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ISP116x PCI/DOS Mini Evaluation Kit

User's Guide

Rev. 1.0

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1. Introduction

The ISP116x PCI/DOS Mini Evaluation Kit consists of small software modules that run various types of USB host functions, such as USB mouse, USB audio and USB printer, to demonstrate the ISP116x's flexibility in implementation with different types of applications. ISP116x refers to both the host controller the ISP1160 and the single-chip host/device controller, the ISP1161x.

The ISP116x Mini Kit comes with two software programs—MP100 and Kenobi2—that were developed using DOS for easy porting

- MP100 is the software program for testing basic USB host functions and a USB mouse. This document describes the use of these functions.
- Kenobi2 is the software program for testing USB audio and a USB printer. For details on these functions, refer to *ISP1161 MiniKit – Kenobi2 User Manual 1.0*.

The ISP116x PCI Mini Kit hardware is plugged into a PC PCI slot.

2. Hardware

The ISP116x PCI/DOS Mini Kit is a stand-alone PC evaluation kit. It succeeds the ISP116x ISA/DOS Mini Kit. The ISP116x ISA/DOS Mini Kit required confusing jumper settings to enable its interrupts and DMA channels on the ISA bus. This PCI/DOS Mini Kit, however, abolishes the need for such settings because its nature of Plug and Play (PnP) means motherboard resources are allocated automatically by the PCI BIOS. The PCI bus also has a much higher data throughput, which could not be accomplished using the ISA bus architecture. This allows you to test ISP116x output levels to the limits.

2.1. System and Hardware Requirements

- PC motherboard with PCI slot supplying 5 V
- Microsoft[®]^[1] Windows[®] 98
- Logitech[®]^[3] mouse.

3. Running MP100

Make sure you have the following files under the same directory:

- MP100.exe
- Egavga.bgi.

To start the program, type **MP100** at the DOS prompt. On starting the program, the main menu screen appears (see Figure 1). Select a number to choose a function.

At the bottom of the screen is the ChipID.

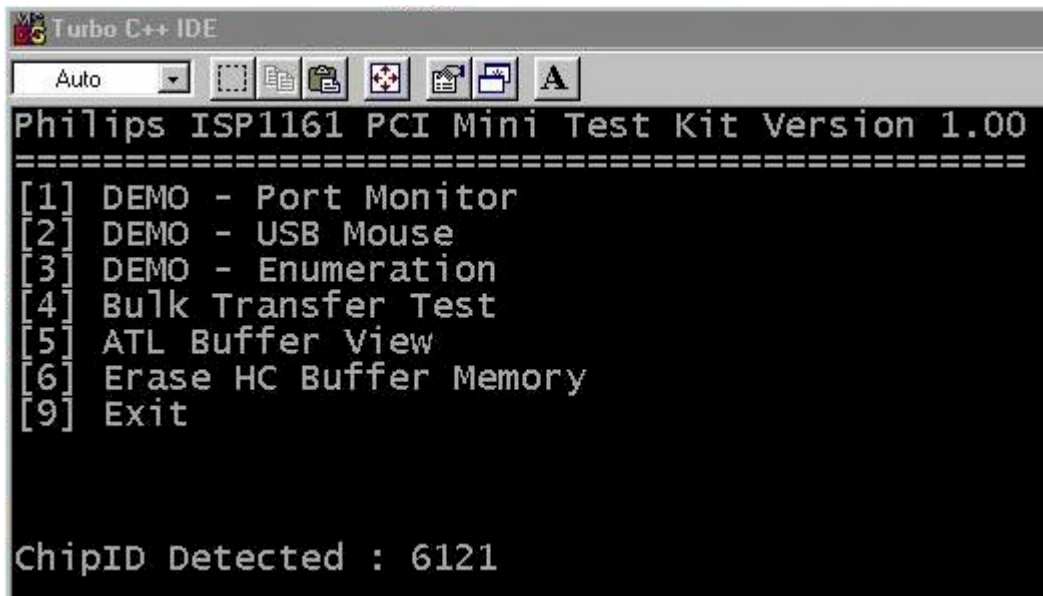
- For engineering sample 1 (ES1), it is 0x6110.
- For ES2, it is 0x6120.
- For ES3, it is 0x6121.
- For ES4, it is 0x6122.

Note: In this document, items that you type or press are indicated in bold.

^[1] Microsoft and Windows are registered trademarks of Microsoft Corporation.

^[2] Windows is a registered trademark of Microsoft Corp.

^[3] Logitech is a registered trademark of Logitech.



```
Turbo C++ IDE
Auto
Philips ISP1161 PCI Mini Test Kit Version 1.00
=====
[1] DEMO - Port Monitor
[2] DEMO - USB Mouse
[3] DEMO - Enumeration
[4] Bulk Transfer Test
[5] ATL Buffer View
[6] Erase HC Buffer Memory
[9] Exit

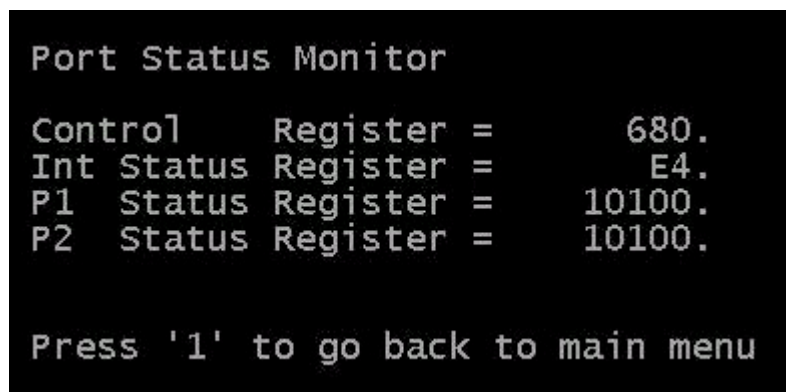
ChipID Detected : 6121
```

Figure 1: Main Menu of the DOS Mini Kit

4. Menu Items

4.1. DEMO - Port Monitor [Press 1]

This routine polls the two downstream ports of the ISP116x. If a connection is detected, the routine enables the port and reports whether the connected device is a full-speed (FS) type or a low-speed (LS) type. To go back to the main menu, press **1**.



```
Port Status Monitor

Control Register = 680.
Int Status Register = E4.
P1 Status Register = 10100.
P2 Status Register = 10100.

Press '1' to go back to main menu
```

Figure 2: Port Status Monitor

4.2. DEMO - USB Mouse [Press 2]

Before running this routine, make sure a USB mouse is plugged into one of the two downstream ports, and then run this routine. It will try to enumerate the mouse and then switch to a graphical screen to display the mouse movement.

This routine does not check whether a mouse is present. It assumes that a mouse is connected. To exit from this routine, press **1**.

```
Command stage ccode = 0 active=0
GetDescriptor... Transaction Completed sucessfully!
Command stage ccode = 0 active=0
GetConfiguration... Transaction Completed sucessfully!
iManufacturer = 1
iProduct = 2
iInterface = 0
Command stage ccode = 0 active=0
Get Product... Transaction Completed sucessfully!
Name length is 15
Product : USB-PS/2 Mouse
Command stage ccode = 0 active=0
Get Manufacturer...Transaction Completed sucessfully!
Name length is 9
Manufacturer : Logitech
Press any key to continue...
```

Figure 3: USB Mouse Demo

4.3. DEMO – Enumeration [Press 3]

This routine is used to check the USB device connected to any of the two downstream ports. It gets the following information from the connected USB device, if available:

- Device Descriptor
- Configuration Descriptor
- String Descriptor for the manufacturer and product names.

When you select this option, the routine will generate a log of the USB transactions and any error messages, after which it will enter a submenu. Press **D** to display the device descriptor or press **C** to display the configuration descriptor.

To go back to the main menu, press **9**.

Note: This is not a complete enumeration process.

4.4. Bulk Transfer Test [Press 4]

This routine sends a bulk data packet of 64 bytes to address 0, endpoint 1. It does not check for the device response. However, if a full-speed device is connected, some bus activities will be observed.

```
Philips ISP1161 Bulk Transfer Test
=====
PTD dumped into ATL buffer
waiting for PTD to be processed... Done!!!

Completion Code:5
Active Bit:0
```

Figure 4: Bulk Transfer

4.5. ATL Buffer View [Press 5]

This routine prints the buffer content of 2048 words, counting from the beginning of the ATL buffer. If the ATL buffer is smaller than 2048 words, only the first (HcATLSize/2) word is correct.

```
00FC 00FD 00FE 00FF 0100 0101 0102 0103 0104 0105 0106 0107 1F20 03DA 9815 FBF6
6CB2 3D2F 95FA 89DF 11B5 85DE 4609 2BB9 9B2E 528D 6954 2393 FA17 D775 2CD2 984B
0D09 1ED9 DBE0 95FF 92C2 1CD6 94D0 87BC 4F30 CA66 A0A7 6806 2174 8249 6BB3 6AE2
610C 754E BFF8 ED3E 5996 3AF4 AFD3 8801 063E AC2A DFD3 FFE0 1437 A3A2 1D2B 6C63
4A2F FA40 AACA A1E6 8854 47DD 57F1 664F F5DA D6CC D086 F070 5CE1 2364 8DF2 B0F9
BE99 32C7 9BC0 20C7 F683 6EDC 24A6 57F2 7C7E 91B4 65CE 4869 46F7 9EC3 DA66 9FC8
457A 3355 DA2A 09AF E133 442B 5DE6 45D0 FD31 9EBF F58F B8BE 49F8 7181 6188 4D97
C002 B675 CF8B DCF3 457D A5E0 259B B067 013D 2667 D916 BAD0 FBA0 CBF0 32CA 84FC
19D1 FB03 67B3 DDA8 6885 3C84 899D 4481 9981 4523 EEE5 3CFF F801 291E AFA5 32A2
5D09 9BED 646D 2F93 FC04 B94F C9FE C808 2DC3 9C33 B2AF 5DFD BE49 2928 75BA 1B08
86C9 45E5 5E2C 2A53 3666 CBE3 A578 C715 A8BD 1B97 6102 AF7E 5754 2F0D BB78 7E4A
2648 8538 28ED 4D6C 810F 308B 6C56 8502 12D9 46C2 BDE4 50DC 421A 0D41 B2F3 6818
46CC 5FF6 F496 FB7F B154 A653 B6AB 2CDF 3D51 7E5F D86E 8C3C D584 C90C 8C90 66B2
64E1 A7FB 9DCA A43A 1E40 7D1B 0C4E 6F6F E46C 46F1 DAB4 8819 AB8D 5796 1989 833E
1A9D 14F3 38CB 0748 AA6E 6546 8E5D BF8D C9DE EFC5 BAED C6A6 2615 C209 8EA1 D888
15C4 6E61 349E 1628 201D 3D84 4BEF 7BCF 1FE3 691C DF85 10C4 C5E5 BC1D 29BD 9A49

Memory Map Page 2
From Address 000200 to 000400
From Address 000512 to 001024
```

Figure 5: Memory Map

4.6. Erase HC Buffer Memory [Press 6]

This routine erases the entire buffer memory of ISP1161 and resets it to 0.

4.7. Exit [Press 9]

To exit the DOS program, press **9**.

5. Cautions

- This evaluation kit aims to demonstrate the functionality of ISP116x through some basic USB operations. It does not represent the optimal way of programming ISP116z.
- This program does not use any hardware interrupt for operation.
- This program is compiled using Borland®^[1] Turbo C Ver. 3.00.
- The two most important low-level access files are: `reg.c` and `buf_man.c`.

The `reg.c` file provides register access routines. These routines must be modified if a different hardware platform is used. The `buf_man.c` file provides buffer management routines.

- The `c_usb.c` file provides USB level routines, such as `GetDescriptor`. A good understanding of the USB protocol is necessary to modify this part of the code.

6. References

- *ISP1161 Full-speed Universal Serial Bus single-chip host and device controller datasheet*
- *Universal Serial Bus Specification Rev. 2.0 (full speed section)*
- *ISP1161 PCI Evaluation Kit User's Guide*

^[1] Borland is a registered trademark of Borland Software Corp.