AVR® MCU P4 Field Engagement Board

Never Compromise

Embedded designs are often expected to become smaller while maintaining the same, or attaining more functionality. This puts an incredible amount of stress on you to compromise multiple aspects of your design by adopting smaller MCUs to save space. The AVR MCU P4 Field Engagement Board demonstrates how Microchip can help remove these limitations, and shows how you can use small and efficient 8-bit AVR MCU devices without having to compromise on power, pins, performance or precision (P4).

Clock Switching for Power Control

The biggest dial for controlling a device's power consumption is the clock frequency—the higher the speed the more power the device needs. Unfortunately, some applications need to run faster to process data or communicate large sets of information in a reasonable amount of time. These faster clock speeds may not allow for precise timing, as higher frequencies will be more costly to break down into seconds. The AVR MCU P4 Field Engagement Board demonstrates how it is possible to have high clock speeds when needed, and dynamically switch to a lower power mode when the high speeds are not required. This is done while also having a crystal oscillator provide high precision timing. No more compromising between battery life and precision!

Memory Reduction Techniques

When driving a display, a general guideline to achieve better looking images is to use more pixels. This makes curves smoother, and allows details to be defined more clearly. However, storage of pixel dense fonts or other images takes a lot of space. Normally a compromise needs to be made between the user interface's look over the capabilities of the microcontroller used. One of the techniques showcased by the AVR MCU P4 Field Engagement Board is to dynamically scale fonts from lower to higher resolutions. This allows the smaller font to be stored on the device, without reducing the reducing user interface.

Pins Reused for Input and Output

Having more pins is usually the answer when an application needs to drive many different outputs as well as accept a large number of inputs. This is simply due to the fact that input and output are thought to be mutually exclusive operations. However, the AVR MCU P4 Field Engagement Board does the impossible by driving LEDs while detecting push button inputs with the same I/O pins. Using this technique, your next design does not have to compromise based on the number of pins!

Turn Off The Non-Essentials

When you are not in a room at your home, or are leaving for the day, it's normal to turn off the lights in order to save energy. Why not use the same philosophy with your design? When certain parts of your circuits aren't being used, there are ways to power them down and remove their power needs. The AVR MCU P4 Field Engagement Board shows how to do this so you don't need to compromise based on the power consumption of desired circuitry.

Key Features

- Pin reuse for inputs and outputs
- Memory reduction by font compression/expansion
- Power savings via on-the-fly clock switching
- Shutdown circuitry for power reduction
- I²C and GPIO Connectors for expandable application

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Where to START

Atmel START is an innovative online tool for intuitive, graphical configuration of embedded software projects. It lets you select and configure software components, drivers and middleware, as well as complete example projects, specifically tailored to the needs of your application. The configuration stage lets you review dependencies between software components, conflicts and hardware constraints. In the case of a conflict, Atmel START will automatically suggest solutions that fit your specific setup.

tinyAVR® MCUs

The device used on the AVR MCU P4 Field Engagement Board is part of the tinyAVR MCU family, which is optimized for applications that require performance, power efficiency and ease of use in a small package. All tinyAVR devices are based on the same architecture and compatible with other AVR devices. The integrated ADC, DAC, comparators, EEPROM memory and brown-out detector let you build applications without adding external components. tinyAVR devices also offer Flash memory and on-chip debug for fast, secure and cost-effective in-circuit upgrades that significantly cut your time to market.

General Purpose Development Hardware

The ATtiny817 Xplained Mini Evaluation Kit (ATTINY817-XMINI) is a hardware platform for evaluating ATtiny817, ATtiny816, ATtiny814 and ATtiny417 microcontrollers. The evaluation kit comes with a fully integrated debugger that provides seamless integration with Atmel START and Atmel Studio development environment.

Popular AVR® MCU Development Boards
Xplained Nano (ATTINY-XNANO)
Xplained Pro (ATMEGA324PB-XPRO)
Xplained Mini (ATMEGA168PB-XMINI) (ATMEGA328PB-XMINI)
STK600 Development Board (ATSTK600)

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