

UM10039

ISP1583 Hi-Speed USB Device Mass Storage Eval Kit

Rev. 04 — 24 April 2007

User manual

Document information

Info	Content
Keywords	isp1583; isp1582; peripheral controller; usb; universal serial bus
Abstract	This document explains the implementation of the ISP1583 in split bus mode.

Revision history

Rev	Date	Description
04	20070424	Removed PLCC_P89C58. Updated Fig 2 and Fig 19 .
03	20070109	Made the following changes: <ul style="list-style-type: none">• Rephrased the content, wherever needed.• Ported to the latest NXP template.• Updated Section 9.
02	20031007	Made the following changes: <ul style="list-style-type: none">• All the figures related to the eval kit.• Section 1• Section 2• Section 3• Section 5• Section 6.2• Section 6.4• Section 8.1
01	20030908	First release.

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1. Introduction

The ISP1583 Hi-Speed Universal Serial Bus (USB) device mass storage eval kit enables you to evaluate the features of the ISP1583 in split bus mode. In this mode, the ISP1583 Parallel I/O (PIO) and direct interface to ATA/ATAPI device mode are evaluated. Evaluate the ISP1583 as a mass storage device (mass storage kit).

On the eval board are the ISP1583 and an 8051 series microcontroller. The kit allows you to connect the ISP1583 to any generic processor when it is configured to separate address and data bus mode (generic processor mode). [Fig 1](#) shows the ISP1583 mass storage eval board.

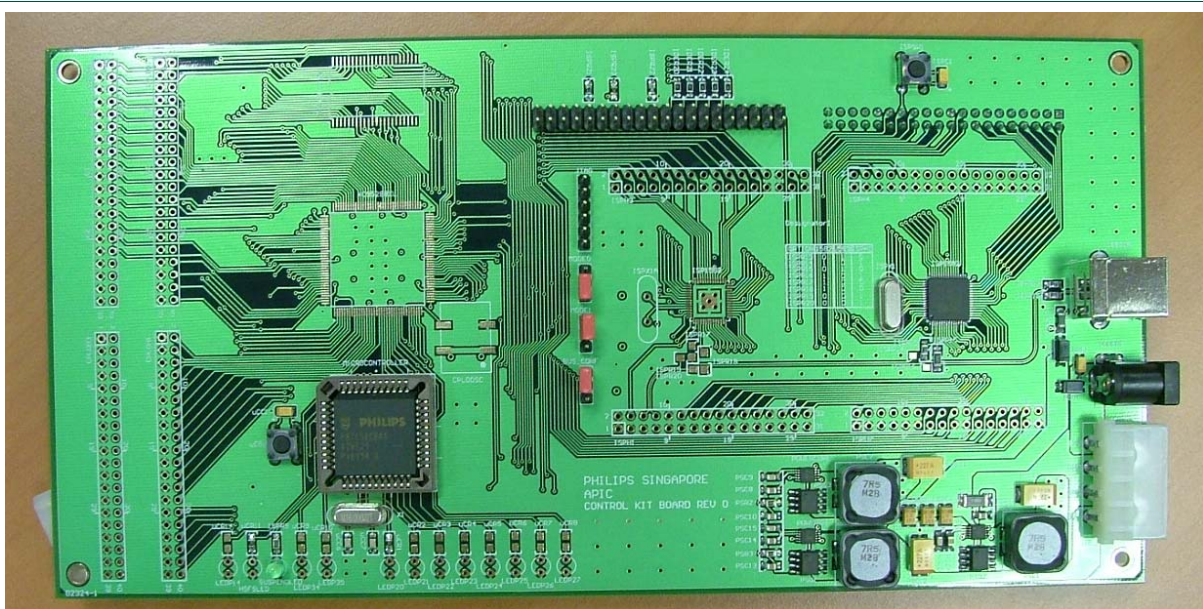


Fig 1. ISP1583 mass storage eval board

2. System requirements

PC host

- Hi-Speed USB Host Controller 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 the mass storage eval kit

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

3. Block diagram

Fig 2 shows the ISP1583 configured to operate in split bus mode. 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 IDE header JP1.

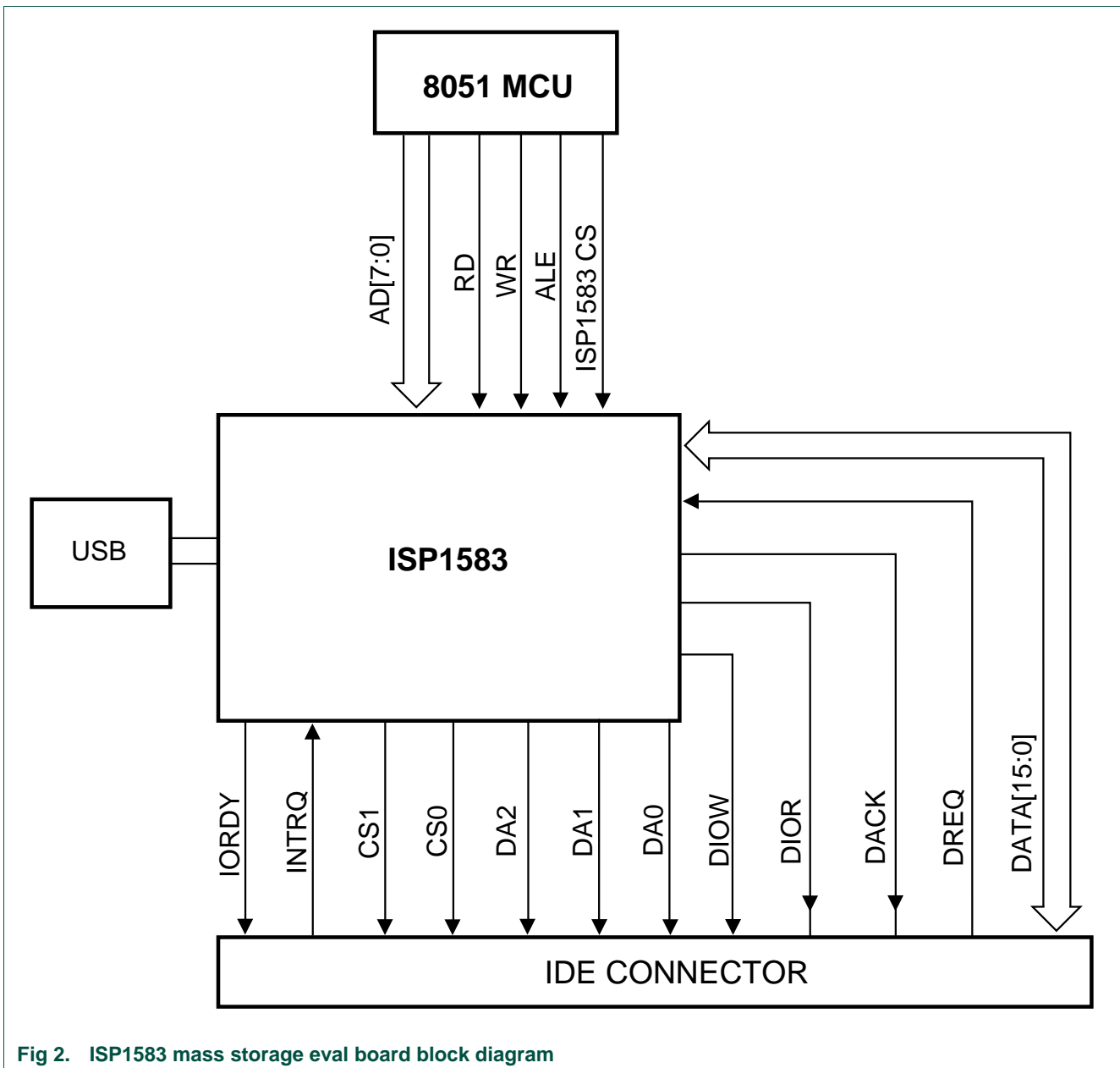


Fig 2. ISP1583 mass storage eval board block diagram

4. PCB layout

[Fig 3](#) shows the PCB layout and placement of components on the ISP1583 mass storage eval board.

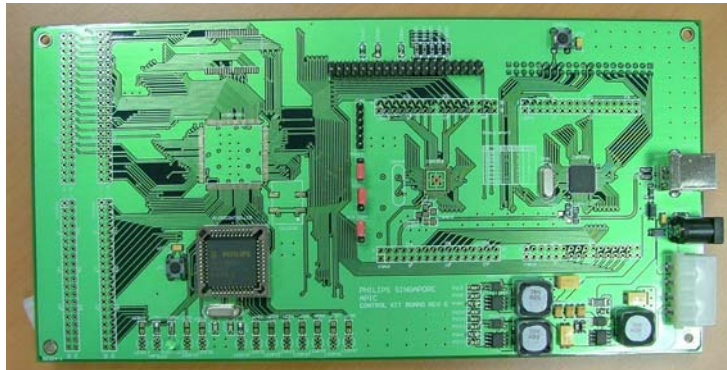


Fig 3. PCB layout

5. Component placement



Fig 4. Location of the ISP1583 on the eval board

6. Header and connector placement

6.1 USB, DC power input and hard disk power output supply connectors

The ISP1583 USB connector is next to the 12-V DC power supply input and the hard disk power out socket.

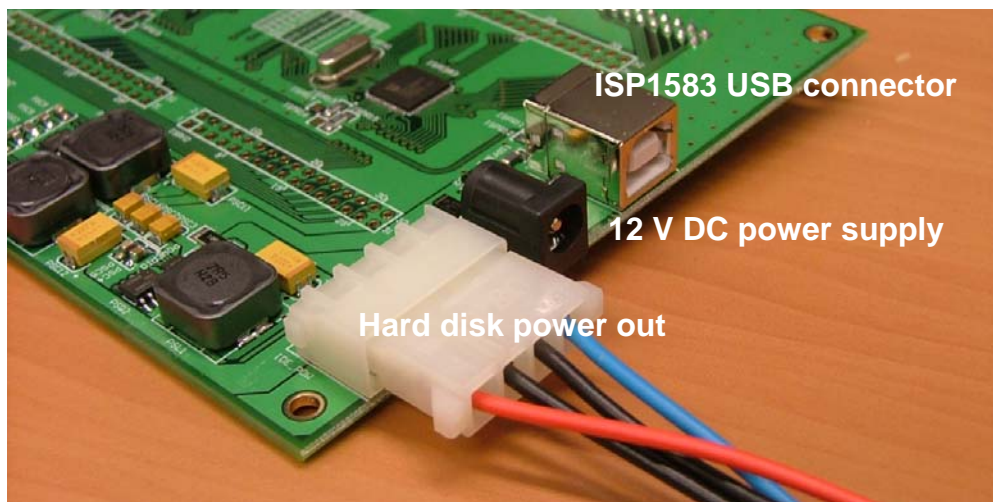


Fig 5. Hard disk power supply output, DC power supply input and USB connectors

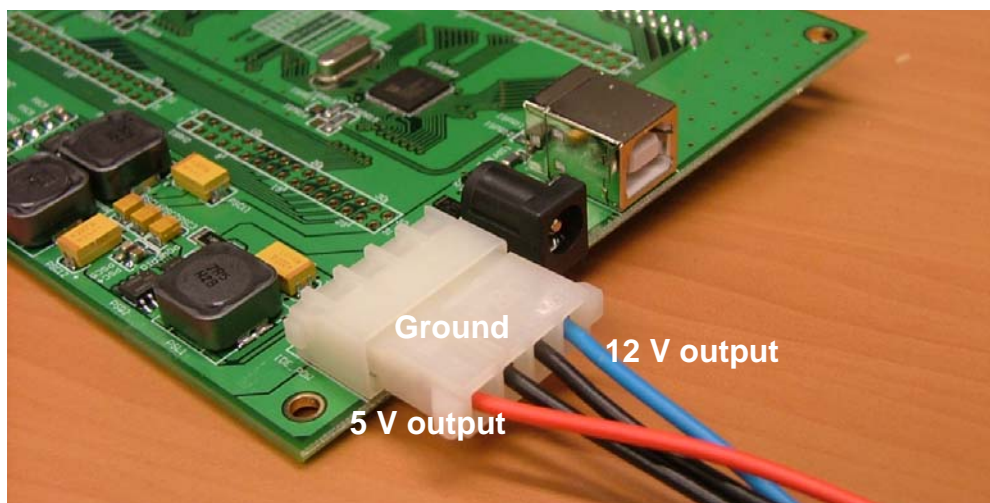


Fig 6. Hard disk power connector

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 ISP1583 processor expansion bus

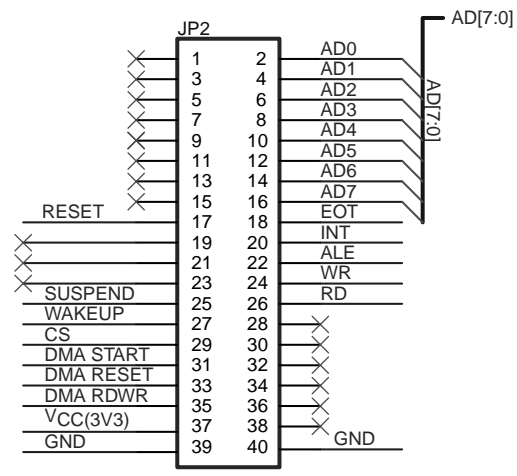
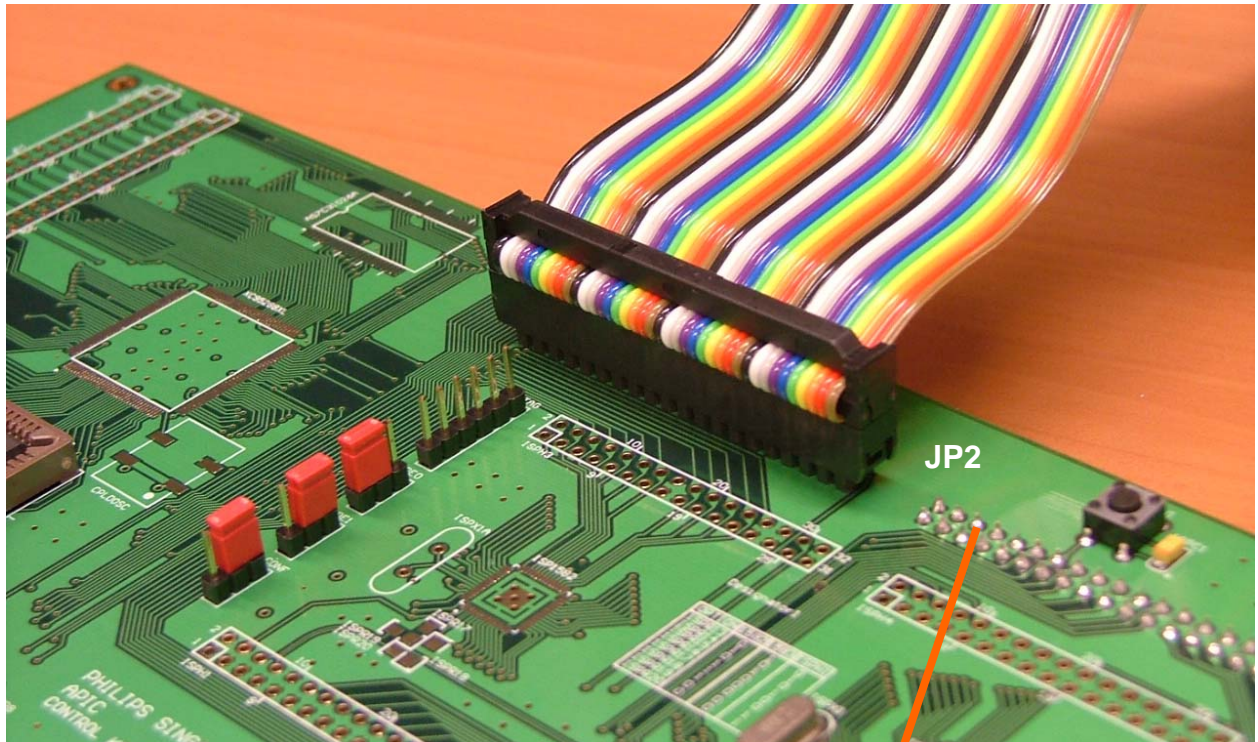


Fig 7. JP2

JP2 acts as an expansion bus for connection to another processor or microcontroller.

6.3 ISP1583 IDE bus

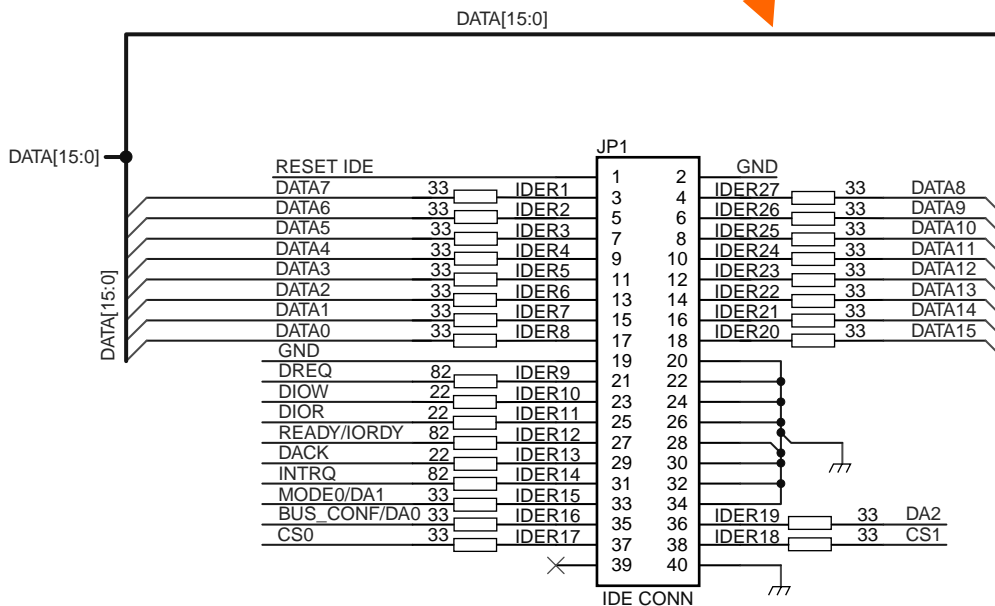
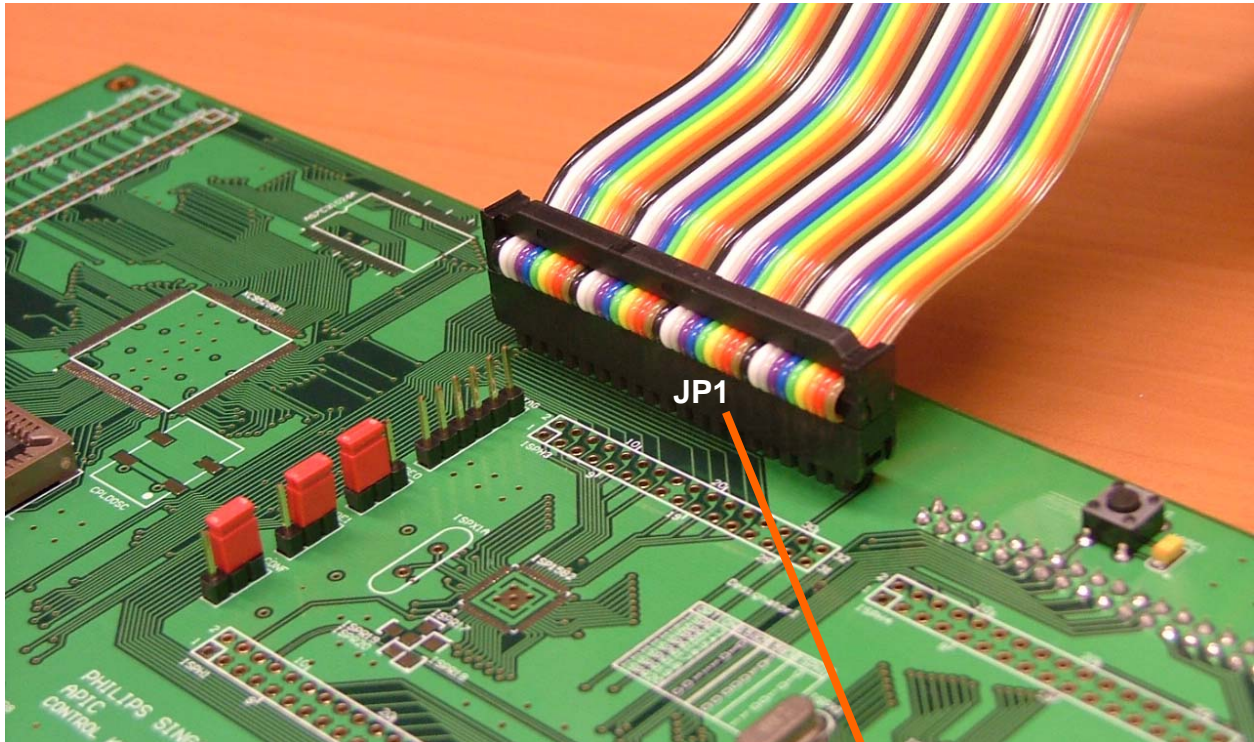


Fig 8. JP1

JP1 acts as a DMA expansion bus for connection to an external DMA controller and the ISP1583 16-bit data bus. It acts as an IDE connector to the ATA/ATAPI device.

6.4 ISP1583 processor selector

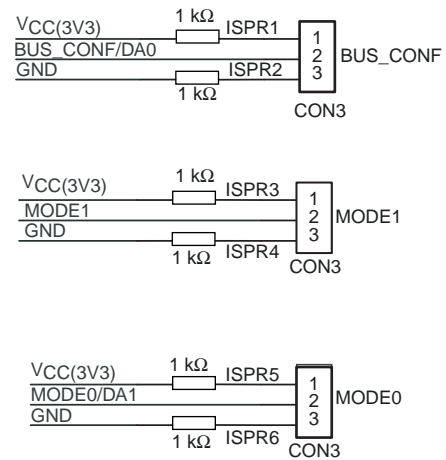
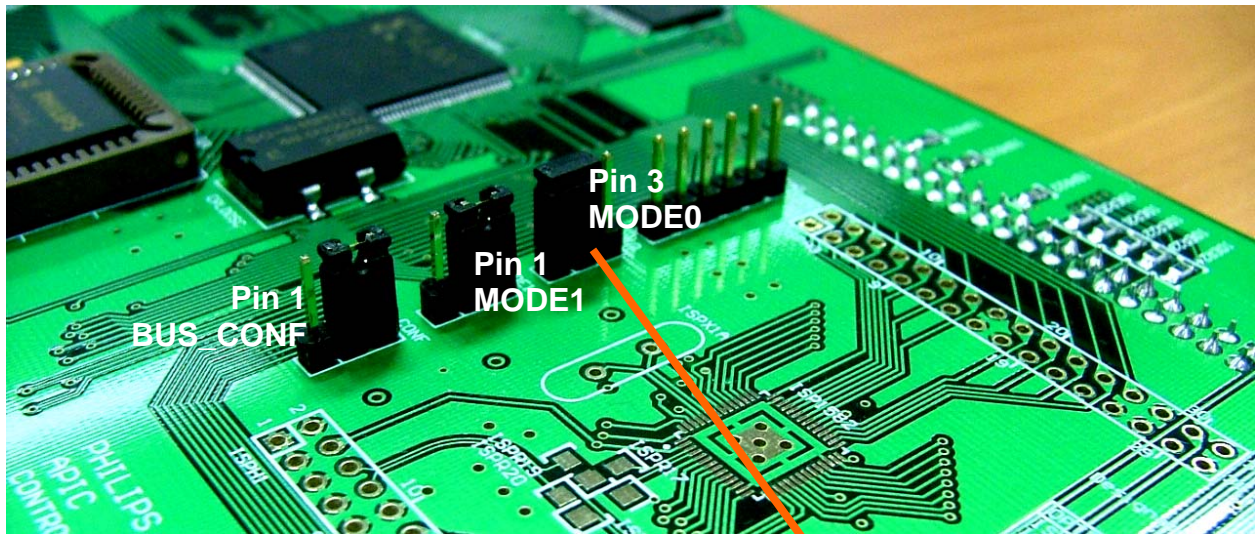


Fig 9. BUS_CONF, MODE1 and MODE0

The ISP1583 mass storage kit is configured to run under the multiplexed 8-bit address and data bus (split bus mode).

7. Switch and LED placement

7.1 Microcontroller reset switch, wake-up switch and suspend LED

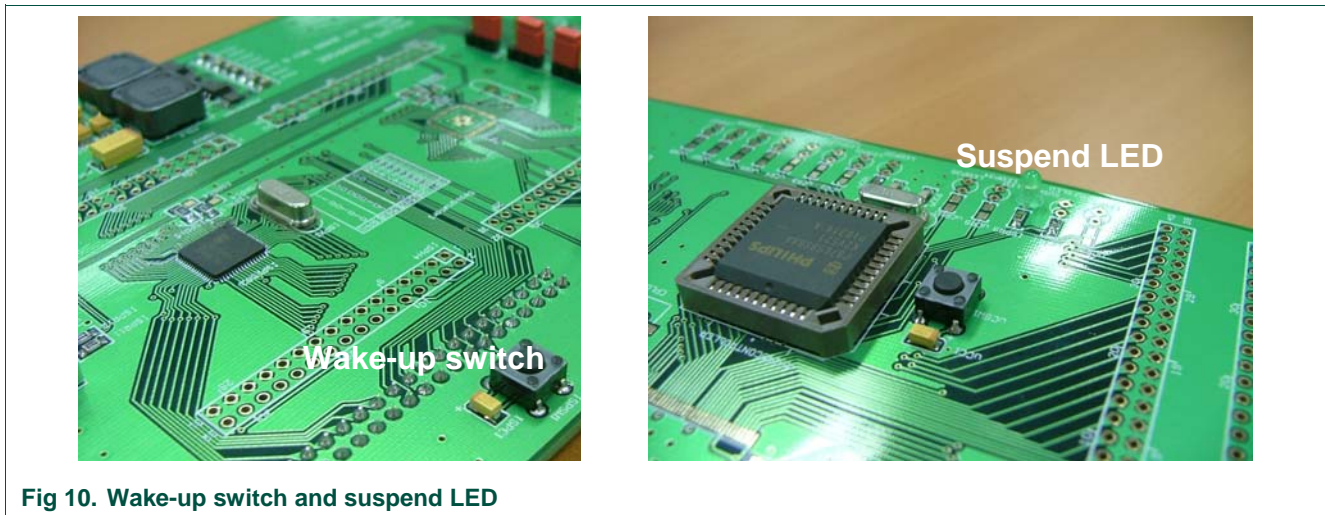


Fig 10. Wake-up switch and suspend LED

The wake-up switch is connected to the ISP1583 wake-up pin, which will wake up the ISP1583 when it is in suspend mode. The suspend LED when lit indicates that the ISP1583 is in suspend mode. The microcontroller reset switch resets the microcontroller, which in turn resets the ISP1583.

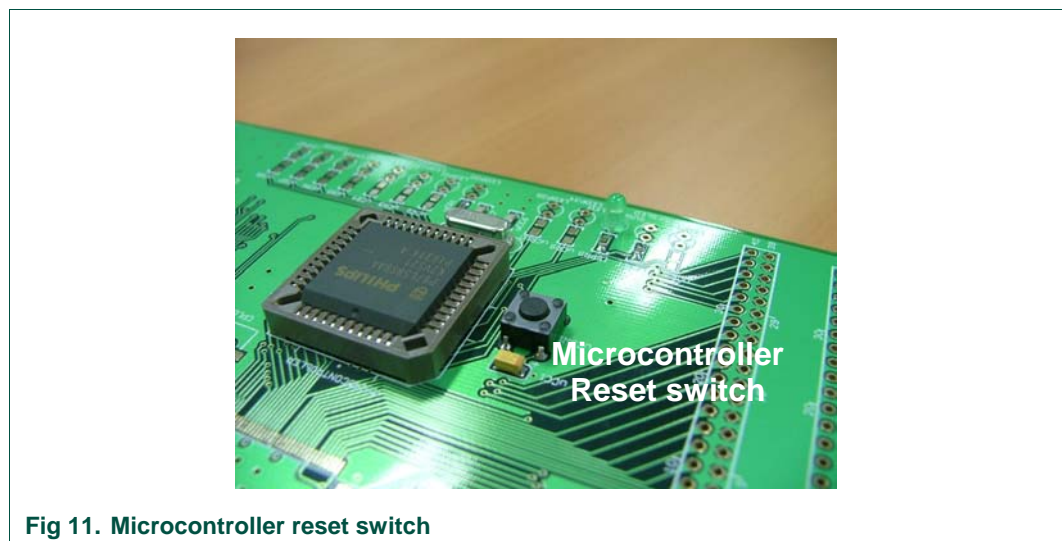


Fig 11. Microcontroller reset switch

8. ISP1583 mass storage kit set-up procedure

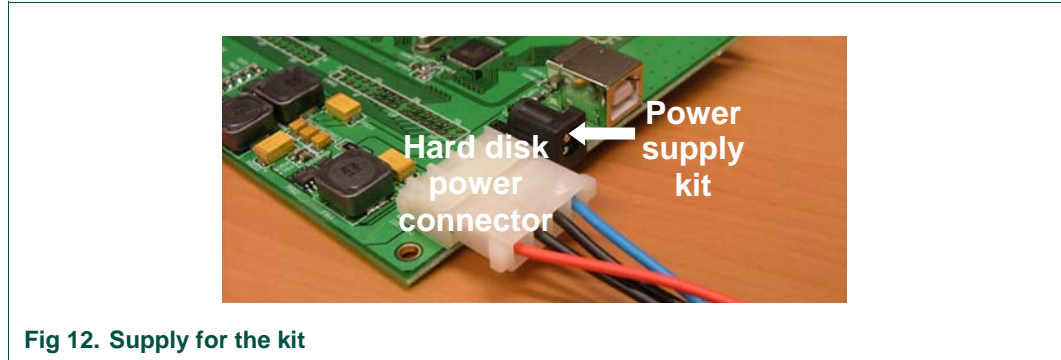


Fig 12. Supply for the kit

8.1 Mass storage kit set-up procedure

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

Caution: Ensure that the BUS_CONF, MODE0 and MODE1 pins are in the default setting.

Table 1. Split bus setting

Processor mode	BUS_CONF pin	MODE1 pin	MODE0 pin
Split bus mode	2 to 3	2 to 3	1 to 2

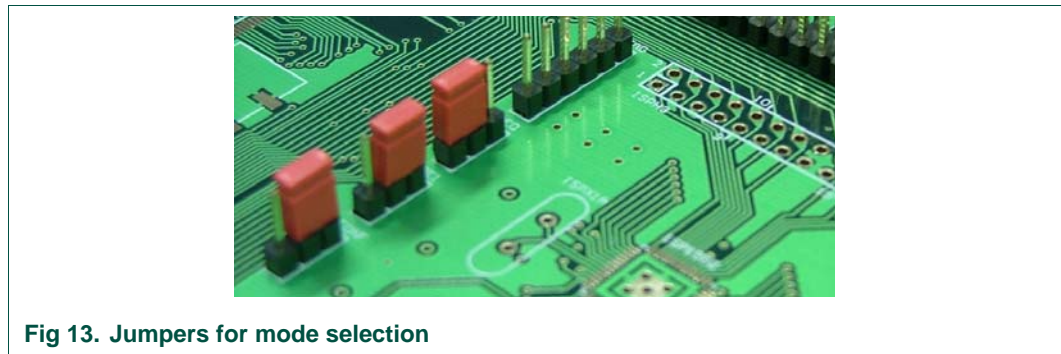
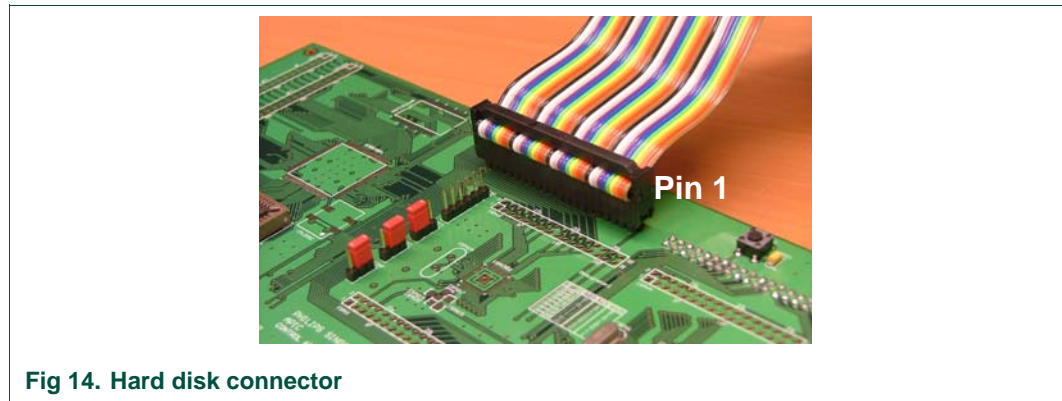
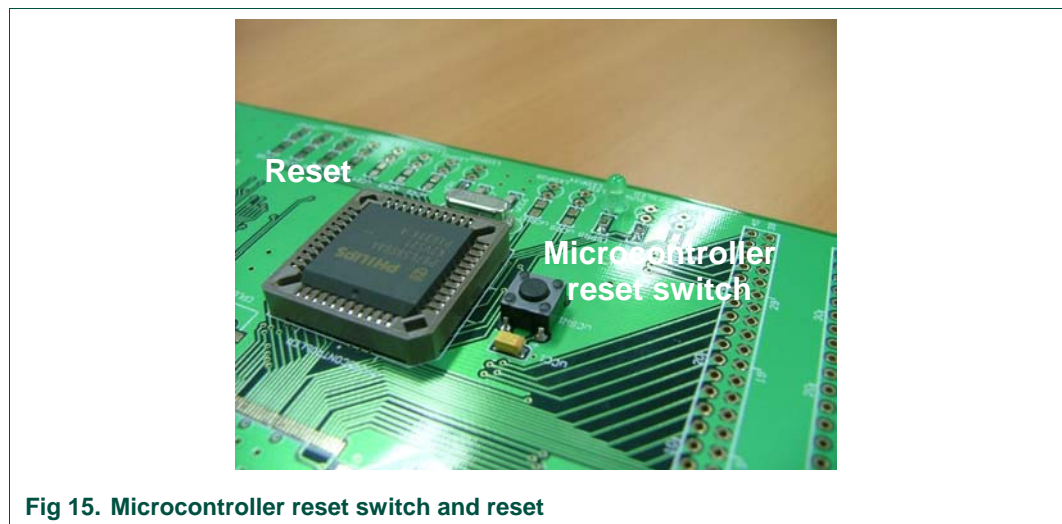


Fig 13. Jumpers for mode selection

1. Connect the IDE cable that is provided with the kit to JP1 and the ATA/ATAPI device. Ensure that pin 1 of JP1 is connected to pin 1 of the ATA/ATAPI device IDE connector.



2. Connect the hard disk power cable supplied with the kit to power connectors of the eval kit and the ATA/ATAPI device.
3. Insert the 12 V DC power supply (that is supplied 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 ISP1583 USB connector.

After successful enumeration, the ATA/ATAPI device will mount on the host PC.

8.2 Mass storage kit host PC set up and bus enumeration procedure

On successful installation, you will see the device added in the Computer Management window under Device Manager as shown in [Fig 16](#).

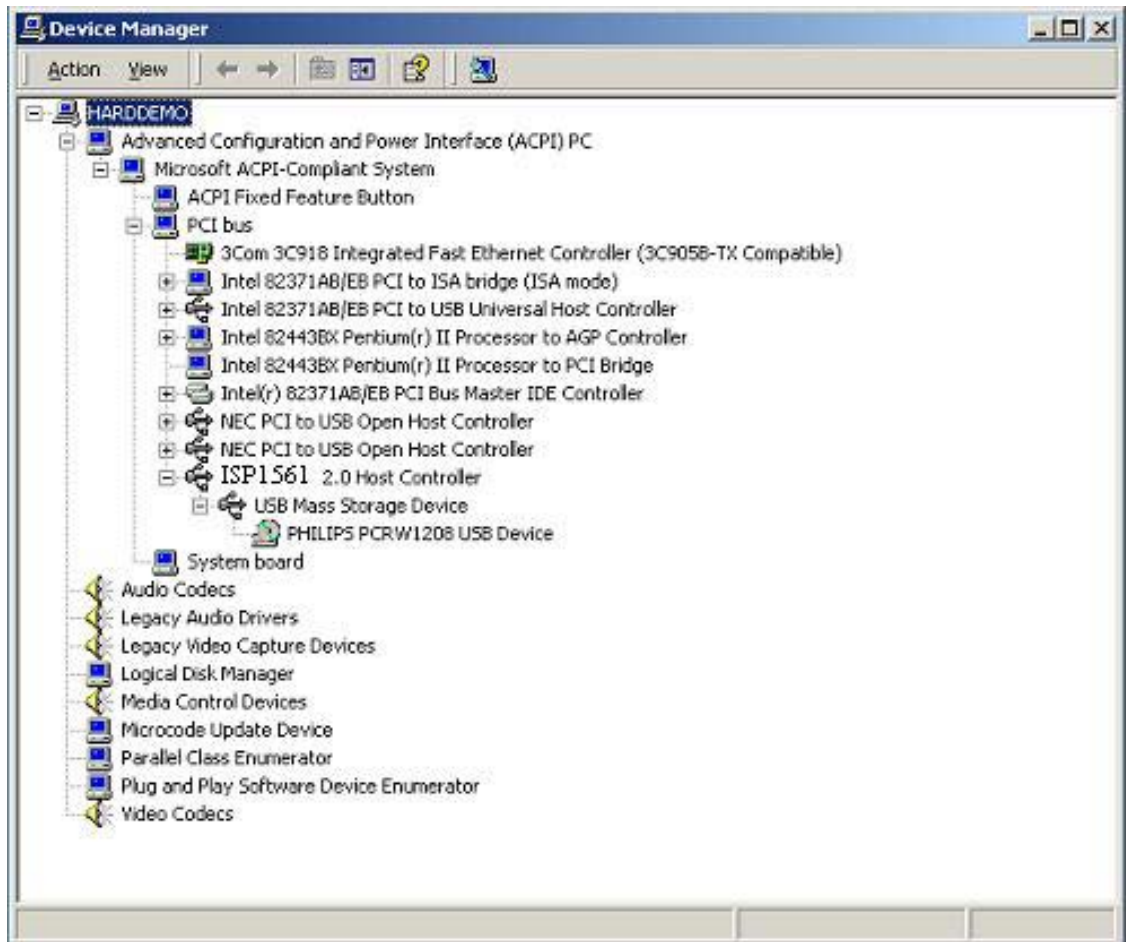


Fig 16. Hi-Speed USB device on NXP ISP1561 EHCI Hi-Speed USB controller

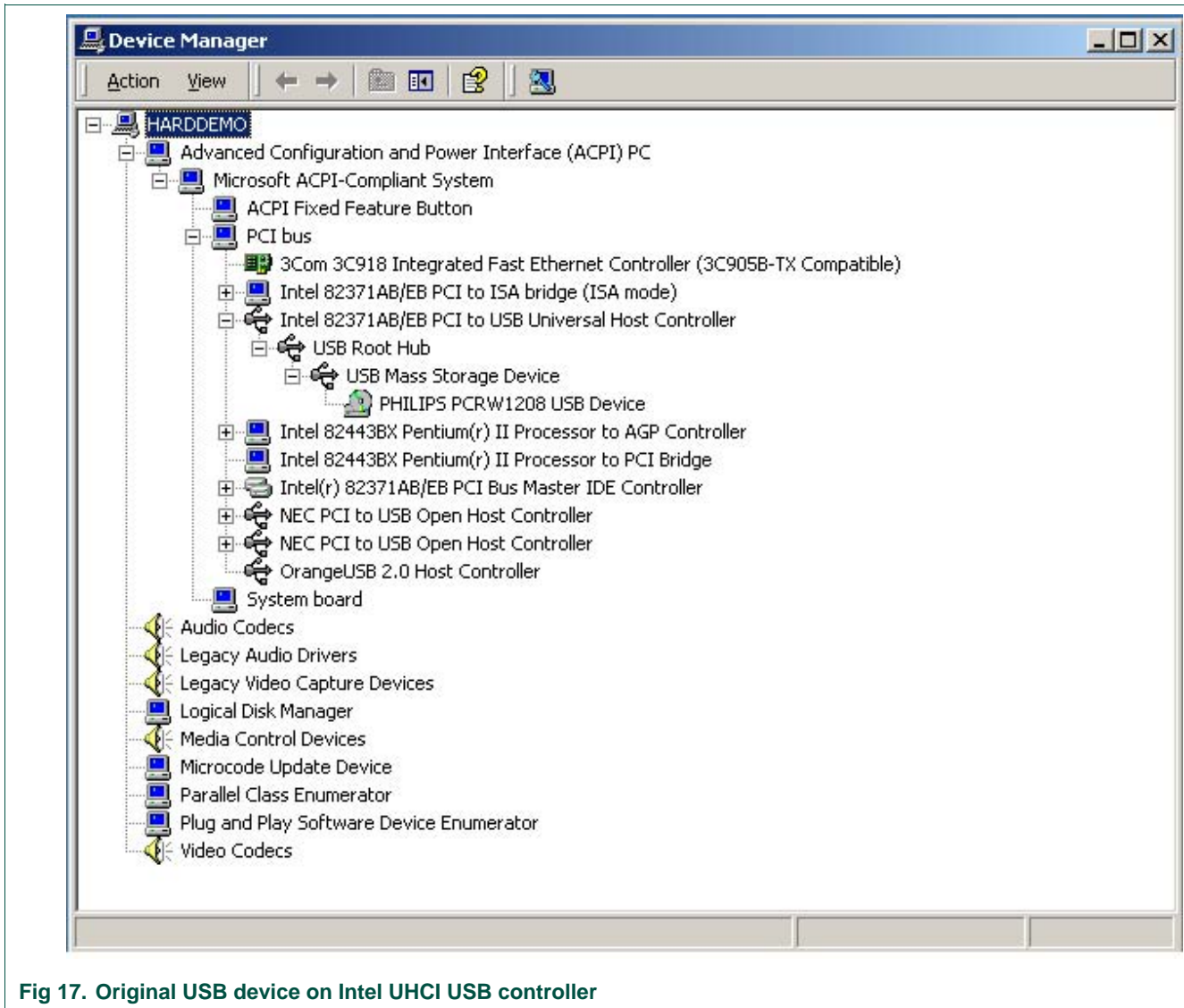


Fig 17. Original USB device on Intel UHCI USB controller

9. Schematics

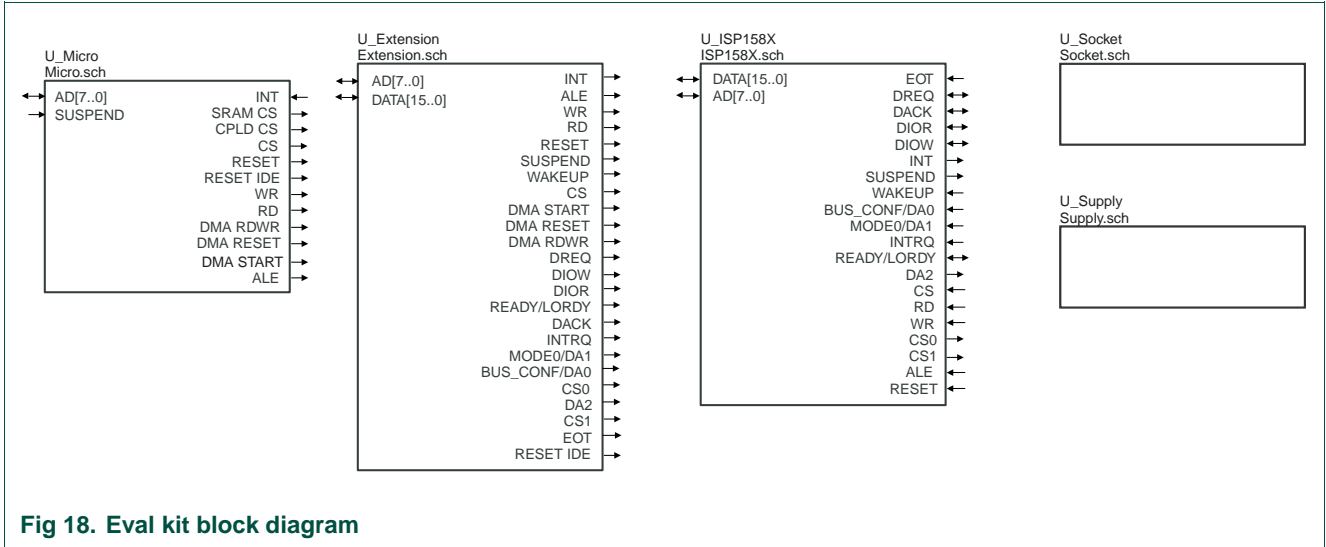


Fig 18. Eval kit block diagram

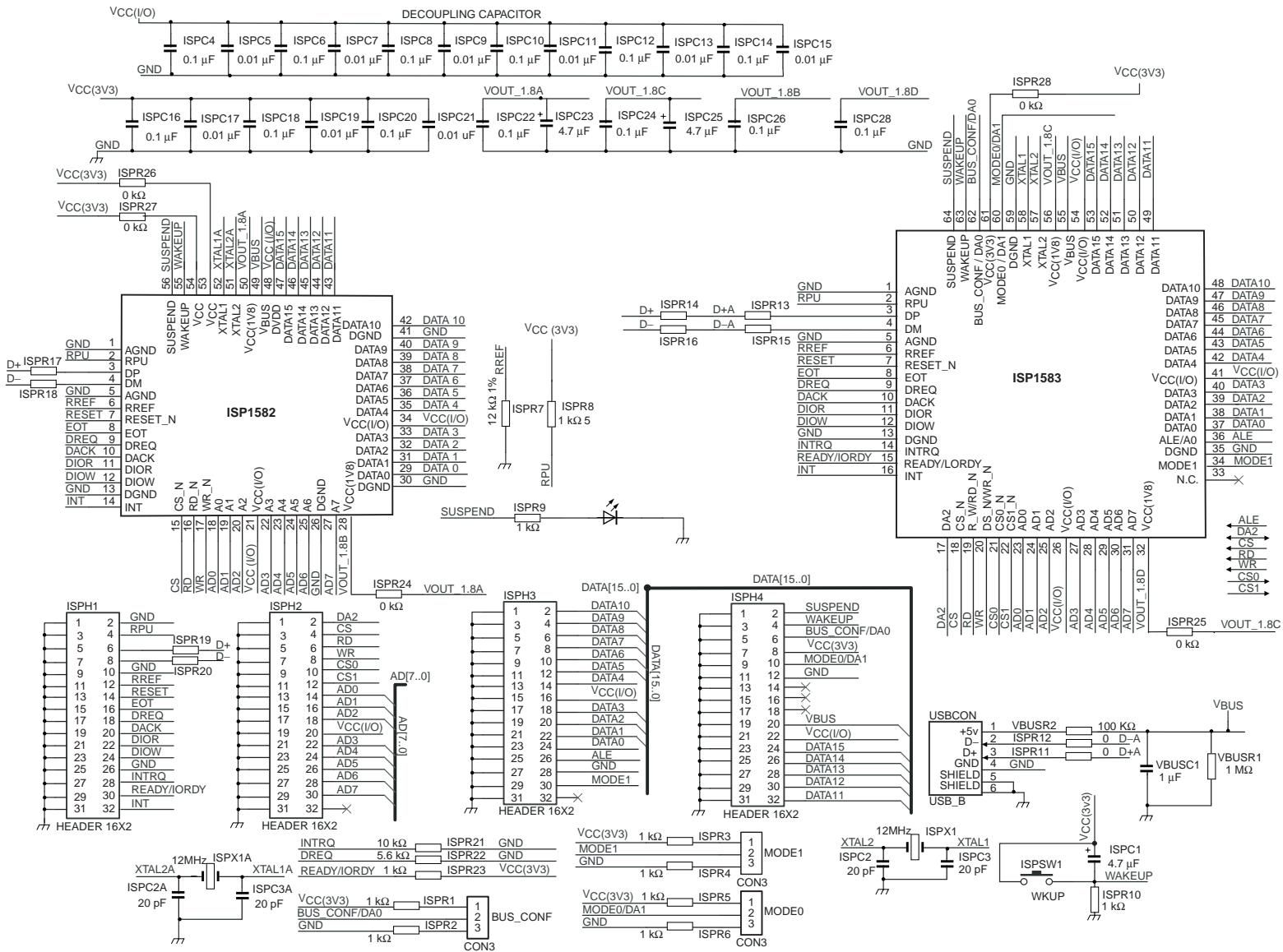


Fig 19. Schematics ISP1582 and ISP1583

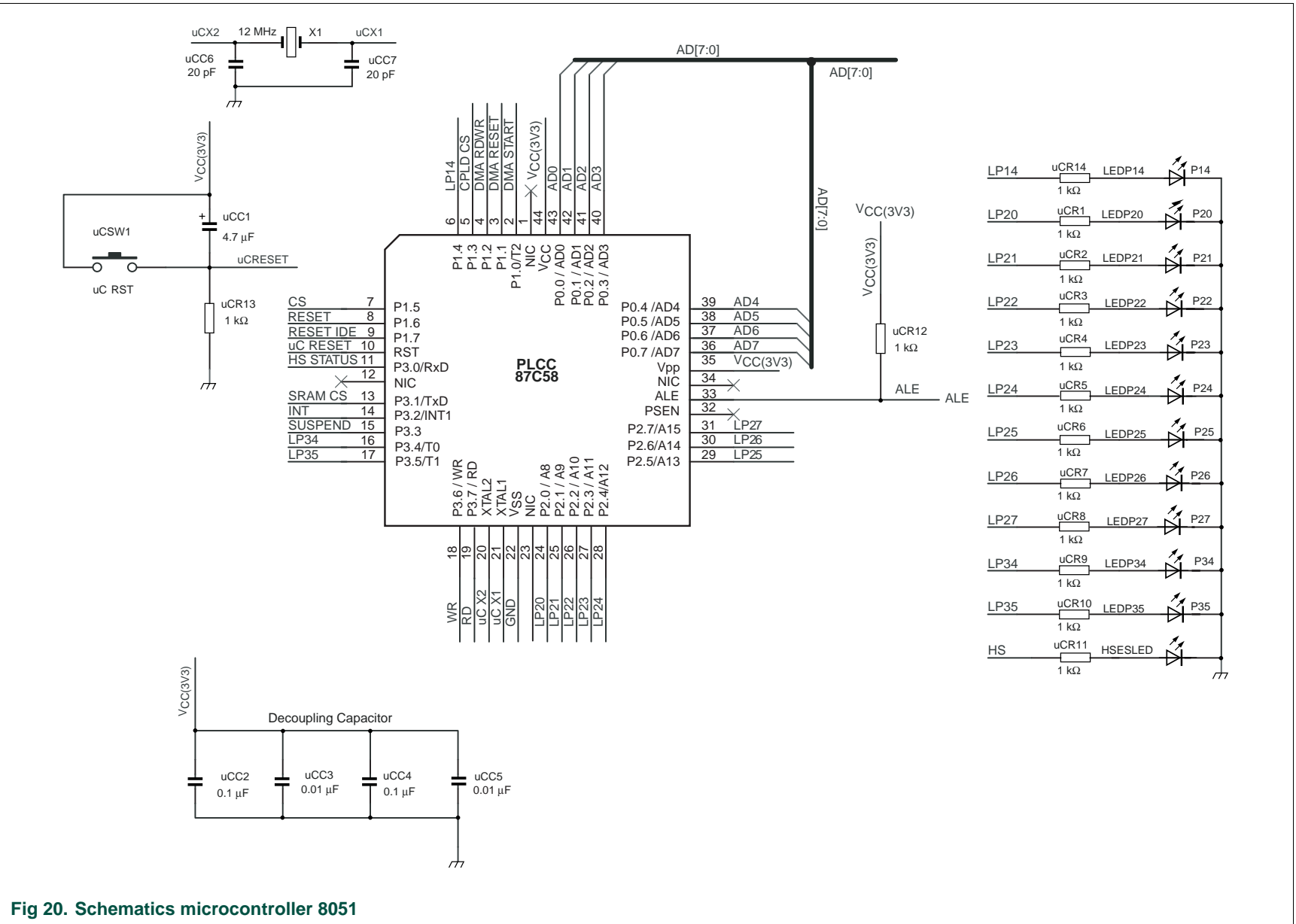


Fig 20. Schematics microcontroller 8051

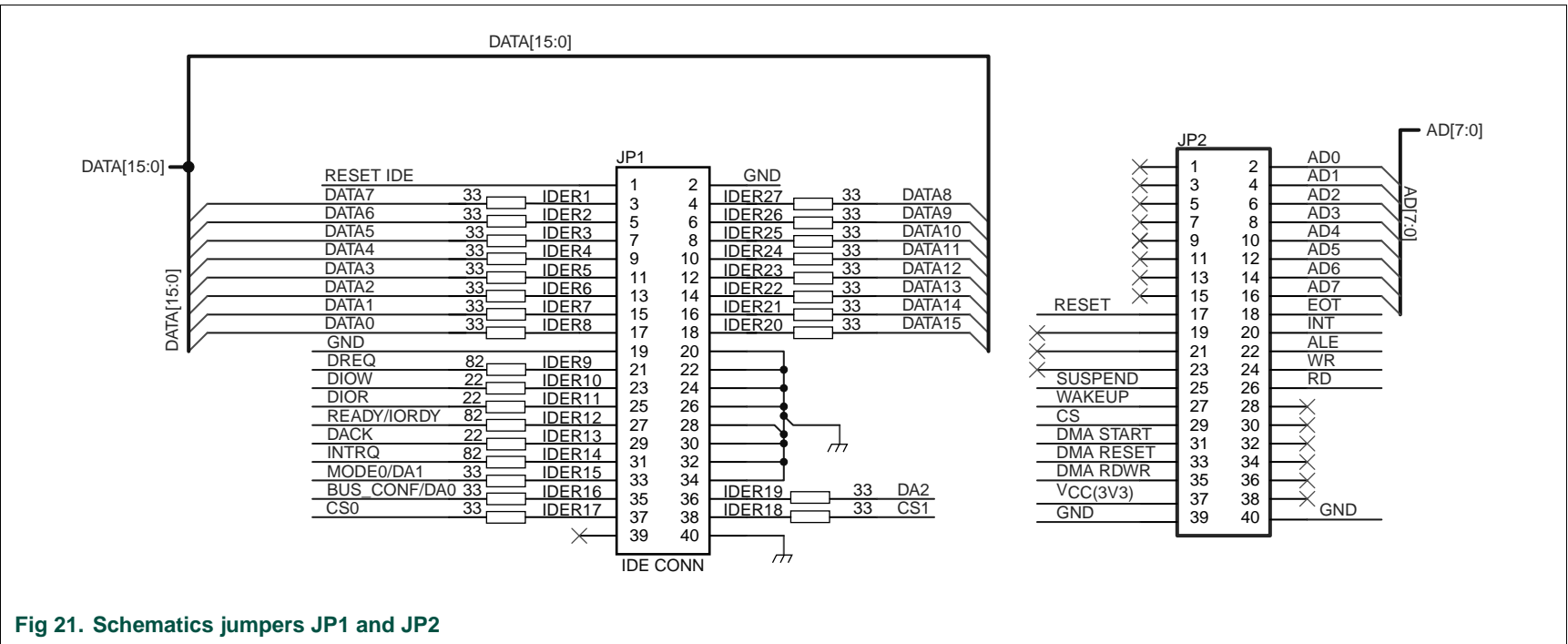


Fig 21. Schematics jumpers JP1 and JP2

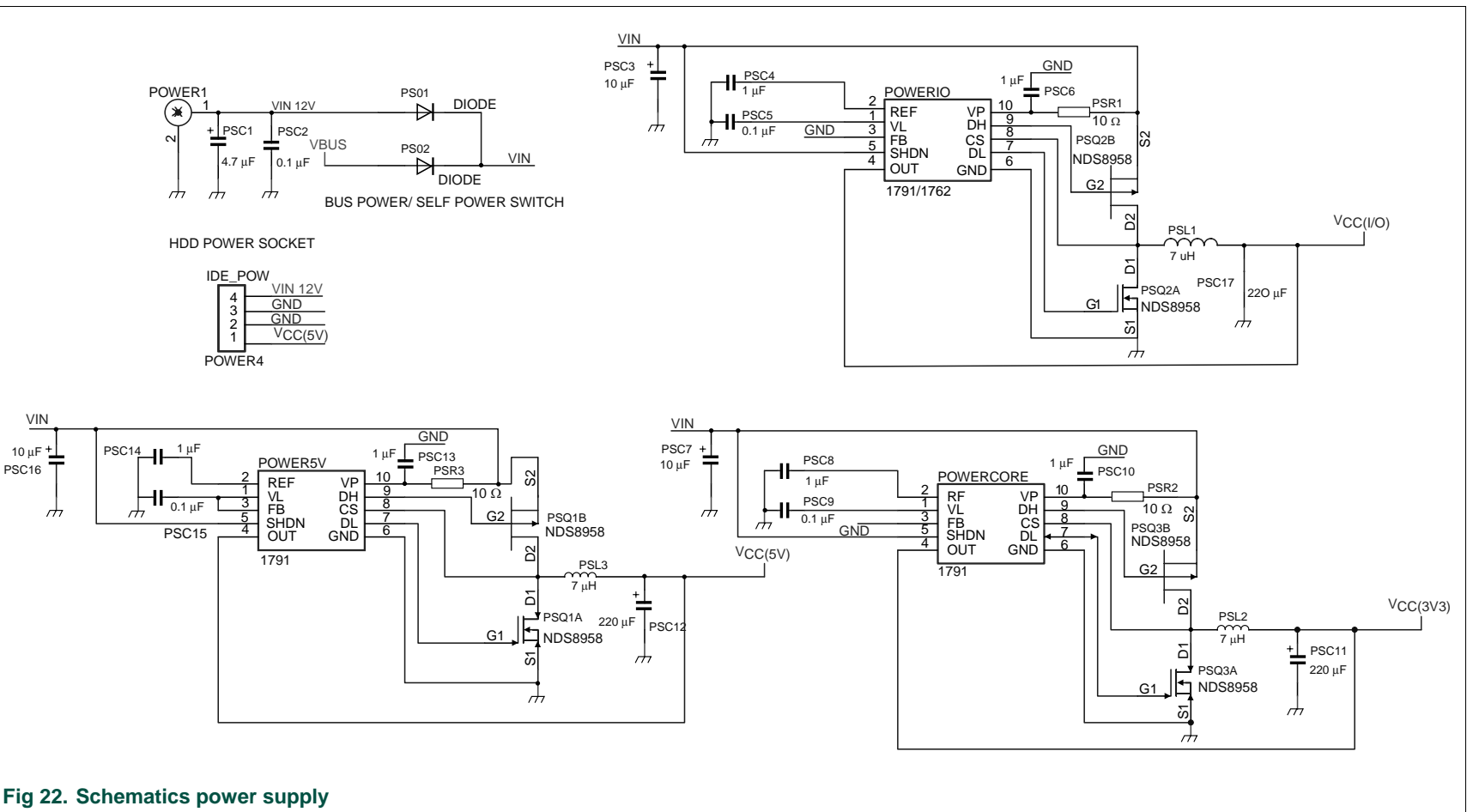


Fig 22. Schematics power supply

10. Bill of material

10.1 ISP1583 mass storage eval board

Table 2. Bill of material of the ISP1583 mass storage eval board

Part Type	Designator	Footprint
0 Ω	ISPR11 ISPR12	805
0.01 μF	SC17 SC15 SC19 ISPC5 SC21 SC7 SC5 SC9 SC13 SC11 ISPC19 ISPC17 ISPC21 ISPC9 ISPC7 ISPC11 ISPC15 ISPC13	603
0.01 μF	CPLDC10 CPLDC6 CPLDC2 CPLDC18 CPLDC14 uCC3 uCC5 CPLDC38 CPLDC34 CPLDC30 CPLDC26 CPLDC22 SC1B SC1D SC1F SC1H	805
0.1 μF	SC18 SC16 ISPC4 SC20 SC14 SC8 SC6 SC12 C10 ISPC6 ISPC20 ISPC18 ISPC26 SPC28 ISPC22 ISPC24 ISPC16 ISPC10 ISPC8 ISPC14 ISPC12 SC4	603
0.1 μF	CPLDC1 PSC15 PSC5 uCC2 PSC9 uCC4 CPLDC5 CPLDC25 CPLDC21 CPLDC37 CPLDC33 CPLDC29 CPLDC17 CPLDC13 CPLDC9 SC1A PSC2 SRAMC1 SRAMC2 SC1I SC1C SC1G	805
0 k Ω	ISPR24 ISPR25 ISPR28 ISPR27 ISPR26	805
1 μF	VBUSC1	
1 μF	PSC14 PSC10 PSC13 PSC6 PSC4 PSC8	805
10 Ω	PSR2 PSR3 PSR1	805
10 μF	PSC16 PSC3 PSC7	CASE B
10 k Ω	ISPR21	805
12 k Ω 1 %	ISPR7	805
12 MHz	X1	XTAL-CSM4A
12 MHz	SX1 SX1B ISPX1 ISPX1A	XTAL-HC49/4H
1791	POWER5V	1791
1791	POWERCORE	1791
1791/1762	POWERIO	1791
1 k Ω	uCR12 ISPR3 uCR11 uCR3 uCR2 uCR1 ISPR4 uCR5 uCR7 uCR6 ISPR5 ISPR6 uCR4 uCR14 uCR9 ISPR9 uCR10 uCR8 ISPR2 ISPR1 ISPR10 uCR13 SPR23	805
1.5 k Ω	ISPR8	805
1 M Ω	VBUSR1	
20 pF	SC3B SC2B ISPC2A SC3 SC2 ISPC3A uCC7 ISPC3 ISPC2 uCC6	805
22 Ω	IDER11 IDER10 IDER13	805
220 μF	PSC17 PSC12 PSC11	CASE D

Part Type	Designator	Footprint
33 Ω	IDER21 IDER22 IDER19 IDER18 IDER7 IDER3 IDER4 IDER5 IDER2 IDER8 IDER6 IDER1 IDER23 IDER17 IDER20 IDER16 IDER15 IDER25 IDER24 IDER27 IDER26	805
4.7 μ F	ISPC23 ISPC25	-
4.7 μ F	ISPC1 uCC1 PSC1	CASE A
48 MHz	CPLDOSC	XTAL-SG615
5.6 k Ω	ISPR22	805
7 μ H	PSL3 PSL1 PSL2	CDRH125
82 Ω	IDER9 IDER14 IDER12	805
CON3	MODE1 MODE0 BUS_CONF	CON3
CPLD	XC95288XL	TQFP_144
DIODE	PSD2 PSD1	SMA
HEADER 16X2	ISPH3 ISPH1 ISPH2 ISPH4	HEADER 16X2
HEADER 16X2	H1 H2 H3 H4	HEADERB 16X2
IDE CONN	JP1	HEADERB 20X2
ISP1582	ISP1582	HVQFN56-SMT
ISP1582	SOCKET1582	SOCKET56
ISP1583	ISP1583	LQFP64-SMT
ISP1583	SOCKET1583	SOCKET64
JTAG	JTAG	HEADER 6
NDS8958	PSQ1 PSQ3 PSQ2	NDS8958
P14	LEDP14	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
P34	LEDP34	LED
P35	LEDP35	LED
PLCC_P87C58	MICROCONTROLLER	PLCC44
POWER4	IDE_POW	POWER4
SRAM	AS7C31026A	TSOP44
uC RST	uCSW1	SW-TACT

Part Type	Designator	Footprint
USB_B	USBCON	USB_A
WKUP	ISPSW1	SW-TACT

11. Abbreviations

Table 3. Abbreviations

Acronym	Description
ATA	Advanced Technology Attachment
ATAPI	Advanced Technology Attachment Peripheral Interface
DMA	Direct Memory Access
IDE	Integrated Drive Electronics
PCB	Printed-Circuit Board
PIO	Parallel I/O
USB	Universal Serial Bus

12. References

- ISP1582 Hi-Speed Universal Serial Bus Peripheral Controller data sheet
- ISP1583 Hi-Speed Universal Serial Bus Peripheral Controller data sheet

13. Legal information

13.1 Definitions

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14. Contents

1.	Introduction	3
2.	System requirements	3
3.	Block diagram.....	4
4.	PCB layout	5
5.	Component placement.....	5
6.	Header and connector placement.....	6
6.1	USB, DC power input and hard disk power output supply connectors	6
6.2	ISP1583 processor expansion bus.....	7
6.3	ISP1583 IDE bus.....	8
6.4	ISP1583 processor selector	9
7.	Switch and LED placement.....	10
7.1	Microcontroller reset switch, wake-up switch and suspend LED.....	10
8.	ISP1583 mass storage kit set-up procedure ...	11
8.1	Mass storage kit set-up procedure	11
8.2	Mass storage kit host PC set up and bus enumeration procedure	12
9.	Schematics	15
10.	Bill of material.....	20
10.1	ISP1583 mass storage eval board	20
11.	Abbreviations	22
12.	References	22
13.	Legal information	23
13.1	Definitions	23
13.2	Disclaimers.....	23
13.3	Trademarks.....	23
14.	Contents.....	24

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