

GPIB Interfaces for Macintosh NuBus

NB-GPIB/TNT, NB-GPIB-P/TNT



NB-GPIB/TNT

Computer/Bus	Macintosh NuBus
Processor	680x0, PowerPC

Overview

The NB-GPIB/TNT is a low-cost, high-performance IEEE 488 interface for NuBus-equipped computers that run the Mac OS, including Macintosh, Power Macintosh, and compatibles. The National Instruments TNT4882C ASIC makes the NB-GPIB/TNT a maximum-performance IEEE 488.2 interface board. The TNT4882C chip performs the basic IEEE 488 Talker, Listener, and Controller functions required by the most recent GPIB standard, IEEE 488.2. The NB-GPIB/TNT can sustain data transfer rates up to 1.3 Mbytes/s using the IEEE 488.1 3-wire handshake. The NB-GPIB/TNT also implements a high-speed GPIB protocol (HS488), so that you can have data transfers up to 1.6 Mbytes/s.

For computers equipped with short (7 in.) NuBus slots, such as the Power Macintosh 6100, the NB-GPIB-P/TNT is available. It is completely software compatible the full-size NB-GPIB/TNT, and with the exception of the RTSI connector, contains the complete functionality.

HS488

The NB-GPIB/TNT uses a high-speed GPIB protocol (HS488). HS488, patented by National Instruments, increases the

maximum data transfer rate of ANSI/IEEE Standard 488.1-1987 up to 8 Mbytes/s. HS488, a superset of the IEEE 488.1 protocol, attempts to conduct data transfers with the new higher speed protocol. If all active Listeners are not capable of HS488 transfers, the protocol automatically switches to the IEEE 488.1 3-wire handshake. Maximum data transfer rates obtainable using HS488 depend on the host computer architecture and system configuration. With the NB-GPIB/TNT, you can attain transfer rates up to 1.6 Mbytes/s. The TNT4882C completely and transparently handles the HS488 protocol. Because HS488 is a superset of IEEE 488.1, you can mix existing GPIB devices with devices that have high-speed capability without changing your application programs. The TNT4882C can implement high-speed data transfers automatically. Thus, devices that have the TNT4882C chip can transparently communicate using HS488 if the corresponding Talker or Listener can also use HS488. The TNT4882C has the ability to enable or disable the HS488 handshake from software.

Transfer Rates

The NB-GPIB/TNT hardware and software combination has maximum performance. Figures 1 and 2 show data transfer benchmarks between a Macintosh Quadra 900 and a Power Macintosh 8100, using 2 m cable. All data transfers used programmed I/O.

Features

TNT4882C ASIC

Completely IEEE 488.2 compatible



FIFO buffers to decouple GPIB transfers from NuBus transfers
16-bit NuBus interface with byte-to-word packing and unpacking
Reduced software overhead
Software and register compatible with Turbo488/NAT4882 chipset

Transfer rates

More than 1.3 Mbytes/s using IEEE 488.1 handshake

More than 1.6 Mbytes/s using HS488

Onboard ROM for configuration information

NI-488.2 Software

Mac OS *Included with boards*

Application Software

LabVIEW

NB-GPIB/TNT, NB-GPIB-P/TNT



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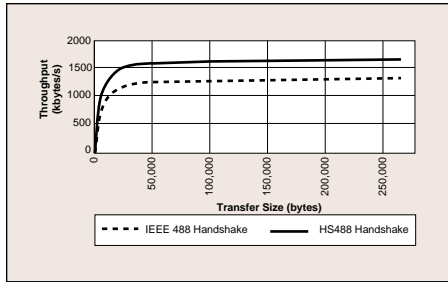


Figure 1. NB-GPIB/TNT Data Transfer Benchmarks

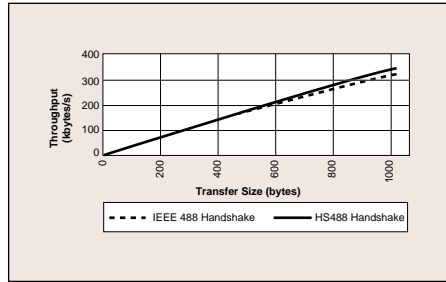


Figure 2. NB-GPIB/TNT Data Transfer Benchmarks (small data blocks)

Part Numbers

Hardware and Software

NB-GPIB/TNT and NI-488.2 for
Mac OS776790-01
NB-GPIB-P/TNT and NI-488.2 for
Mac OS776756-01

Hardware, Software, and GPIB Cable

NB-GPIB/TNT, NI-488.2 for
Mac OS, and 2 m
X2 GPIB cable776790-51
NB-GPIB-P/TNT, NI-488.2 for
Mac OS, and 2 m
X2 GPIB cable776756-51

GPIB Cables

X2 double-shielded GPIB cable
1 m763061-01
2 m763061-02
4 m763061-03
8 m763061-04

Hardware

The key component of the NB-GPIB/TNT hardware is the TNT4882C ASIC.

The TNT4882C ASIC is a single-chip IEEE 488.2 Talker, Listener, and Controller interface that combines the circuitry of the NAT4882 IEEE 488.2 Controller ASIC and Turbo488 performance-enhancing ASIC from National Instruments, along with built-in IEEE 488.1-compatible (glitch free) transceivers. The TNT4882C also implements the HS488 data transfer protocol for high-speed GPIB data transmission. For sending DMA requests to an NB-DMA board, the

NB-GPIB/TNT can send an interrupt request signal over the RTSI. In addition, a 16-bit by 16-deep FIFO buffer on the NB-GPIB/TNT buffers data sent to or received from the GPIB to enhance performance. You can also monitor and control the IEEE 488 bus through a 16-bit read/write port independent of the IEEE 488 interface functions. The port outputs are disabled at system reset and do not interfere with normal IEEE 488 operations. The ability to read and write all 16 IEEE 488 lines gives a mechanism for stand-alone functional testing of the NB-GPIB/TNT or other instruments. The monitors are part of the TNT4882C circuitry.

Specifications

IEEE 488 Compatibility
Compatible with IEEE 488.1 and IEEE 488.2

Capability Code	Description
SH1	Source Handshake
AH1	Acceptor Handshake
T5, TE5	Talker, Extended Talker
L3, LE3	Listener, Extended Listener
SR1	Service Request
PP1, PP2	Local/Remote Parallel Poll
RL1	Remote/Local
C1, C2, C3, C4, C5	Controller
E1, E2	Three-state bus drivers with automatic switch to open-collector during parallel poll

IEEE 488 Bus Transfer Rates

Standard IEEE 488 handshake 1.3 Mbytes/s
HS488 handshake 1.6 Mbytes/s

(actual rates depend upon system configuration and instrument capabilities)

Power Requirement from NuBus

+5 VDC 300 mA typical,
350 mA maximum

Physical

Dimensions

NB-GPIB/TNT 10.2 by 35.5 cm
(4.0 by 12.8 in.)
NB-GPIB-P/TNT 10.2 by 17.8 cm
(4.0 by 7.0 in.)

I/O connector IEEE 488
standard 24-pin

Operating Environment

Ambient temperature 0° to 55° C
Relative humidity 10% to 90%,
noncondensing

Storage Environment

Ambient temperature -20° to 70° C
Relative humidity 5% to 90%,
noncondensing