

Freescale MQX RTOS Example Guide

TCHRES example

This document explains the TCHRES example, what to expect from the example and a brief introduction to the API used.

The example

The example demonstrates the usage of touch LCD driver in addition to the ADC driver to show the coordinates of a point at which user hits on LCD screen. In fact only the ADC peripheral module of the MCU is employed in this example to convert the output signal from LCD touch screen into a corresponding value of voltage detected. The coordinates displayed on the terminal are the relative values of the voltages detected with respect to the base values assigned for the bottom right corner of LCD screen. The minimum coordinate is 511 while the maximum coordinate is 3577.

Running the example

The example can only be run on MCU boards with ADC peripheral module. The `BSPCFG_ENABLE_ADC` macro or `BSPCFG_ENABLE_ADC1` and/or `BSPCFG_ENABLE_ADC0` macros must be set to non-zero in the `user_config.h` file prior to compilation of MQX libraries and the example itself.

This example requires the TWR-LCD board in addition to MCU board. To run the example the corresponding IDE, compiler, debugger and a terminal program are needed.

Explaining the example

The coordinates of a point on LCD screen includes the horizontal coordinate (X value) and vertical coordinate (Y value). To measure those values, separate instance of ADC is used. One ADC channel is for the X coordinate and the other ADC channel is for the Y coordinate.

The application example creates only one task called `Main_task` which is responsible for following jobs.

- Open the connection to ADC peripheral module with the 12bit resolution of the ADC conversion machine. Depending on the MCU tower board the X coordinate and Y coordinate will be handled by separate ADC module or share one ADC module with different channel. This includes setting the clock for ADC conversion, the triggering method to start conversion from analogue to digital values, installing interrupt handler and activating the interrupt associated with the completion of ADC conversion. It also initializes the PDB module and sets up the PDB module as the trigger source for ADC module.
- Install a new input/output channel named "tchscr:" into the kernel with the GPIO pin numbers used for ADC operation, the valid range of ADC values for coordinates X and Y and the specific ADC channels used for measuring the voltages associated with coordinates X and Y.
- Open the connection to ADC channels associated with X value and Y value. This initializes the Programmable Delay Block module for

- triggering ADC channels to trigger the conversion and initializes the GPIO port pins for ADC functions.
- Enter an endless loop to update the current value of the voltages associated with the horizontal direction and vertical direction relative to the base values. The results are displayed on the terminal. Those results are updated every 100 ms.

The following picture shows some example sets of coordinates on LCD screen.

```
Touch detected in raw ADC values (X,Y) = (3137, 2856)
Touch detected in raw ADC values (X,Y) = (3140, 2858)
Touch detected in raw ADC values (X,Y) = (3162, 2858)
```