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OmniBusBox™

Multi-Protocol

High-Performance Ethernet/USB Interface to Multiple Avionics Databuses



Protocols

- MIL-STD-1553
- ARINC 429/575
- ARINC 708/453
- ARINC 717/573
- RS-232/422/485
- Discrete I/O
- Custom

Features

- High channel count
- Mixed protocols
- PowerPC user processor
- Ethernet and USB ports
- CompactFlash socket
- IRIG time synchronization
- Can be upgraded/reconfigured

Description

The OmniBusBox™ enables computers and networks to interface with multiple avionics databuses via Ethernet or USB. Applications for the OmniBusBox include simulation, monitoring, and testing of avionics equipment and systems. The OmniBusBox may be configured as a local peripheral to a computer, as a remote data server in a network, or as a stand-alone unit.

The OmniBusBox is a member of Ballard's OmniBus® product line, a family of avionics databus interfaces that takes flexibility and power to a new level. With the demand for products with high channel counts and multi-protocol capability comes the need for more processing power, not only for handling the protocol but also for running the user's application. The OmniBus family has addressed these requirements through modularity and by adding multiple processors.

Flexible Configuration

Through modularity, Ballard can provide unique, user-specified configurations on short notice at minimum cost. The flexibility of this design allows more protocol and channel count combinations to be developed and stocked than is practical with fixed configurations. The unique OmniBus architecture offers higher performance than general-purpose modular systems. Modularity also means that users may upgrade or reconfigure their OmniBus with additional functionality, channels, and protocols as their requirements change.

Multiple Processors

OmniBus modularity allows additional processors to be added as more channels and/or protocols are added. Because each module has its own DSP (see diagram on next page), OmniBus products provide high channel count and mixed protocol capability without relying on the host processor or risking data loss from an overloaded DSP. By including more channels, protocols, and processing power in a single product, OmniBus provides better economy of scale.

User Processor

An on-board PowerPC® processor can be programmed by the user to run independently or to off-load other processors in the system. Users can upload programs and may save them in non-volatile on-board memory. The PowerPC can be configured to automatically boot and run independently of the Ethernet or USB ports. Possible applications include data servers, data converters, dynamic data generation/simulation, data filtering, and event triggering. For example, the OmniBusBox could be configured as a stand-alone data converter that translates ARINC 429 to MIL-STD-1553.

Additional Capabilities

- OmniBusBox provides two Ethernet ports, a USB 2.0 port, two serial RS-232 ports, and a CompactFlash® socket.
- The OmniBusBox may be controlled remotely through the Ethernet or USB ports.
- The two auto-speed sensing 10/100 Ethernet ports are configured as a switch, so the OmniBusBox can be easily added

Ballard Technology

11400 Airport Road, Everett, WA 98204-8782 USA ▪ Tel: (800) 829-1553 (425) 339-0281 Fax: (425) 339-0915
E-mail: sales@ballardtech.com Web: www.ballardtech.com

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in-line between a computer and its existing Ethernet connection.
- IRIG circuits allow channels, boards, and other equipment to be synchronized to a standard clock time. The IRIG time can come from an outside source or be generated on board.
- All OmniBus products include various digital input and output signals.
- In addition to desktop use, the OmniBusBox can be rack mounted or bolted down.

Software

The easiest way to operate an OmniBusBox is with Ballard's CoPilot® software running on a Windows® computer. CoPilot is an intuitive, interactive program that simplifies the simulation and testing of avionics systems. CoPilot auto-detection, engineering units conversion, and other features increase user productivity. The Plus version of CoPilot adds graphical displays, a powerful scripting engine, and playback. Because CoPilot can host multiple devices, channels, and databuses (MIL-STD-1553, ARINC 429, and ARINC 708), it is the ideal tool for OmniBus. CoPilot may be purchased separately or bundled with OmniBus hardware.

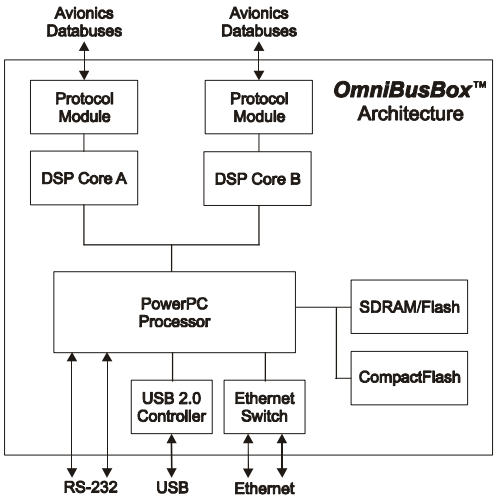
Alternatively, software developers can use the included BTIDriver™ API library to quickly develop custom applications. Although each OmniBus product can be easily configured and run with only a few API calls, the comprehensive library includes a broad range of functions for specialized needs. All OmniBus products run Ballard's universal BTIDriver API, so applications developed for one platform or product can be easily ported to another.

Windows drivers are included; call for availability of Linux, VxWorks®, or other drivers. An SDK is available for experienced Linux users to develop software for the PowerPC.

Ordering Information

The order number for an OmniBus product is a combination of the board part number and module part number(s). For example, a 162-xxx-xxx is an OmniBusBox with two protocol modules (xxx = module P/N).

P/N	*Description*
162	two-core OmniBusBox



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11400 Airport Road
Everett, WA 98204-8782 USA
Tel: (800) 829-1553 (425) 339-0281
Fax: (425) 339-0915
E-mail: sales@ballardtech.com
Web: www.ballardtech.com

OmniBus Products:
- OmniBus PCI
- OmniBus cPCI
- OmniBus VME
- OmniBusBox (Ethernet/USB)

OmniBus Protocols:
- MIL-STD-1553
- ARINC 429
- ARINC 708
- ARINC 717

OmniBusBox Configurations:

Channel Count per Module

Protocol	*Maximum Channels*
1553	2 (both dual redundant)
429	16 (various R/T combinations)
708	4 (2R/2T)
717	4R/4T (biphase/bipolar selectable)

Example Configurations for 2 Modules
- Up to 4 MIL-STD-1553 channels
- Up to 32 ARINC 429 channels
- 1 or 2 MIL-STD-1553 channels plus up to 16 429 channels
- Up to 16 ARINC 429 channels plus 2 or 4 ARINC 708 channels
- Up to 24 ARINC 429 channels plus 8 ARINC 717 channels

Technical Specifications:

Interfaces
10/100 Ethernet: 2 ports (internal switch)
USB 2.0: Full Speed and High Speed
RS-232: Two ports (on single RJ12)
CompactFlash socket: Type I/II
IRIG modes: A and B

Software
CoPilot® available (Windows® software)
BTIDriver™ API included (VB, C/C++, LabVIEW®)
OS drivers: Windows® included; call for availability of Linux, VxWorks®, others
Embedded Linux installed; SDK available

Main Board
Processor: IBM PowerPC® (405GPr), 333 MHz
Memory: 64 MB SDRAM, 4 MB Flash
DIO: 2 inputs, 2 outputs (additional 3 inputs and 3 outputs per core)
Other: real-time clock (1000+ hrs. backup)

Physical
Size: 1.7 (1U) x 12 x 9.6 in. (approx. 44 x 305 x 244 mm)
Weight: 3.5 lbs. (1.6 kg)
Mounting options:
- table-top (rubber feet)
- bolt-down
- rack mount

Connectors
60-pin Molex® LFH™ (per core)
Various cables and connectors available

Power
Supply (built-in):
- Universal 100–250 VAC, 0.6–0.25 A, 50–60 Hz
- Optional 28 VDC; others available

Fuses:
- 1 A, 250 V, time lag
- 5 x 20 mm IEC 60127-2

Environmental
Temperature: 0° to 50° C
Convection cooling: internal fan
Humidity: 0 to 95% (non-condensing)

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