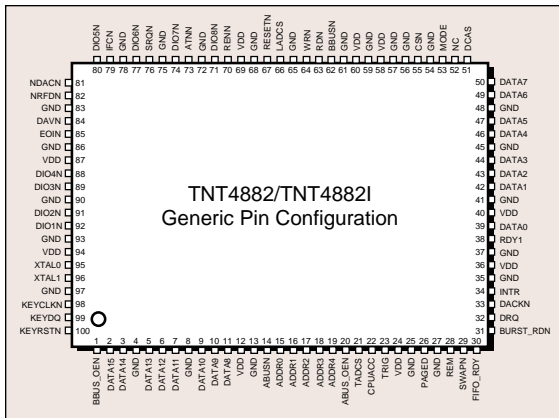# High-Performance Single-Chip GPIB Talker/Listener ASIC

TNT4882/TNT4882I

Generic Mode Pin Configuration

TNT4882

TNT4882I

Overview

The TNT4882 and TNT4882I provide a single-chip IEEE 488.2 Talker/Listener interface to the General Purpose Interface Bus (GPIB). You can use the TNT4882I for industrial temperature (-40° to 85°C) applications. The TNT4882 and TNT4882I combine 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. Because the TNT4882 and TNT4882I contain a complete NAT4882 register set, which in turn has a complete NEC μPD7210 or Texas Instruments TMS9914A register set, developers using any of these chips can port existing code directly to the TNT4882 and TNT4882I, thereby significantly reducing software development time. The TNT4882 and TNT4882I are ideal for use in all IEEE 488 instrument designs because of its small size, surface-mount package, and performance enhancements that include HS488, a high-speed mode for GPIB transfers.

HS488 Overview

The HS488 high-speed mode 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 and TNT4882I completely and transparently handles the HS488 protocol without additional circuitry. Because HS488 is a superset of IEEE 488.1, you can mix existing GPIB devices with devices that are high-speed capable without changing your application programs.

TNT4882/TNT4882I Hardware Architecture and Modes

The TNT4882 and TNT4882I integrate the circuitry of the Turbo488, NAT4882, and IEEE 488.1-compliant transceivers. The TNT4882 and TNT4882I circuitry logically interconnects these three components in one of two ways: "two-chip" mode or "one-chip" mode.

The TNT4882 and TNT4882I power up in two-chip mode (see Figure 2), which duplicates the Turbo488/NAT4882 chipset exactly for software compatibility.

To achieve higher data transfer rates, you can switch the TNT4882 and TNT4882I to one-chip mode (see Figure 1) in software. In one-chip mode, the FIFO connects directly to the GPIB transceivers, and the CPU accesses all registers directly. You can access

Features

Software compatible with the Turbo488/NAT4882 combination

100-pin plastic quad flat pack (QFP), surface-mount package

Built-in IEEE 488.1 compliant transceivers

Built-in ISA bus glue logic

Fast data transfers
  1.5 Mbytes/s using IEEE 488.1 handshake,
  Up to 8 Mbytes/s using HS488

Internal wrap-back mode provides complete in-system functional testing

Meets all IEEE 488.2 requirements

Automatic EOS and/or new line message detection

Direct memory access (DMA)

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

Two 8-bit 16-deep FIFOs buffer data between GPIB and CPU

Timer function for disciplined use of CPU bus bandwidth

TNT4882I

Industrial grade temperature rating
  (-40° to 85° C)

High-Performance Single-Chip GPIB Talker/Listener ASIC

NAT4882 registers in the same amount of time as Turbo488 registers.

The NAT4882 portion of the TNT4882 and TNT4882I can emulate either the NEC μPD7210 or the TI TMS9914A GPIB controller chips. The state of one of the TNT4882 and TNT4882I input pins determines the chip emulation mode on power up, but you can switch the chip emulation mode back and forth between 7210 and 9914 modes through software.

The TNT4882 and TNT4882I have two different pin configurations. The Generic pin configuration provides a simple interface to any CPU. With the ISA pin configuration you can connect the TNT4882 and TNT4882I directly to an ISA bus without any external glue logic or data transceivers. You can also use the ISA pin configuration TNT4882 and TNT4882I with an 8-bit (PC/XT) bus. It may be desirable 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, one-chip mode, 7210 mode, and 9914 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, source-code software routines for common Talker/Listener operations, and hardware and software reference manuals. This kit is available to all interested developers who wish to use the TNT4882 or TNT4882I in their designs.

Part Numbers

TNT4882 ASIC...................TNT4882-AQ
TNT4882I ASIC...............TNT4882-AQI
TNT4882 Developer kit............776866-01

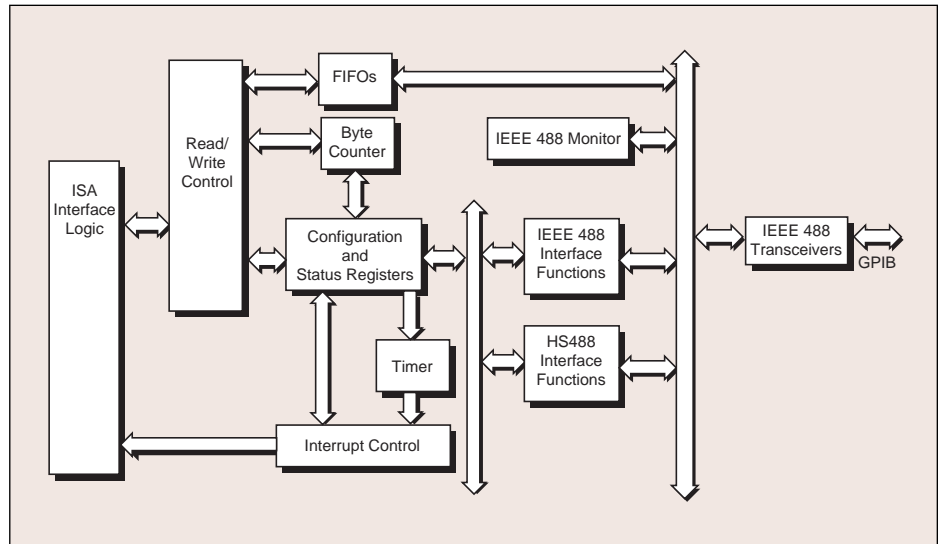*Contact National Instruments for a detailed TNT4882/TNT4882I data sheet.*
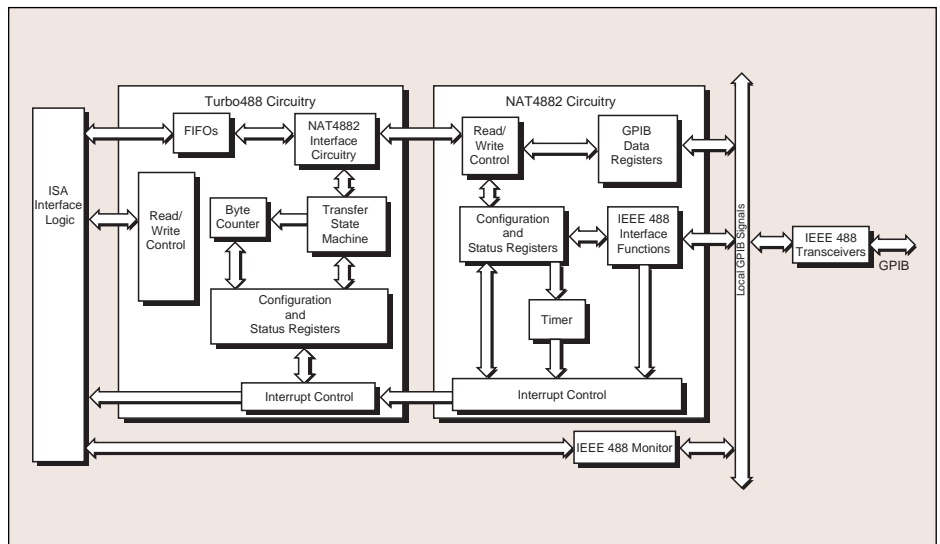

Figure 1. TNT4882/TNT4882I Block Diagram, One-Chip Mode

Figure 2. TNT4882/TNT4882I Block Diagram, Two-Chip Mode