

Embedded Solutions from the OmniBus Family

Applications

- Protocol converter
- Data server (Ethernet)
- Data recorder
- Remote monitoring

Interfaces

- MIL-STD-1553
- ARINC 429/575
- ARINC 708/453
- ARINC 717/573
- RS-232/422/485
- Ethernet (10/100)
- USB 2.0 Host (High Speed)
- CompactFlash® disk
- Discrete I/O

Description

Ballard's Avionics BusBox is a small lightweight embedded computer with built-in interfaces for standard peripherals and for various avionics databuses. Under the direction of its application specific software, the Avionics BusBox can autonomously perform tasks that involve receiving information from some interfaces and processing and mapping the information into other interfaces.

Architecture

At the heart of the Avionics BusBox is a user programmable PowerPC® processor, which controls the various standard (serial, Ethernet, and USB) and avionics databus (MIL-STD-1553, ARINC 429/708/717, etc.) interfaces. The high level of functionality implemented in the hardware interface circuitry gives the software application full use of the PowerPC processor.



Application Examples

The flexibility of the Avionics BusBox lends itself to many different applications.

As a protocol converter, the Avionics BusBox can aid in the integration of commercial and military avionics. For example, acting as a MIL-STD-1553 Bus Monitor and an ARINC 429 transmitter, the Avionics BusBox could make navigation data from a military system available to a commercial device.

The Ethernet port may be used in a variety of applications including an Ethernet-to-avionics bridge, an avionics data server, or a remote control/monitoring interface for avionics devices.

Aircraft data can be monitored and recorded to the on-board CompactFlash disk. This is useful in maintenance applications where flight data can subsequently be analyzed to detect potential problems.

Additional Features

The USB host port allows for the connection of a wide variety of devices. For example, a USB mass storage device could be used for transferring data to/from the Avionics BusBox, or an 802.11 wireless device could be attached as an alternative to the wired Ethernet port.

Also included are serial ports and avionics level discrete I/O which can be used to interface with other devices.

Software

Programs for the PowerPC processor are developed on a host computer and then uploaded to the Avionics BusBox where they can be saved in non-volatile Flash memory. Applications can then boot from the Flash memory and run without host intervention.

A Software Development Kit (SDK) allows users to develop their applications using the included BTIDriver™ API. All OmniBus products run Ballard's universal BTIDriver API, so applications developed for one platform or product can be easily ported to another. Although the Avionics BusBox can be easily configured and run with only a few API calls, the comprehensive library includes a broad range of functions for specialized needs.

Also included with the SDK are many example programs and the development tools for compiling applications to run on the embedded PowerPC processor.

Avionics BusBox Technical Specifications

General

- PowerPC 405GPr processor (266 MHz)
- 64 MB SDRAM
- 16 MB Flash
- Real Time Clock (with 650+ hours of backup)
- CompactFlash slot (with power fail protection)
- High resolution timer for time-tagging events (1us)
- Embedded Linux Operating System

Interfaces

- MIL-STD-1553
 - BC/RT/MON (Single or Multi-Function)
 - Hardware controlled transmit scheduling
 - TA/SA message filtering
 - Sequential monitor
- ARINC 429
 - Periodic and asynchronous messages
 - Hardware controlled transmit schedule
 - Receive message filtering (Label/SDI)
 - Sequential monitor
- ARINC 708
 - Hardware controlled transmit schedule
 - Receive message filtering
 - Sequential monitor
- ARINC 717
 - Transmit and receive
 - Sub-frame and super-frame support
 - 64,128,256,512,1024,2048,4096,8192 wps
 - Sequential monitor
- RS-232/422/485
 - Selectable baud rates
 - Optional handshake signals (232 mode)
- Ethernet
 - Auto-sensing 10/100 Mb/s
 - TCP, UDP
 - Built-in Telnet, FTP, and Web servers
- USB 2.0 Host
 - High Speed (480 Mb/s)
 - Mass storage devices
 - Wireless (802.11) devices
- Discrete I/O
 - Outputs: Open/GND
 - Inputs: Open/GND or 28V/Open

Environmental

- Industrial Temperature Range
 - Storage Temperature: -55 to 100°C
 - Operating Temperature: -40 to 70°C
- Compact enclosure
 - 4 x 6 x 1.7 inch (excluding connectors and flange)
 - Mounting holes

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Technology

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Specializing in avionics databases

MIL-STD-1553
ARINC 429/575/629/708/717
AFDX/ARINC 664
SPACE SHUTTLE
Custom Products

Avionics BusBox Configurations

Standard Models

The Avionics BusBox is available in a number of configurations. The following is a list of the standard models.

Model 100 (Base configuration)

- PowerPC Processor
- 64 MB SDRAM
- 16 MB Flash
- Real Time Clock
- 2 RS-232/422/485 (selectable)
- 1 Ethernet (10/100) Port
- 1 USB Host Port
- 6 Open/GND Discrete Inputs
- 4 Open/GND Discrete Outputs
- CompactFlash (512MB)
- 28 VDC supply (Industrial grade)

Model 110 (MIL-STD-1553)

- Model 100 plus...
- 1 MIL-STD-1553 (Multi-Function)

Model 140 (ARINC 429)

- Model 100 plus...
- 4R/2T ARINC 429

Model 150 (1553 + ARINC 429)

- Model 100 plus...
- 1 MIL-STD-1553 (Multi-Function)
- 4R/2T ARINC 429

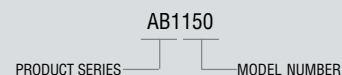
Standard Options

The standard configurations are customizable with some standard options. Please contact Ballard Technology about the following options.

- 28 VDC supply (Avionics grade)
- Different sized CompactFlash

Ordering Information

Avionics BusBox order numbers consist of the product series and a model number.



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