

Reset and Interrupt Handling (Cont.)

The second type of interrupts will continue to respond as long as the interrupt condition persists. This type of interrupt does not require an interrupt flag bit. If the interrupt condition disappears before the interrupt is enabled, the interrupt will not be triggered.

When the LGT8XM CPU exits from the interrupt service routine, the execution flow is returned to the main program. After executing one more instruction in the main program, it can respond to other pending interrupt requests.

It should be noted that the System Status Register (SREG) is not automatically saved after entering or returning from an interrupt routine. Managing the SREG must be handled in software.

The CLI command clears the Global Interrupt Flag (I) in SREG (Status Register). When interrupts are disabled using the CLI instruction, interrupts will be immediately disabled. Interrupts that occur after the CLI instruction will not get a response, nor will interrupts that occur simultaneously with the CLI instruction.

Interrupt Response Time

Any LGT8XM enabled interrupt will respond within 4 CPU clock cycles. After these CPU clock cycles, the interrupt enters the actual interrupt service routine. In these four clocks, the Program Counter value from before the interrupt is Pushed onto the Stack, and the system execution flow Jumps to the interrupt vector address and corresponding interrupt service routine. If an interrupt occurs during execution of a multi-cycle instruction, this instruction is completed before the interrupt is served. If the interrupt occurs while the system is in sleep mode (SLEEP), the interrupt response requires an additional 4 clock cycles. This increase comes in addition to the start-up time from the selected sleep mode. For a detailed description of the sleep mode, please refer to the relevant chapter on power management.

It takes 2 clock cycles to return from the interrupt service routine. During these 2 clock cycles, the Program Counter (two bytes) is Popped back from the Stack, the Stack Pointer is incremented by two, and the I-bit in SREG is automatically set.