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PRODUCT DATASHEET



PMC-601

SPMC/DPMC-601 Dual-Channel MIL-STD-1553 and Discrete Digital I/O Module

Features

- Two independent MIL-STD-1553 interfaces
- Support for 1553A, 1553B Notice 2, and STANAG 3838
- Device population options include:
  - 61588 mini-ACE with 4K word dual-port RAM
  - 61688 mini-ACE Plus with 64K word dual-port RAM
  - custom options for MIL-STD-1553A-, MIL-STD-1760-, and McAir-compliant waveforms
- Both transformer-coupled and direct-coupled signals provided
- BC, RT, MT modes independently selectable for each channel
- 16 bits of TTL-compatible discrete digital I/O
- Both front panel and backplane I/O
- Built-In-Test (BIT) firmware provided when integrated with our processor cards
- INTEGRITY, LynxOS, and VxWorks drivers available
- PCI 2.1-compliant 32-bit, 33 MHz interface
- Needs only 5V from the basecard, no other voltages required
- Available in five ruggedization levels, level 0, 100, and 200 air-cooled, and level 100 and 200 conduction-cooled

Introduction



The SPMC/DPMC-601 PMC module allows customers to readily incorporate MIL-STD-1553 and discrete digital I/O connectivity into military and aerospace embedded computing systems. As a member of our comprehensive range of ruggedized PMC modules, ease of integration with other elements of our product line is assured, as is after-sales technical support, life-cycle management services, and the commitment to long-term availability.

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Architecture

Figure 1 illustrates the internal architecture of the PMC-601. A 32-bit, 33 MHz PCI-to-local-bus bridge and board-specific control logic is implemented within an FPGA device. The PCI-to-local-bus bridge interfaces two 61588/61688 MIL-STD-1553 controllers to the PCI bus. Four onboard transformers provide both transformer-coupled and direct-coupled outputs for the two MIL-STD-1553 interfaces. Registers within the FPGA provide control for 16 bits of TTL-compatible discrete digital I/O. All I/O is routed to the Pn4 connector for routing to the backplane connectors when the module is placed on processor cards or carrier cards that support backplane PMC I/O

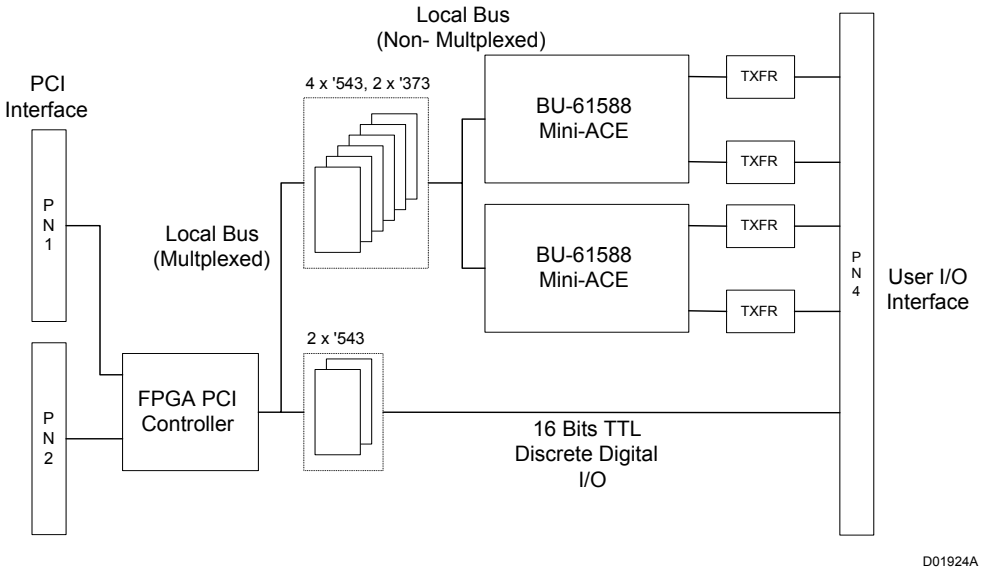


Figure 1: PMC-601 Dual 1553B Block Diagram

Dual MIL-STD-1553 Interfaces

The MIL-STD-1553 interfaces are implemented with either the DDC 61588 mini-ACE or the 61688 mini-ACE Plus. Mini-ACE/Mini-ACE Plus features include:

- Bus Controller (BC), Remote Terminal (RT), and Bus Monitor (MT) modes
- internal dual port RAM
  - > 4Kwords for mini-ACE
  - > 64Kwords for mini-ACE Plus
- Hardware and software compatibility with previous BU-61580 ACE series devices
- Bus Controller features
  - > BC frames of up to 512 messages
  - > Programmable inter-message gap time
  - > Single frame or auto-repeat modes
  - > Automatic retries
- Remote Terminal features
  - > programmable illegalization of RT commands
  - > Busy bit programmable on a subaddress basis
- Bus Monitor modes
  - > Word Monitor mode, used to capture all words transferred on either '1553 bus
  - > Word Monitor with Trigger Word
  - > Selective Message Monitor mode, used for selective monitoring based on RT address, Transmit/Receive bit, and Subaddress

The mode of operation of each mini-ACE device (BC, RT, MT) can be selected independently of the mode of the other device.

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MIL-STD-1553A and MIL-STD-1553B Compatibility

Standard versions of the PMC-601 are compliant to all aspects of MIL-STD-1553B, Notice 2. Standard versions are also compliant to the protocol aspects of MIL-STD-1553A that differ from MIL-STD-1553B such as using RT address 31 as an valid RT address instead of the broadcast address, use of subaddress 31 as a valid subaddress instead of a mode code indicator, and different error conditions under which an RT should return a status word. For full compliance to the MIL-STD-1553A waveform requirements, a custom version of the PMC-601 can be provided that uses an alternate version of the DDC mini-ACE.

RT Address Selection Options

The RT address for each MIL-STD-1553 interface is set independently. Factory-set zero-ohm resistors determine how the RT address is set, from a number of options as follows:

- RT address set in hardware by configuring backplane inputs (factory default for versions with the standard mini-ACE)
- RT address set by software (factory default for versions with the mini-ACE Plus)
- RT address set by software or hardware, depending on the state of a TTL input line
- RT address set by software or hardware, depending on the state of a register bit

TTL Discrete Digital I/O

The PMC-601 provides a total of 16 bits of TTL-compatible discrete digital I/O, configurable as inputs or outputs in blocks of 8. Each I/O line has TTL-compatible characteristics and has a 10K-ohm pull-up resister to +5V. As an output, the transceiver has an Iol of 48 mA.

PCI Specifications

- PCI Rev 2.1 compliant 32-bit, 33 MHz
- 5 volt signaling level, independent of V(I/O) inputs which are no-connects
- PMC INTA* interrupt used
- PCI-to-local-bus bridge implemented within QuickLogic pASIC 2 QL2007 FPGA

Mechanical Format

The PMC-601 is a single width PMC module. Air-cooled modules are designed in accordance with the IEEE 1386 and 1386.1 specifications. All I/O is available from the Pn4 connector for routing to the backplane via basecard connectors. Air-cooled modules also include a front-panel connector which provides access to the transformer coupled MIL-STD-1553 signals.

Conduction-cooled modules are designed in accordance with ANSI/VITA 20-2001, Conduction-Cooled PCI Mezzanine Card Standard. The cooling surfaces provided are the Primary Thermal Interface Region and the side 1 Secondary Thermal Interface Regions.

Older level 100 conduction-cooled versions of the PMC-601 as integrated with the DMV-178 single board computer do not include the side 1 Secondary Thermal Interface Regions.

Available Software

The PMC-601 MIL-STD-1553 driver provides a flexible, easy to use, and comprehensive application programming interface (API). Currently used in many deployed military systems, the driver's extensive feature set allows it to be used as-is for the vast majority of applications. The driver supports Bus Controller, Remote Terminal, and Bus Monitor modes of operation as well as both MIL-STD-1553A and MIL-STD-1553B protocols.

The driver is sold separately from the PMC-601 hardware, and is available for INTEGRITY, (part number DSW-601-400-CD), LynxOS (part number DSW-601-300-CD), and VxWorks (part number DSW-601-000-CD, see separate datasheet for details)

Built-In-Test (BIT)

BIT for the PMC-601 is provided by firmware routines within our Card Level Diagnostics (CLD) package. CLD is part of the Foundation Firmware suite of firmware components delivered in the Flash memory of our processor cards. Current processor cards that incorporate PMC-601 BIT include the SVME/DMV-178, SVME/DMV-179, SVME/DMV-181, SVME/DMV-182, SCP/DCP-119, and SCP/DCP-122



Cables

- CBL-601-000 is an I/O extension cable compatible with the our standard 78-way PMC I/O connector found on base-card cable sets. It mates with the 78-way connector and provides separate connectors for the transformer-coupled ‘1553 signals, RT address bits, and discrete TTL I/O. Connectors for ‘1553 signals are 3-lug Twinax bulkhead jack connectors (Trompeter part number BJ79-47)
- CBL-601-001 connects to the front panel connector of air-cooled PMC-601s and provides access to the transformer-coupled ‘1553 signals via 3-lug Twinax bulkhead jack connectors (Trompeter part number BJ79-47). Connection to the PMC-601 is via a 14-way Honda HDR-E14MG1 connector which includes a positive retention mechanism

Variants

- single or dual channel
- standard mini-ACE or mini-ACE Plus
- ruggedization levels
- custom population options for MIL-STD-1553A-, MIL-STD-1760-, and McAir- compliant waveform

Table 1: Specifications

RUGGEDIZATION LEVELS*			
SPMC card	Available in levels 0, 100 and 200		
DPMC card	Available in levels 100 and 200		
POWER REQUIREMENTS - Dual ACE			
+5 V (+5, -2.5%) (per VMEbus spec.)	25% duty cycle 50% duty cycle 100% duty cycle	600 mA (max.) 1050 mA (max.) 1650 mA (max.)	530 mA (typical) 750 mA (typical) 1250 mA (typical)
POWER REQUIREMENTS - Single ACE			
	25% duty cycle 50% duty cycle 100% duty cycle	350 mA (max.) 550 mA (max.) 850 mA (max.)	300 mA (typical) 400 mA (typical) 630 mA (typical)
DIMENSIONS			
	Size		Weight
SPMC card	per IEEE 1386.1		<160 g (<0.33 lb.)
DPMC card	per IEEE 1386.1 (VITA 20-2001)		<150 g (<0.35 lb.)

*Refer to Ruggedization Guidelines for more details.

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