

# MIL-STD-1553 / PCI IP Core for FPGAs



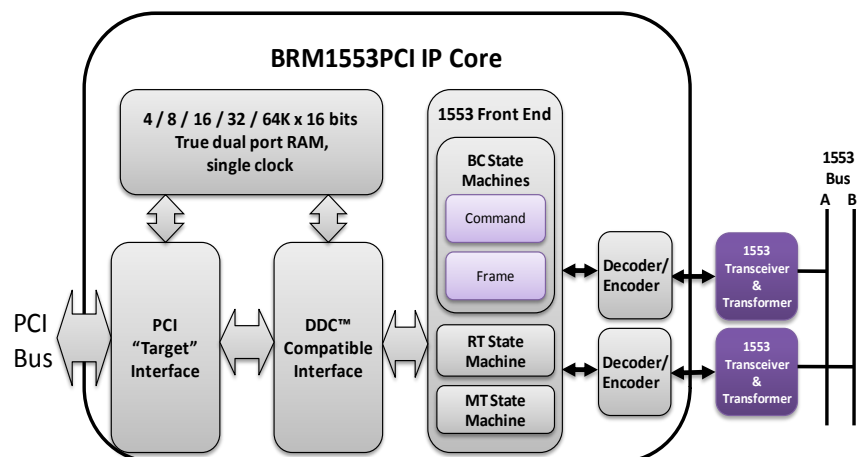
## BRM1553PCI

### Mil-Std-1553 IP Core with PCI interface to Back-End

Compact, Robust, Reliable  
MIL-STD-IP-Cores

#### Key Features and Benefits

- Mil-Std-1553 Intellectual Property for FPGAs and ASIC
- Suitable for any MIL-STD-1553 BC, RT, MT implementation
- Compatible to *Enhanced DDC<sup>®</sup> Mini-Ace<sup>®</sup> and Micro-Ace<sup>®</sup>* interface and functionality, works with existing software drivers
- 33/66MHz PCI back-end interface
- Supports PCI Burst mode
- Small FPGA area utilization
- Up to 4 x 1553 cores with a single PCI interface
- Modular architecture allowing flexible implementations
- Provided with full verification environment
- Passed full RT validation testing by 3rd party
- Based on vendor and technology independent VHDL code



#### More products from Sital:

- MIL-STD-1553 IP Core, DDC<sup>®</sup> compatible with local bus interface
- MIL-STD-1553 IP Cores for simple BC/RT/MT Applications.
- MIL-STD-1553 Discrete Components Transceiver
- MIL-STD-1553 Testers.
- MIL-STD-1553 Design Services
- ARINC 429 IP Core
- PCI IP core

Designed from ground up for use in aerospace, avionics and military MIL-STD-1553 solutions, Sital's MIL-STD-1553 IP products, offer uniquely compact, robust and reliable BC, RT, MT solutions for any PLD/FPGA and ASIC device. They were developed following the company's unflinching commitment to quality and excellence along with strict adherence to meeting the stringent requirements of the military and aerospace specifications.

More information available at [www.sitaltech.com](http://www.sitaltech.com)



## Specifications

### Compatibility

#### Mil-Std-1553

- MIL-STD-1553B Notice 2
- RT Validated according to test plan from MIL-HDBK-1553A
- 1Mbps Data Rate
- Connects to any transceiver-transformer pair
- Enhanced DDC<sup>®</sup> Micro-ACE<sup>®</sup> interface

#### PCI

- PCI specification 2.3 compliant
- 33MHz performance (66MHz optional)
- 32 bit datapath
- Zero wait states burst mode
- Full Target functionality

#### RAM

- 4, 8, 16, 32, 64K by 16 bits Dual Port RAM (Limited by FPGA resources only)
- Optional external to FPGA Dual Port RAM.

### Supported FPGAs

- Any FPGA with sufficient number of LUTs and Dual-Port memory
- FPGA families from the following vendors:
  - Xilinx
  - Altera
  - Lattice
  - Actel (with external memory)

\* For other FPGAs or ASIC please consult Sital

### BRM1553PCI Deliverables

- EDIF net list for the desired core (BC/RT/MT) for FPGA family and memory
- User's manual
- Sample VHDL code that incorporates the core
- Synthesis script for sample code

### Available Configurations

- **BRM1553PCI-BCRTMT**: Bus Controller + Remote Terminal + Monitor Terminal
- **BRM1553PCI-RT**: Remote Terminal
- **BRM1553PCI-RTMT**: Remote Terminal and Message/Word Monitor

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# BRM1553PCI

## A Core for Any Mil-Std-1553 Implementation

The BRM1553PCI IP Core is suitable for any Mil-Std-1553 implementation. The core incorporates a backend logic that arranges the messages in a predefined memory structure, which simplifies the interface between the 1553 bus and the local CPU. The BRM1553PCI core can act as a full replacement (2<sup>nd</sup> source) for DDC<sup>®</sup> Micro-Ace<sup>®</sup> devices as the data is arranged in the same way and back-end interface is compatible to PCI.

## Small Gate Count

Sital's BRM1553PCI requires very small space from FPGA for complex applications. The following table shows **examples** of the area usage, in different FPGA devices:

Vendor	FPGA Family	Area Usage (4-LUT count)	
		BC+RT+MT	RT Only
Altera	Cyclone 3	4620	3550
Xilinx	Spartan 3	4500	3360
Lattice	XP2	4250	3100
Xilinx, Altera	Older FPGA families	5440	3700

- These numbers are approximate. Other FPGA vendors and families are available
- Actual area usage may vary according to core configuration and FPGA.

## Backend Interface

Includes DDC's<sup>®</sup> Micro-ACE<sup>®</sup> interface over PCI, compatible with existing drivers and applications.

- No need to rewrite drivers' code
- Eliminates replacement risk

## Manchester Decoder

The unique Manchester decoder can work with PCI's 33/66MHz clock, reduce clock sources and clock domains on board (reduces EMI/RFI).

Advanced algorithms for filtering out noise and disturbances enable the core to operate in harsh environments.

## Advanced Verification

To ensure a fully reliable and robust product the core was developed using an advanced verification environment that includes a Random-Generation engine, Code-Coverage and assertion tools. All MIL-STD-1553B functions and performance requirements were verified.

## 3<sup>rd</sup> Party Validation

The BRM1553PCI IP Core successfully passed the full MIL-STD-1553B Notice 2 RT Validation test, according to a test plan from MIL-HDBK-1553A.

Validation tests were performed by an independent 3<sup>rd</sup> party laboratory.

## Simple Integration

In order to simplify the integration of the core, a sample VHDL design that uses the core is provided, including:

- A comprehensive user's manual.
- A VHDL gate level model of the core for the target technology.
- A Transceiver VHDL model that connects the core with 2 buses.
- A bus tester VHDL model that generates 1553 messages and checks the return replies.
- A top Test bench that instantiates all of these components to a working example.
- A simulation script for compiling and running the core.

## About Sital Technology

Founded in 1993, Sital Technology is a leading provider of IP cores and products for Mil-Std-1553.

SITAL Technology's key quality resource is its creative, talented and professional staff. Our engineers are veterans of the Israeli Air Force, who served in the technical units of the F-16 avionics systems. They gained knowledge and experience with the MIL-STD-1553 standard from the bottom up, both as design engineers for MIL-STD-1553 components and as technicians working on the aircrafts.

Among our many customers you can find NASA, Israeli Aircraft Industries (IAI), Rafael, Elbit, Astronautics, Tadiran, Israeli Ministry of Defense, Elta, Honeywell, BAE Systems, RADA and many others.

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