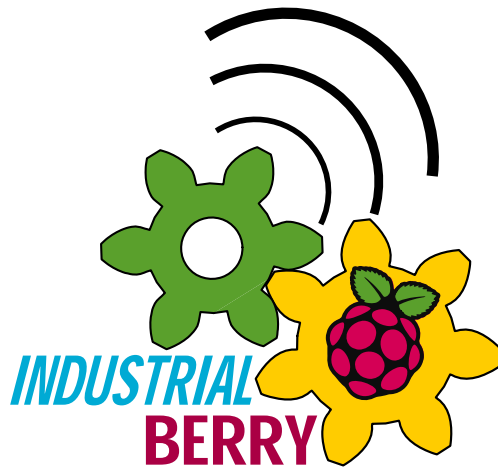


USB-Isolated V 1.0



www.industrialberry.com

May 2013

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Chapter 1

License

Open-source hardware shares much of the principles and approach of free and open-source software. In particular, we believe that people should be able to study our hardware to understand how it works, make changes to it, and share those changes. To facilitate this, we release all of the original design files (Eagle CAD) for the IndustrialBerry hardware. These files are licensed under a Creative Commons Attribution Share-Alike license, which allows for both personal and commercial derivative works, as long as they credit IndustrialBerry and release their designs under the same license. The IndustrialBerry software/firmware is also open-source.

Chapter 2

Introduction

The USB Isolated V 1.0 (see Fig. 2.1) is an extension board for RaspBerry Pi based on an Open Hardware Design. It is a board with an USB Digital Isolator (ADuM4160) produced by Analog Device. The board is connected to the Raspberry with an USB Bus, this feature allow the compatibility with other linux boards.

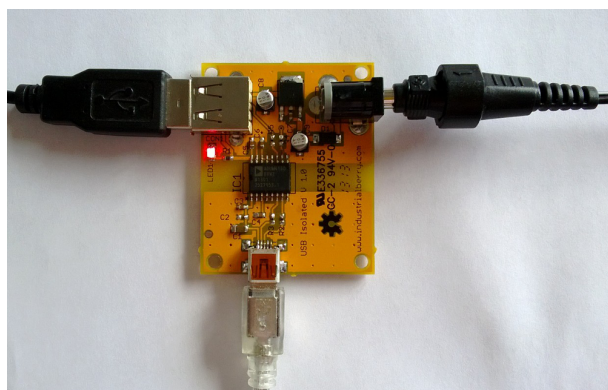


Figure 2.1: USB Isolated V 1.0

Chapter 3

Hardware implementation

The USB interface is implemented with the ADuM4160 [1] IC produced by Analog Device. This IC is simple to use for the USB Isolation.

We can see in figure 3.1 the schematic of the USB isolator and isolated power supply. Every USB connector has an own power supply system with a dedicated ground (GND for board side and AGND for peripheral one).

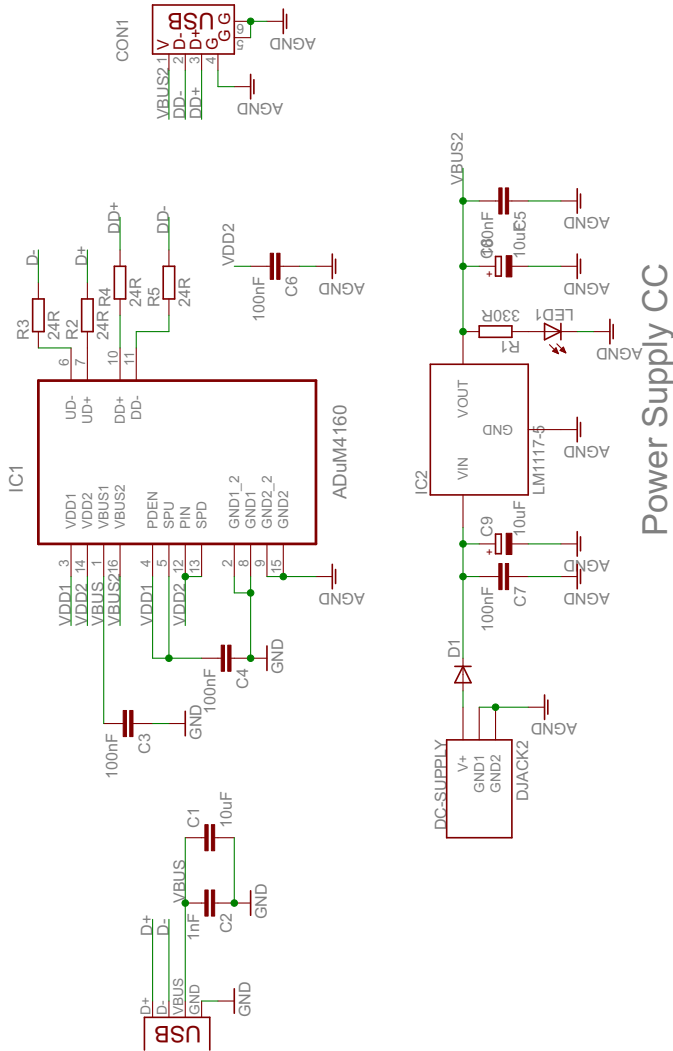


Figure 3.1: Schematic USB Isolated V 1.0

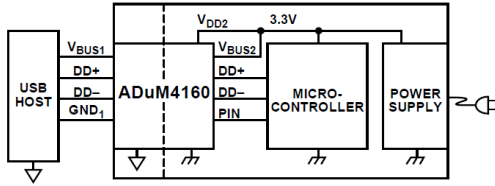


Figure 3.2: Typical application

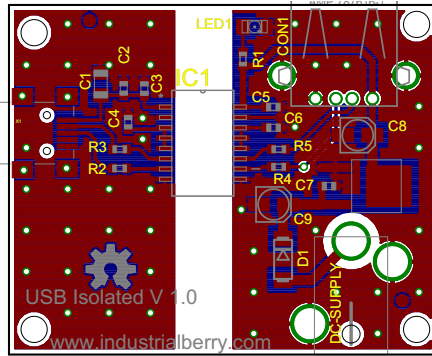


Figure 3.3: Board Layout

Chapter 4

Components list

In the table 4.1 we can see the Bill of Material for the board, all the components are available on-line. For simplicity, every component has a DigiKey order code (www.digikey.com).

Quantity	Value	Package	Parts	Digikey-cod	Unit Price \$
1	Yellow	1206	LED1	754-1144-1-ND	0,21
4	24 Ω	0603	R2, R3, R4, R5	RMCF0603JT24R0CT-ND	0,02
1	330 Ω	0603	R1	P330GCT-ND	0,01
1	1nf	0603	C2	445-1298-1-ND	0,10
4	100nf	0603	C3, C4, C5, C6, C7	445-1316-1-ND	0,10
1	10uf	1206	C1	311-1376-1-ND	0,21
2	10uf	CPOL-EU153CLV-0405	C8, C9	493-2100-1-ND	0,47
1	ADuM4160	SOICW-16	IC1	ADUM4160BRWZ-ND	11,00
1	LM1117-5.0	TO-252-3	IC2	LM1117DT-5.0-ND	1,76
1	20V1A	DO-214AC	D1	GS1M-TPCT-ND	0,38
1	USBSMD	USBSMD	X1	WM117116CT-ND	1,59
1	USB-PTHPTH	FEMALE TYPE A PCB	CON1	AE9923-ND	0,63
1	DJACK2	SOCKET, DC, 6.3MM X 2MM	DJACK2	1308873 (Farnell) PCB	1,50
1				Total	2,50
					21,31

Table 4.1: USB Isolated V 1.0 for Raspberry PI

Bibliography

- [1] Analog Device, One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106, U.S.A. *ADuM4160 Datasheet*.