1 Introduction

This document introduces an understanding of In System Programming (ISP) of the TMS470 FLASH devices. The FLASH API Modules are compiled on the IAR 4.30a ARM C compiler. They are tested for correct FLASH manipulation. It is recommended to use the IAR compiled versions with the IAR workbench. When using a different compiler the sequence of the API Modules must be verified. If a compiler optimizes an operation it may not correctly perform the FLASH Operation (Compact, Erase, or Program).

Note: Do not overwrite the FLASH Protection Keys and the Memory Security Module (MSM) Keys. If the keys are rewritten and the data is not known, the part cannot be reprogrammed or accessed in the case of the MSM.

Note: This document is only a start to understand the FLASH API modules. Please look to the Application Notes for a complete understanding of these routines.

1.1 Flash Programming Overview

The TMS470 devices require a specific sequence to correctly erase and program the FLASH memory. Incorrectly programming the FLASH may result in unreliable operation or worst-case cause FLASH cell depletion. Texas Instruments provides the F05 TI FLASH API modules that are follow the correct sequence and are test proven the correct method. The FLASH API Modules simplify FLASH operations and ensure correct operation.

The TI F05 FLASH API routines are a library of routines which when called with the proper parameters in the proper sequence will erase, program or verify flash memory on the TMS470 family of Texas Instruments microcontrollers. These routines must be run in a privileged mode (mode other than user) to allow access to the flash control registers and to the interrupt disable bits. Most of the routines enter Flash Configuration Mode and therefore the system clock should not exceed 24MHz. The FLASH API routines are described in the TMS470 Family - F05 Flash Module Software Peripheral Driver User's Specification SPNU257 document.

The compiled routines were verified on the IAR 4.30a ARM C compiler.

1.2 FLASH Module object compile

The FLASH API modules compiled in to a user-defined segment, the API_SEGMENT. This segment allows the API routines to run from FLASH or RAM depending on the application. The linker command file allocates the FLASH and RAM space. The files compiled and given as object files with the FLASH API download. The files include blank.r79, compact.r79, erase.r79, fver.r79, feed_dog.r79, init_state.r79, match_key_B.r79, prog.r79, psa.r79, psa_calc.r79, sector_select.r79, track_pulses.r79, verify.r79, verify_psa.r79. See below for an example of the segment designation and see the ISP Application Notes for examples.

```
#pragma location="API_SEGMENT"
void FLASH API Routine (void)
 {
...
...
...
 }
```