Port Guide for Keystone II Board Management Controller

# Introduction

The Board Management Controller (abbreviated BMC) is a subsystem of Keystone II EVMs that is responsible for various board activities including booting and shutdown.

# File Structure

The BMC file structure was designed to try and minimize the amount of necessary changes to port to new boards. Files within the BMC fall into one of two main categories:

1. Common Files – These files are found in the ‘inc’ and ‘src’ directories. They should require very little or no changes when porting.
2. EVM Specific Files – These files are found in directories named after the EVM they are used for (i.e. ‘evmk2k’,’evmK2E’…). When porting, a new EVM specific folder will have to be created to store the new files.

Each category is discussed in more detail in the following sections.

## Common Files

Common files were designed to minimize alterations between EVMs. There are, however, instances where it may be necessary to alter some of the files when porting the BMC to a new EVM:

* inc/bmc.h – The version will need to be updated. There are macros for various values used in the BMC that may also need to be changed.
  + GPIOE\_SPI\_SPEED – The SPI speed used by the SPI port that controls the GPIO Expanders.
  + LCD\_SPI\_SPEED – The SPI speed used by the SPI port that controls the LCD
  + BAUD\_RATE – The UART Baud Rate (should not need to be changed).
* inc/bmc\_commands.h, src/bmc\_commands.c, src/bmc\_cmd.c – These will need to be altered if new commands are added, old ones removed, or the behavior of any command is altered.
* inc/bmc\_lcd.h, src/bmc\_lcd.c, inc/bmc\_font.h, src/bmc\_font.c – If a different LCD is used, these files will need to altered to work with the new hardware. If the LCD is the same, but the direction needs to be flipped, change the LCD\_DIRECTION macro in inc/bmc\_lcd.h to the desired direction (SOCBELOW or SOCABOVE).
* inc/bmc\_state.h, src/bmc\_state.c – These files determine how the board is setup during boot, and contain functions to place the board in various states. They will need to be altered if the desired method of booting changes or any of the steps in the boot change.
* inc/gpio\_driver.h, src/gpio\_driver.c – These files will only need to be altered if the GPIO expanders used change (the amount of expanders is irrelevant, only the type matters for these files).
* src/bmc\_polling.c – This file will need to be altered depending on what is polled by the system (buttons, gpio pins, etc.)

## EVM Specific Files

The EVM specific files are contained in a folder named for the platform the BMC will run on. At the time this paper was written, only one such folder existed: evmk2k. The folder contains the CCS project files, and two folders containing platform specific source code. When porting the BMC, the old project can be moved to a new folder, imported to CCS and renamed. The source files will need to be altered as well. A description of each one is given below:

* include/bmc\_map.h – Contains all the pin mappings for the Stellaris microcontroller. The mappings will need to be changed to the correct pins for the port.
* source/bmc\_clk\_gen.c – Contains the values of the various CDC registers. These values are stored in arrays. The first CDC has 2 arrays; one for normal operation and one for an external 10 MHz clock. If new values are needed for the registers, or the number of CDCs has changed, this file will need to be altered.

For K2E first CDC has one array and second has two arrays. One is for secondary reference clock and other is for Primary reference clock source.

For K2L, both the CDCM has 3 arrays for each. One is for secondary reference clock and other two are for Primaries.

* source/\*\_local.c – These contain arrays of structures that represent hardware peripherals, they are:
  + gpio\_local – Defines each of the gpio ports and expanders.
  + i2c\_local – Defines devices connected to the two i2c ports.
  + spi\_local – Defines all devices connected to the spi ports (including the GPIO expanders (FPGA Expanders in case of K2L)).
  + soc\_local – Defines the SoC’s of the system.