

Scale interface for use with "Yuriy's" Android tablet DRO

The interface is designed as an interface between various types of scales and a microcontroller which converts the signals from the scales into a string of numbers in the format to work with Yuriy's Android tablet based DRO See his website

<http://www.yuriystoys.com/2012/09/do-it-yourself-dro-with-arduino-and.html>

The interface hardware (Not necessarily the Attiny4313 and the software I am using) will support the following scale types 2 x 24 bit protocol Chinese scales (Including setting them to fast sample mode.) 7 BCB protocol Chinese scales, BIN6 protocol Chinese scales, iGaging scales and quadrature output scales. (Glass scales, magnetic scales, rotary encoders.) There is also signal conditioning for optical encoders or hall effect sensors to as a tachometer. (If the microcontroller firmware supports that function. There is also a touch probe input for use with the DRO function. This enables the DRO to set a zero reference when the probe makes contact with the edge of the work piece. You only need to build the parts of the interface you require. The touch sensor and tachometer input circuits could be left out. If you do not need the fast mode on 2 x 24 bit scales you could leave out the analog 4051 multiplexer (IC10) and resistors. R17 to R24. The connector for the scales gives the option of 1.5 volts (For the original Chinese scales.) 3.3 volts (For iGaging scales.) and 5 volts (For glass scales.) The voltage pin used for the scale also needs to be linked to the scale power pin. This is to set the comparator reference voltage to the correct value.

At the moment the Attiny4313 and firmware support 2 x 24 bit Chinese scales, 7 BCD Chinese scales and BIN6 Chinese scales directly. It should also work with iGaging scales but it has only been tested using a unit that emulates the data from iGaging scales. (I do not have any iGaging scales for testing.) It also supports the data from "Wixey" type angle gauges. Indirectly it can support quadrature scales using the Shumatech QCC100

<http://www.shumatech.com/web/products/qcc-100>

The interface accepts tachometer data from my "DRO Tacho module" in the form of a 24 bit binary word consisting of three bytes sent to the serial input on the interface module. (The least significant byte is sent first.)

The software in my interface module uses an interrupt routine for the USART received data to minimise disturbing the data reception from the scales. To ensure the three bytes are all from the same group of three a test is done to check that the three bytes are received within 6 mS (At 19200 bauds three bytes should be received within about 3 mS.) A further test is done that there is no more than about 6 seconds between reading. (The maximum time would be 3 seconds for 20 pulses per minute input.) This sets the displayed value to zero to avoid the last valid reading from being displayed after a loss of tacho data.

It should be possible to use this method in the Aduino and MSP430 interfaces.

The firmware is configured to work with the different protocols by setting the switch to setup mode before the unit is powered up. To configure the unit you need to run a terminal emulator program on the Android tablet. I have been using "blue term" which is free from "Google Play"

In setup mode it starts by asking which scale to configure . It then shows the current scale type on that input and asks for a new type or C/R to accept the current type. If a 2 * 24 scale is selected it asks if you want fast mode enabled. Then it asks if you want the absolute data or the relative data. It then asks if you want to save the settings for this scale to EEPROM It then asks for the next scale to configure. (Or "X" to return to normal mode.)