Purpose: To demonstrate how pressure measurements can be made using All Sensors Digital Pressure Sensor with All Sensors Evaluation Board. For this Discussion Hyperterminal is used to acquire data from the EV Board to a PC

Application: Ideal for engineers to collect data in lab evaluation

Discussion as Reported:

Overview of Digital Output Sensors

All Sensors Digital Output Sensors use propritary surface mapping technology to produce a fully digital output that virtually eliminates all repeatable errors over temperature and pressure. These sensors provide 12 bit serial output (14 bit in High resolution mode) with a nominal accuracy of 0.5% which includes the combined effects of offset and span shifts over temperature, linearity, hysteresis, offset and span calibration (for some digital sensors nominal accuracy is 0.25%). Typically, all combined errors over temperature are less than 0.1%. In addition to synchronous communications, the digital output pressure sensors incorporates a bi-directional, TTL level, asynchronous serial interface mode (hardware selectable 9,600 or 19,200). This mode includes a command set that allows the host to select resolution mode and make minor adjustments to offset.

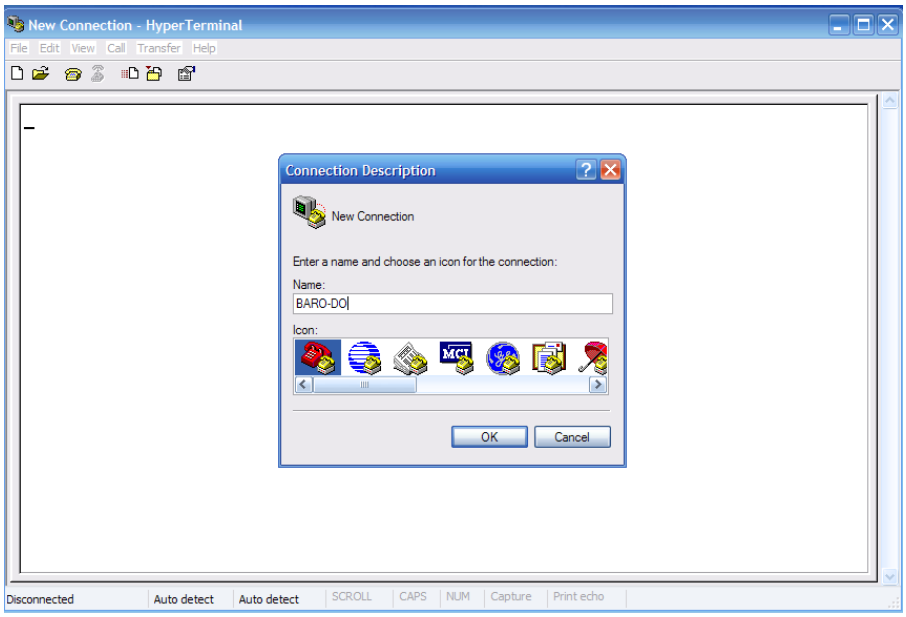
These sensors are available in -40 to 125C (Military Grade) and -20 to 85C (Industrial Grade) temperature compensated range. For detailed sensor performance and command set refer to sensor datasheet.

Overview of Digital Evaluation Board

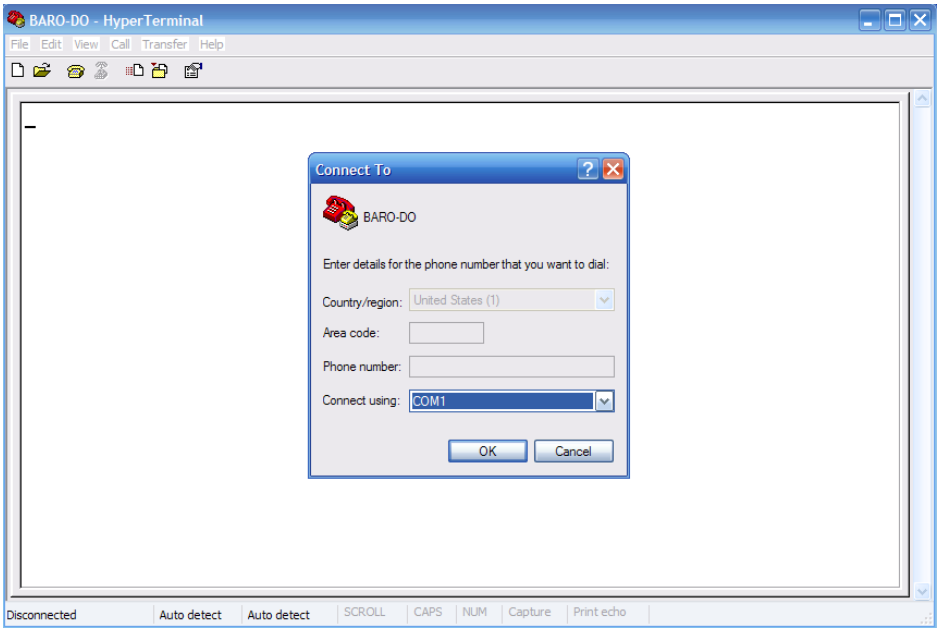
All Sensors Digital Evaluation Board converts CMOS/TTL compatible sensor signals to RS232 levels for serial computer interfacing. This unit is packaged in a sturdy housing from which the sensor pressure ports are easily accessable. The DB-9 connector brings ease of mobility and reduces hastle of connecting wires. EV Board used in conjunction with a digital sensor is an ideal way for engineers to collect data before completing the prototype process by specifying the necessary sensor and collecting data using their PC or Laptop . All Sensors is currently developing software which can be used with the EV Board to collect data in desired pressure units, sampling controls, operating mode controls and the ability to store, track and chart data.

Taking Measurements using Hyperterminal

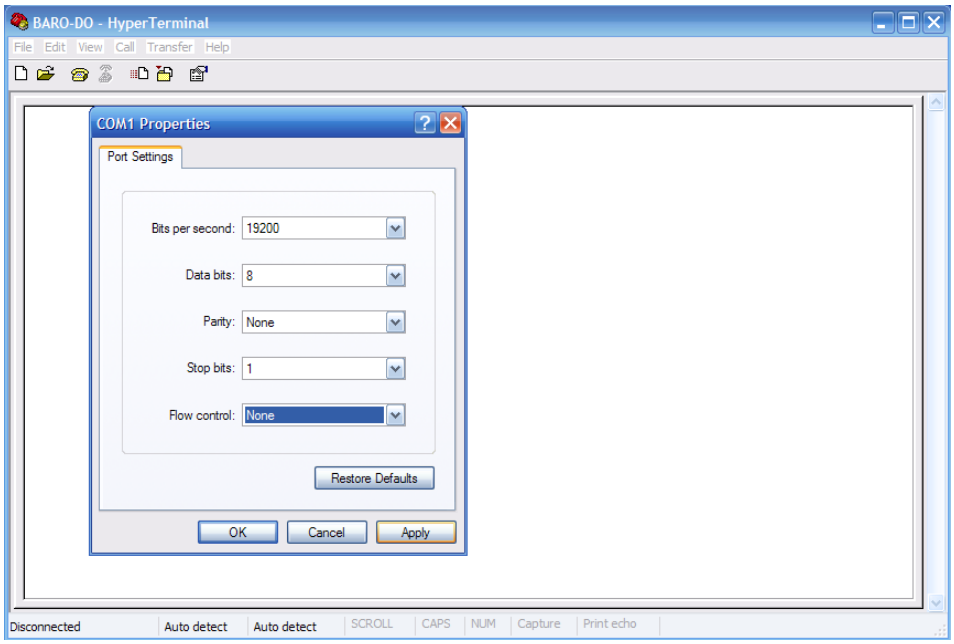
Connect the EV Board to a windows based machine via RS232 Serial cable. Run "**Hyperterminal**" application and create a new connection



1) From the drop down list under "**Connect using**" select COM port EV Board is connected to

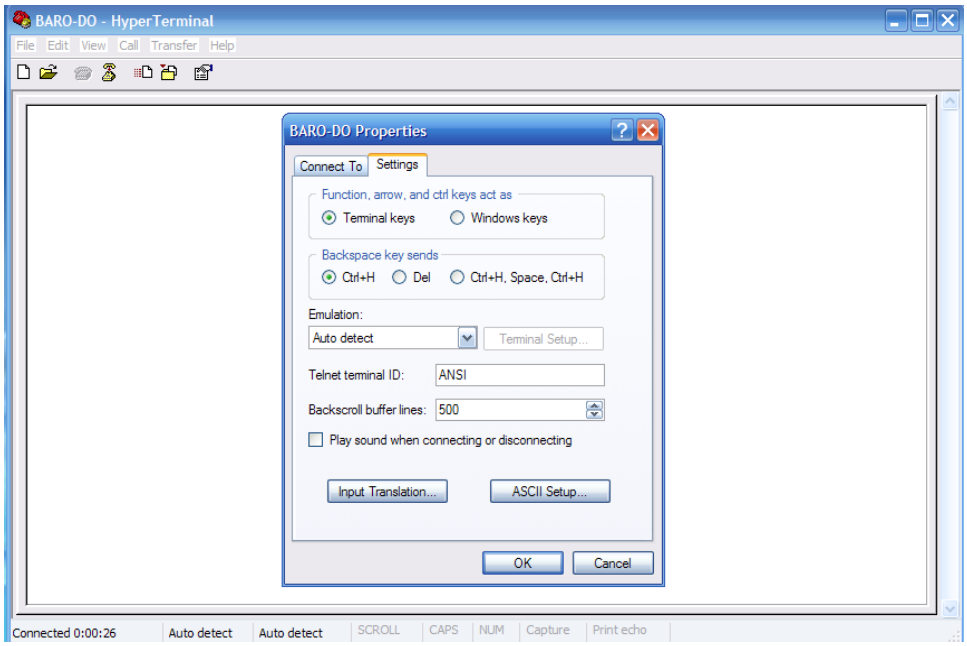


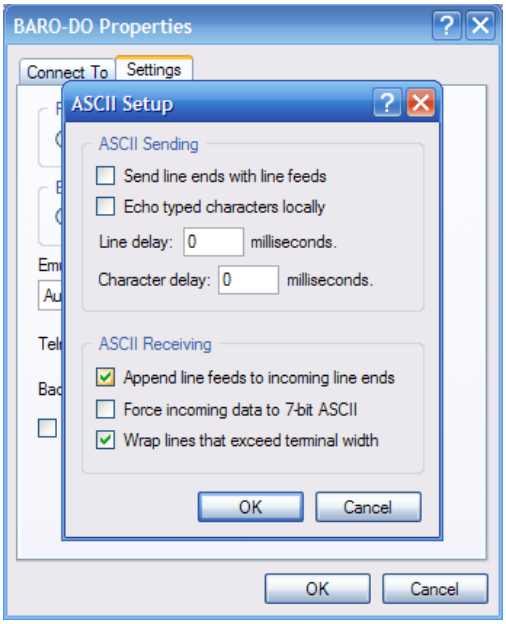
2) **"Configure"** COM port and as necessary modify **"Bits per second"** to 19200 and **"Flow control"** to None. *If JP2 on EV Board is selected for 9,600 modify "Bits per second" to 9600*



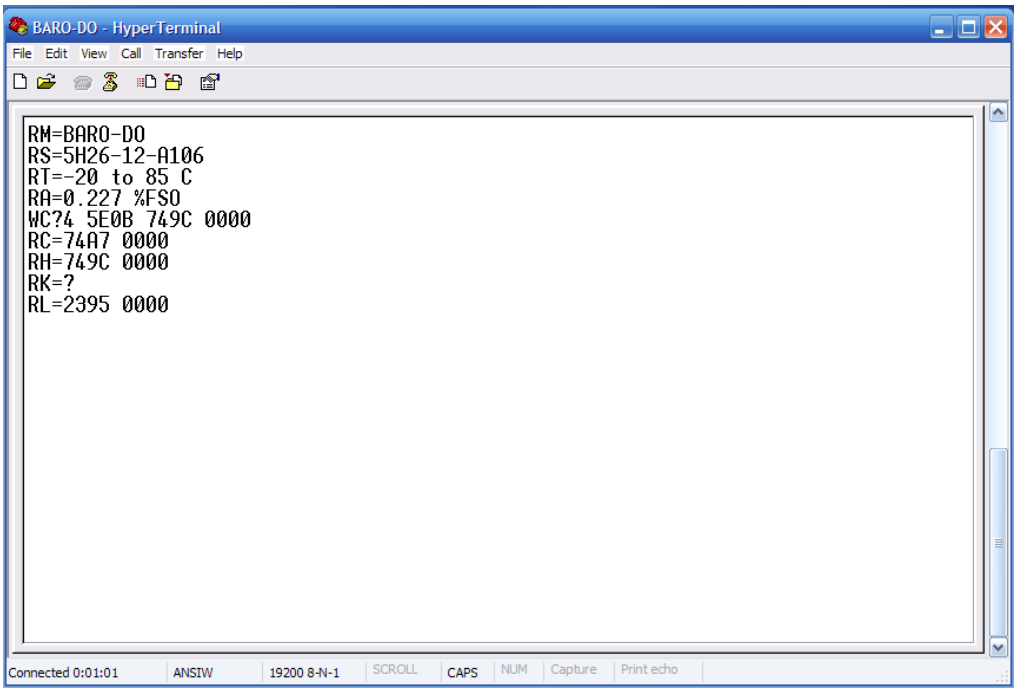
3) Select File -> Properties-> Settings-> **"ASCII Setup"**. Check **"Append Line feeds to incomming line ends"**

Not required , but will help preserve each command entered. This can be useful when saving a log of telnet session





4) On the main screen, type any of the commands listed under **"Command Summary Table in part Datasheet"**



If the sensor does not respond to commands listed in the part datasheet verify the following:

- Sensor is mounted in the correct orientation on the EV Board.
- Baud Rate selected for COM Port and EV Board is the same. By default Baud Rate on EV Board is set to 19,200bps.

- EV Board is connected to COM port as selected in HyperTerminal.

Converting Digital Output to Pressure Units:

The output acquired using HyperTerminal is an 8 character ASCII string which represents a hexadecimal value. The first 4 characters encode a pressure reading while the remaining is reserved for error codes. To get a reading in pressure units, the acquired data must be converted into decimal format (Digital Output) and scaled by Digital Span (depends on operating resolution) using the following formulas:

$$\mathbf{Pout = Digital\ Output} \times \left[\frac{\mathbf{FSO \times Units}}{\mathbf{10{,}000}}\right] \ (\textit{Low Resolution Mode})$$

$$\mathbf{Pout = Digital\ Output} \times \left[\frac{\mathbf{FSO \times Units}}{\mathbf{32{,}767}}\right] \ (\textit{High Resolution Mode})$$

Consult to part datasheet for FSO and units. If FSO is not listed in the datasheet, as a rule of thumb FSO will be the higher limit of the operating pressure. For example, in case of BARO-D-DO sensor (DS-0010) FSO will be 1100 and units will be mBar.

Written by:
Usman Bhatti
Application Engineer