

Dedicated Systems' News



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GNAT Pro Safety-Critical for ARM Processors

Ada now available for popular bareboard platform

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AdaCore announced the availability of its GNAT Pro Safety-Critical product for ARM Cortex micro-controllers. This bare-board product provides a complete Ada development environment, oriented towards systems that are safety-critical or have stringent memory constraints. Developers of such systems can now exploit the software engineering benefits of the Ada language, including reliability, maintainability and portability.

ARM processors are becoming more and more prevalent in the aerospace, defence and transportation industries. This is due in large part to the vibrant support ecosystem that ARM enjoys, and to the growing popularity of these low-cost, low-power microprocessors.

The ARM platform adds to the GNAT Pro Safety-Critical product offering, which is already available for PowerPC and LEON boards, allowing easy portability among all three platforms. The technology does not require any underlying operating system, so it can be deployed on very small memory boards.

GNAT Pro Safety-Critical for bare-board ARM supplies a fully configurable / customisable run-time library and implements High-Integrity profiles that are especially relevant to safety-critical systems. The Zero Footprint Profile (ZFP) in particular defines an Ada subset that does not require any run-time routines, thus reducing the memory footprint to user code only.

The tool suite includes the following:

- Support for Ada 2012 (including the important “contract-based programming” features that make it easier to reflect the program’s intent) and all earlier versions of the Ada language
- A set of static analysis tools
 - GNATstack stack analysis tool
 - GNATmetrics complexity metrics tool
 - GNATcheck coding standard verification tool
- Support for the Ravenscar tasking profile
- The GNATtest unit test harness generator
- The GDB visual debugger
- A native Integrated Development Environment (IDE) as well as an Eclipse plug-in.

About GNAT Pro Safety-Critical

GNAT Pro Safety-Critical is a complete development environment for applications that need to meet the highest levels of safety-related standards found in industries such as aeronautics, space, railway, defence and medical systems. The product consists of the full GNAT Pro environment enhanced with a suite of tools — specifically GNATcheck, GNATmetric, and GNATstack — and specialised run-time libraries designed for usage in a safety certification context.

Owing to both the product’s technical features and the Ada language’s software engineering foundations, GNAT Pro Safety-Critical facilitates formal compliance with domain-specific safety standards. In addition to supporting RTCA DO-178B / DO-178C (also known as EUROCAE ED-12B / ED-12C), GNAT Pro Safety-Critical can help reduce the effort in certifying systems against standards such as DEF STAN 00-55 / 00-56 (defence), DO-278 / DO-278A (ground-based systems), CENELEC EN 50128 (rail) and ECSS-E-ST-40C / ECSS-Q-ST-80C (space). GNAT Pro Safety-Critical has been used to develop systems that have been certified to DO-178B Level A.

Technology Briefing: Future Airborne Capability Environment (FACE)

18th April 2013 9.00am—11.30am : Mawson Lakes Conference Centre

The Future Airborne Capability Environment (FACE) is a joint initiative being driven by the US Navy NAVAIR and US ARMY PEO Aviation. FACE delivers an open architecture that enables rapid deployment and reuse of software across platforms and greater interoperability. The expectation is that this will lead to a broader choice of software suppliers and a platform for integrating both future and legacy systems.

For more information go to www.dedicatedsystems.com.au/software-news or
Book your place at info@dedicatedsystems.com.au

Schroff®**Novastar—a new Platform of Aluminum Cabinets**

Impressive design and high functionality

19" Cabinets with attractive looks, high functionality and optimal access to electronics housed within are particularly important in laboratory-based ICT and in audio and video applications. For these areas Schroff has developed Novastar, a new platform of aluminum cabinets.

With its aluminum frame and interior-mounted cladding parts this cabinet offers an impressive appearance even without cover components, decorative frames or doors. The interior cover parts mean that the cabinet, available up to 47 U high, is 19"-capable while retaining a space-saving width of only 553 mm. The 19" perforation is integrated into the front and rear uprights and serves to accommodate 19" chassis. In this design the sub-assemblies are sealed flush with the cabinet frame. In many situations the front of the cabinet is not closed with a door, to ensure that the components can be accessed and serviced directly. Where required, however, a suitable steel or fully glazed door can be supplied. These doors feature an innovative hinge design that allows an opening angle of 180°. Additionally, the door can be removed or the end stop position changed without the need for tools.

The cabinet frame can be dismantled and consists of a die-cast frame and aluminum profiles that provide the Novastar range with high robustness despite their lighter weight construction. The cabinet offers protection up to IP40 and has a static load-carrying capacity of up to 400 kg. A groove integrated in the side of the frame can be used for fixing support arm systems for monitors or other accessories. Stationary or pull-out shelves, slide rails and other accessories offer flexible expansion options. The newly designed quick-release fasteners of the side panels are designed in such a way that they can be used as carrying handles on smaller cabinet sizes. With castors with built-in adjustable feet, the cabinet is ideal for mobile use in the laboratory.

Since power dissipation in ICT and audio/video applications tend to be small, in many cases sufficient cooling can be provided by natural convection (e.g. with cut-outs in the rear panel). Where required, however, Novastar can also be equipped with various ventilation solutions such as a raised cover with fan unit.

By default frame, cover and base elements are finished in RAL 7021 (black grey) with light grey (RAL 7035) cladding parts. The Novastar cabinet range can however also be supplied in any of 21 other colours (single or in combination) via Schroff's modification service.

**DNx-AI-218 / DNx-AI-228-300: 8 ch. 24-bit fully isolated A/D boards**

+/- 10V and +/- 300V Input Ranges

United Electronic Industries (UEI) announces the release of new analog input boards. All offer 8 analog input channels, 24-bit A/D resolution and 120 ksps maximum sampling rates. All boards also offer 350 Vrms channel-to-channel and channel-to-chassis isolation. The DNR versions are for use with UEI's RACKtangle® chassis, while the DNA versions are designed for installation into the PowerDNA Cube chassis. The **DNx-AI-218** offers a ± 10 VDC input range suitable for most general purpose DAQ measurements while the **DNx-AI-228-300's** ± 300 VDC input range makes it an ideal solution in a host of high voltage applications including battery testing, power plant monitoring, aircraft power monitoring and more.

The boards provide simultaneous sampling and each channel is based on its own oversampled SAR converter. Input gains of 1, 2, 4, 8, 16, 32 and 64 are fully software programmable. A diagnostic input mode flags open circuited connections and over-voltage conditions. The boards also go into a high impedance mode when power is removed, making them ideal for high reliability, redundant monitoring application.

Software included with the DNx-AI-218 and 228-300 provides a comprehensive yet easy to use API that supports all popular Windows programming languages. UEI also provides factory written drivers for all popular non-Windows operating systems including VxWorks and more. Finally, the UEIDAQ Framework supplies complete support for those creating applications in data acquisition software packages such as LabVIEW, MATLAB/Simulink, DASyLab or any application which supports ActiveX or OPC servers.





Virtex-7™ boards in XMC and VPX form factors



4DSP, a technology design company with offices in Austin and the Netherlands, announced the release of the **FM780** and **VP780**, two highly configurable modules with advanced Digital Signal Processing (DSP) capabilities and multiple I/O options. The FM780 is XMC (VITA 42.3) compliant with a PCI Express Gen 2 interconnect while the VP780 is a 3U VPX form factor (VITA 46). Both cards offer a FMC (FPGA Mezzanine Card, VITA 57) site and two 4DSP BLAST (Board Level Application Scalable Technology) locations that are closely coupled to the onboard Xilinx Virtex-7™ FPGA and 2GB of DDR3 SDRAM.

The Virtex-7™ FPGA device available on-board is user-programmable and can be used for the implementation of high-end signal processing algorithms. Based on customer requirements, front-panel I/O modules may be added to enable the FM780 and VP780 to perform data acquisition and waveform generation, high-speed communication, image processing and implement various types of complex DSP applications. In addition to 2GB of on-board DDR3 SDRAM the FM780 and VP780 offer a variety of memory options such as NAND Flash, QDRII SRAM+, and extra DDR3 SDRAM through BLAST modules. Optionally, the user-configurable BLAST mounting sites may also be populated with JPEG2000 CODECs or even a customer's specific logic devices or circuit designs. Both the FM780 and VP780 are also available as conduction cooled modules.

The FMC site provides a method of adding industry standard I/O modules based on the FMC standard. 4DSP has several FMC modules to choose from in addition to the many modules available from the FMC ecosystem, providing a very large selection of readily available I/O options for the FM780 and VP780.

Applications will benefit from the performance of the Virtex-7™ and the I/O flexibility of the FMC site. The VP780 and FM780 are an excellent choice for high performance applications that require large band signal digitisation or generation through the use of accelerated frequency-domain algorithms.

A full suite of tools is available to support the FM780 and VP780:

Board control and monitoring tools / Flash programming utility / Confidence tests / Host side API / Software program example / Xilinx ISE project / Test firmware and VHDL source code / Drivers for Windows, Linux, VxWorks / Stellar IP is available for this product. A simple way to design FPGA firmware with automated code and bit stream generation.

Both the VP780 and FM780 are available in operating temperature ranges of 0°C to 70°C and -40°C to 85°C with optional conformal coating.



XMC Module: High Speed Dual-Port Isolated RS-485 Interface

The **DU1-MUSTANG** is a XMC compliant single width mezzanine card, equipped with a PCI Express® to dual-UART bridge. Two high speed RS-485 balanced line transceivers with internal 5kV isolation barrier provide for optimum reliability and immunity against electromagnetic noise (EMC) and electrostatic discharge (ESD).

The UARTs (COM ports) are compatible with any asynchronous serial application. Certified device drivers are available for Windows®. The 16Mbps EIA/TIA-485 transceivers can be configured for full-duplex operation (4+1 wire cable) or half-duplex (2+1 wire cable), either point-to-point or multipoint applications.



Steve Elliott Retires !

Steve has decided to stay embedded more often, hang up his keyboards, empty his bookcases and move to real-time retirement. John caught up with him for some rare insights just prior to his departure.....

John: You have a weird accent, where exactly were you born?

Steve: Essex, you could say I migrated from old south Wales to New South Wales!

John: Do you remember your first computer?

Steve: I was fortunate enough to have access to an Elliott 803 paper tape & push button input & paper tape output – Autocoder programming

John: When I google the 803 I notice that it is a solid state computer with lots and lots of germanium in it - you worked together with Walter another Germanium for 17 years :)

Steve: Sigh, ha ha, yes I was fortunate to have 2 German-iums in my life.

John: Favourite Architectures?

Steve: Iapx 432; Inmos transputer; Burroughs B1700

John: So tell us how you first got involved in real-time?

Steve: Real-time and dedicated systems have been my specialty since my university projects using PDP-8 & Honeywell H516 to code character display on an oscilloscope.

John: How did you first become involved with VxWorks and Wind River Software?

Steve: A Sydney based defence contractor found themselves with a requirement to provide interfaces & VxWorks drivers for a number of exotic avionics interfaces. I was brought in to design & implement the software and guide the hardware design. (circa 1991-92).

John: You have the an uncanny ability to find the bug and solve the unsolvable. Is there any advice you could offer to those new to embedded and real-time.

Steve: Implementing requirements is easy; checking that preconditions comply is hard. 20% of an implementation is getting required performance; 80% is preventing un-required (and usually unspecified) performance. If your system has a fault, develop a hypothesis to its cause & code tests for that.

John: Best Computer / Gadget of all time

Steve: VBM Espresso Machine

John: You are a movie buff from way back. Is there one you really enjoy watching

Steve: The Birds

John: So what does the future hold now, how will you be spending your time?

Steve: My intention is to do more reading, cycling and travel.



On behalf of all of us at Dedicated Systems as well as our customers and partners we thank Steve for his loyal service over many years and wish him all the best for his future endeavours.

Please send any farewell wishes to: Steve@dedicatedsystems.com.au .