TIMS-0102

I2C AND SPI INTERFACE

USB - MODULE

TIMS-0102
USB - I2C AND SPI INTERFACE MODULE

HIGHLIGHTS

- Small Size and Low Price
- I2c and SPI Master Mode Communications
- USB 1.1/2.0 Full Speed Intrerface
- I2C Signal Buffer for Mixed Signal Levels
- Programmable Clock Rates
- 7 and 10-Bit I2C Addressing
- MicroWire Compatible
- Field-Upgradeable Firmware
- USB Bus Powered
- Windows, Linux and LabVIEW drivers

Fast and Easy Communication with I2C and SPI Devices and Circuits

Jova Solutions USB - I2C and SPI Interface Modules offer a quick and easy method of communicating with I2C and SPI devices and circuits. The TIMS-0102 module is completely self-contained and powers itself from the USB interface. The design includes an I2C voltage buffer for mixed signal level use, programmable logic, and programmable clock-rates, all to support rapid prototyping of circuits that use the I2C and SPI protocols.

I2C Interface
The I2C is a 2-wire serial bus interface, the de-facto standard for integrated circuit (IC) communications. The TIMS-0102 provides a dedicated DB-9S connector for I2C communications. The I2C clock rate is programmable and supports both the 100KHz and 400KHz standard clock rates. The TIMS-0102 supports both 7 and 10 bit I2C addressing and operates as an I2C Master.

I2C Signal Buffering
A Philips P82B96 buffers SDA and SCL signals between target device and the TIMS–0102 module. This is a dual bi-directional bus buffer designed for use between different logic levels (2V – 15V).

SPI Interface
SPI is a 3-wire communications bus that uses additional chip select lines to address each device. The TIMS-0102 provides a dedicated DB-15S connector for SPI communications. The TIMS-0102 has configurable clock rates and supports several SPI modes thru configurable Tx and Rx clocking parameters. 8 programmable chip select lines are available at the connector.

USB Interface
The TIMS-0102 modules interface to computers via a USB 1.0/2.0 full speed (FS) connection, now standard on all PCs and laptops. USB connections allow a virtually unlimited number of USB devices to connect through a single PC port.

Drivers and Software
A complete LabVIEW driver library is provided for ease of integration into higher level programs.
A low-level DLL is also provided for integration with other programming languages. All drivers are available for both the Windows and Linux operating systems.

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I2C Features

Voltage Level Buffering

The I2C SDA and SCL signals are buffered between the connected device and the TIMS-0102 module interface logic with a bi-directional bus buffer, Philips PN P82B96. This device is specifically designed to buffer I2C signals between different logic levels (2V - 15V).

Pull-up Resistors

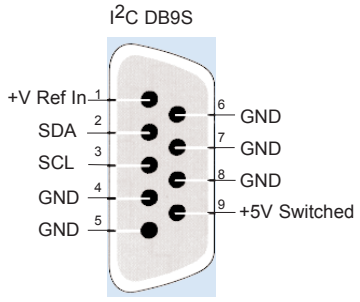
Users must supply pull-up resistors on the I2C SDA and SCL lines to the +Vref input signal. Since the overall net current requirements based on all devices that will be connected to the SDA or SCL lines should be considered when selecting the pull-up resistor values, it is left to the user to provide them.

Clock Rates

The TIMS-0102 support the 100 KHz and 400 KHz standard I2C clock rates. In addition, 252 other clock speeds are available between 39 KHz and 10 MHz, which can be used for non-standard communications, or for margin testing purposes.

I2C Interface Connector (DB-9S) Pin Out

Pin	Signal
1	+VREF In
2	SDA
3	SCL
4	GND
5	+5V Switched
6	GND
7	GND
8	GND
9	GND



Drive Current

The Philips P82B96 buffer used in the TIMS-0102 has a 60mA sink capability for driving low impedance busses.

Device Addressing

The TIMS-0102 supports both 7 and 10-bit I2C device addressing.

SPI Features

Drive Current

The TIMS-0102 can drive all output signals with a maximum of 25 mA current source or sink.

Transmit (Tx) Clocking

The Tx clock idle state is configurable to be high or low. Tx can also be configured to the falling or rising edge.

Receive (Rx) Clocking

The Rx clocking can be configured so that it is sampled at the middle or end of the Tx output period.

Clock Rates and Speed

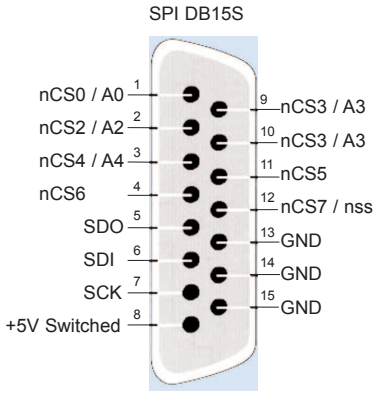
The TIMS-0102 supports 766 clock rates between 1.44 KHz and 10 MHz. Three overlapping ranges, each with 255 supported clock rates, exist for SPI communications. The driver software simplifies configuration by allowing "Target" clock rates to be specified. The actual clock rates are calculated and returned by the driver.

Chip Select

Several modes of operation exist for performing chip select functionality.

SPI Interface Connector (DB-15S) Pin Out

Pin	Signal
1	nCS0 / A0
2	nCS2 / A2
3	nCS4 / A4
4	nCS6
5	SDO
6	SDI
7	SCK
8	+5V Switched
9	nCS1 / A1
10	nCS3 / A3
11	nCS5
12	nCS7 / nss
13	GND
14	GND
15	GND



Chip Select Modes

1	7 independent chip-select lines.
2	Master mode operation. A 4-bit address and an nEN (Not Enable) are available for connection to the user's chip-select decode circuitry.

Physical Specifications

Operating Temperature	0 to +50 deg C.
Storage Temperature	– 40 deg C to +125 deg C
Temperature (max)	+70 deg C
Height	1.20 (in.)
Width	4.50 (in.)
Depth	3.25 (in.)
Weight	6 oz.