Sample application: **Bluetooth Oscilloscope**
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What you need

- **LC2138**
- **IFBT41 (RN-41/42 Bluetooth module)
  incl. 10-pin flat ribbon cable**
- **3.3V power supply**
- **Smartphone/Tablet with Android (>= 2.3)**
- **ECO-C-arm Compiler + BaseA/IF232LP**

How it works

The ADC of the LPC2138 is used to sample (7Bit) one channel (two channels) with 500kSps (with 250kSps each). The samples are stored and transmitted – via Bluetooth - to an Android app, where the data is displayed. You can adjust the trigger level and edge as well as single or auto-trigger. The curves can be horizontally shifted and zoomed.

A reference signal is provided „for free“: A PWM output up to 50kHz, with adjustable duty cycle (1... 99%). This signal is generated by a timer in the background with zero CPU load.

With 500 kilosamples this is not a candidate for a real-life application, but this example is more intented to show that it is possible to control the device without the need for further hardware (display, keyboard).

Of course this could have also been done using a PC program. But not everybody has his notebook ready everyhwhere, while more and more people (they may know it or not) carry a whizz kid in their shirt pocket: Display, touchscreen, sound, haptic, even Gigabytes of memory, all this wireless – what more do you want?

Compile **bto.c** and program the Flash of the LC2138.
Then connect the Bluetooth module, using the 10-pin flat ribbon cable.
Install **bto.apk**.
Before you start the app, the Bluetooth module must be paired with your smartphone/tablet (in Settings/Bluetooth).

In case of connection problems: To reduce power consumption, the Bluetooth module has an adjustable connect window, which is best maximized. To do this, install and start the Bluetooth terminal **bttm.apk**. Power on, connect and send **$$$** within 1 minute. To maximize the connect window enter **sj,0800**.

For more documentation see **bto.c**.

Operation

When the app gets started, it shows the screen for Bluetooth device selection. All currently paired devices are offered. As it makes no sense to connect to devices other than the Bluetooth module, the selection can be limited to device names containing a particular string, defined in settings. Always offered is „Demo“, in case the external hardware is not available. If only one device is available, it is selected automatically.

On successful connection, the main screen is shown. Initiate sampling by pressing the SAMP. key. Using the control wheel, you can horizontally shift and zoom the curves, depending on where you start rotating it (set defaults with the DEF. key). The TRIG. key opens the trigger screen, where you can set the trigger level and edge as well as single or auto-trigger (set defaults with the DEF. key).

In settings you can switch between four channel combinations, and enable acoustic and haptic feedback for the control wheel. In addition you can set the frequency and duty cycle for the reference signals.

Screenshots