XHSC 小华半导体
XIAOHUA SEMICONDUCTOR

32-bit Microcontrollers

HC32F460_A460_F451_F452 Series Cold Start Judgment Method

Application Notes

Rev1.0　September 2023

Applicable objects

Product Series	Product Model	Product Series	Product Model
HC32F460	hc32f460jcta hc32f460jeta hc32f460jeua hc32f460kcta hc32f460keta hc32f460keua hc32f460pctb hc32f460pehb HC32F460PETB	**HC32A460**	HC32A460PETB
HC32F451	hc32f451feub hc32f451jeub hc32f451ketb HC32F451PETB	**HC32F452**	hc32f452feub hc32f452jeub hc32f452ketb HC32F452PETB

declaration　　Ming Dynasty (1368-1644)

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1 summarize

MCU chip startup can be categorized into cold startup and hot startup.

Cold start, also known as power-on start, is generally the first startup of the chip after the power is turned on. Cold start requires the completion of operations such as power-up, self-test, and hardware initialization.

A hot start is when a chip restarts the system during operation, either as a prepared hardware reset, a software reset, or an unanticipated software reset triggered by a system protection mechanism.

In practical applications, it is necessary to determine whether the startup mode of the MCU is a hot start or a cold start to decide whether some peripherals need to be initialized. In this article, we will introduce the method of determining the cold start mode of HC32F460, HC32A460, HC32F451, HC32F452 series MCUs.

2 Cold Start Judgment Method

HC32F460, HC32A460, HC32F451, HC32F452 series MCUs, the power-on reset flag bit (PORF) is triggered by the NRST

If this happens, it is not possible to judge the startup mode of MCU by PORF, which should be combined with the DBGC_MCUSTPCTL register in the debug controller module. It is necessary to combine with the DBGC_MCUSTPCTL register in the debug controller module to determine the startup mode of the MCU. bit16 in the DBGC_MCUSTPCTL register is reserved bit, which can be reset by writing 1 to reset, writing 0 to clear zero, and reset by power-on reset and power-off reset to clear zero. Write 1 to DBGC_MCUSTPCTL.bit16, and after power on again, if DBGC_MCUSTPCTL.bit16 == 0U and RMU_RSTF0.PDRF is 0, then the MCU is in cold start reset mode.

The procedure for determining the MCU cold start mode is shown in the following figure.
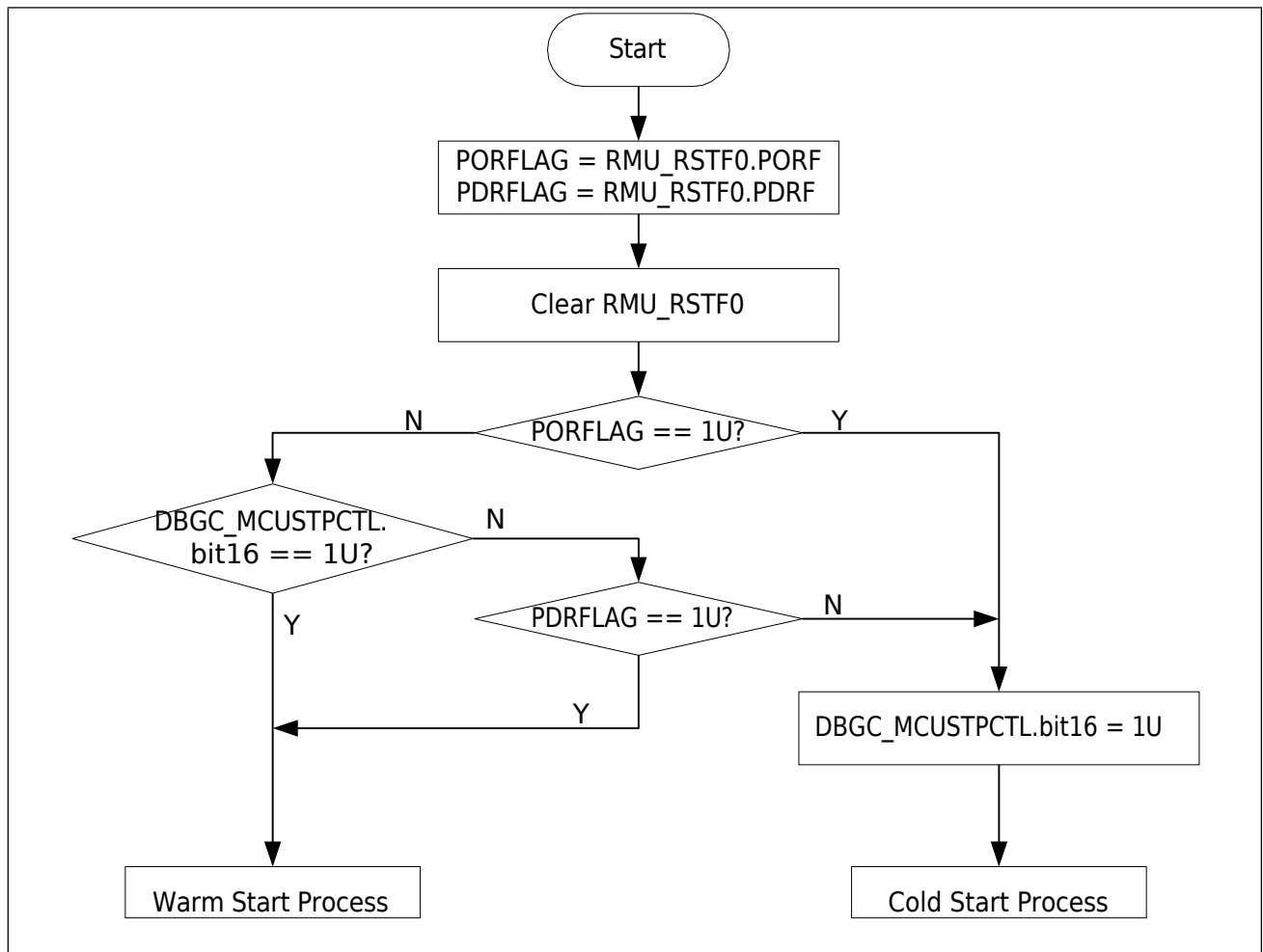

Figure 1-1 Cold Start Judgment Flowchart

3 reference code

The reference code for HC32F460, HC32A460, HC32F451, HC32F452 series MCU cold start judgment method is as follows:

```
uint32_t u32PorFlag;
uint32_t u32PdrFlag.

u32PorFlag = READ_REG32(bCM_RMU->RSTF0_b.PORF);
u32PdrFlag = READ_REG32(bCM_RMU->RSTF0_b.PDRF ).

/* Clear reset flag */
RMU_ClearStatus();

if (1UL == u32PorFlag) {
    SET_REG32_BIT(CM_DBGC->MCUSTPCTL, (1UL << 16U)).
    /* Cold start process */
} else if (1UL == ((CM_DBGC->MCUSTPCTL & 0x00010000UL) >> 16U)) {
    /* Warm start process */
} else if (1UL == u32PdrFlag) {
    /* Warm start process */
} else {
    SET_REG32_BIT(CM_DBGC->MCUSTPCTL, (1UL << 16U)).
    /* Cold start process */
}
```

4 summarize

This document mainly introduces the cold start judgment method of HC32F460, HC32A460, HC32F451, HC32F452 series MCUs, which provides a reference for customers' practical applications.

Version Revision Record

version number	revision date	revision
Rev1.0	2023/09/08	First Edition Release.