

External GPIB Controller for the PC Parallel Port

GPIB-1284CT



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Computer/Bus	PC Parallel
Processor	Intel x86, Pentium

Overview

The GPIB-1284CT is a bidirectional parallel-to-GPIB controller that you can use to control GPIB devices from the parallel port of your computer. The GPIB-1284CT is ideal for computers with no plug-in slots, such as notebook computers, but which have a standard parallel port. The TNT4882C performs the basic IEEE 488 Talker, Listener, and Controller functions, as well as all the Controller functions required by IEEE 488.2. The GPIB-1284CT has two parallel ports, one for connecting to the host computer and another for transparent pass-through connection to other parallel port devices. The GPIB-1284CT uses an internal switching power supply or optional DC power input for easy integration into any application. The DC version can also be powered by the PC keyboard port via a special power cable (included). The GPIB-1284CT is ideal for laptop computer applications and situations requiring high-speed transfer rates. The GPIB-1284CT is also useful in standard PC applications when you have a limited number of plug-in slots for instrument control.

Parallel Port Interface

The Standard Parallel Port (SPP) was the original parallel port interface. This

Centronics-type parallel port handles unidirectional data transfers only. IBM PS/2 computers extended the specification to handle bidirectional data transfers using the same parallel port signals. The parallel port is a simple interface that is inexpensive to implement, making it ideal for connecting to peripheral equipment. The primary application for the unidirectional PC parallel port was to connect to printers. However, new PCs and the IBM PS/2 line have bidirectional parallel ports that facilitate communication with input and output devices. The high-speed parallel port is ideal for use in instrument control systems, which often require large amounts of data to transfer quickly. The Enhanced Parallel Port (EPP) makes the parallel port better suited for connecting to peripheral devices. The goal was to make the parallel port a bidirectional interface with increased maximum transfer rates. EPP is defined in the IEEE 1284 standard. The EPP can achieve high transfer rates, up to 2 Mbytes/s. The EPP specification assigns microprocessor-type functions to the parallel port lines (for example, address strobe, data strobe) to access adapter hardware directly.

IEEE 488 and Parallel Interface Details

The GPIB-1284CT converts a PC with a parallel port into a GPIB Talker/Listener/Controller (TLC). The GPIB-1284CT

Features

- TNT4882C ASIC
- Completely IEEE 488.2 compatible
- Reduced software overhead
- GPIB control from the PC parallel port
- Three I/O ports
 - IEEE 1284 parallel port for computer connection (25-pin D-Sub)
 - Output parallel port for transparent pass-through connection (25-pin D-Sub)
 - Standard GPIB port
- Three bidirectional parallel port modes
 - 4-bit bidirectional mode for unidirectional ports (SPP)
 - Standard 8-bit bidirectional port mode (PS/2 type ports)
- EPP mode
- Compact size
- Power options
 - Built-in, universal power supply for 100-120 or 220-240 VAC
 - DC power from a wall-mount power supply
- No configuration switches

NI-488.2 Software

- Windows 3.1
- DOS

Application software

- LabVIEW
- LabWindows/CVI
- LabWindows

Kit Contents

- GPIB-1284CT (with power option),
- NI-488.2 software for DOS/Windows, and parallel cable

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implements the full range of GPIB Controller functions, including those specified by IEEE 488.2-1987. The GPIB-1284CT uses the National Instruments TNT4882C GPIB chip to implement all IEEE 488 protocols and maximize the performance of GPIB data transfers. The GPIB-1284CT connects to one of the following parallel ports – standard ISA unidirectional parallel port, IBM PS/2 type bidirectional parallel port, or EPP. The GPIB-1284CT parallel port is completely compatible with IEEE 1284, Standard Signaling Method for a Bidirectional Parallel Peripheral Interface for Personal Computers, which also defines EPP. The GPIB-1284CT has an additional pass-through parallel port for transparent data transfers to a second parallel port device. When the GPIB-1284CT powers on, all parallel port activity from the computer connection routes directly to the pass-through parallel port connection. When the NI-488.2 driver software executes GPIB commands and performs data transfers, it sends a data sequence to the GPIB-1284CT to indicate that it needs to switch into “GPIB mode.” When the GPIB sequence is complete, the GPIB-1284CT returns to transparent “pass-through mode.” When the GPIB-1284CT is in GPIB mode, the NI-488.2 driver performs writes and reads

across the parallel port to access the GPIB circuitry on the GPIB-1284CT. If the host computer has a standard unidirectional (SPP) or PS/2 type bidirectional port, the driver software emulates EPP-type transfers by writing and reading SPP registers. When connected to a unidirectional parallel port, the GPIB-1284CT accomplishes bidirectional communication by using four of five status lines to return data from the GPIB-1284CT 4 bits at a time. If the host computer has an EPP port, it will perform EPP transfers to access the GPIB-1284CT circuitry.

Hardware

Figure 1, the GPIB-1284CT block diagram, illustrates the key components of the GPIB-1284CT. The following paragraphs describe these components.

TNT4882C – The TNT4882C ASIC, the first single-chip IEEE 488.2 Talker, Listener, and Controller interface, 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 transceivers.

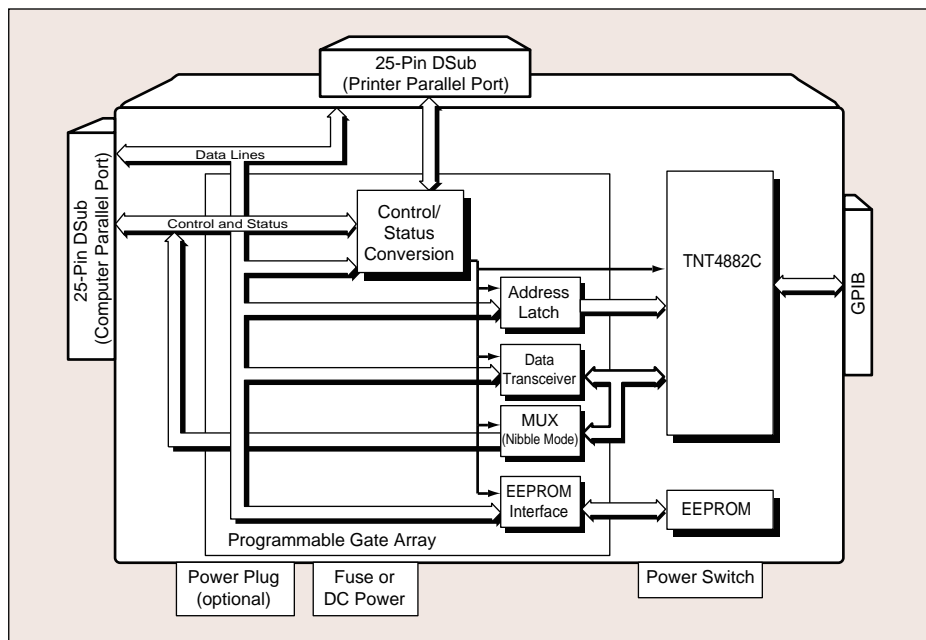


Figure 1. GPIB-1284CT Block Diagram

E²PROM – The E²PROM contains the program that loads into the Field-Programmable Gate Array (FPGA) on the power up of the GPIB-1284CT. You can update this program by running a utility on the host computer that downloads programs into the E²PROM. As parallel port specifications change, you will be able to quickly upgrade the GPIB-1284CT using firmware updates from National Instruments.

Windows 95 Compatibility

NI-488.2 software for DOS can be installed and used to run DOS applications under Windows 95 and the NI-488.2 software for Windows 3 can be installed and used to run Win16 and Win32 applications under Windows 95.

Part Numbers

Hardware and Software

GPIB-1284CT (AC Version) and NI-488.2 for DOS/Windows*

U.S. 120 VAC	776858-01
Swiss 220 VAC	776858-02
Australian 240 VAC	776858-03
Universal Euro 240 VAC	776858-04
North American 240 VAC	776858-05
U.K. 240 VAC.....	776858-06

GPIB-1284CT (DC Version) and NI-488.2 for DOS/Windows**

120 VAC	776859-01
220 VAC.....	776859-31

Cables

GPIB-1284CT (25-pin D-Sub) to PC parallel port (25-pin D-Sub)

1 m	181072-10
2 m	181072-20

* Includes internal switching power supply specified power cord, and parallel cable.

** Includes specified wall-mount or desktop power supply, optional external keyboard power cable, and parallel cable.

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Specifications

Parallel Port

Compatible with IEEE 1284

Modes accommodated – 4-bit bidirectional mode for unidirectional parallel ports (SPP), 8-bit bidirectional mode for IBM PS/2 type ports, and EPP mode.

IEEE 488 compatibility

Compatible with IEEE 488.1 and IEEE 488.2

GPIB address software selectable (no switches)

Handles all primary and secondary addresses

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

External Indicators

Power – Power is applied to the GPIB-1284CT

Ready – GPIB-1284CT is ready for operation

Pass-Through – The GPIB-1284CT is in pass-through mode

Talk – In GPIB mode, the GPIB-1284CT is the GPIB Talker

Listen – In GPIB mode, the GPIB-1284CT is a GPIB Listener

IEEE 488 Bus Transfer Rates (GPIB reads - GPIB writes)

ISA Unidirectional Parallel Port

DOS..... 61 kbytes/s..... 104 kbytes/s

Windows..... 52 kbytes/s..... 75 kbytes/s

PS/2 Bidirectional Parallel Port

DOS..... 117 kbytes/s..... 110 kbytes/s

Windows..... 81 kbytes/s..... 75 kbytes/s

EPP

DOS..... 309 kbytes/s..... 282 kbytes/s

Windows..... 152 kbytes/s..... 136 kbytes/s

(actual rates depend upon system configuration and instrument capabilities)

Power Requirements

AC version..... 100-120 VAC ±10%, 50-60 Hz, 37 mA
220-240 VAC ±10%, 50-60 Hz, 39 mA

DC version +5 to +13 V regulated, 340 mA

Physical Dimensions

AC version..... 7.6 by 4.1 by 11.7 cm
(3.0 by 1.7 by 4.6 in.)

DC version 7.6 by 2.8 by 11.7 cm
(3.0 by 1.1 by 4.6 in.)

I/O Connectors

Parallel Ports

25-pin D-Sub for computer connection, 25-pin D-Sub for pass-through connection

GPIB Port..... IEEE 488 standard 24-pin

Operating Environment

Temperature 0° to 40° C

Relative humidity 10% to 90%, noncondensing

Storage Environment

Temperature -20° to 70° C

Relative humidity 10% to 90%, noncondensing

Noise Emissions

FCC Class A verified