

Electrical Measurements

Analog-Digital Conversion

Isolation

The top diagram illustrates a DC-DC converter (ADUM5000ARWZ) with input and output capacitors (C18, C19, C20, C21, C22, C23, C24, C25) connected to 5V and GND lines, with separate 5V_ISO and GND_ISO lines.

The bottom diagram illustrates a signal isolator (IC_DIL16-SOIC-16) with input and output capacitors (C26, C27) and resistors (R3, R4) connected to 5V and GND lines, with separate 5V_ISO and GND_ISO lines.

Real Time Clock

The diagram shows the connection of a DS3234 Real Time Clock module. The module is connected to a 3V3 supply and GND. The RTC_SQW pin is connected to the 3V3 supply through a 22pF capacitor (C31) and a 10k resistor (R2). The RTC_CS pin is connected to GND through a 10k resistor (R2). The RTC pins are labeled: VCC (4), VBAT (16), GND (2, 7, 8, 9, 10, 11, 12, 13, 14, 15), SCLK (18), SCLK (19), GOUT (17), DIN (1), CS (5), INT/SQW (6), RST (3), and 32KHZ (3). The RTC is labeled DS3234.

Voltage Reference for ADC

The diagram illustrates the voltage reference circuit for the ADC. The ADR3425ARJZ-R7 reference is powered by a 5V_ISO supply (pin 4, VIN) and connected to ground (pin 1, GND_FORCE). The output of the reference (pin 6, VOUT_FORCE) is labeled 2V5_VOLTAGE_REF. This output is buffered by a chain of four op-amp buffers (C16, C3, C4, C5) to provide a stable 2V5 output. The input of the first buffer (C16) is connected to the output of the reference and has a 0.1uF capacitor to ground. The output of the first buffer is connected to the input of the second buffer (C3), which has a 47uF capacitor to ground. The output of the second buffer is connected to the input of the third buffer (C4), which has a 0.1uF capacitor to ground. The output of the third buffer is connected to the input of the fourth buffer (C5), which has a 100pF capacitor to ground. The output of the fourth buffer is connected to the 2V5 output terminal. The ground connection is labeled GND_ISO.

3V3 Regulator

The diagram illustrates a 3V3 Regulator circuit. It features a 5V input source labeled '5V ISO' connected to the VIN pin (pin 1) of the LP2985-33DBVT IC. A 1μF capacitor (C28) is connected between the 5V ISO source and the GND ISO source. The GND ISO source is connected to the GND pin (pin 2) of the IC. The IC is also connected to a 3V3 output source labeled '3V3'. A 2.2μF capacitor (C30) is connected between the 3V3 output source and the GND ISO source. The IC has several pins: VIN (1), ONV_{LM}-OFF (3), BYPASS (4), and GND (2). A 10nF capacitor (C29) is connected between the ONV_{LM}-OFF pin (pin 3) and the BYPASS pin (pin 4). The IC is labeled '3V3_REGULATOR' and 'LP2985-33DBVT'.

Standalone Arduino (atmega328)

Connectors

The diagram illustrates the connection of a 1WIRE_BUS module to a 3P1 connector, an ISP module to a 20P connector, and a 20P connector to a 20P connector. The 20P connector is labeled 'FEMALE 20P' and 'TO MASTER_BOARD'.

title	
Measuring PCB	
desinger	date
Sideridis Paschalis	March 2016
description	
<p>This board measures Voltage, Current and Temperature of a PV panel. In addition, it gets Date and Time stamp. The data are collected by the microprocessor Atmega328 and send out as I2C packages to master board. Every connection outside the board is isolated. (NOMINAL 40V@8A, MAX 45V@15A)</p>	