

## IBM PC GPIB PRODUCTS

# 488-PC2

## ISA BUS GPIB CONTROLLER CARD

### DESCRIPTION

ICS's 488-PC2 is an enhanced IEEE 488 Bus Interface Card that converts any PC with an ISA bus into a full-function IEEE 488.2 Bus Controller. The 488-PC2 Card can also function as an IEEE 488 interface that lets you use your personal computer as a bus device. The 488-PC2 Card performs all of the basic IEEE 488.1 functions such as talker, listener and system controller or Controller-in-charge.

### Hardware

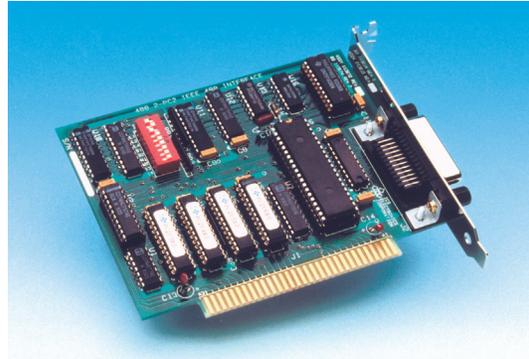
The 488-PC2 card is implemented with programmable logic arrays and an NEC 7210 type bus controller chip to provide high speed DMA transfers with data rates up to 300 Kbytes per second. On card switches select the address, DMA channels 1, 2, or 3, Interrupt levels 2 through 7 and wait states. Quality features such as no jumpers, on-card oscillator and an internal wait state generator make the 488-PC2 Card easy to use. The 488-PC2 installs in any available card slot in any PC with an ISA bus.

### Software

The 488-PC2 card includes ICS's 488.2 Driver which provides IEEE-488.2 support for DOS and Windows programming languages. DOS language support includes libraries for: Quick Basic 4.5, Visual Basic, Professional Basic, Borland C/C++, and Microsoft C/C++. Window 3.1, 95 and 98 programs are supported by DLLs for 16 and 32-bit Windows programming languages.

The 488-PC2 Driver also provides a 488.1 GWBASIC driver that works with BASICA and most other interpretive BASICs and a Pascal library for early versions of Turbo Pascal and Microsoft Pascal.

The 488-PC2 software includes Windows and DOS program examples for each language. The examples are working programs that the user can build on to create his or her application. The C language examples include the make files so the user can quickly compile his own programs.



488-PC2 Card

### Keyboard Controller Programs

The 488-PC2 software also includes DOS and Window versions of ICS's Interactive Keyboard Controller programs. These ready-to-run interactive programs give the user direct control of GPIB devices from the computer keyboard without having to write a program. The Keyboard Controller programs can be used to verify the 488-PC2 installation, to test a new GPIB device, or to try out new device commands before incorporating them in a program.

### 488.2 and SCPI Capabilities

ICS's 488-PC2 card lets you take full advantage of the new IEEE 488.2 Standard and SCPI commands (SCPI means Standard Commands for Programmable Instruments). The 488-PC2 card enables any PC to become an IEEE 488.2 controller and execute the 488.2 controller protocols. Use the 488.2 protocols and SCPI commands in your programs to simplify your programming and improve program legibility.

### Ease of Installation

ICS's 488-PC2 card is extremely easy to install. Being a half-slot card it can be installed in any available card slot. A single rocker switch assembly sets the card I/O address, interrupt level, and DMA channel. There are no jumpers to set or move. An Install program graphically confirms the card switch settings.

- Converts any ISA bus PC into a GPIB Controller  
*Works in virtually all PCs.*
- Fast data transfer rate >300 kbytes/second.  
*Fast throughput.*
- DLLs for Windows 3.1, 95 and 98 programs support 16 and 32 bit applications.  
*488.2 support for all MS Windows programming languages.*
- IEEE-488.2 linkable libraries for Quick Basic, MS Visual Basic for DOS, Borland C/C++ and Microsoft C/C++.  
*488.2 support for the most popular DOS languages.*
- Includes Interactive Keyboard programs for driving GPIB devices.  
*Lets you try out commands and control instruments without writing a program.*
- Functions as System Controller, Controller-in-charge or as a GPIB device.  
*Use the GPIB bus to transfer data to other PCs.*
- Replaces most generic ISA 7210 cards and PC2a cards.  
*Use with existing programs*



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# 488-PC2: SPECIFICATIONS

## Program Capabilities

### ICS Command Set

All 488-PC2 commands and 488.2 protocols listed in the table on the right.

### DOS Supported Languages

GWBasic (Ver 3.11 and 3.22)  
BasicA (Ver 3.11 and 3.22)  
Borland Turbo C for DOS (Ver 3.0)  
HP Vectra BASIC (Ver 3.11 and 3.22)  
Quick Basic (Ver 4.5)  
MS Professional BASIC (Ver 7.1)  
MS Visual Basic for DOS (Ver 1.0)  
Borland Turbo PASCAL (Ver 4.0)  
Microsoft Pascal (Ver 4.0)

### Windows Supported Languages

Borland C/C++ (Ver 2.0, 3.0 and 4.0)  
Borland Turbo C for Windows 3.1  
Microsoft Quick C (Ver 2.5)  
Microsoft C/C++ (Ver 5.0, 6.0 and 7.0)  
Microsoft Visual C++ (Ver 1.0, 1.5)  
MS Visual Basic for Windows (Ver 3.0, 4.0 and 5.0)

### Operating System

Microsoft DOS 3.3-6.2 or equivalent  
MS Windows 3.0/3.1/95 and 98

### Keyboard Controller Programs

Sends user inputs from the PC Keyboard to bus device, reads device responses and executes other bus commands.

## IEEE 488.1 Capabilities

The 488-PC2 meets IEEE-STD-488.1 with the following capabilities:

- AH1, SH1, C1, C2, C3, C4, and C9
- E2 Drivers incorporate power up/down protection.

## IEEE 488.2 Capabilities

Includes all required 488.2 controller protocols and the ability to monitor all of the Bus signal lines.

## 488 Bus Performance

### GPIB Handshake Rate

(Rates vary with the PC)  
>300 KBytes/second with DMA  
>240 KBytes/second without DMA

**Timeout** - 1 msec to 6.5 sec and none.

## Commands and Functions

Command	Function
<b>ieAbort</b>	Sends IFC
<b>ieClose</b>	Closes driver
<b>ieDevClr</b>	Clears device
<b>ieDevice</b>	Installs bus device
<b>ieEnter</b>	Inputs data
<b>ieEnterA</b>	Inputs data to an array
<b>ieEnterB</b>	Inputs binary data
<b>ieEol</b>	Sets terminators
<b>ieErrPtr</b>	Assigns error variables
<b>ieEventEnable</b>	Enables hardware event messages for Windows
	Specifies last event type
<b>ieEventStat</b>	Enter standby state
<b>ieGotoStby</b>	Reads GPIB signals
<b>ieGPIBStat</b>	Initialize driver
<b>ieInit</b>	Local lockout
<b>ieLlo</b>	Set device to local
<b>ieLocal</b>	Outputs data
<b>ieOutput</b>	Outputs array data
<b>ieOutputA</b>	Outputs binary data
<b>ieOutputB</b>	Passes control
<b>iePassCtl</b>	Parallel Polls bus
<b>iePPoll</b>	Configures parallel poll
<b>iePPollC</b>	Unconfigures parallel poll
<b>iePPollU</b>	Sets device to remote
<b>ieRemote</b>	Sends bus mnemonics
<b>ieSend</b>	
<b>ieService-Enable</b>	Enables user routine
<b>ieService-Disable</b>	Disables user routine
<b>ieSPoll</b>	Serial polls device
<b>ieSRQStat</b>	Gets SRQ status
<b>ieStatus</b>	Gets command status
<b>ieTakeCtl</b>	Becomes active ctlr
<b>ieTimeout</b>	Sets time-out period
<b>ieTrigger</b>	Triggers device
<b>ieWaitSRQ</b>	Waits for SRQ or time
<b>488.2 Protocols</b>	
<b>ieAllSpoll</b>	Serial polls devices
<b>ieFindLstn</b>	Finds bus devices
<b>ieFindRQS</b>	Finds device requesting service
<b>ieReset</b>	Resets system
<b>Time Utilities</b>	
<b>msDelay</b>	Programmable delay
<b>icsTimer</b>	Reads system time
<b>isTimeOut</b>	Sets background time mark and tests if time past time mark

## PC Bus Capabilities

**I/O Addresses:** 2E1, 22E1, 42E1 & 62E1

**DMA:** Channels 1, 2, or 3.

**Interrupts:** AT interrupts 2 to 7.

**7210 Registers:** 0-7 addressed from 02E1 to 1EE1 in 0x400 steps.

## Physical

**Size:** Half-size card, 5 in long.

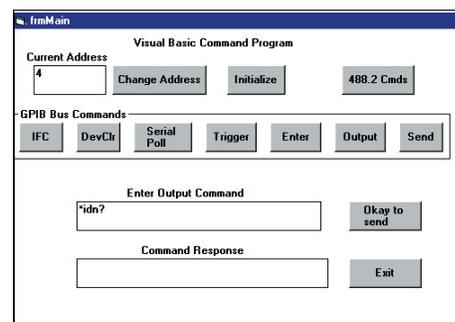
**Connector:** IEEE-488 Standard 24-pins with metric lock studs.

**Power:** 5 ± 0.2 Vdc, 500 mA max

**Compatibility:** Replaces most generic 7210 and NI PC2a type GPIB Controller Cards. Does not replace the following cards: MC ISA-GPIB or GPIB/LC

## Included Accessories

Instruction Manual  
ICS's 488.2 Driver for Windows and DOS, example programs and Keyboard Controller programs on 3.5 inch disks.



**Keyboard Controller Program**

## ORDERING INFORMATION

488-PC2 Bus Controller/Interface Card including 488.2 Driver and Manual

**Part Number**

488-PC2

488-PC2 Bus Controller Card without Driver or Manual

113670-02

IEEE 488 Bus Cables

See separate data sheet