Simple Digital Readout (SDRO1)

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Introduction:

SDRO1 is an Android Application written using MIT AppInventor software.

https://appinventor.mit.edu/

The app establishes a Bluetooth connection with hardware described in another document. The hardware send JSON strings {X:10,Y:20,Z:30) that are the incremental count of incremental position sensors. These counts are scaled and displayed. App buttons allow the counts to be set to zero. A database using the Bluetooth name as a namespace saves and restores positional data. Several patterns are made available as well as the ability to load a pattern from a comma separated file (CSV)

There are two files that supply this App. The SDRO1.APK is the compiled application that will run on Android devices. The SDRO1.aia file is the source that can be viewed and modified using the online App Inventor software.

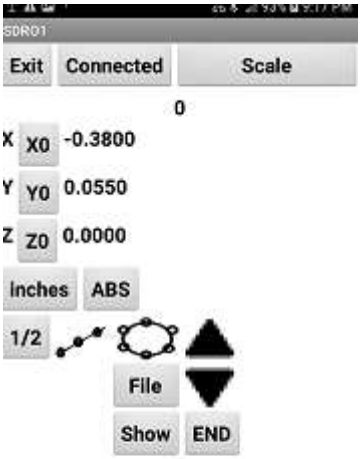
The Startup Screen

Press the Connect to Bluetooth button.

A list of Bluetooth paired devices is asking for your choice (HC-05)

The Bluetooth connection is established and the Bluetooth name is used to find the namespace in a database on the Android device. If not found it is created with default values. If found the last saved configuration is read from the database.

The Exit button saves the configuration to the database.



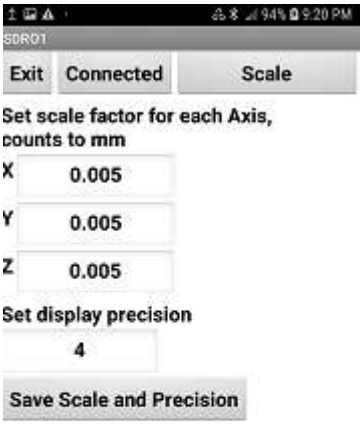
The Scale button brings up the scale factor screen.

For a 5 micron linear sensor 0.005 is the correct value.

To reverse the direction of an axis use a negative value.

The display precision is the number of digits right of the decimal point to display.

Exit will save the scale values.



The X0, Y0, and Z0 buttons zero the Axis readings. These work two different ways.

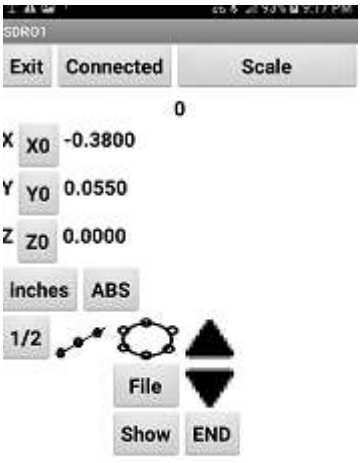
In absolute coordinates (ABS) the counter in the hardware is set to zero and the offset is set to zero.

In incremental coordinates (INC) the hardware counters are not changed. The incremental offset is set to negative of the absolute value and the offset is set to zero.

Example: Zero the X axis in absolute. Move the X axis encoder to read 10 in absolute. Press the ABS button to go into incremental coordinates. Zero the X axis in incremental mode. Switch back to absolute by pressing the INC button and the X readout displays 10.

The inches buttons toggles readings to mm, and vice versa.

The 0 at the center top tracks the hole number in patterns discussed below.



The operator positions the cutting axis (Z) over the left edge of a workpiece and zeros the Z axis. The operator then positions the cutting axis over the right edge of the workpiece and presses the 1/2 button. The following dialog is used to select the axis to be centered.

The readout for the axis will change. The operator then moves that axis to zero, over the center of the workpiece, then zero that axis. Repeat using Y-axis and front and back of the workpiece.

Pattern Buttons

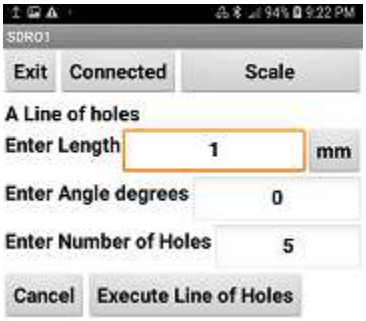
The pattern buttons create a list of hole positions. The Show button displays this list.

The Up and Down buttons allow the operator to select a hole position in the pattern.

Select hole, using the machine position controls, zero the display readings and drill the hole.

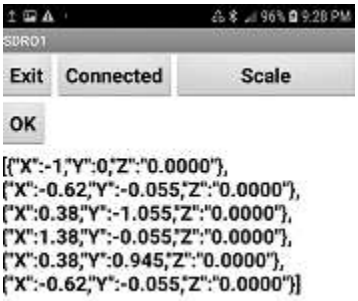
When finished use the END button to clear the list and return to normal position display.

Line of Holes at angle to X-axis

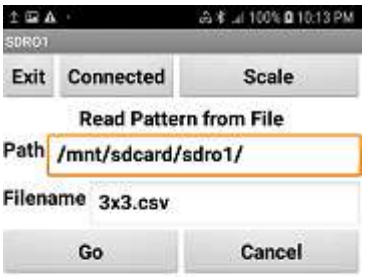


Circular Arc of Holes (Flange holes)

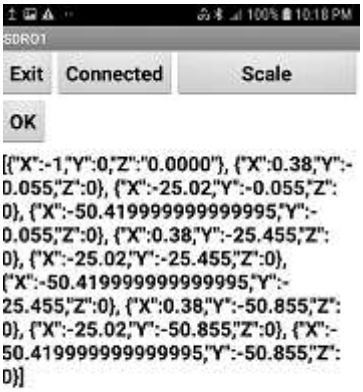
A Pattern Display



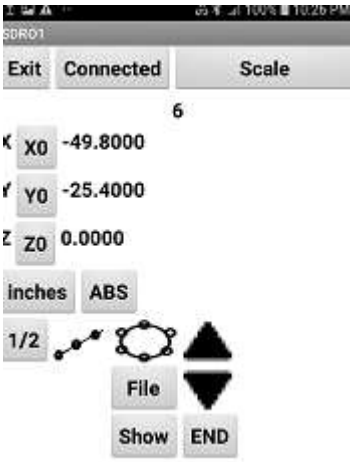
The File Button Reads a File from the Path on the Android device.



A 3x3 hole pattern read from the 3x3.csv file



Hole 6 of the 3x3 file before the operator moves the machine axis to zero the display.



The CSV file format:

SDRO1
Units 25.4

X	Y	Z
0	0	0
1	0	0
2	0	0
0	1	0
1	1	0
2	1	0
0	2	0
1	2	0
2	2	0

The 25.4 after Units is used to convert the XYZ numbers to mm.

A 10.0 would means that the XYZ numbers are in cm.

25.4 means the XYZ numbers are measured in inches.