Technical Datasheet

AB3000 Rugged Computer

Embedded Computer for Demanding Applications

Vertical Mounting Chassis

Available Interfaces

MIL-STD-1553	2D/3D Video
ARINC 429/575	Audio
ARINC 708/453	Discrete I/O
ARINC 717/573	PMC Expansion
RS-232/423/422/485	· ARINC 664
CANBus	· Sync. Serial
Ethernet	· Ethernet Switch
USB 2.0 Host	· Other I/O & Functions

Description

The rugged AB3000 is a family of compact, conduction-cooled computers for use in demanding environments. These versatile systems include many built-in standard peripherals, avionics databuses, and user interfaces, as well as PMC expansion capability. With the addition of application software, the AB3000 provides a readily available Commercial Off-The-Shelf (COTS) solution to challenging interface, bridging, control, and audio/display problems. The AB3000 is available in over 100 different configurations to meet a wide variety of needs.

Typical applications for the AB3000 include data and protocol conversion, databus and network bridging, data servers, data recorders, communications, power controllers, federated controllers and multiple net-centric applications. In addition, the AB3000 can support voice and visual processing for cockpit voice actions, canned message delivery, workstation expansion and more. The AB3000 is small, lightweight and loaded with capabilities for easy integration into today's modern aircraft, UAVs, and ground mobile platforms.

Architecture

At the heart of the AB3000 is a user-programmable Intel Atom E680T processor with hyper-threading and virtualization. It features an integrated graphics media accelerator (GMA) for 2D/3D video and 2-channel audio. Protocol processing for the avionics interfaces is off-loaded to dedicated interface circuitry, maximizing Intel processor resources for the user application.

Software

There are two ways software can operate the AB3000: embedded or tethered. Embedded programs are typically developed on a host computer and then uploaded to the AB3000's non-volatile Flash memory. At power-on the embedded application boots from the Flash memory and runs without host intervention. In tethered operation, a separate computer runs the application and controls the AB3000 over Ethernet.

The included Software Development Kit (SDK) provides tools and examples to facilitate the development of software applications. The AB3000 uses Ballard's universal BTIDriver API, so application software for this device is easily ported to or from other Ballard products. Although the AB3000 can be configured and run with only a few API calls, the comprehensive library includes a broad range of functions for specialized needs. Optional CoPilot® software facilitates analysis and test for in-flight and other embedded applications.

Features

- Versatile computer system
- Intel® Atom™ E680T processor
- 2D/3D graphics engine
- Standard computer I/O
- Avionics databuses
- PMC expansion site

Design Specifications

- Helicopter, fixed wing, ground mobile
- Rugged: MIL-STD-810
- EMC quiet: MIL-STD-461
- Commercial: DO-160
- Resilient: MIL-STD-704
- Low power: 20 to 50 W

Mechanical

- Small: 5.3 x 7.7 x 2.8 in
- Lightweight: 5 lb (2.3 kg)
- Conduction or convection cooled
- MIL-SPEC connectors
- Horizontal and vertical mounting options

Software

- Universal BTIDriver™ API compatible
- Embedded Linux® SDK (included)
- Windows® Embedded 7 (optional)
- VxWorks® and other RTOS BSPs (optional)
- CoPilot® analysis & test software (optional)

Benefits

- A true COTS solution
- Prevalidated system
- Seamless prototype to deployment
- Reduces project risk, time, and cost
- Single solution for many applications

Ballard TECHNOLOGY

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AB3000 Rugged Computer

Available Interfaces

MIL-STD-1553

Up to 4 dual-redundant channels
BC/RT/MON (Single- or Multi-Function)
Hardware controlled transmit scheduling
CH/TA/SA filtering
Sequential monitor

ARINC 429

Up to 24 channels (Rx/Tx)
Periodic and asynchronous messages
Hardware controlled transmit scheduling
Receive message filtering (Label/SDI)
Sequential monitor

ARINC 708

Up to 4 channels
Hardware controlled transmit scheduling
Receive message filtering
Sequential monitor

ARINC 717

Up to 2 channels
Biphase/Bipolar
Transmit and receive
Sub-frame and super-frame support
64, 128, 256, 512, 1024, 2048, 4096, 8192 wps
Sequential monitor

RS-232/423/422/485

4 channels
Selectable baud rates
Ethernet (TCP) serial server mode

Ethernet

2 ports
Auto-sensing 10/100/1000 Mb/s
IEEE 1588 (PTP) hardware assisted
TCP/IP, UDP
Built-in Telnet/SSH, FTP, and Web servers

USB 2.0 Host

2 ports
High-speed (480 Mb/s)

Avionics Discrete I/O

Up to 48 programmable Input/Output
Open/GND configuration

Specifications

The AB3000 is available in a large number of configurations that all share the base model features below:

Base Model Features

- Intel Atom E680T 1.6GHz processor
- Hyper-threading and virtualization
- 2 GB RAM
- 8 GB solid-state storage (32GB optional)
- Video Out: DVI; Intel GMA 600 2D/3D graphics engine; MPEG-4, H.264
- Audio In: 2 mic pre-amps with 8-96kHz sampling; Audio Out: 2 headphones, 50 mW into 16 ohm
- 2 Ethernet ports (10/100/1000)
- 4 RS-232/423/422/485 (selectable)
- 1 CANbus 2.0 (ARINC 825 PHY)
- 2 USB 2.0 host ports
- Keyboard connection via USB
- Avionics discrete I/O
- IRIG A or B, AM, PWM and PPS
- Voltage and temperature monitoring
- Conduction-cooled PMC site
- Power: 28 VDC nominal, MIL-STD-704, MIL-STD-1275
- MTBF: 242,000+ hours

Environmental

Storage temperature: -55 to 100°C
Operating temperature: -40 to 71°C
Conduction or convection cooled
DO-160, MIL-STD-810, MIL-STD-461
Hose down; Salt fog resistant
(Contact factory for environmental test data)

Mechanical

Compact enclosure: 5.3 x 7.7 x 2.8 in (135 x 195 x 71 mm), mounting flanges extend 0.6 in (15 mm) on each side
Weight: 5 lb (2.3 kg)
Horizontal and vertical chassis options
(CAD installation drawings available)

Connectors

Base & databus I/O: D38999 (100-pin)
PMC I/O: D38999 (100-pin)
Power: D38999 (4-pin)

Software

Universal BTIDriver API compatible
Embedded Linux SDK (included)
Microsoft® Windows® Embedded 7 (optional)
VxWorks, LynxOS-178, and other RTOS BSPs (optional)
CoPilot analysis & test software (optional)
Data recorder software (optional)

AB3000 Models

Ballard offers over 100 COTS AB3000 configurations. Contact factory for ordering information, accessories, and custom needs. Following are a few example configurations:

Model AB3186

Base Model features plus 2 dual-redundant multi-function MIL-STD-1553, 8R/4T ARINC 429, 1R/1T ARINC 717 channels

Model AB3280

Base Model features plus 4 dual-redundant multi-function MIL-STD-1553 channels

Model AB3430

Base Model features plus 16R/8T ARINC 429 and 1R/1T ARINC 717 channels

Model AB3342

Base Model features plus 8R/4T ARINC 429, 1R/1T ARINC 708 and 1 dual-redundant multi-function MIL-STD-1553 channel

Chassis Options

Choice of horizontal or vertical chassis
Color: black standard (green optional)

PMC and I/O Expansion Options

Factory-installed PMC cards further expand AB3000 functionality. Possibilities include ARINC 664, additional 1553/429/717/708 channels, synchronous/asynchronous serial, 9-port Ethernet switch, memory, 1394B and more.

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