Application Note

HSI manual calibration application note

Introduction

This document describes the HSI manual calibration method, facilitating users to calibrate the frequency of HSI according to the actual requirements during regular operation.

This document is only applicable to Nsing MCU products. Currently, the supported product series include N32G4FR series, N32G45x series, N32WB452 series.

NSING Technologies Pte. Ltd.
Add: NSING, Teletech Park #02-28, 20 Science Park Road, Singapore 117674
Tel: +65 69268090
Email: sales@nsing.com.sg

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NSING Technologies Pte. Ltd.
Add: NSING, Teletech Park #02-28, 20 Science Park Road,
Singapore 117674
Tel: +65 69268090
Email: sales@nsing.com.sg

1 Overview

User calibration for HSI through the API allows for coarse trimming with a step of about 400kHz and fine trimming with a step of about 28kHz.

2 Operation Method

2.1 Function Description

Function prototype: void HSI_GetOptTrim(uint8_t *opt_value,uint8_t *trim_value);
The current HSI opt_value and trim_value are available through the function.
Parameter description: opt_value: coarse tuning value
trim_value: fine tuning value
Return: void

Function Prototype: uint8_t HSI_SetOptTrim(uint8_t opt_type, uint8_t opt_val, uint8_t trim_type, uint8_t trim_val);
This function calibrates the HSI by adjusting coarse and fine trim values.
Parameter description:
opt_type: 0: frequency increase (+); 1: frequency decrease (-);
opt_val: the required increment or decrement value (increase or decrease according to the opt_val. The calibration will fail if the calibration value exceeds the required)

trim_type: frequency increase (+); 1: frequency decrease (-);
trim_val: the required increment or decrement value (increase or decrease according to the trim_val. The calibration will fail if the calibration value exceeds the required)

Return: 0: succeed; 1: opt_type/trim_type wrong; 2: opt/trim value exceeds range

Note: opt/trim value range: 0x0~0xf.

2.2 Application Demo

This example takes the N32G45x series MCU as an example to demonstrate how to calibrate the HSI frequency. You can visualize the frequency changes on oscilloscope while the HSI frequency is being measured. For detailed examples, please refer to the application note "RCC_HSI_Calibration".

NSING Technologies Pte. Ltd.
Add: NSING, Teletech Park #02-28, 20 Science Park Road, Singapore 117674
Tel: +65 69268090
Email: sales@nsing.com.sg

3 Version History

Version	Date	Changes
V1.0.0	2022.08.31	Initial version

NSING Technologies Pte. Ltd.
Add: NSING, Teletech Park #02-28, 20 Science Park Road,
Singapore 117674
Tel: +65 69268090
Email: sales@nsing.com.sg

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