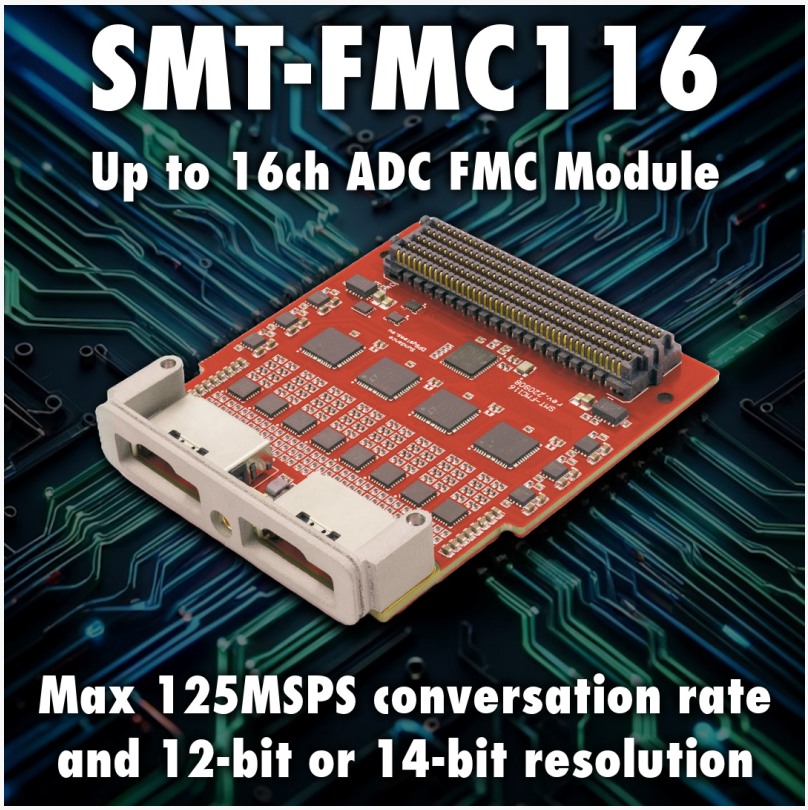
Sundance releases our highest channel density ADC board for instrumentation, control, and measurement applications

CHESHAM, BUCKINGHAMSHIRE, UNITED KINGDOM, October 17, 2024 /EINPresswire.com/ -- Sundance, an electronic “COTS” board manufacturer and early adopter of the VITA57.1 FMC module, has today released our highest ADC channel density board for instrumentation, control, and measurement applications.



SMT-FMC116 - Up to 16ch ADC FMC Module, max 125MSPS conversation rate and 12 or 14 bit resolution.

The new SMT-FMC116 is a High-Pin-Count (HPC) FMC module that offers up to sixteen (16) channels, each with up to a 125MSPS conversation rate and 12-bit or 14-bit high-resolution.

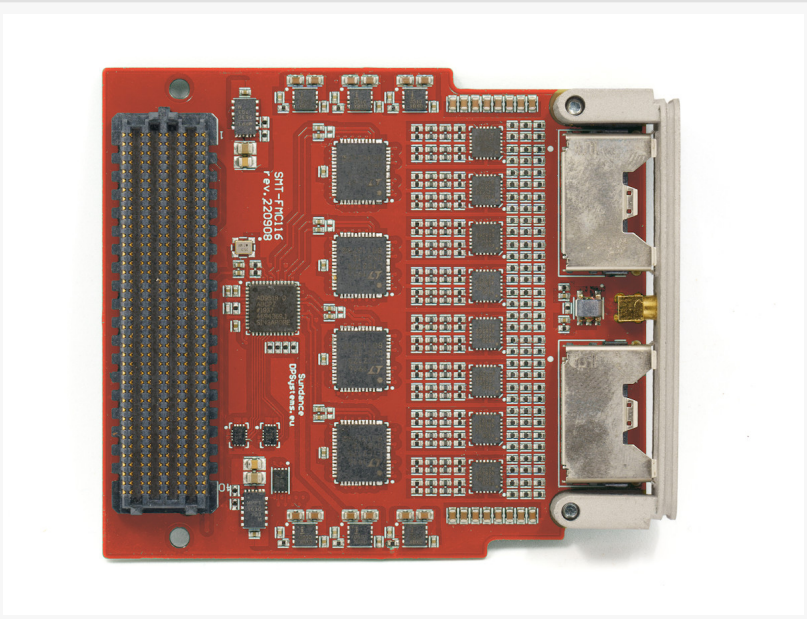
The SMT-FMC116 incorporates up to four of Analog Devices’ LTC217x quad-channel ADC converters semiconductors with LVDS interfaces and a single 1.8V power supply. The benefit of LVDS is the lower latency and less cost than now more common JESD204B interfaces. The SMT-FMC116 will interface with Altera, AMD, Lattice and Microchip’s family of FPGAs without implementing a specific device-dependent IP-Core.

"Our SMT-FMC116 is our 3rd generation of FMC modules based on the LTC217x family of ADC devices and represents a significant advancement in channel density from a single module", said Flemming Christensen, CEO of Sundance. "SMT-FMC116’s combination of low-latency data conversion and control by a single FPGA device makes it a unique solution for developers across various industries that required sixteen channels of synchronised capture of analogue signals.”

The advancement in PCB technology and the integration of more features in monolithic power

semiconductors enabled the SMT-FMC116 to go from an initial 4-channel FMC module in 2010 to a 16-channel ADC converter integrated into the small FMC form factor.

The biggest obstacle for any higher-channel data acquisition module is the physical interface to the outside world. The small size of the FMC module front panel calls for high-density, slim, right-angle interconnect solutions. The 0.635mm AcceleRate® Right-Angle Slim Socket and AcceleRate® Slim Cable Assembly from Samtec are the ideal solution for this application.



SMT-FMC116 - ADC FMC Module

"Sundance is one of Samtec's early adaptors of our AcceleRate® family of slim, direct attach interconnects. The ARF6-RA series enables the high-channel interfaces Sundance demanded in this application.", said Matthew Burns, Global Director of Technical Marketing at Samtec. He continued, "The SMT-FMC116 perfectly combines Sundance's innovation and miniaturisation using our high-performance interconnect solutions."

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>
> *Matthew Burns, Global Director of Technical Marketing at Samtec.*

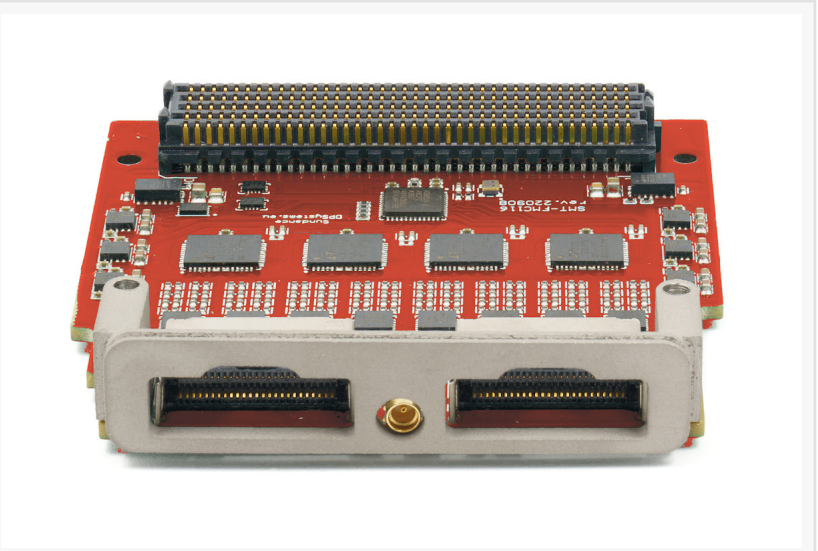
For more information about the SMT-FMC116 and its capabilities, please visit - https://store.sundance.com/product/smt-fmc116/ - or contact Flemming.C@Sundance.com

What is a VITA57.1 FMC module?
FMC stands for FPGA Mezzanine Card. It is a VITA standard that defines I/O mezzanine modules connected to an FPGA or other device carrier board. FMC is a connectivity standard that enables custom, modular I/O for FPGA platforms in a compact, standardised form factor ideal for embedded and instrumentation systems.

It bridges FPGAs to various interfaces for processing real-world signals. It originated in 2007 and was standardised by https://www.vita.com/

The concept separates the ever-involving FPGA technology from the relatively static nature of Input/Output standards, like HDMI, RS232C, Ethernet, etc. Designing and testing high-fidelity analogue semiconductors can take many months and require numerous re-spins of PCBs, but

when they work, they can last decades.



SMT-FMC116 - ADC FMC Module

The connector technology used by the FMC standard is the multi-sourced SEARAY from either Samtec – https://www.samtec.com/standards/vita/fmc – or Molex – https://www.molex.com/en-us/products/connectors/board-to-board-connectors/searay-searay-slim-connectors and comes in heights from 7mm to 22mm and with two variations in terms of number of pins

Low Pin Count (LPC): Provides 68 single-ended signals or 34 differential pairs and a single (1) serial transceiver pair
High Pin Count (HPC): Offers 160 single-ended signals or 80 differential pairs, plus ten (10) serial transceiver pairs.

The standard was expanded with an update in 2023, called VITA57.4, that offered more serial transceiver pairs and all these standards can be purchased here – https://www.vita.com/Purchase-Standards

An excellent article written by Samtec's Matt Burns, Global Director, Technical Marketing – https://vita.militaryembedded.com/7734-deja-vu-the-ubiquity-of-vita-57/

A PDF about Sundance's & Other Vendor's FMC Modules: https://www.sundance.com/wp-content/uploads/docs/Sundance_FMC_Modules_0924.pdf

Are there any limitations of FMC modules?
The FMC module is only 69mm x 76.5 mm, as it was intended to be fitted onto another VITA form factor called VITA 41.x "XMC", and that inflicted a mechanical issue on the amount of space for In/Out connectors. The actual width to populate with connectors is only 50mm wide.

The importance of Samtec's ARF6-RA connector
The typical route of routing analog (RF) signals into an FMC module would depend on the number of channels required, with the "SSMC"—Right Angle SSMC Jack (Female) Bulkhead PCB Connector Turret, Solder (https://www.fairviewmicrowave.com/)—connector being the smallest possible. However, that will still only allow ten (10) of them to fit onto an FMC, and the cost is approximately $30 each.

The ARF6 – https://www.samtec.com/products/arf6-ra – connector, as found on SMT-FMC116,

has sixteen (16) pairs of connectors and a cost of approx. $10 each and a total width of 20mm each. That will allow two ARF6-RA to be fitted to enable the sixteen (16) analog input channels.

Why was the LTC217x selected?
The LTC217x – https://www.analog.com/en/products/ltc2175-14.html – is proven and mature ADC and supported by the Open Hardware Repository – https://ohwr.org/project/fmc-adc-100m14b4cha/-/wikis/home – and requires only a few signal pairs of differential FPGA pins per channel of ADC.
Another benefit of the LTC217x is that this device only requires a single 1.8V DC, compared to the other ADC devices that stipulate multiple DC sources.

Are there any benefits of LVDS Interface compared to JESD204?
All FPGA vendors will have LVDS (Low-Voltage Differential Signals) connectivity, without exception, making it very easy to connect and control the SMT-FMC116 from any FPGA family.

The much higher-speed ADC/DAC Modules are now using a standard called “JESD204”, a serial interface that is not much different from what can be found in a PC now. The benefits are small devices with fewer pins, but it has some limitations, as the serial data will have to be converted inside the FPGA. Not all FPGA vendors offer IP-Cores for JESD204, but they must be re-developed and targeted for the chosen device.

This has an engineering cost and a resource cost for the available FPGA fabric, so a bigger FPGA might be required.

https://www.intel.com/content/www/us/en/products/details/fpga/intellectual-property/interface-protocols/jesd204c.html

https://www.xilinx.com/products/intellectual-property/ef-di-jesd204.html

https://www.microsemi.com/document-portal/doc_view/136596-dg0755-polarfire-fpga-jesd204b-standalone-interface-demo-guide

https://www.latticesemi.com/products/designsoftwareandip/intellectualproperty/referencedesigns/referencedesigns02/jesd204adc

The IP-Cores typically have a cost and limitations to distributions of the sources. That makes it much harder to integrate the bespoke application IP in the FPGA.

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