td>
<td>0 = Commercial (–5° to +55° C), No coating</td>
</tr>
<tr>
<td>1 = Not Routed</td>
<td>2 = High</td>
<td>1 = Commercial (–5° to +55° C), Humiseal 1A33 Polyurethane</td>
</tr>
<tr>
<td></td>
<td>3 = Highest</td>
<td>2 = Commercial (–5° to +55° C), Humiseal 1B31 Acrylic</td>
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<tr>
<th>C = Front Panel</th>
<th>F = PCIe Option</th>
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<tr>
<td>1 = Reserved</td>
<td>0 = No PCIe</td>
<td><strong>0 = Commercial (–5° to +55° C), No coating</strong></td>
</tr>
<tr>
<td>2 = Mid-size</td>
<td>1 = PCIe on ports 4 – 7</td>
<td><strong>1 = Commercial (–5° to +55° C), Humiseal 1A33 Polyurethane</strong></td>
</tr>
<tr>
<td>3 = Full-size</td>
<td>2 = PCIe on ports 8 – 11</td>
<td><strong>2 = Commercial (–5° to +55° C), Humiseal 1B31 Acrylic</strong></td>
</tr>
<tr>
<td>4 = Reserved</td>
<td>3 = PCIe on ports 4 – 11</td>
<td><strong>3 = Reserved</strong></td>
</tr>
<tr>
<td>5 = Mid-size, MTCA.1 (captive screw)</td>
<td></td>
<td><strong>4 = Industrial (–20° to +70° C), Humiseal 1A33 Polyurethane</strong></td>
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<tr>
<td>6 = Full-size, MTCA.1 (captive screw)</td>
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<td><strong>5 = Industrial (–20° to +70° C), Humiseal 1B31 Acrylic</strong></td>
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### AMC529C – ABC – DEF – G0J

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<th>F = PCIe Option</th>
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</thead>
<tbody>
<tr>
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<td>0 = No PCIe</td>
<td><strong>0 = Commercial (–5° to +55° C), No coating</strong></td>
</tr>
<tr>
<td>1 = Contact Vadatech</td>
<td>1 = PCIe on ports 4 – 7</td>
<td><strong>1 = Commercial (–5° to +55° C), Humiseal 1A33 Polyurethane</strong></td>
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<td>2 = PCIe on ports 8 – 11</td>
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*Ruggedization level is per the uTCA.2 and uTCA.3 specification

** Edge of module
RELATED PRODUCTS

| AMC526 Dual ADC | AMC517 Kintex-7 FPGA | VT872 ½ ATR Short, 6 AMC Conduction Cooled Chassis |

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