

# Invisible Hand

**Attention :** Macintosh game players, especially Tetris addicts :

Interested in a way to increase your high scores, or to mess with your friend's minds? Have you ever lost Tetris waiting for one of those long, skinny pieces? If so, then the Invisible Hand is for you.

The Invisible Hand is a Control Panel which provides you with an easy and subtle way to influence games, when and if you want. Specifically, it allows you to control what random number is returned by the Macintosh System trap `_Random`. You can configure the Invisible Hand to return a different random number for all thirty-two combinations of the modifier keys (command, option, shift, caps-lock, and control). In Tetris, for example, the Invisible Hand can be configured so that when you hold down the shift key you receive four by one long pieces ( xxxx ), when the caps-lock is down, you receive two by two square pieces, and when no modifier keys are down the game plays normally. So you can play along as usual, except on certain occasions when you just 'really need that piece', and be assured that you will get it.

Invisible Hand is fully functional on Macintosh computers running System 6.0.4 or better. It has been tested on B&W and color Macs from System 4.1, Finder 5.5 (!!) up to System 7.0.1. If you are using earlier software, you still can use most of Invisible Hand's functionality : see below under Early Systems.

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- Warning : The Invisible Hand is a general purpose utility which will affect any program (not just games) which call the Apple system trap `_Random`. This may cause unforeseen and hazardous effects.
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• If you wish to share any notable 'effects' (positive or negative) which the Invisible Hand has, you can send (U.S. Post or e-mail) explanations to me. I will attempt to update a listing of these 'effects' from time to time on the networks. I can be reached via U.S. mail (as above) or the Internet : mauerc@carleton.edu. Here are two reports I have already recieved :

Name : Tetris

Version : 1.00

Company : Academy Soft-ELORG & Spectrum HoloByte

Programmers : Roland Gustafsson et al.

Report by : anonymous

Effects :

The following notes apply only to this specific implementation of Tetris, it does not apply to any other version, including the desk accessory version also distributed by Spectrum HoloByte.

To have Invisible Hand affect Tetris, you must hold down the modifier keys while you are dropping a piece. Invisible Hand allows you to 'fix' the piece which will appear two pieces in the future (the piece in the 'next piece' box). The number returned by \_Random is assigned a piece by Tetris according to the table below. You should be able to figure out how to configure the Invisible Hand so that your favorite modifier key (like control), returns your favorite piece.

|   |   |
|---|---|
|    | 1 |
|  | 2 |
|  | 3 |
|  | 4 |
|  | 5 |
|  | 6 |
|  | 7 |

Name : Spectre

Version : 1.0

Company : Velocity & Peninsula Gameworks

Programmers : Steve Newman, Sam Schillace, et al.

Report by : anonymous

Effects :

Playing against computer opponents, Spectre calls \_Random VERY frequently, and I haven't spent enough time to figure out what effects the Invisible Hand has on it. However, when you teleport (using the " ` " key), it uses \_Random numbers to check to see if you explode (if you are low on juice), and to determine your new position on the field (among other things).

### **Installation :**

- To install the Invisible Hand simply drag it into your System Folder. If you are running System 7, it belongs in the Control Panels folder inside the System Folder. On startup, holding down the shift key or the mouse button disables the Invisible Hand.

### **Not-So-Obvious Features :**

- The function `_Random` "returns a pseudo-random integer, uniformly distributed in the range from -32767 to 32767." The Invisible Hand interprets all input as numbers in this range (you only can return valid 'Random' integers).

- Changing a variable and immediately exiting (without hitting tab, return, enter, or selecting another item in the list) will cause the change not to be registered by the Invisible Hand. To be sure a value is entered, hit tab, return or enter before exiting from the Control Panel.

### **Questions about the Invisible Hand :**

#### **• How can I tell if a program calls `_Random`?**

Unfortunately, if you are not familiar with the debugger MacsBug there very is little you can do to detect if a program calls `_Random`. If you set the Invisible Hand to return one number all the time (by holding down shift continuously, or by setting the Hand to return a number when no modifier keys are down), and you see no noticeable effect in the program you are running, it probably does not call `_Random`.

Note : Setting the Invisible Hand to return one number all the time is STRONGLY discouraged; while I have not encountered a program which critically needs a random number, one may exists; and in any case, it isn't very subtle.

If you are familiar with MacsBug (Apple's debugger), the following procedure will help you determine definitively if a program calls `_Random`, or not. If you do not completely understand these instructions and their implications, do not attempt to do this.

- 1) Restart with MacsBug in the System Folder (don't do this while you're in the middle of something important!).

- 2) Enter the debugger (this is usually done by hitting the programmer's key, or by pressing the interrupt switch on your Mac).

- 3) Type `"atb _Random"` – This sets a break point at the `_Random` trap. Every time the `_Random` trap is called, you will enter the debugger.

You will see : `"A-Trap break at A861 (_Random) every time"`

- 4) Type `"g"` to re-enter the Finder – it may seem that your Mac is running in slow motion; this is a side effect of setting the break.

- 5) Run the program or game and test it thoroughly. Bard's Tale, for example, may only call `Random` when it is generating a new character.

- 6) Every time the program calls `_Random`, you will abruptly enter the debugger with a message resembling :

```
"A-Trap Break at 00##### : A861 (_Random)"
```

If your program does not enter the debugger at any point

- 7) To clear the break type `"atc"` while you are in the debugger. You can also use Macsbug's on-line help : type `"help"` or `"?"` (`"? a-traps"` tells more about these traps).

- This procedure only helps you to determine if the program calls `_Random`, not the effect of returning different "random" numbers will have on your program. This is up to you to figure out. Remember this Control Panel is thoroughly disclaimed – you assume all risks when you do this.

- **How does the Invisible Hand work?**

In the Macintosh ROM, Apple provides programmers with a function, `_Random`, which returns a pseudo-random integer. On startup, the Invisible Hand patches (or redirects) the system trap `_Random` to a function which we have written. Programs which call this trap are those which are affected by the Invisible Hand; others are not. Every time `_Random` is called it reads the configuration of the keyboard, and returns either a number which you have specified, or it calls the standard Apple `_Random` function.

The Invisible Hand Control Panel communicates with the INIT via the Gestalt manager. In system versions previous to System versions previous to 6.0.4 the Gestalt is not present, and the Control Panel is inoperable (see Early Systems).

- **Early Systems (previous to 6.0.4)**

With System 6.0.4, Apple introduced a new manager, called the Gestalt manager. Without Gestalt, the Invisible Hand control panel cannot communicate with the Invisible Hand INIT (or System Extension). If this is the case, the Invisible Hand icon may still appear on startup, but it will not appear in the Control Panel. To use the Invisible Hand with systems versions previous to 6.0.4, you must be familiar with ResEdit.

- The following procedure can be used to configure the Invisible Hand using ResEdit (if you have an older System or not). Do not use ResEdit if you do not know exactly what you are doing!

- 1) Open the Invisible Hand using ResEdit
- 2) Open the 'TABL' resource. (We have included a template for editing this resource).
- 3) Change the values in the 'TABL' resource.
- 4) Save the changes and test.