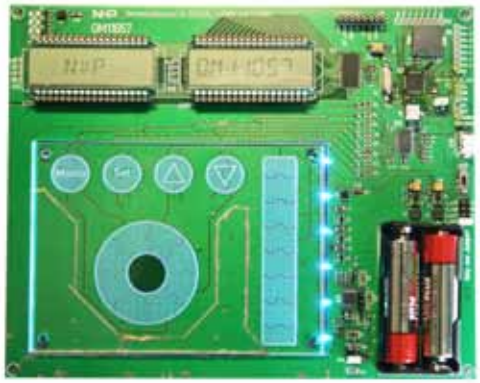


# NXP capacitive sensor demo board OM11057

# Fast, easy evaluation of capacitive sensors

This board, equipped with an LCD driver and controlled by a Cortex-M0™ MCU, demonstrates the features of two capacitive sensor devices.

### Key features

- 8-channel capacitive sensor PCF8885
- 2-channel capacitive sensor PCA8886
- LCD/LED driver PCF8536
- Cortex-M0 LPC1111 with 8 KB flash memory
- Standalone operation
- Powered via two AA batteries or USB
- Software modifications via LPC-Link
- Sounder for audible feedback

### Applications

- Hermetically sealed keyboards
- Proximity detection
- Switches in medical and explosive environments
- Vandal-proof switches
- Gaming devices
- Portable communications
- Fixed and mobile entertainment systems
- White goods
- Automotive (e.g. passive keyless entry)

The NXP OM11057 demonstrates the features of the PCF8885, an 8-channel capacitive sensor, the PCF8886, a 2-channel capacitive proximity sensor and the PCF8536, an LCD/LED controller which can be used to drive an LCD and the accompanying backlight. The board is controlled by a low-cost, 32-bit Cortex-M0 microcontroller LPC1111.
An LPC-Link debug probe is also included with the board, so designers can easily modify the firmware or reprogram the LPC1111 using NXP's low-cost LPCXpresso development platform.

The sensor PCF8885 is configured to control a total of 20 sensors: the slider (eight channels), the wheel (eight channels), and four buttons. The device's very high sensitivity delivers reliable operation, even though it's covered by plexiglass (acrylic glass). The proximity sensor PCA8886 uses one of its two channels to detect whether a hand is approaching the controls. The other channel can be connected to an external sensor. The LCD/LED driver PCF8536 controls both of the board's LCDs using a multiplex rate of eight.

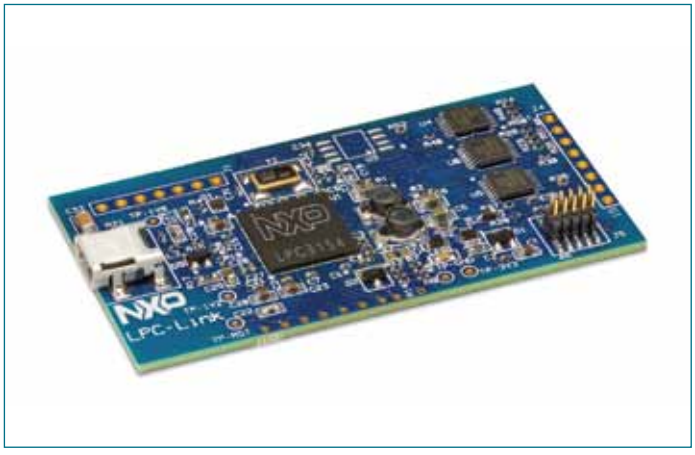
## Capacitive sensor PCF8885

This 8-channel proximity switch uses a patented (EDISEN) method to detect a change in capacitance on remote sensing plates. Changes in the static capacitance (as opposed to changes in the dynamic capacitance) are automatically compensated using continuous auto-calibration. The eight input channels operate independently of each other. The device offers built-in support for a matrix sensor arrangement. In this set-up, the device generates an interrupt when two channels are activated simultaneously, and suppresses additional channel outputs when two channels are already active.

## Capacitive proximity sensor PCA8886

This device uses the same operating principle as the PCF8885. Remote sensing plates (e.g. conductive foil) can be connected directly to the IC or remotely using coaxial cable. The device can be used on its own, without a microcontroller.

## The OM11057 includes an LPC-Link JTAG/SWD debug probe




## LCD/LED driver PCF8536

This device generates the drive signals for any multiplexed LCD with up to eight backplanes, up to 44 segments, and up to 320 elements. It is compatible with most microcontrollers and microprocessors, and communicates via a two-line, bidirectional $I^2C$-bus or a three-line, unidirectional SPI-bus. A display RAM with auto-incremented addressing minimizes communication overhead. An on-chip PWM controller supports LED illumination. Up to six independent PWM channels can be configured, each with 128 levels. This makes it possible to configure two RGB controllers with more than two million colors each. The PWM channels can also be used for static drive. The Q900 types of this device are AEC-Q100 compliant and offer a target operating temperature of 95 °C.

| Device | Features |
|---|---|
| PCF8885 | ▸ Dynamic proximity switch with eight input channels, digital processing<br>▸ Support for matrix arrangement of sensors for up to 24 keys using one PCF8885 (4 x 4 matrix, plus 8)<br>▸ Continuous auto-calibration<br>▸ $I^2C$ Fast-mode compatible interface<br>▸ Clock and interrupt cascading of two ICs for up to 80 keys<br>▸ Low-power battery operation (IDD ~ 10 µA)<br>▸ Sleep mode (IDD <100 nA)<br>▸ Adjustable response time<br>▸ Adjustable sensitivity<br>▸ TSSOP28 package (others available on request) |
| PCF8886 | ▸ Dynamic proximity switch with two input channels, digital processing<br>▸ Continuous auto-calibration,<br>▸ Adjustable sensitivity, can be made very high<br>▸ Adjustable response time<br>▸ Wide input capacitance range (10 to 60 pF)<br>▸ Sensing plate and IC can be several meters apart<br>▸ Low-power battery operation ($I_{DD}$ = 6 µA typical)<br>▸ Output configurable as push-button, toggle, or pulse<br>▸ TSSOP16 package (others available on request)<br>▸ AEC-Q100 compliant for automotive applications |

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Date of release: February 2011
Document order number: 9397 750 17066
Printed in the Netherlands