APPLICATION NOTE

# Atmel AT06857: Developing Extension Boards for the Xplained Pro Evaluation Kits

## Atmel Microcontrollers

## Description

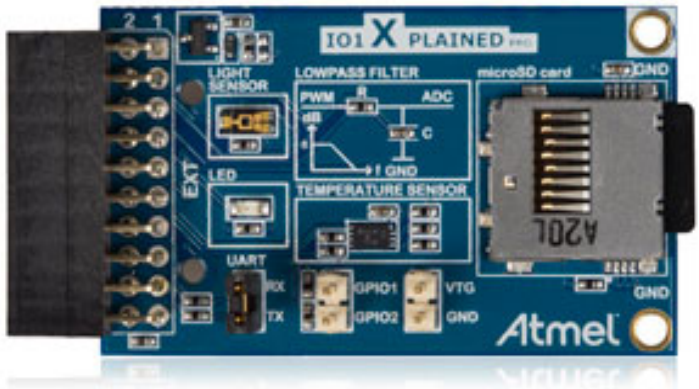
This application note describes where to find the resources and specification for making extensions for the Atmel® Xplained Pro evaluation kits.

Both as a hobbyist and as a professional company wanting to promote IP or components for embedded designs it can be relevant to make extensions for the Atmel Xplained Pro development platform, The Xplained Pro is an open platform and the Xplained Pro name can be used to indicate the relation to the platform. This also means that it is allowed to make and promote commercial designs for the platform.

## Features

- Develop extensions for the Xplained Pro evaluation kit
  - PCB specification
  - Design guidelines
  - Tips and tricks

**Figure 1. IO1 Xplained Pro Extension Boardoards for the Xplained Pro Evaluation Kits**



# 1. Xplained Pro Extension Board Specification

The Xplained PRO board specification is available from the website: http://gallery.atmel.com/ : click on the Partner button:


On this page you will find information about how to become an Atmel Gallery developer. This includes the information needed for designing extension boards for the Xplained Pro Evaluation boards. Click on the “HDK USER GUIDE (PDF)” button:


This will open a PDF containing all the information needed to create PCBs which can connect to any of the available extension headers on the Xplained Pro evaluation kit.

# 2. Tips and tricks when creating Xplained Pro extensions

This is short checklist for a last minute PCB check before ordering the first prototype and before starting the PCB design. This is not in any case meant to be a complete checklist for the PCB design, but more of a short list of useful tips.

- The headers for EXT1, EXT2 and EXT3 appear mirrored compared to normal headers on the extension board. I.e. pin 1 will be located to the left on an MCU board (e.g. Atmel SAM D20 Xplained Pro) while on the extension board (your board) pin 1 will be located to the right. This is because dual row 90 degree headers are used.
- The USART TX pin refers to the MCU, i.e. data going out from the MCU. Hence this needs to be connected to the RX pin on any USART device on the extension board (your board). Same convention applies to the USART RX pin but data will of course flow in the opposite direction.
- PWM and ADC channels are both specified as differential channels, marked (+) and (-), however these can also be used as standalone channels, if complementary PWM pins or differential ADC input is not required.
- For best possible ADC performance the ADC signal traces should be kept as wide and short as possible, and as far away as possible from any high speed digital signals which may inject noise to the ADC signals. Note that an extension board will not be an optimum solution for good ADC measurements, largely due to that signals need to travel out of the PCB through the header and then down to a different PCB.
- It is not optimum to design an extension for a specific MCU board, as this may mean that other MCU boards cannot use that extension board, but sometimes this is not avoidable because the feature one wants to demonstrate only exists on certain pins for a certain MCU, and this pin(s) is not part of the Xplained Pro standard headers. As a courtesy for other potential users the silk-screen and information for the extension should thoroughly state which MCU board(s) the extension supports.
- $I^2C$ pins do usually have pull-ups on the main MCU board (e.g. SAM D20 Xplained Pro), but it could be an idea to place footprints for adding custom pull-ups on the extension board if space allows it. These can become handy when tuning the correct pull-up strength on the $I^2C$ data and clock lines.

# 3. Revision History

| Doc. Rev. | Date | Comments |
|---|---|---|
| 42235A | 01/2014 | Initial document release |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