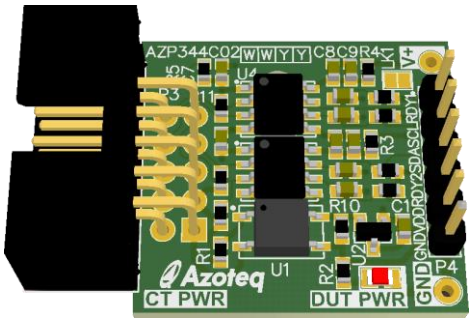
AZD084 User Guide for Isolated digital communications buffer

A technical guide for using the isolated communications buffer device (AZP344C02)



1 Introduction

The in-line isolated buffer device was made for isolated I²C communications and 1-wire streaming between an Azoteq USB device (such as the DS100 or CT210) and Azoteq products.

The purpose of the device is to provide the designer with extensive visual feedback whilst having a minimal impact on the sensor environment (no common signal ground between test device and PC).

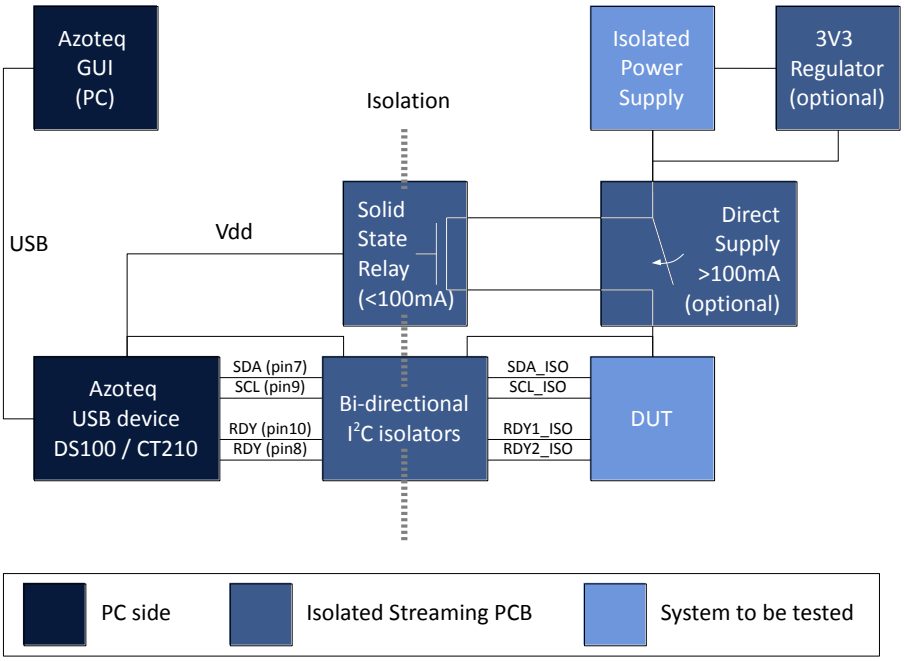


Figure 1-1 Isolated Communications PCB block diagram

The isolated streaming PCB plugs directly into the USB device. A standard Azoteq 20-pin male header is provided at the isolated side for connection to the test system.

It is important to note that the isolated streaming PCB does add larger GND to the test system. This effect is minimized in the layout. In addition capacitive coupling to the PC GND is made mostly through the isolation ICs. This amounts to a total of about 3pF as shown in Figure 1-2.

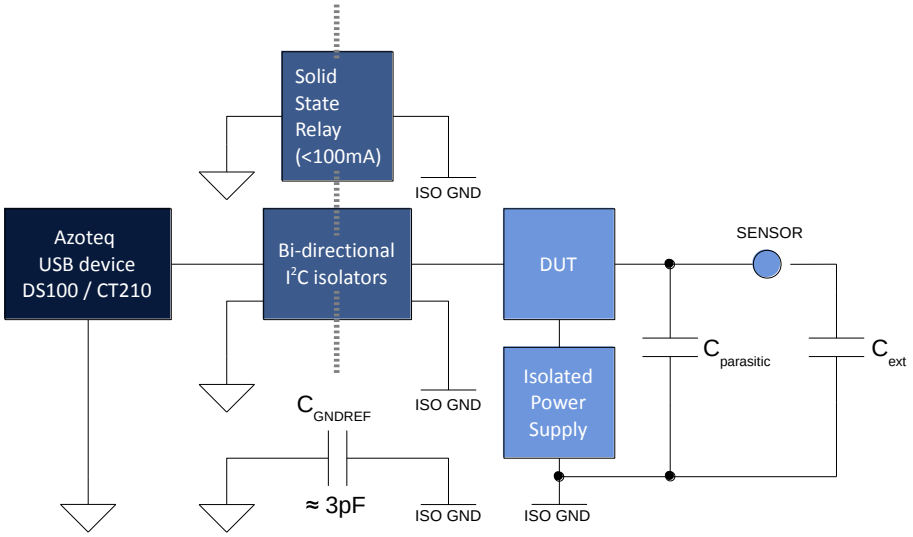


Figure 1-2 Isolated communications PCB parasitic capacitance model

Signal connections can be made as show in Table 1. More details on the circuit can be seen in the next section.

Table 1 Isolated streaming buffer pin connections

Signal	Pin (on connector P4)
VDDHI (3V3 / 5V)	2
SDA	4
SCL	5
RDY1	6
RDY2	3
ISO GND	1

2 Schematic

2.1 Device Connections

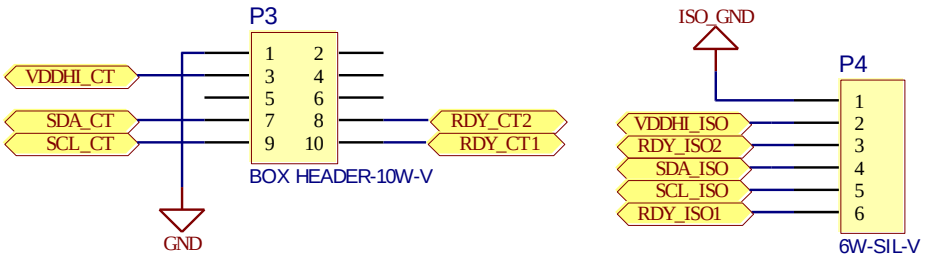


Figure 2-1 Module connectors, PC side (left), DUT side (right)

The device is plugged into an Azoteq USB device at P3 and plugged into the DUT at P4.

2.2 Signal Connections

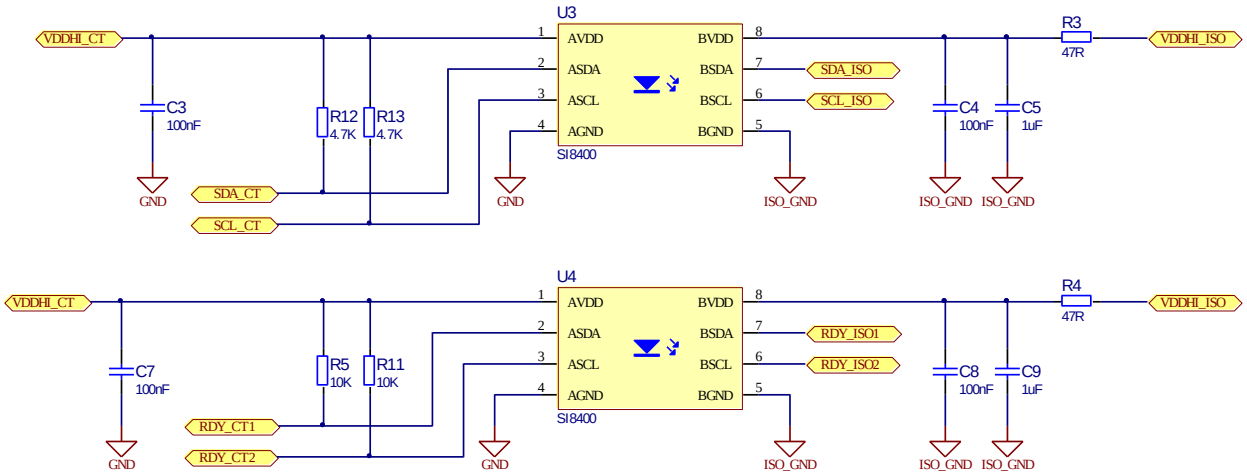


Figure 2-2 Bi-directional isolated I²C buffers

The SI8400 device offers bi-directional I2C communications. The SDA and SCL pins are open drain I/Os and always require pull-up resistors in order to function.

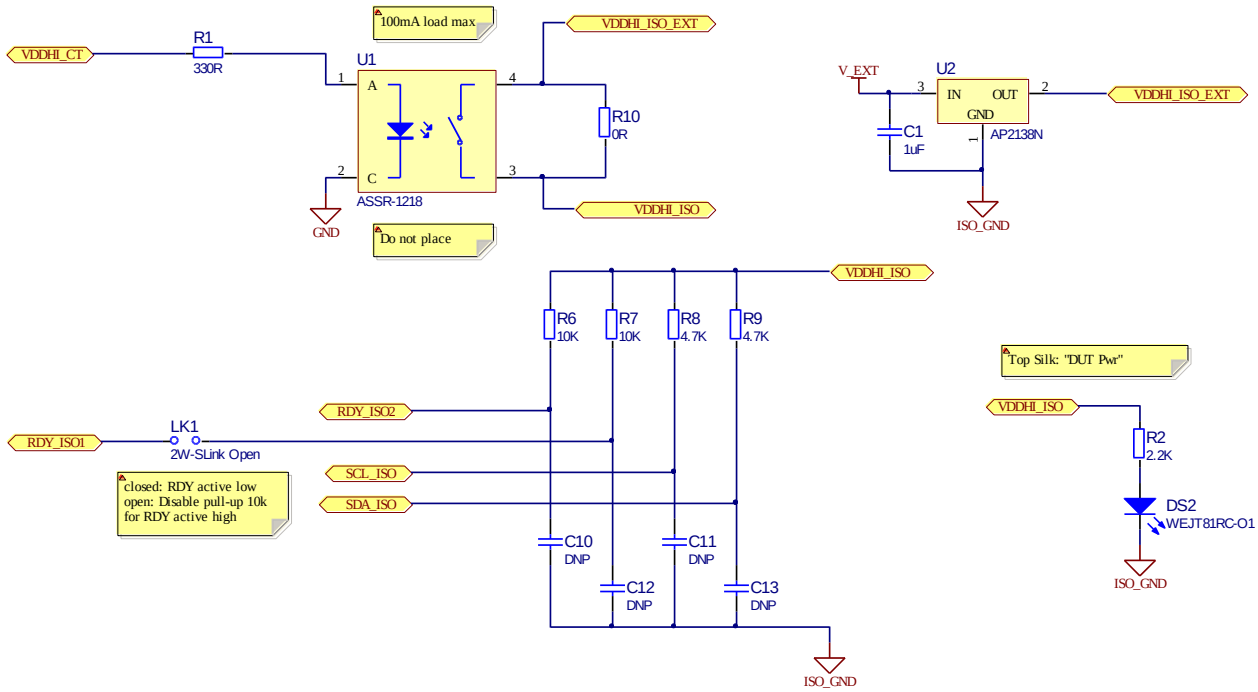


Figure 2-3 Top left: synchronized VDDHI selection (when U1 is placed), Bottom left: DUT Pull-up selection and Right: Power supply circuitry

The PCB offers the capability of selecting the RDY line to operate in a RDY active low or RDY active high state. This can be set depending on the DUT.

2.3 Power supply connections

The PCB has an optically isolated solid state relay (default a do-not-place component) to offer synchronized switching of the device power with low voltage drop-out and relatively high current drive possibilities. It is recommended to place a 0R resistor at R10 when currents larger than 100mA are expected. The synchronized supply switching functionality will be lost by placing R10.

There are various ways of powering the PCB:

- Wires soldered in at “V+” and “GND” (3.3V to 6.6V)
- Through-hole coin cell holder at “V+” and “GND” (3.3V to 6.6V)
- Power from DUT side – P4:pin2 (VDDHI_ISO, 3.0V to 5.5V)

The 3V3 regulator may be used to regulate the supply. Depending on the current consumption, V_EXT should be chosen to comply with this LDO regulator. Maximum dropout expected is 0.6V.

When powering the PCB, be sure to operate the chosen Azoteq IC within the recommended limits. Some ICs are designed to operate in the 3.0V to 5.5V range while others are designed for the 1.8V to 3.3V range.

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