

# UMI0039\_2

## ISPI583 Hi-Speed USB Device Mass Storage Eval Kit

Semiconductors

October 2003

### User's Guide Rev 2.0

**Revision History:**

Version	Date	Description	Author
2.0	September 2003	Made the following changes: <ul style="list-style-type: none"><li>• All the figures related to the eval kit.</li><li>• Section 1.</li><li>• Section 2.</li><li>• Section 3.</li><li>• Section 5.</li><li>• Section 6.2.</li><li>• Section 6.4.</li><li>• Section 8.1.</li></ul>	Albert Goh
1.0	September 2003	Initial version	Albert Goh

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# CONTENTS

<b>1.</b>	<b>INTRODUCTION</b> .....	<b>5</b>
<b>2.</b>	<b>SYSTEM REQUIREMENTS</b> .....	<b>5</b>
<b>3.</b>	<b>BLOCK DIAGRAM</b> .....	<b>6</b>
<b>4.</b>	<b>PCB LAYOUT</b> .....	<b>6</b>
<b>5.</b>	<b>COMPONENT PLACEMENT</b> .....	<b>7</b>
<b>6.</b>	<b>HEADER AND CONNECTOR PLACEMENT</b> .....	<b>8</b>
6.1.	USB, DC POWER INPUT AND HARD DISK POWER OUTPUT SUPPLY CONNECTORS.....	8
6.2.	ISPI583 PROCESSOR EXPANSION BUS.....	9
6.3.	ISPI583 IDE BUS.....	10
6.4.	ISPI583 PROCESSOR SELECTOR.....	11
<b>7.</b>	<b>SWITCH AND LED PLACEMENT</b> .....	<b>12</b>
7.1.	MICROCONTROLLER RESET SWITCH, WAKE-UP SWITCH AND SUSPEND LED .....	12
<b>8.</b>	<b>ISPI583 MASS STORAGE EVAL KIT SETUP PROCEDURE</b> .....	<b>13</b>
8.1.	MASS STORAGE KIT SETUP PROCEDURE .....	13
8.2.	MASS STORAGE KIT HOST PC SETUP AND BUS ENUMERATION PROCEDURE .....	15
<b>9.</b>	<b>SCHEMATICS</b> .....	<b>17</b>
9.1.	ISPI583 MASS STORAGE EVAL BOARD .....	17
<b>10.</b>	<b>BILL OF MATERIAL</b> .....	<b>22</b>
10.1.	ISPI583 MASS STORAGE EVAL BOARD .....	22
<b>11.</b>	<b>REFERENCES</b> .....	<b>27</b>

# FIGURES

Figure 1-1: ISPI583 Mass Storage Eval Board .....	5
Figure 3-1: ISPI583 MassStorage Eval Board Block Diagram .....	6
Figure 4-1: ISPI583 Mass Storage Eval Board .....	6
Figure 5-1: ISPI583: At upper-right corner of the eval board .....	7
Figure 6-1: Hard disk power supply output, DC power supply input and USB connectors .....	8
Figure 8-1: Hi-Speed USB Device on Philips ISPI561 EHCI Hi-Speed USB Controller .....	15
Figure 8-2: Original USB Device on Intel UHCI USB Controller.....	16

# TABLES

Table 10-1: Bill of Material of the ISPI583 Mass Storage Eval Board .....	22
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## I. Introduction

The ISPI583 Hi-Speed USB Device Mass Storage Eval Kit enables you to evaluate the features of the ISPI583—a Hi-Speed Universal Serial Bus (USB) device. The ISPI583 supports Generic mode and Split Bus mode CPU interface and direct interface to any ATA/ATAPI device—in a multiplexed address and data bus in a USB mass storage application. Evaluate the ISPI583 as a mass storage device (Mass Storage kit).

On the eval board are the ISPI583 and an 8051 series microcontroller. The kit allows you to connect the ISPI583 to any generic processor when it is configured to the separate address and data bus mode (Generic Processor Mode). Figure I-1 shows the ISPI583 Mass Storage eval board.

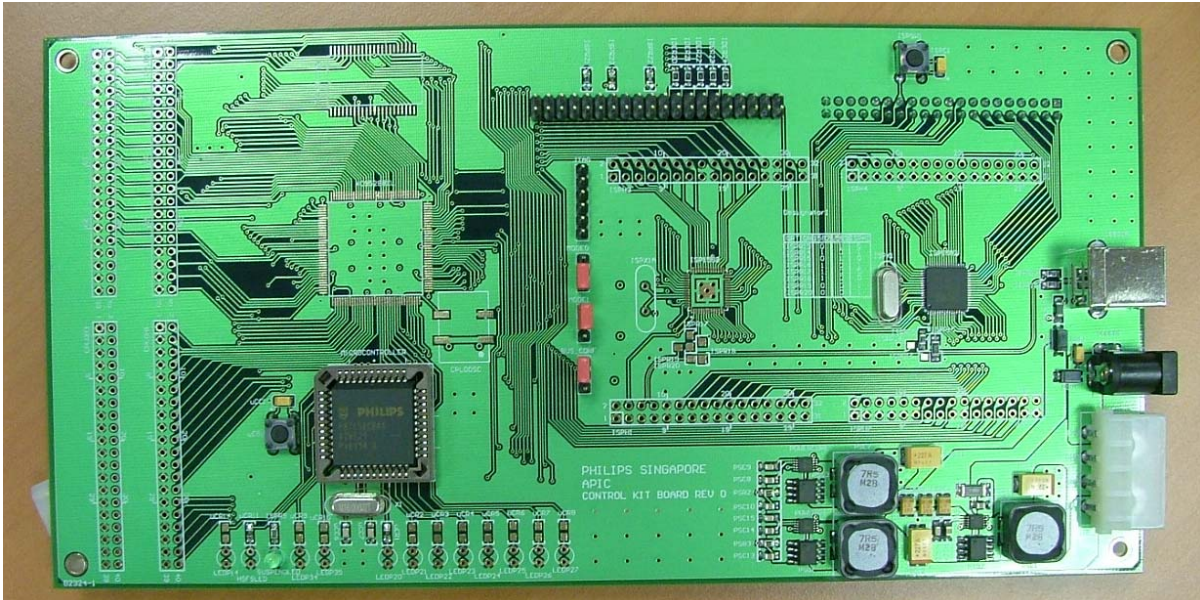


Figure I-1: ISPI583 Mass Storage Eval Board

## 2. System Requirements

### PC Host

- Hi-Speed USB Host Controller add-on card under Microsoft® Windows® 2000 or Windows XP\*

### Device

- 12 V DC power supply
- IDE cable
- Hard disk power cable
- ATA/ATAPI device\*

### Firmware

- Keil C Compiler\*
- Firmware for Mass Storage eval kit

\*—Denotes that the item will not be included in the eval kit.

### 3. Block Diagram

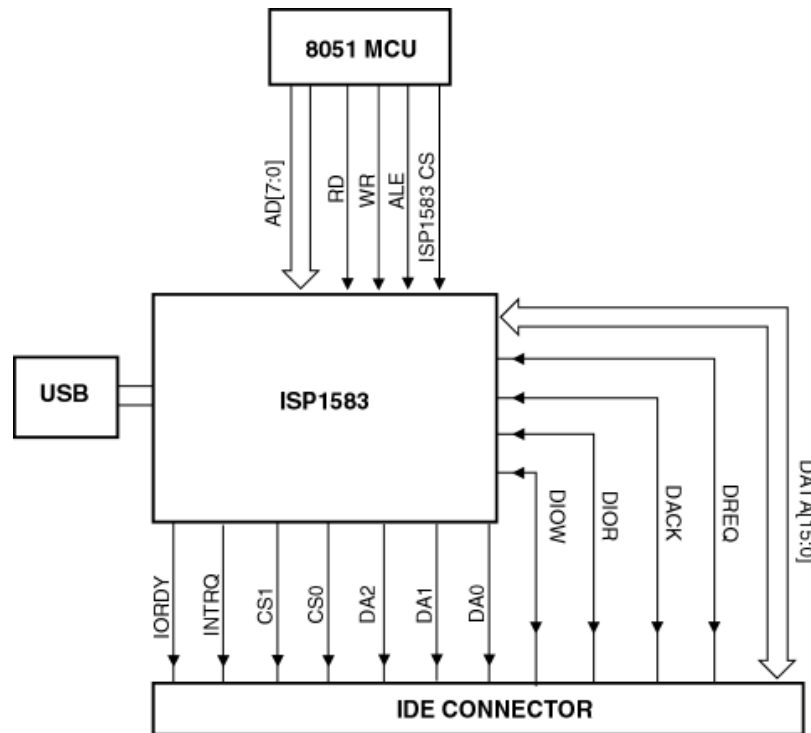


Figure 3-1: ISPI583 MassStorage Eval Board Block Diagram

Figure 3-1 shows the ISPI583 configured to operate in the Split Bus mode. The Xilinx® XC95288XL, which when available acts as a local DMA Controller, is removed when the board is configured as a mass storage application. In the Mass Storage kit, the ATA/ATAPI device is connected to the IDE header JPI.

### 4. PCB Layout

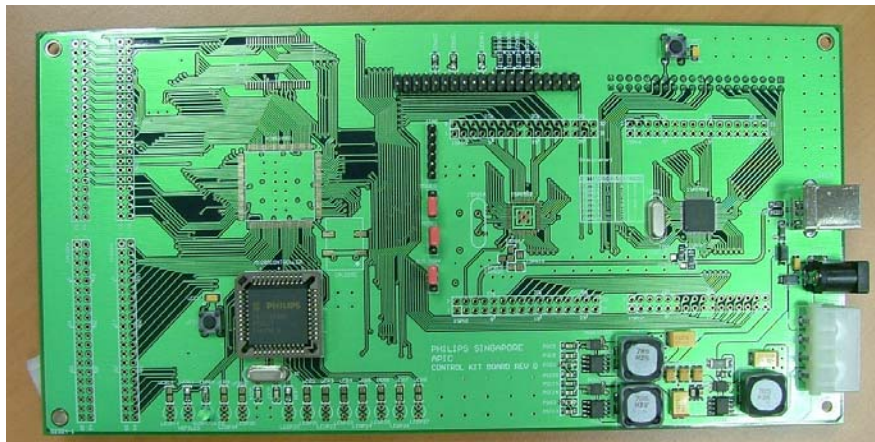


Figure 4-1: ISPI583 Mass Storage Eval Board

Figure 4-1 shows the PCB layout and placement of components on the ISPI583 Mass Storage eval board.



## 5. Component Placement

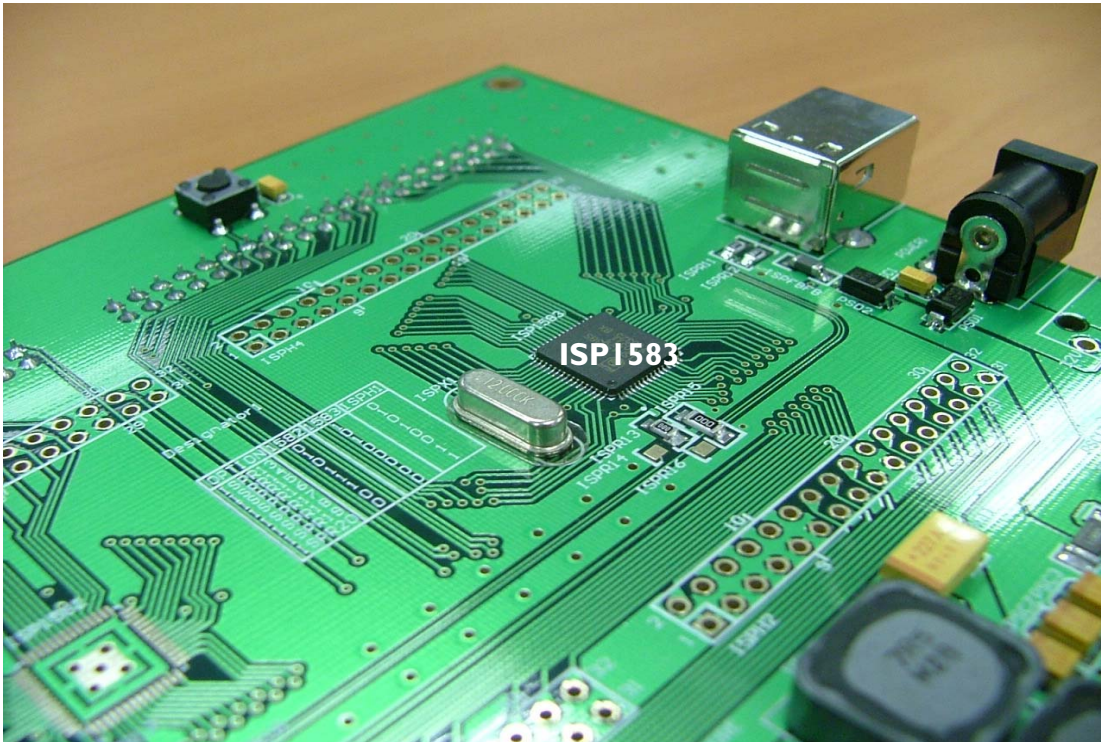


Figure 5-1: ISP1583: At upper-right corner of the eval board

## 6. Header and Connector Placement

### 6.1. USB, DC Power Input and Hard Disk Power Output Supply Connectors

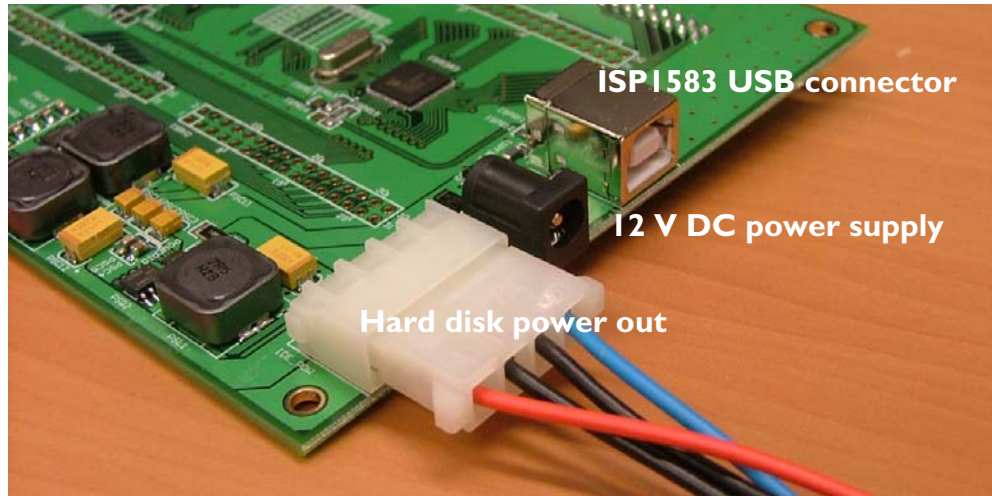
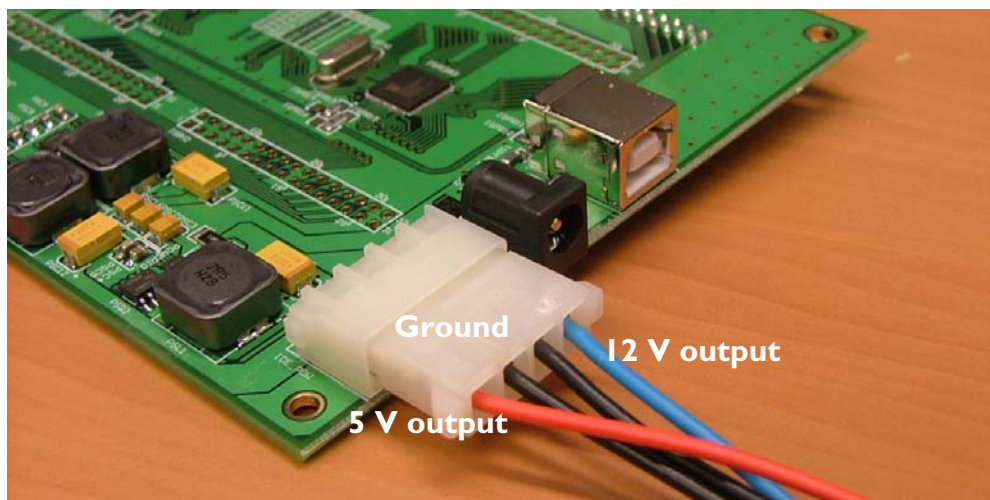


Figure 6-1: Hard disk power supply output, DC power supply input and USB connectors

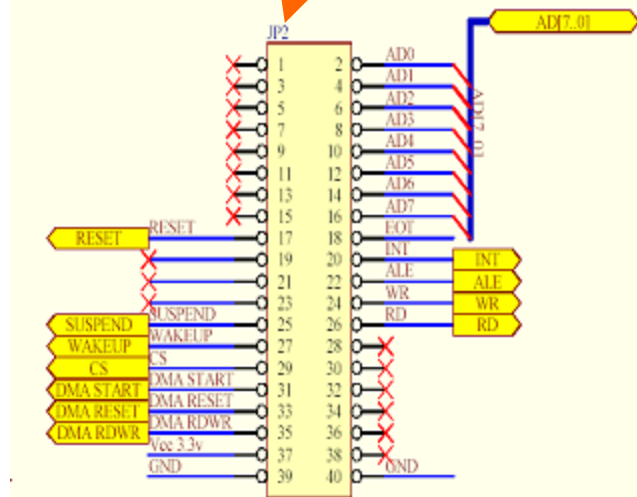
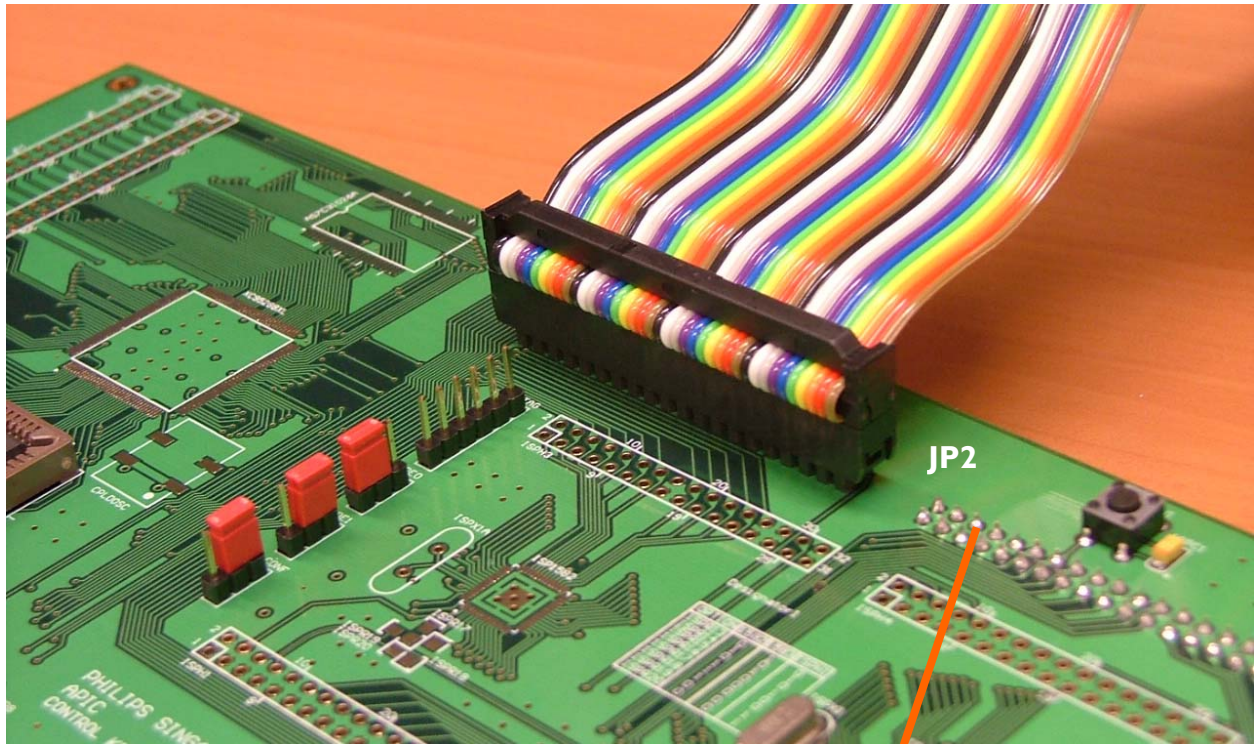
The ISPI583 USB connector is next to the 12-volt DC power supply input and the hard disk power out socket.



**Caution:** The hard disk Power Out socket is mainly used to supply power to the ATA/ATAPI device that is connected to the kit. Do not use this connector to power the kit.

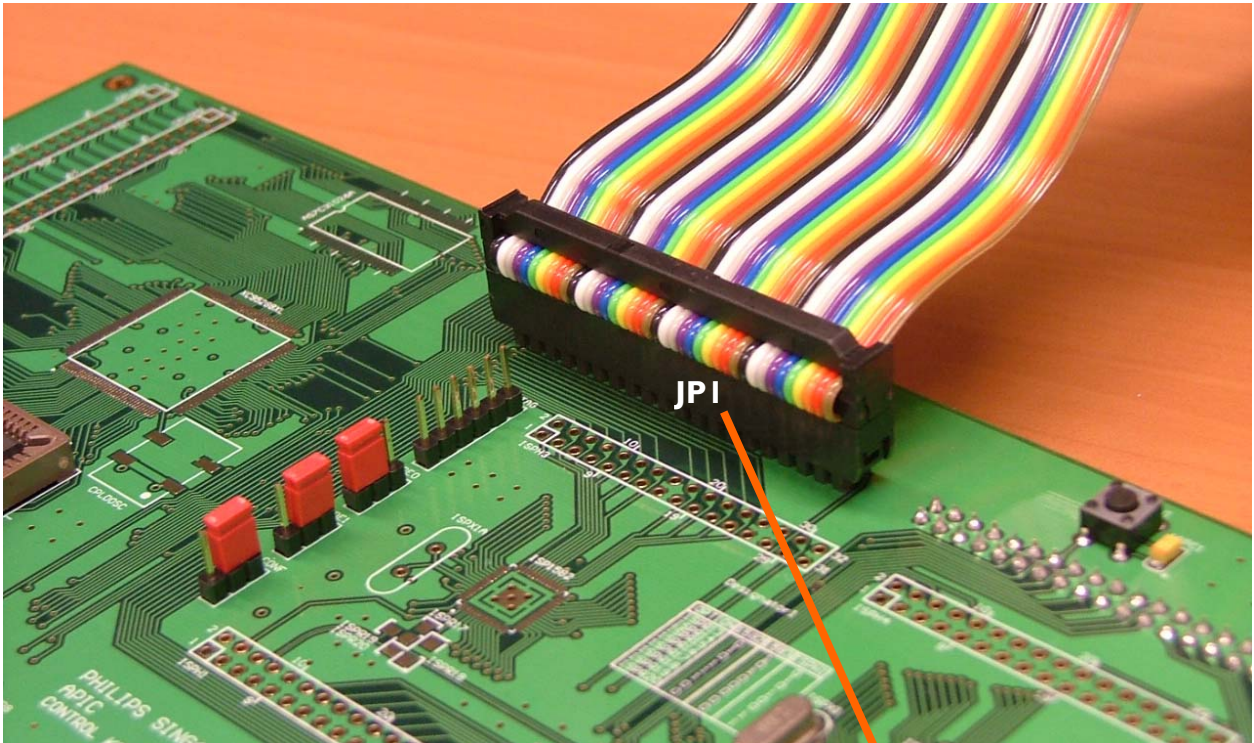


### 6.2. ISPI583 Processor Expansion bus

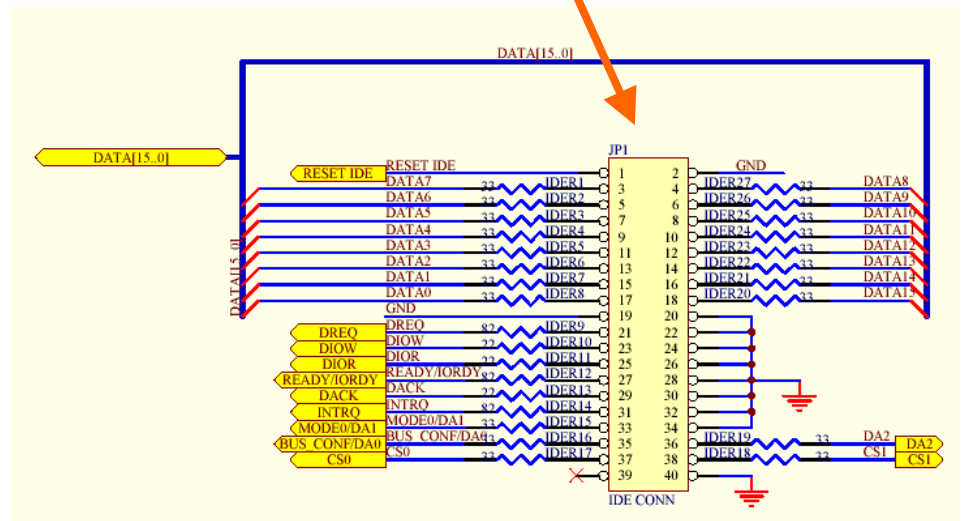


Acts as an expansion bus for connection to another processor or microcontroller.

### 6.3. ISPI583 IDE Bus

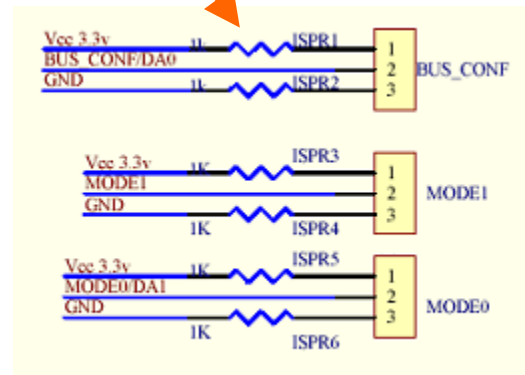
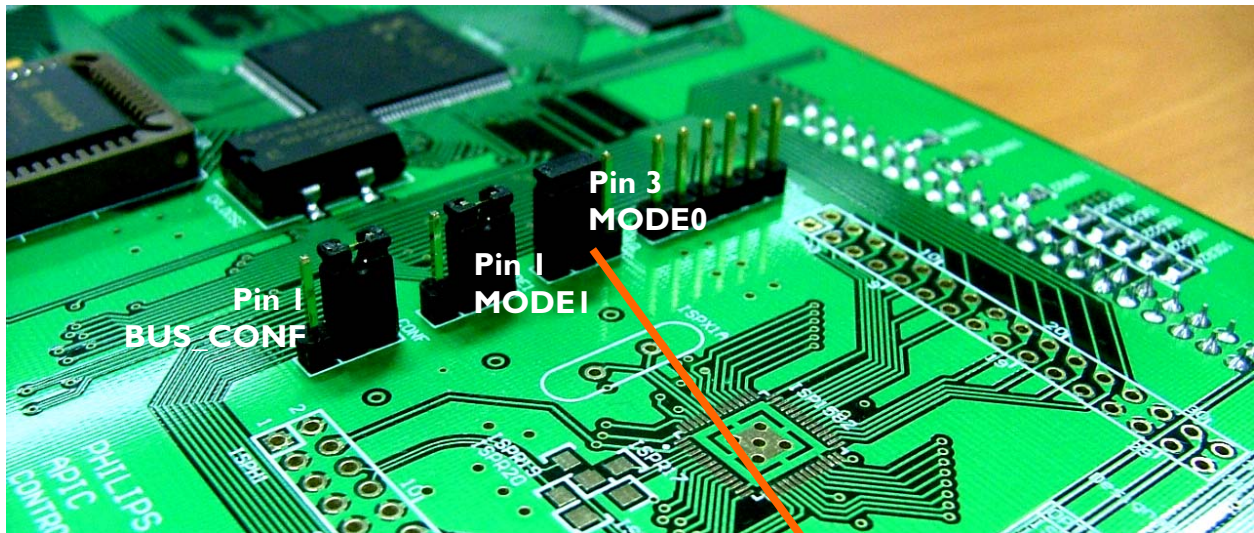


Acts as a DMA expansion bus for connection to an external DMA controller and ISPI583's 16-bit data bus. JPI acts as an IDE connector to the ATA/ATAPI device.





### 6.4. ISPI583 Processor Selector

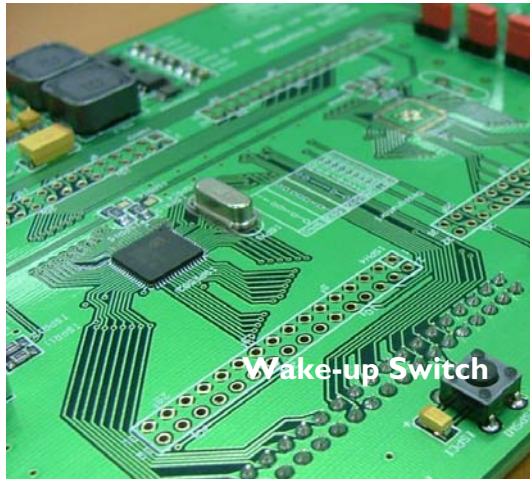


The ISPI583 Mass Storage Kit is configured to run under the multiplexed 8-bit address and data bus (Split Bus Mode).

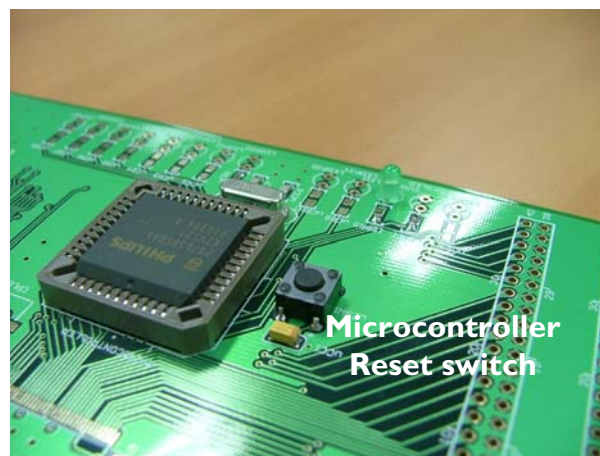
Processor Mode	Bus Config Pin	Mode 1 Pin	Mode 0 Pin
Split Bus Mode	2 - 3	2 - 3	1 - 2

## 7. Switch and LED Placement

### 7.1. Microcontroller Reset Switch, Wake-Up Switch and Suspend LED



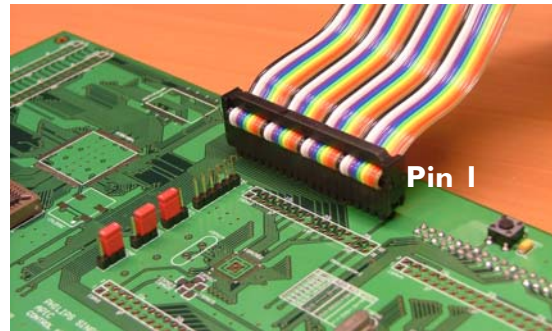
The Wake-Up switch is tied to ISPI583's wake-up pin, which will wake up ISPI583 when it is in suspend mode. The Suspend LED when lit indicates that ISPI583 is in the suspend mode. The Microcontroller Reset switch resets the microcontroller, which in turn resets the ISPI583.



## 8. ISPI583 Mass Storage Eval Kit Setup Procedure

### 8.1. Mass Storage Kit Setup Procedure

1. Connect the IDE cable that is provided with the kit to JPI and the ATA/ATAPI device. Ensure that pin 1 of JPI is connected to pin 1 of ATA/ATAPI device IDE connector.



2. Connect the hard disk power cable supplied with the kit to the power connectors of the HDD and the ATA/ATAPI device.



**Caution:** The hard disk power out socket is used mainly for supplying power to the ATA/PI device connected to the kit. Do not power the kit through this connector. The ATA/ATAPI device has to be set to master mode.

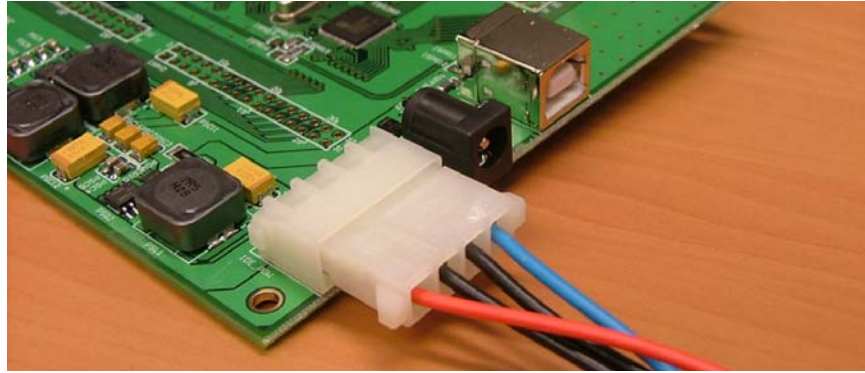
**Caution:** Make sure that the Bus Config, Mode 0 and Mode 1 pin are at the default setting.



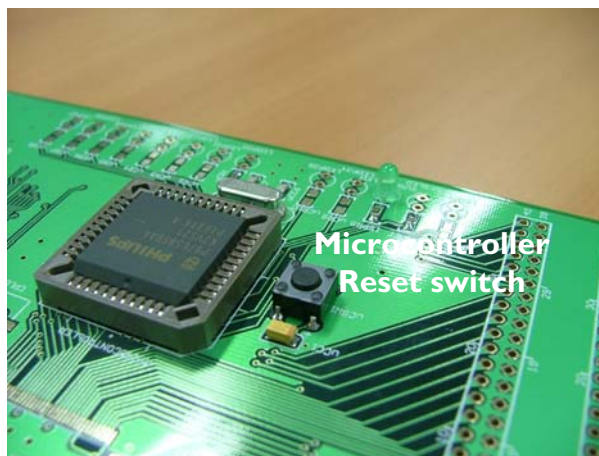
Processor Mode	Bus Config Pin	Mode 1 Pin	Mode 0 Pin
Split Bus Mode	2 - 3	2 - 3	1 - 2

3. Insert the 12-volt DC power supply (that is supplied together with the kit) to the DC jack and switch on the power.





4. Press the Microcontroller Reset switch.



5. Plug in the USB cable to the ISPI583 USB connector.  
After successful enumeration, the ATA/ATAPI device will mount on the host PC.

## 8.2. Mass Storage Kit Host PC Setup and Bus Enumeration Procedure

On successful installation, you will see the device added in the Computer Management window under Device Manager as shown in Figure 8-1.

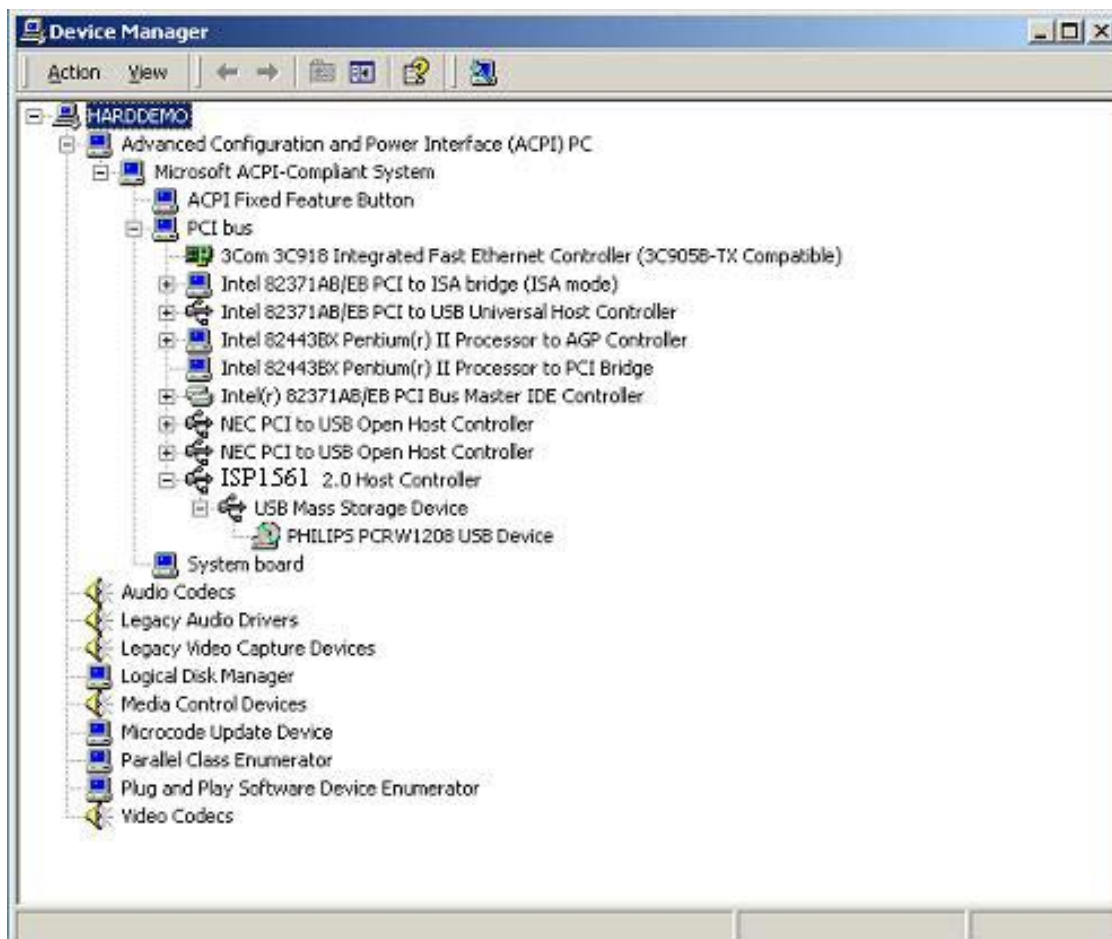


Figure 8-1: Hi-Speed USB Device on Philips ISP1561 EHCI Hi-Speed USB Controller

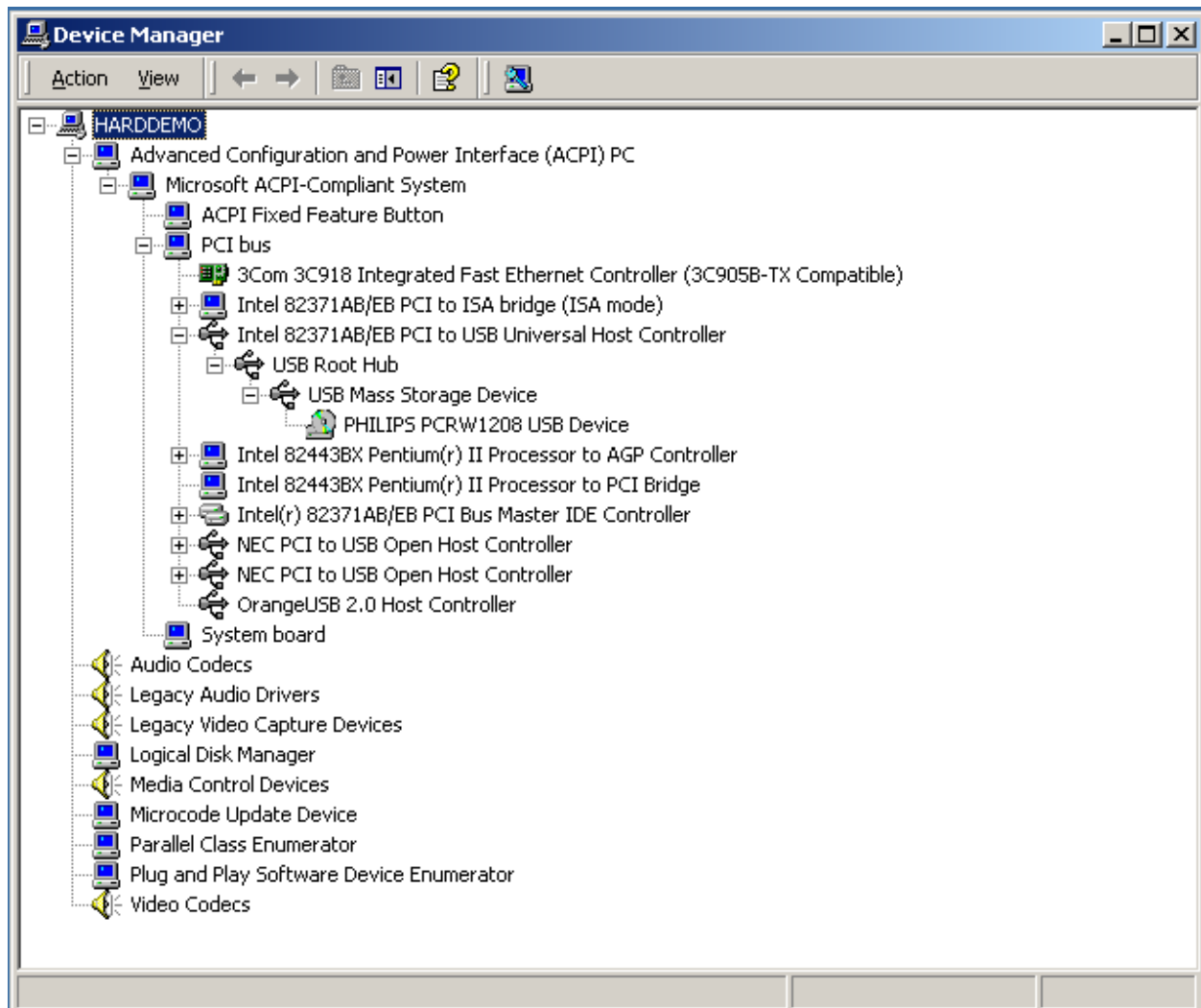
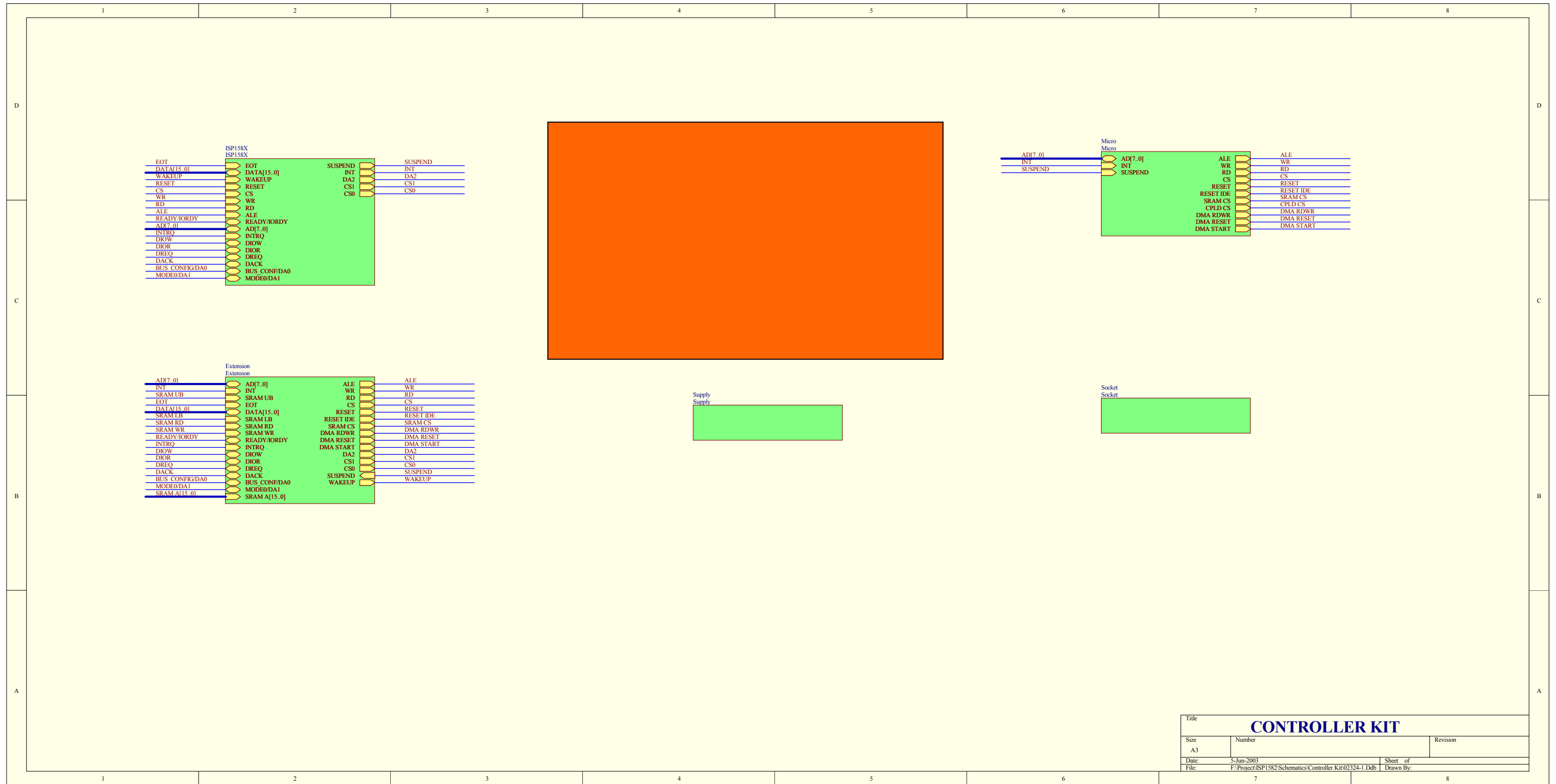
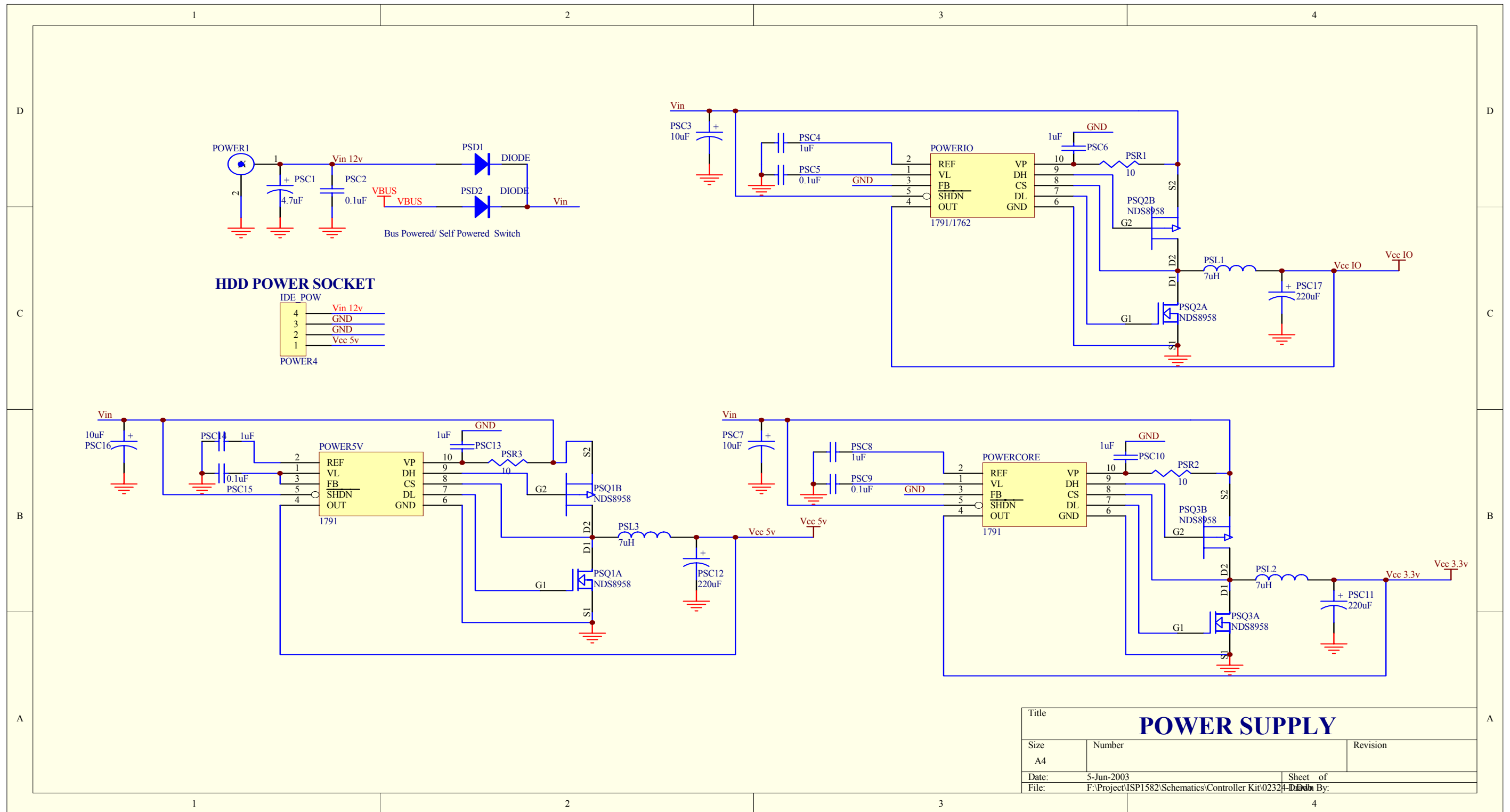


Figure 8-2: Original USB Device on Intel UHCI USB Controller

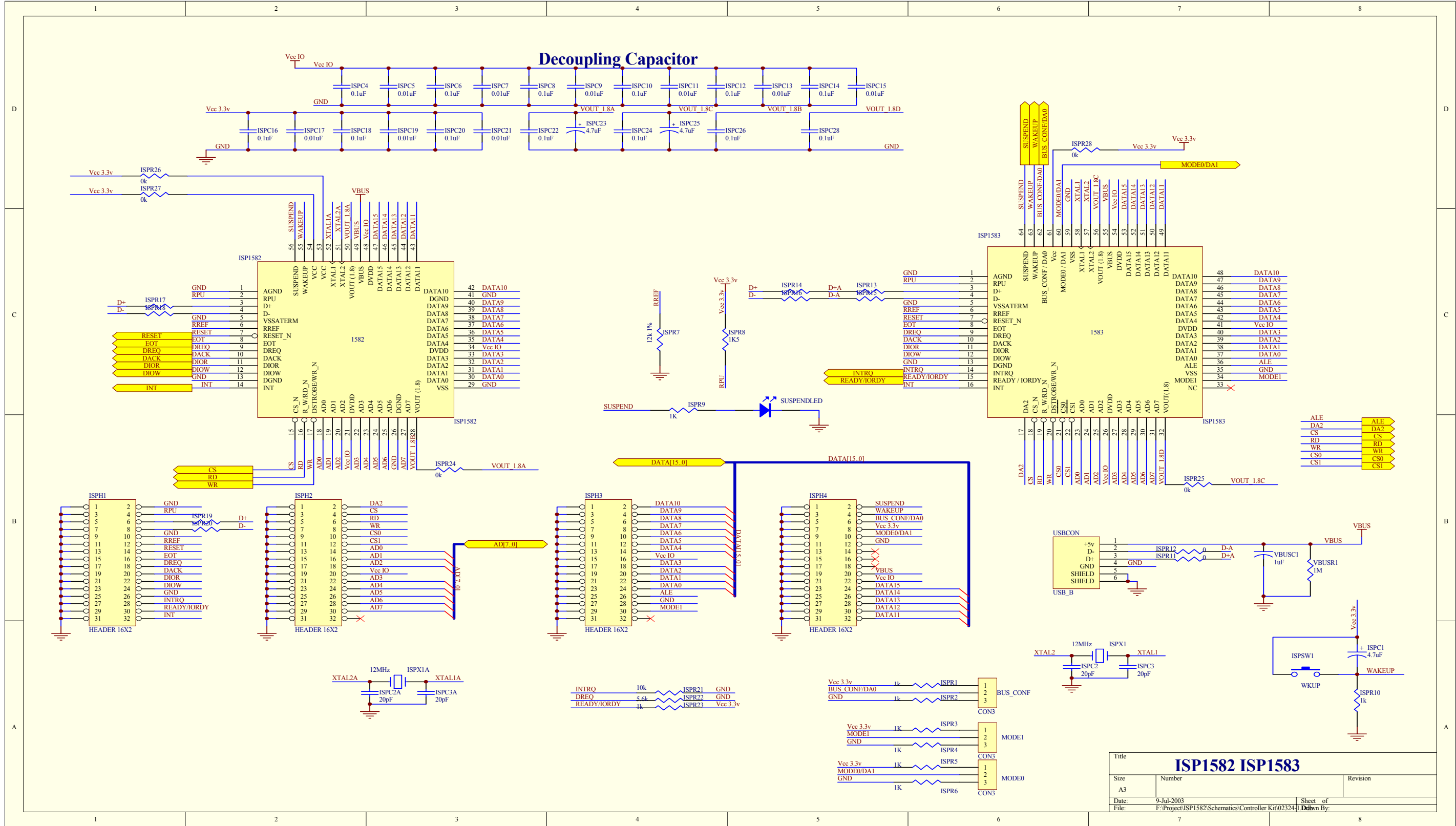
## 9. Schematics

### 9.1. ISP1583 Mass Storage Eval Board

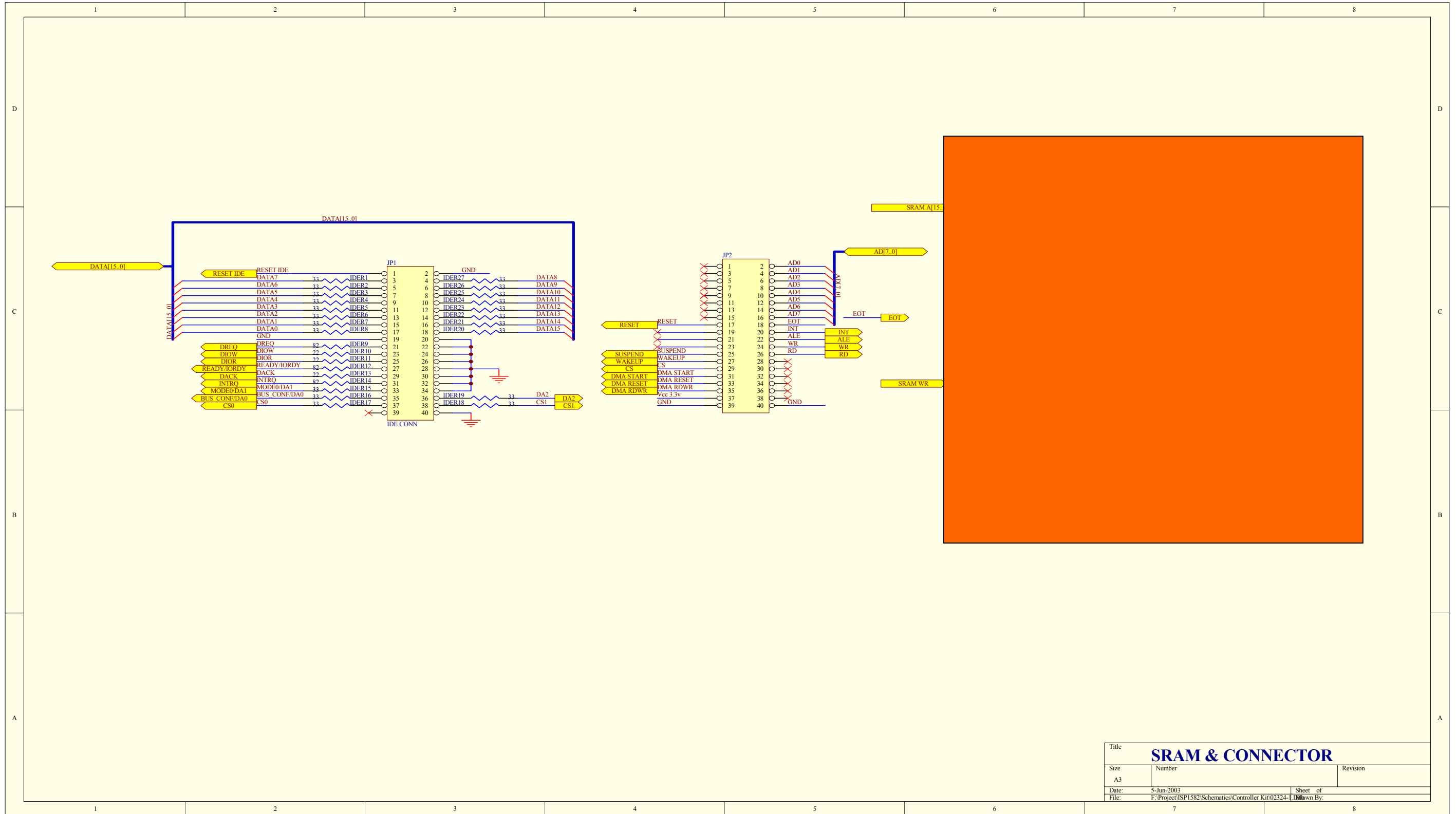




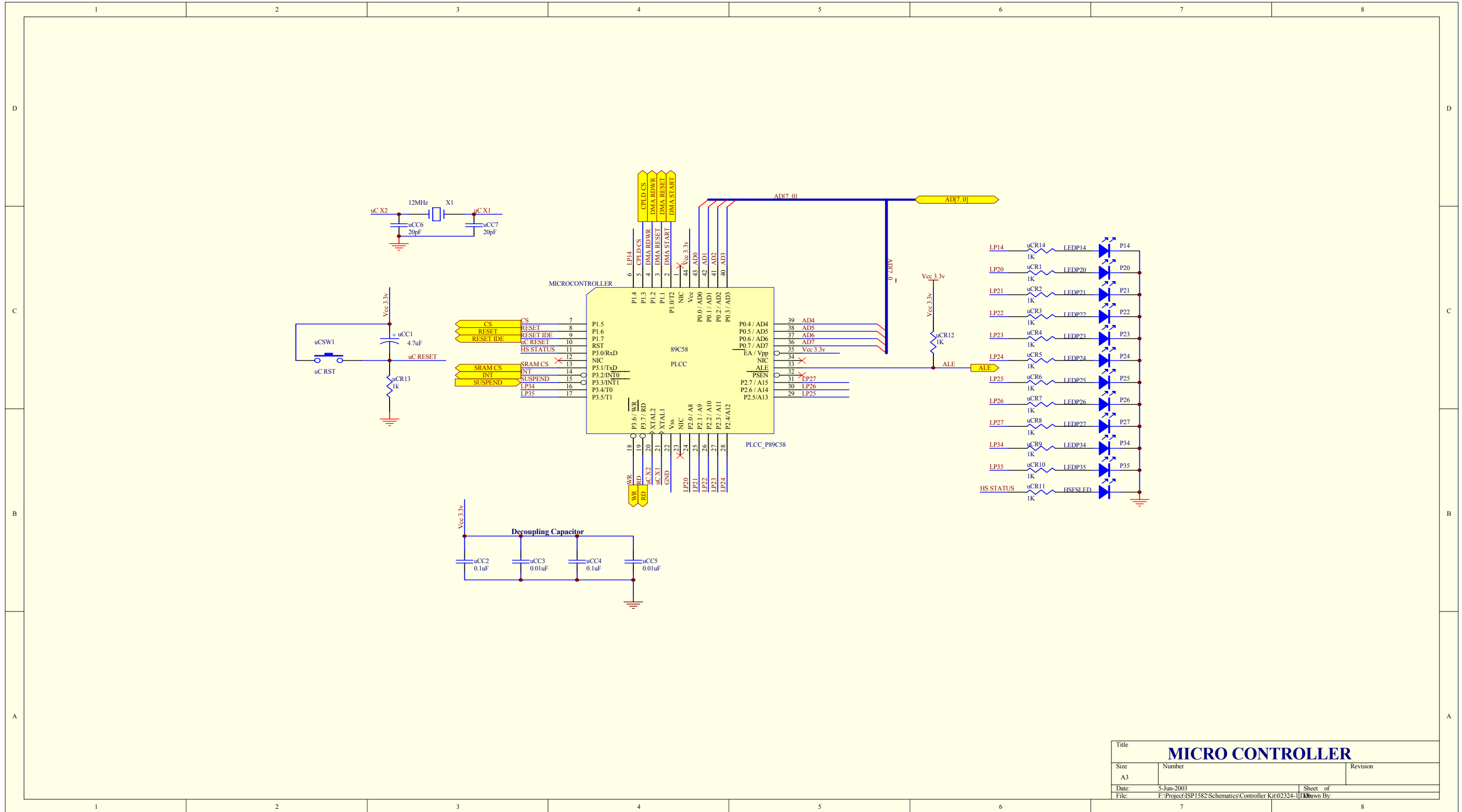




Title		
<b>ISP1582 ISP1583</b>		
Size	Number	Revision
A3		
Date:	9-Jul-2003	Sheet of
File:	F:\Project\ISP1582\Schematics\Controllor Kit\023241	Drawn By:



Title		
<b>SRAM &amp; CONNECTOR</b>		
Size	Number	Revision
A3		
Date:	5-Jun-2003	Sheet of
File:	F:\Project\ISPI583\Schematics\Controller Kit\02324-	Drawn By:



Title		
<b>MICRO CONTROLLER</b>		
Size	Number	Revision
A3		
Date:	5-Jun-2003	Sheet of
File:	F:\Project\ISP1582\Schematics\Controller Kit(02324-1)	Drawn By:

## 10. Bill Of Material

### 10.1. ISPI583 Mass Storage Eval Board

Table 10-1: Bill of Material of the ISPI583 Mass Storage Eval Board

Part Type	Designator	Footprint
0	ISPR11	805
0	ISPR12	805
0.01 $\mu$ F	SC17	603
0.1 $\mu$ F	SC18	603
0.01 $\mu$ F	SC15	603
0.1 $\mu$ F	SC16	603
0.01 $\mu$ F	SC19	603
0.1 $\mu$ F	ISPC4	603
0.01 $\mu$ F	ISPC5	603
0.1 $\mu$ F	SC20	603
0.01 $\mu$ F	SC21	603
0.1 $\mu$ F	SC14	603
0.01 $\mu$ F	SC7	603
0.1 $\mu$ F	SC8	603
0.01 $\mu$ F	SC5	603
0.1 $\mu$ F	SC6	603
0.01 $\mu$ F	SC9	603
0.1 $\mu$ F	SC12	603
0.01 $\mu$ F	SC13	603
0.1 $\mu$ F	SC10	603
0.01 $\mu$ F	SC11	603
0.1 $\mu$ F	ISPC6	603
0.01 $\mu$ F	ISPC19	603
0.1 $\mu$ F	ISPC20	603
0.01 $\mu$ F	ISPC17	603
0.1 $\mu$ F	ISPC18	603
0.01 $\mu$ F	ISPC21	603
0.1 $\mu$ F	ISPC26	603
0.1 $\mu$ F	ISPC28	603
0.1 $\mu$ F	ISPC22	603
0.1 $\mu$ F	ISPC24	603
0.1 $\mu$ F	ISPC16	603
0.01 $\mu$ F	ISPC9	603
0.1 $\mu$ F	ISPC10	603
0.01 $\mu$ F	ISPC7	603
0.1 $\mu$ F	ISPC8	603
0.01 $\mu$ F	ISPC11	603
0.1 $\mu$ F	ISPC14	603
0.01 $\mu$ F	ISPC15	603

Part Type	Designator	Footprint
0.1 $\mu$ F	ISPC12	603
0.01 $\mu$ F	ISPC13	603
0.1 $\mu$ F	SC4	603
0.01 $\mu$ F	CPLDC10	805
0.01 $\mu$ F	CPLDC6	805
0.01 $\mu$ F	CPLDC2	805
0.1 $\mu$ F	CPLDC1	805
0.01 $\mu$ F	CPLDC18	805
0.01 $\mu$ F	CPLDC14	805
0.1 $\mu$ F	PSC15	805
0.1 $\mu$ F	PSC5	805
0.01 $\mu$ F	uCC3	805
0.1 $\mu$ F	uCC2	805
0.1 $\mu$ F	PSC9	805
0.01 $\mu$ F	uCC5	805
0.1 $\mu$ F	uCC4	805
0.1 $\mu$ F	CPLDC5	805
0.1 $\mu$ F	CPLDC25	805
0.1 $\mu$ F	CPLDC21	805
0.01 $\mu$ F	CPLDC38	805
0.1 $\mu$ F	CPLDC37	805
0.1 $\mu$ F	CPLDC33	805
0.1 $\mu$ F	CPLDC29	805
0.01 $\mu$ F	CPLDC34	805
0.1 $\mu$ F	CPLDC17	805
0.1 $\mu$ F	CPLDC13	805
0.1 $\mu$ F	CPLDC9	805
0.01 $\mu$ F	CPLDC30	805
0.01 $\mu$ F	CPLDC26	805
0.01 $\mu$ F	CPLDC22	805
0.1 $\mu$ F	SC1A	805
0.01 $\mu$ F	SC1B	805
0.1 $\mu$ F	PSC2	805
0.1 $\mu$ F	SRAMC1	805
0.1 $\mu$ F	SRAMC2	805
0.1 $\mu$ F	SC1I	805
0.01 $\mu$ F	SC1D	805
0.1 $\mu$ F	SC1C	805
0.01 $\mu$ F	SC1F	805
0.01 $\mu$ F	SC1H	805
0.1 $\mu$ F	SC1G	805
0k	ISPR24	805
0k	ISPR25	805
0k	ISPR28	805



Part Type	Designator	Footprint
0k	ISPR27	805
0k	ISPR26	805
1K5	ISPR8	805
1K	uCR12	805
1K	ISPR3	805
1K	uCR11	805
1K	uCR3	805
1K	uCR2	805
1K	uCR1	805
1K	ISPR4	805
1K	uCR5	805
1K	uCR7	805
1K	uCR6	805
1K	ISPR5	805
1K	ISPR6	805
1K	uCR4	805
1K	uCR14	805
1K	uCR9	805
1K	ISPR9	805
1K	uCR10	805
1K	uCR8	805
1M	VBUSR1	
1k	ISPR2	805
1k	ISPR1	805
1k	ISPR10	805
1k	uCR13	805
1k	ISPR23	805
1 $\mu$ F	VBUSC1	
1 $\mu$ F	PSC14	805
1 $\mu$ F	PSC10	805
1 $\mu$ F	PSC13	805
1 $\mu$ F	PSC6	805
1 $\mu$ F	PSC4	805
1 $\mu$ F	PSC8	805
4.7 $\mu$ F	ISPC23	
4.7 $\mu$ F	ISPC25	
4.7 $\mu$ F	ISPC1	CASE A
4.7 $\mu$ F	uCC1	CASE A
4.7 $\mu$ F	PSC1	CASE A
5.6k	ISPR22	805
7uH	PSL3	CDRH125
7uH	PSL1	CDRH125
7uH	PSL2	CDRH125
10	PSR2	805

Part Type	Designator	Footprint
I0	PSR3	805
I0	PSR1	805
I0k	ISPR21	805
I0 $\mu$ F	PSC16	CASE B
I0 $\mu$ F	PSC3	CASE B
I0 $\mu$ F	PSC7	CASE B
I2MHz	XI	XTAL-CSM4A
I2MHz	SX1	XTAL-HC49/4H
I2MHz	SX1B	XTAL-HC49/4H
I2MHz	ISPX1	XTAL-HC49/4H
I2MHz	ISPX1A	XTAL-HC49/4H
I2k 1%	ISPR7	805
20pF	SC3B	805
20pF	SC2B	805
20pF	ISPC2A	805
20pF	SC3	805
20pF	SC2	805
20pF	ISPC3A	805
20pF	uCC7	805
20pF	ISPC3	805
20pF	ISPC2	805
20pF	uCC6	805
22	IDER11	805
22	IDER10	805
22	IDER13	805
33	IDER21	805
33	IDER22	805
33	IDER19	805
33	IDER18	805
33	IDER7	805
33	IDER3	805
33	IDER4	805
33	IDER5	805
33	IDER2	805
33	IDER8	805
33	IDER6	805
33	IDER1	805
33	IDER23	805
33	IDER17	805
33	IDER20	805
33	IDER16	805
33	IDER15	805
33	IDER25	805
33	IDER24	805

Part Type	Designator	Footprint
33	IDER27	805
33	IDER26	805
48MHz	CPLDOSC	XTAL-SG615
82	IDER9	805
82	IDER14	805
82	IDER12	805
220µF	PSC17	CASE D
220µF	PSC12	CASE D
220µF	PSC11	CASE D
1791	POWER5V	1791
1791	POWERCORE	1791
1791/1762	POWERIO	1791
CON3	MODE1	CON3
CON3	MODE0	CON3
CON3	BUS_CONF	CON3
CPLD	XC95288XL	TQFP_144
DIODE	PSD2	SMA
DIODE	PSD1	SMA
HEADER 16X2	ISPH3	HEADER 16X2
HEADER 16X2	ISPH1	HEADER 16X2
HEADER 16X2	ISPH2	HEADER 16X2
HEADER 16X2	ISPH4	HEADER 16X2
HEADER 16X2	H1	HEADERB 16X2
HEADER 16X2	H2	HEADERB 16X2
HEADER 16X2	H3	HEADERB 16X2
HEADER 16X2	H4	HEADERB 16X2
IDE CONN	JPI	HEADERB 20X2
ISPI582	ISPI582	HVQFN56-SMT
ISPI582	SOCKET1582	SOCKET56
ISPI583	ISPI583	LQFP64-SMT
ISPI583	SOCKET1583	SOCKET64
JTAG	JTAG	HEADER 6
NDS8958	PSQ1	NDS8958
NDS8958	PSQ3	NDS8958
NDS8958	PSQ2	NDS8958
P14	LEDPI4	LED
P20	LEDP20	LED
P21	LEDP21	LED
P22	LEDP22	LED
P23	LEDP23	LED
P24	LEDP24	LED
P25	LEDP25	LED
P26	LEDP26	LED
P27	LEDP27	LED

Part Type	Designator	Footprint
P34	LEDP34	LED
P35	LEDP35	LED
PLCC_P89C58	MICROCONTROLLER	PLCC44
POWER4	IDE_POW	POWER4
SRAM	AS7C31026A	TSOP44
USB_B	USBCON	USB_A
WKUP	ISPSWI	SW-TACT
uC RST	uCSWI	SW-TACT

## II. References

- *ISP1583 Hi-Speed Universal Serial Bus interface device data sheet*
- *ISP1582/83 Software Guide*

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