High-Performance Single-Chip GPIB Talker/Listener ASIC

NI TNT4882

- Built-in IEEE 488.1-compliant transceivers
- 100-pin plastic quad flat pack (QFP), surface-mount package
- Single-chip ISA to GPIB solution
- Fast data transfers
  - 1.5 Mbytes/s using IEEE 488.1
  - 8 Mbytes/s using HS488
- Software compatible with the Turbo488/NAT4882 combination
- Internal loop-back mode allows complete in-system functional testing
- Meets all IEEE 488.2 requirements
- Automatic EOS and/or new line message detection
- DMA capable
- Programmable timer interrupt for general-purpose timing
- Reduces software overhead
  - Does not lose a data byte if ATN asserts during transmission
  - Static interrupt status bits do not clear when read
  - Automatically transmits END or performs RFD holdoff on last byte of DMA transfer
- Interrupts when handshake is complete on last byte of a DMA transfer
- 32-bit counter for large, uninterrupted data transfers
- 32-byte FIFO buffers data between GPIB and CPU/DMA controller
- Timer function for disciplined use of CPU bus bandwidth

Overview

The National Instruments TNT4882 provides a single-chip IEEE 488.2 Talker/Listener interface to GPIB. The NI TNT4882 combines the circuitry of the NAT4882 IEEE 488.2 Controller ASIC, Turbo488 performance-enhancing ASIC, and GPIB transceivers to create a single-chip IEEE 488.2 interface. The TNT4882 contains a complete NAT4882, NEC µPD7210, and Texas Instruments TMS9914A register set. Therefore, if you use any of these ASICS, you can port existing code directly to the TNT4882, significantly reducing software development time. The TNT4882 is ideal for use in all IEEE 488 instrument designs because of its compact size, surface-mount package, and performance enhancements that include HS488, a high-speed protocol for GPIB transfers.

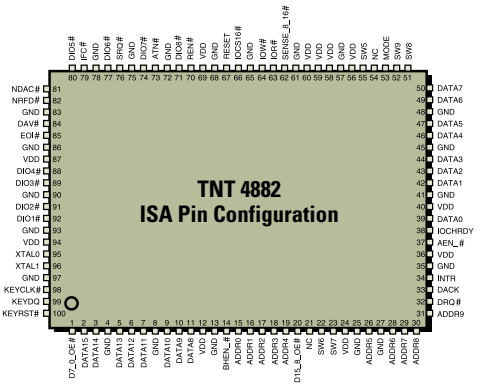

Figure 1. ISA Pin Configuration

HS488

The HS488 protocol for GPIB transfers increases the maximum data transfer rate of ANSI/IEEE Standard 488.1-1987 up to 8 Mbytes/s. Maximum data transfer rates obtainable using HS488 depend on the host architecture. The TNT4882 completely and transparently handles the HS488 protocol without additional circuitry. Because HS488 is a superset of the IEEE 488.1 standard, you can mix existing non-HS488 GPIB devices with devices that are high-speed capable without changing your application programs.

INFO CODES

For more information or to order products online, visit *ni.com/info* and enter:

tnt4882

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TNT4882 Hardware Architecture and Modes

The TNT4882 integrates the circuitry of the Turbo488, NAT4882, and IEEE 488.1-compliant transceivers (Figure 2). The TNT4882 circuitry logically interconnects these three components in one of two ways – two chip or one chip mode.

The TNT4882 powers up in two-chip mode, which duplicates the Turbo488/NAT4882 chip set exactly for software compatibility.

To achieve higher data transfer rates, you can switch the TNT4882 to one-chip mode in software. In one-chip mode, the FIFO connects directly to the GPIB transceivers, and the CPU accesses all registers directly. You can access NAT4882 registers in the same amount of time as Turbo488 registers. New software designs should be written using one-chip mode.

The NAT4882 portion of the TNT4882 can emulate either the NEC µPD7210 or the TI TMS9914A GPIB Controller ASICs. The

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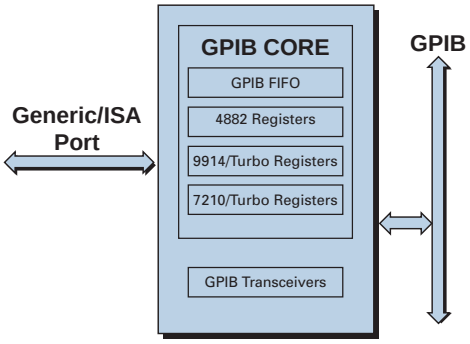

Figure 2. TNT4882 Block Diagram

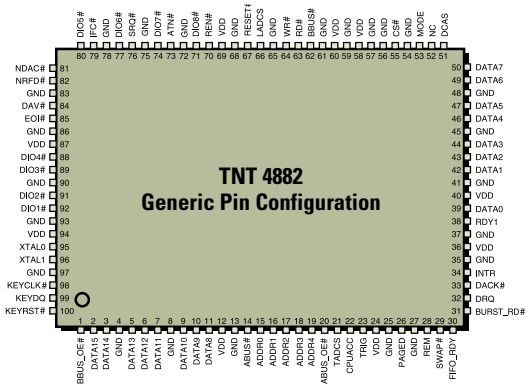

Figure 3. Generic Mode Pin Configuration

state of one of the TNT4882 input pins determines the chip emulation mode on power-up, but you can switch emulation mode through software.

The TNT4882 has two different pin configurations. The generic pin configuration provides a simple interface to any CPU (Figure 3). With the ISA pin configuration, you can connect the TNT4882 directly to an ISA bus without any external glue logic or data transceivers (Figure 1). You can also use the ISA pin configuration TNT4882 with an 8-bit ISA bus. You may want to use the ISA version for interfaces other than an ISA bus to take advantage of the built-in 5-bit address decoder. You can use two-chip mode or one-chip mode identically with either pin configuration.

TNT4882 Developer Kit

To assist in the TNT4882 hardware design and software implementation, a special developer kit is available. This kit contains two TNT4882 chips, a TNT4882 ISA evaluation board, high-performance NI-Device DDK (page 688), source code, and software and hardware reference manuals. This kit is available to all interested developers who want to use the TNT4882 in their designs.

Ordering Information

TNT4882 ASIC

Tray of 66 chips TNT4882-BQ66
Developer Kit.....776866-01
Sample Kit 778609-01

Contact National Instruments or visit *ni.com* for a detailed TNT4882 data sheet.