

AB2000

*Embedded Computer for
Rugged Applications*

Avionics BusBox®

Available Interfaces

MIL-STD-1553	Discrete I/O
ARINC 429/575	PMC Expansion
ARINC 708/453	· ARINC 664
ARINC 717/573	· Sync. Serial
RS-232/423/422/485	· CAN bus
Ethernet	· Ethernet Switch
USB 2.0 Host	· Other I/O &
Flash Drive	Functions

Description

The Avionics BusBox 2000 (AB2000) is a family of small, lightweight, conduction-cooled, embedded computers for rugged 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 AB2000 provides a readily available Commercial Off-The-Shelf (COTS) solution to challenging interface, bridging, and control problems. The AB2000 is available in over 100 different configurations to meet a wide variety of needs.

Typical applications for the AB2000 include data and protocol conversion, databus and network bridging, data servers, data recorders, communications, power controllers, federated controllers and multiple net-centric applications. The AB2000 delivers outstanding performance for applications on the ground or in the air, and is easily integrated into today's modern aircraft, UAVs, and ground mobile platforms.

Architecture

At the heart of the AB2000 is a user-programmable PowerPC processor. It runs the software application and controls standard interfaces, such as Ethernet, USB and serial. Protocol processing for the avionics interfaces (MIL-STD-1553, ARINC, discrete I/O) is off-loaded to dedicated interface circuitry to increase efficiency and maximize PowerPC resources for the user application.

Software

There are two ways software can operate the AB2000: embedded or tethered. Embedded programs are typically developed on a host computer and then uploaded to the AB2000'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 AB2000 over Ethernet.

The included Software Development Kit (SDK) provides tools and examples to facilitate the development of software applications. The AB2000 uses Ballard's universal BTIDriver API, so application software for this device is easily ported to or from other Ballard products. Although the AB2000 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.



*Optional Vertical
Mounting Plate*



*Wide Variety of Built-in Avionics
Interfaces and Standard I/O*

Features

- Versatile computer system
- PowerPC® processor
- Standard computer I/O
- Avionics databuses
- PMC expansion site

Validated

- Helicopter, fixed wing, ground mobile
- Rugged: MIL-STD-810
- EMC quiet: MIL-STD-461
- DO-160 Certified
- Low power: 8 to 30 W

Mechanical

- Small: 5.5 x 7.3 x 2.5 in
- Lightweight: 3.5 lb (1.6 kg)
- Conduction or convection cooled
- MIL-SPEC connectors
- Mounting hardware (optional)

Software

- Universal BTIDriver™ API compatible
- Embedded Linux® SDK (included)
- VxWorks® and other RTOS BSPs (optional)
- CoPilot® Analysis & Test Software (optional)

Benefits

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

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AB2000 Avionics BusBox

Specifications

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

2 channels
Selectable baud rates
Optional handshake signals (232 mode)
Ethernet (TCP) serial server mode

Ethernet

1 port
Auto-sensing 10/100 Mb/s
TCP/IP, UDP
Built-in Telnet, 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 AB2000 is available in a large number of configurations that all share the base model features below:

Base Model Features

- PowerPC processor
- 64 MB SDRAM
- 16 MB Flash
- Real Time Clock (with 650+ hours of backup)
- 1 Ethernet port (10/100)
- 2 RS-232/423/422/485 (selectable)
- 2 USB 2.0 host ports
- Avionics discrete I/O
- IRIG A or B, AM, PWM and PPS
- Voltage and temperature monitoring
- Flash drive (512 MB standard)
- Conduction-cooled PMC site
- Power: 28 VDC nominal
- MTBF: 350,000+ 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
(Contact factory for environmental test data)

Mechanical

Compact enclosure: 5.46 x 7.31 x 2.48 in
(139 x 186 x 63 mm)
Weight: 3.5 lb (1.6 kg)
Horizontal and vertical mounting
(CAD installation drawings available)

Connectors

Base & databus I/O: D38999/20FG35SA
(79-pin)
PMC I/O: D38999/20FG35SB (79-pin)
Power: D38999/20FC4PN (4-pin)

Software

Universal BTIDriver API compatible
Embedded Linux SDK (included)
VxWorks and other RTOS BSPs (optional)
CoPilot analysis & test software (optional)
Data recorder software (optional)

AB2000 Models

Ballard offers over 100 COTS AB2000 configurations. Contact factory for ordering information, accessories, and custom needs. Following are a few example configurations:

Model AB2280

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

Model AB2146

Base Model features plus 8R/4T ARINC 429 and 1R/1T ARINC 717 channels

Model AB2342

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

Standard Accessories

Interconnect Kits

17019: Mating Connectors (J1, J2)
17020: Mating Connectors (J1, J2, J3)
17021 & 17027: Lab Connectivity & Power Supply Kits

Mounting Kits

17023: Horizontal Mounting Kit
17024: Vertical Mounting Kit

PMC and I/O Expansion Options

Factory-installed PMC cards further expand AB2000 functionality. Possibilities include ARINC 664, additional 1553/429/717/708 channels, synchronous/asynchronous serial, 9-port Ethernet switch, memory, 1394B and more.

Ballard 
TECHNOLOGY

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Aerospace
Military
Commercial

Interfaces
Embedded Systems
Software

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