Operating manual for RS485 mini signal conditioner board

1. PRODUCT DESCRIPTION

The RS-485 signal conditioner utilizes Fredericks single and dual axis electrolytic tilt sensors. The signal conditioner provides the necessary excitation to the sensor and signal conditioning of the output to communicate over a RS485 interface.

Standard industrial RS-485 interface enables long transmission distances and possibility to connect multiple modules, with individual addresses, to the same bus. In addition to tilt angle, temperature information is also available from the module that can be used for temperature compensation of the sensor.

2. INSTALLATION

2.1 Mounting

The board in mounted in a horizontal position when a sensor in installed into the board. If external single axis sensors are connected thru cables, then the board can be mounted in any position. Following are the board dimensions,

Board dimensions.....1.25 x 1.25 inches or 32mm x 32mm square
Mounting hole and spacing.....0.089 inches diameter and 1.05 inches (center to center)

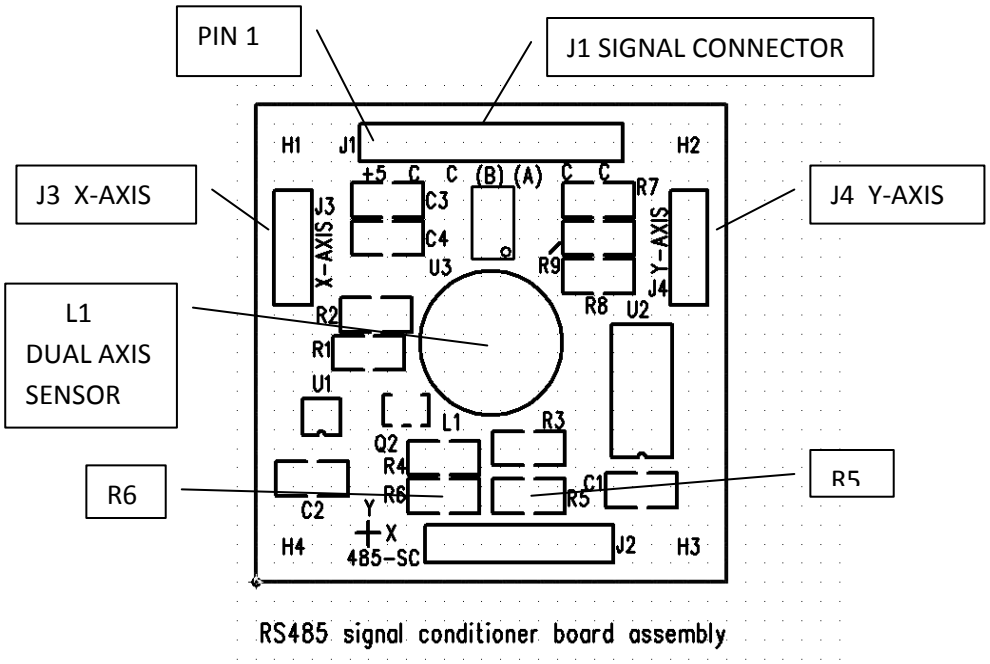
2.2 Electrical connections

Below is a table of the power and signal pin-outs,

Pin #	Signal name	Direction	Description
1	Vcc	Input	Supply voltage input: +3 to +5 vdc regulated
2	GND	-	Ground - The reference for the digital signals and the supply voltage
3	GND	-	Ground - The reference for the digital signals and the supply voltage
4	TX	Bi-directional	RS485 - B
5	RX	Bi-directional	RS485 - A
6	GND	-	Ground - The reference for the digital signals and the supply voltage
7	GND	-	Ground - The reference for the digital signals and the supply voltage

2.3 Board layout

Below is a drawing showing the board layout,



Sensor configuration	Description
Dual Axis sensor mounted on board (standard configuration)	Dual axis sensor is mounted in location L1 R5 is 10.0K ohms R6 is not installed
Single axis sensors mounted off board	Single axis sensors are connected to J3 (x-axis) and J4 (Y-axis) No sensor is installed in L1 R5 is not installed R6 is 1.0K ohms Note: If R5 is not removed then R6 must be less than 100 Ohms

Note: J2 is for factory use only.

2.4 Data-bus connections

Before connecting the modules to the bus, make sure they all have different addresses (see 3.3 command 81). Connect all 'A' of each module and all 'B' of each module.

NOTE: RS485 cannot be connected to RS232 interface.

MASTER MODULE MODULE MODULE MODULE

]----------A----------A----------A - - - - - - - - - - A

]----------B----------B----------B - - - - - - - - - - B

Max 32 modules in one bus

If communication fails to work, switch A and B polarity at Master end

2.5 Communication setup

For communication, use e.g. Hyper-terminal software (standard in MS Windows). The following parameters are either fixed or factory default for setting up the communications.

Function	Setting	Comments
Baud rate	9600 (factory default)	Settable from 1200 to 38400
Number of data bits	8	Fixed
No parity	N	Fixed
Number of stop bits	1	Fixed

3. COMMANDS

3.1 Command format

The following is the command format to read the sensor output and board temperature

***XXYY#** (* = start of string, XX = address, YY = command, # = end of string)

3.2 Data commands

Command description	Command	Output
X axis data	*9911#	ascii (16 bit)
Y axis data	*9921#	ascii (16 bit)
Board temperature	*9941#	ascii (10 bit) see note

NOTE: To convert the 10 bit data returned from the on board MCP9700 use the following formulas,

MCP9700 output voltage = 10 bit value / 1023 * supply voltage

Temperature C = (MCP9700 output voltage – 0.5) / 0.010

3.3 Setup commands

<table>
<tr><th>Command</th><th>Command description</th><th>Output</th></tr>
<tr><td>*9980#</td><td>Read product information</td><td>Fredericks
RS485 signal conditioner
Ver 1.0</td></tr>
<tr><td>*9981Axx#</td><td>Change address
(xx = address 01 to 99)</td><td>Returns new address</td></tr>
<tr><td>*9982Sxxxxxxxxxxxx#</td><td>Enter user information
x- must be exactly 12 characters.
alpha/numeric, – and SP are acceptable</td><td>Returns ID</td></tr>
<tr><td>*9982D#</td><td>Read user information</td><td>Reads the information entered by the user</td></tr>
<tr><td>*9988Rx#</td><td>x – code for baud rate
<table>
<tr><th>Code</th><th>Rate</th></tr>
<tr><td>1</td><td>1200</td></tr>
<tr><td>2</td><td>2400</td></tr>
<tr><td>3</td><td>4800</td></tr>
<tr><td>4</td><td>9600</td></tr>
<tr><td>5</td><td>19200</td></tr>
<tr><td>6</td><td>38400</td></tr>
</table></td><td>none</td></tr>
<tr><td>*9989B#</td><td>Reset to factory defaults
Address = 99
Baud rate = 9600</td><td>none</td></tr>
</table>

Note: There is a hardware reset if the baud and/or address is unknown. This is done by placing a short on R9 on the PCB before powering the unit. After power is applied remove power and short. This will reset the unit to the default values. Refer to 2.3 board layout for R9 location.