

## MIL-STD-1553 Interface for Conduction Cooled PMC

### MIL-STD-1553 Features

- 1 or 2 dual-redundant MIL-STD-1553 A/B channels
- BC, RT and Monitor operation
- Each 1553 channel may be ordered in five levels of functionality (see table at right)
- Flexible BC schedules with gaps, branches, retries, etc.
- Support for all 1553B messages, mode codes, broadcast, etc.
- Capture all or selected traffic on fully loaded buses
- Full error detection and error injection to word and bit level
- Variable transmit amplitude and zero crossing distortion
- IRIG time-tags/synchronization
- RT address input discretes
- Direct and transformer coupled



### PMC Features

- PCI: universal voltage, 32-bit, 33/66 MHz
- PrPMC compatible
- Conduction cooled
- Rear panel I/O (P14 connector)
- Optional front panel I/O
- PowerPC user processor
- RS-232/422/485 ports
- Avionics discrete I/O

### Description

Ballard's OmniBus®1553 PMC brings the power and flexibility of OmniBus 1553 products to the PMC form-factor. This COTS-based device offers a rugged, conduction cooled, dual channel 1553 interface. The OmniBus 1553 PMC is able to withstand extreme temperatures, shock and vibration making it ideal for interfacing to MIL-STD-1553 databuses in harsh environments.

### Architecture

The OmniBus 1553 PMC can be a peripheral to a host processor

system, or it can be operated as a stand-alone device utilizing the PowerPC embedded processor. The MIL-STD-1553 channels are implemented as hardware modules external to the processor. This results in the user having full utilization of the processor while protocol operations are autonomously performed in hardware. The OmniBus architecture ensures all schedules will be maintained and all data will be received, on fully loaded 1553 databuses. Transmit schedules, message structures and sequential monitor records are all stored in shared memory accessible by both the processor and the protocol hardware. A DMA mode is provided for efficiently transferring data from the on-board sequential monitor to the host processor.

	A	B4	B32	C	D
Number of Simultaneous Terminals	1	4	32	32	32
Monitor	✓	✓	✓	✓	✓
Filtering for terminal address	✓	✓	✓	✓	✓
Filtering for subaddress		✓	✓	✓	✓
Concurrent terminal monitoring				✓	✓
Protocol Error Injection				✓	✓
Variable Transmit Amplitude					✓
Zero Crossing Distortion					✓

*Levels of functionality for OmniBus 1553 channels*

The OmniBus 1553 PMC modules are available with 1 or 2 dual-redundant 1553 channels. To provide flexibility and economy each channel can be ordered in one of five levels of functionality (see table above). All levels provide Bus Controller, Remote Terminal or Monitor operation and support all 1553 message types. The higher levels can concurrently simulate multiple terminals, inject errors, and adjust the waveform. For a complete description of the MIL-STD-1553 interface, see the OmniBus 1553 brochure.

### Additional Capabilities

The OmniBus 1553 PMC is a conduction cooled PMC module with a universal PCI interface. Standard rear panel I/O (P14) or optional front panel I/O connectors provide access

to the 1553 databus signals. Additional I/O include RT address inputs, IRIG signals, RS-232/422/485 serial ports, and avionics discretes. These standard interfaces make the OmniBus 1553 PMC useful in a variety of systems.

## Applications

Applications for OmniBus products include operational environments as well as testing and simulation. The multi-channel, multi-terminal capability, on-board PowerPC processor, and the rugged, conduction cooled PMC formfactor are ideal for COTS systems. Extensive error detection and generation capability make OmniBus 1553 well suited to product development, simulation, and system testing.

## Detailed Specifications

<b>General</b>	
PMC	VITA 20, Conduction Cooled PMC Primary and secondary thermal interfaces IEEE P1386.1 with optional front I/O bezel installed VITA 32, PrPMC compatible
Physical	4mm x 143.75mm P14 rear panel I/O connector
Power (typ)	+3.3VDC: 650mA +5VDC: 850mA 3.7W dissipated on side 1 2W dissipated on side 2
<b>Environmental<sup>(1)</sup></b>	
Operating temp	-40 to 70°C at card edge (CC3)
Storage temp	-55 to 100°C (C3)
Vibration	0.1g <sup>2</sup> /Hz, 5-2000Hz (V3)
Shock	40g, 11ms
Altitude	-1,500 to 60,000 feet
<b>Interfaces</b>	
MIL-STD-1553	1 or 2, dual-redundant channels (BC, RT, and MON)
IRIG	A or B, TTL
Serial	2 RS-232/422/485 ports <sup>(2)</sup>
Discretes	12 MIL-STD-1553 RT address inputs, 8 avionics I/O, 6 digital I/O
<b>Software</b>	
API	BTIDriver included for C/C++, VB, LabVIEW
O/S	Drivers available for Windows, Linux, VxWorks, INTEGRITY
Embedded	Linux and other Board Support Packages available

<sup>(1)</sup> Test verification pending (data available upon request)

<sup>(2)</sup> Serial ports are accessible by the on-board PowerPC processor

## Software

Users can develop software using the included BTIDriver™ API. Although the OmniBus 1553 PMC can be easily configured and run with only a few API calls, the comprehensive library includes a broad range of functions for specialized needs.

BTIDriver is a universal API compatible among all OmniBus Family products, so applications developed for other platforms are easily migrated to applications for the OmniBus 1553 PMC.

Software support includes drivers for various operating systems, as well as support for programming the embedded processor.

## OmniBus 1553 PMC Ordering Information:

The order number for an OmniBus 1553 PMC is a combination of the board part number (141) and the channel configuration part number. The table below illustrates the MIL-STD-1553 module numbering scheme. Any mix of levels may be ordered on a single PMC module. The table on the previous page describes the 5 levels of functionality (A to D).

P/N	CH0 Level	CH1 Level
510	A	—
520	B4	—
530	B32	—
540	C	—
550	D	—
511	A	A
522	B4	B4
533	B32	B32
544	C	C
555	D	D
551	D	A

## Example Configuration:

Part number: 141-551 /E

- conduction cooled PMC board
- channel 0 is level D
- channel 1 is level A
- extended temperature range (/E)

## Ordering Options:

Please contact Ballard Technology about the following standard options:

- conformal coating
- front panel I/O (air-cooled)

**Ballard** // // // // //  
**Technology**

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OmniBus Products:

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

OmniBus Protocols:

- MIL-STD-1553
- ARINC 429
- ARINC 708
- ARINC 717

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