

## Application Note

### DNF

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### 1. Preface

This application note describes sample software for the noise reduction function by DNF.  
This document helps the user check operation of a product under development and develop its program.

### 2. Technical Term

| Term/Abbreviation | Definition                        |
|-------------------|-----------------------------------|
| ADC               | Analog-to-Digital Converter       |
| BSP               | Board Support Package             |
| DNF               | Digital Noise Filter Circuit      |
| Timer             | T32A : 32-bit Timer Event Counter |

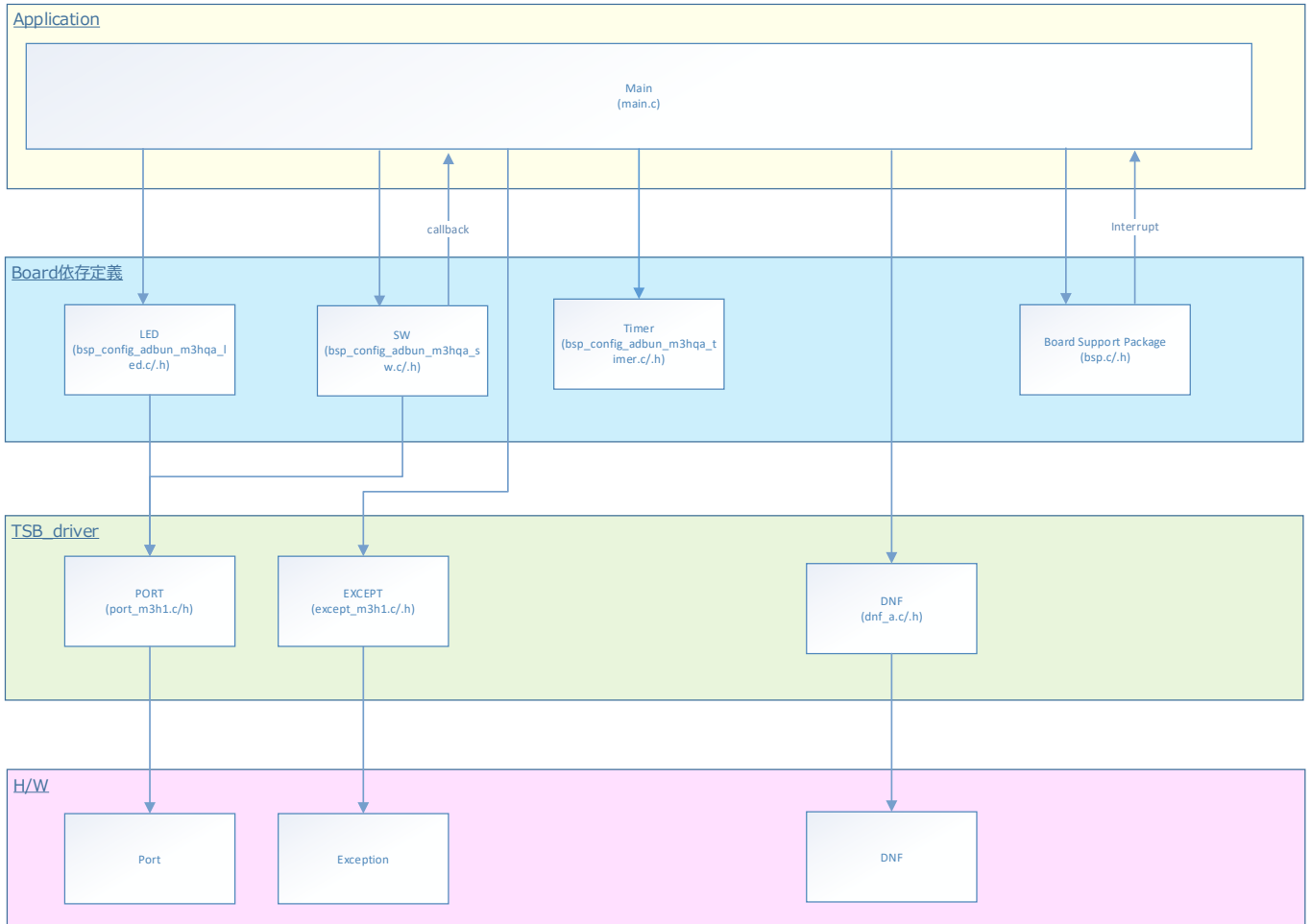
### 3. Reference Document

| Document                           | Notes  |
|------------------------------------|--|
| Data sheet                         | Refer to the data sheet of MCU to be used.           |
| Reference manual                   | Refer to the reference manual of each IP to be used. |
| Application note<br>MCU User Guide | Refer to the MCU user manual to be used.             |
| Driver API list                    | Refer to the MCU Doc folder to be used.              |

## 4. Target Sample Program

| Sample Program | Outline                        |
|----------------|--------------------------------|
| DNF            | Sample program of DNF function |

## 5. Configuration Diagram



## 6. Sample Program : DNF

This is sample software that displays the external signal interrupt detection by pressing Push-Switch by switching the LED lighting.

### 6.1. Outlines of Operation

BSP\_LED\_1 is controlled when BSP\_PSW\_4 is pressed.

If you press BSP\_PSW\_4 when BSP\_LED\_1 is off, BSP\_LED\_1 will turn on.

If BSP\_PSW\_4 is pressed while BSP\_LED\_1 is on, BSP\_LED\_1 will turn off.

Detects external signal interrupts caused by pressing Push-Switch via DNF.

### 6.2. Function to Use

The functions to use are as follows.

For the Port assignment of each channel, refer to the MCU user manual.

| IP                | Channel   | Objective                           |
|-------------------|-----------|-------------------------------------|
| PORT(Push-Switch) | BSP_PSW_4 | For external interrupt signal input |
| PORT(LED)         | BSP_LED_1 | -                                   |

### 6.3. Interrupt to Use

| Interrupt      | Outlines  |
|----------------|---|
| INT17_18_32_33 | External interrupt. External interrupt when PSW is pressed              |
| INTT32A00A     | T32A Timer A<br>Timer counter increment every 1ms for Switch processing |

### 6.4. Configuration

“main.c” configuration setting.

| Configuration      | Current Value | Description       |
|--------------------|---------------|-------------------|
| Noise filter clock | 2             | fc divider (fc/2) |

### 6.5. Example of Terminal Emulator Output

Nothing.

## 7. DNF Driver

### 7.1. List of driver

The DNF is controlled by using the following interface.

For an example of use, refer to the source code.

| Driver              | Control Outlines                                 |
|---------------------|--|
| REG_DNFCKCR_set     | Set the noise filter clock selection value       |
| REG_DNFCKCR_get     | Get the noise filter clock selection value       |
| REG_DNFENCR_enable  | Enable interrupt noise filter control            |
| REG_DNFENCR_disable | Disable interrupt noise filter control           |
| REG_DNFENCR_get     | Get interrupt noise filter control setting value |

### 7.2. Details

See “3. Reference Documents” for more information.

## 8. Revision History

| Revision | Date       | Description   |
|----------|------------|---------------|
| 1.0      | 2022-04-08 | First release |

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