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Solstice Family: Pressure Sensor

I^{2}C Pressure Sensor

General Description

The SF-6 is a 14-bit Pressure Sensor board. The board is based on the Fujikura AP41(AP41R-200KG-7) 200KPa Pressure sensor. The board must be powered with 3.3Vdc. The communication to the board is through two-wire interface and will require pullups on the SDA, SCL lines; 4.99K recommended to start. Actual resistance will depend on the length of the serial cable and the number of devices on the bus.

Fujikura Pressure Sensor is composed of a silicon piezoresistive pressure sensing chip and a signal conditioning integrated circuit. The low-level signal from the sensing chip is amplified, temperature compensated, calibrated, and finally converted to a high-level output signal that is proportional to the applied pressure.

Applications

- Battery-operated devices
- Medical devices
- Industrial pneumatic devices
- Consumer devices

Benefits and Features

- Digital output
- 14-bit Pressure resolution
- 11-bit Temperature resolution
- Low power consumption
- High accuracy
- Package compatible with XFPM & XFGM integrated pressure sensor
- Modification available
- Operating Temperature Range: –40°C to +125°C
- RoHS
- Board Size: 1.250" x 1.250"
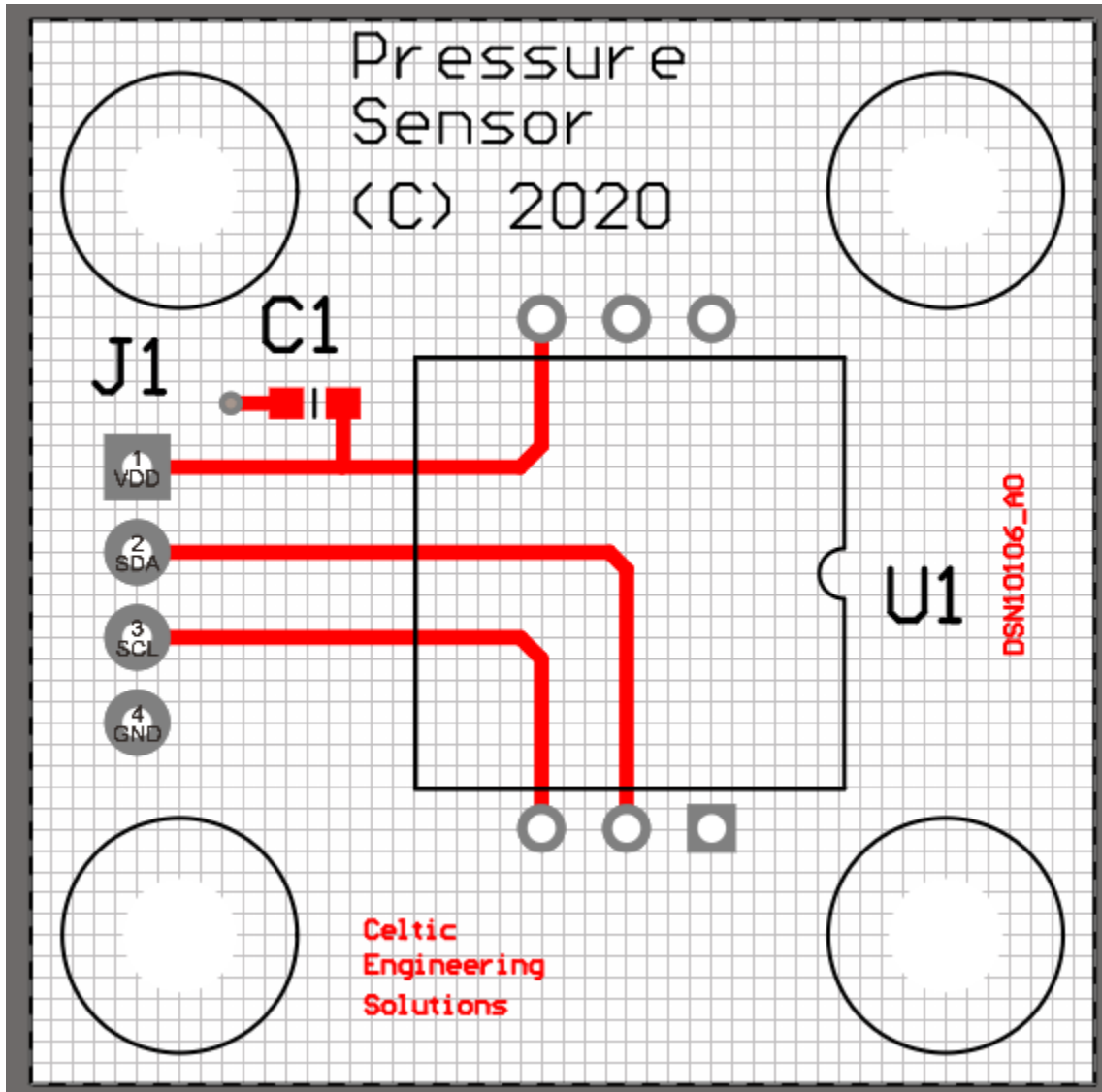
Pin Configuration (J1)

Pin	Name	Function
1	VDD	Power Supply Input
2	SDA	Bidirectional Serial Data
3	SCL	Serial Clock Input
4	GND	Ground

Absolute Maximum Ratings

VDD, SDA, SCL, Alert/RDY, A0……………... 3.3V

Storage temperature…………………………. -65°C to +150°C

Pin Description

Serial Data Pin (SDA)

SDA is a bidirectional input/output pin, used to serially transmit data to and from the host controller. This pin requires a pull-up resistor to output data.

Serial Clock Pin (SCL)

SCL is a clock input pin. All communications and timing are relative to the signal on this pin. The clock is generated by the host controller on the bus.

Power supply Input (VDD)

VDD is the power pin. The operating voltage is 3.3Vdc. For those using Arduino's, you must connect the power to the 3.3V power pin and tie the two I2C pull-up resistors to 3.3 as well.

Ground (GND)

This is the system ground pin

Serial Interface

The AP41 address is configured in the factory. This device has a hex address of 0x78. The data is collected by sending the device address to the board. Four 8-bit bytes will be returned. The first contains 2 status bits and part of the pressure data. The second byte is the low bits of the pressure. Byte 3 is the upper 8-bits of the temperature. The fourth byte contains the last 3-bits of the temperature.

This is a scope shot of the data transfer:

Address   Status 2 bit   Pressure 14 bit   Temperature 10 bit
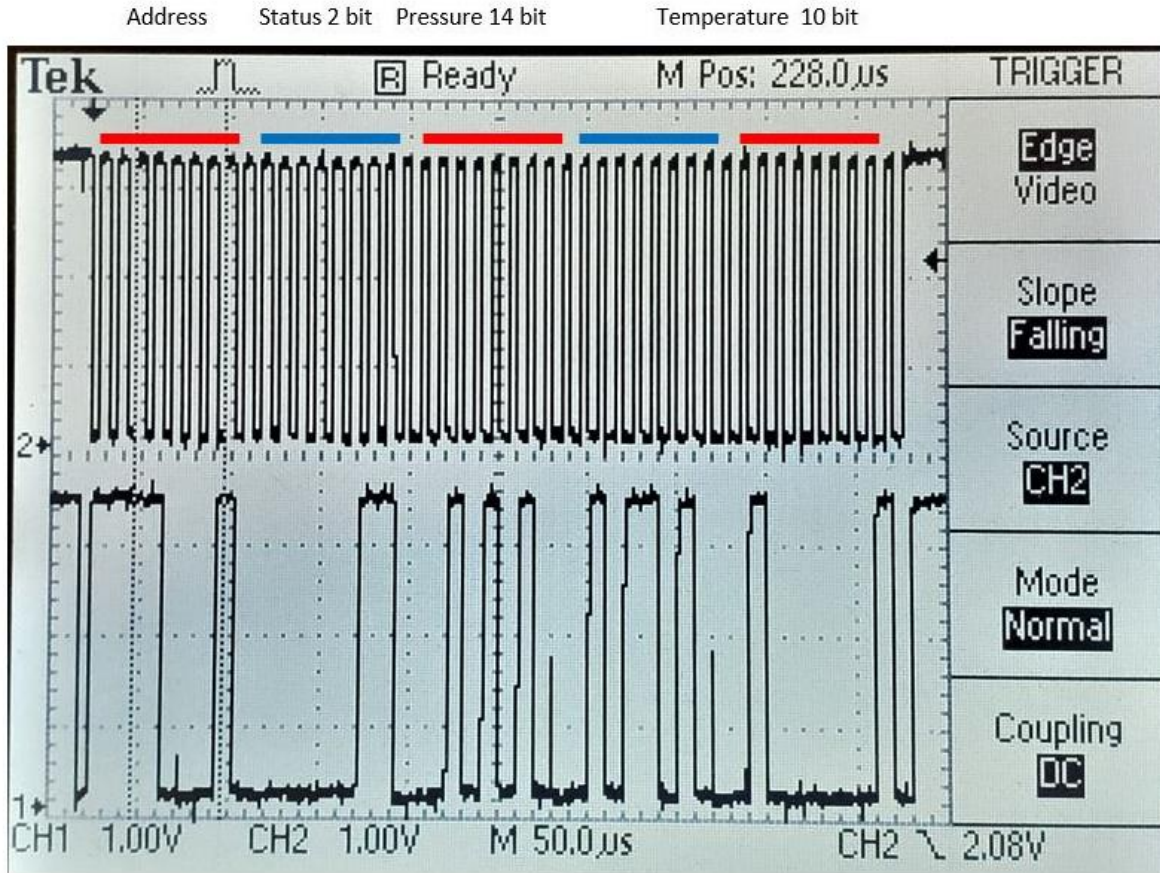
The top is a 100khz clock (SCL) and the bottom is the data (SDA).

The temperature is important because the pressure error is not zero outside of the 0°C – 85°C range and a correction must be applied if it is used above or below those extremes.

For additional information about the performance of the AP41 and the register please see Fujikura datasheet.

Revision History

NR	New Release
01	Explained how to use with Arduino