Component Design Document

For

<TIMER\_0>

**Table of Contents**

Revision History 1

*1. Introduction* 2

1.1 Objective 2

1.2 Context Diagram 2

2. *External Interface* 2

2.1 STD\_TYPES.h

2.2 BIT\_MATH.h 2

3. *Static Design* 2

3.1 Files 2

3.2 Types 3

3.3 Symbol Define <#define> 3

3.4 Const 3

3.5 Interface (Services) 3

*4.* *Dynamic Design* 4

4.1 Mode Management 4

4.2 Sequence Diagram 4

*5.* *Shared Resources* 4

5.1 Analysis 4

5.2 Protection 4

6. *Configuration Parameters* 4

6.1 Pre-compile time 4

6.2 Link time 5

6.3 Post-build 5

*7.* *Configuration Constrains* 5

*8.* *Integration Constrains* 5

*9.* *History* 5

Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Date** | **Reason For Changes** | **Version** |
| Ahmed El-Gawahergy | 15th April 2018 | Create the template | 1.0 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# *1. Introduction*

## Objective

The target of this component is to generate system tick, general clock to system which will be used by operating system to manage the task and run them at desired time using this tick

## Context Diagram

TIMER\_0\_Init\_And\_Run()

**TIMER\_0**

# *External Interface*

## STD\_TYPES.h

### Types

|  |  |
| --- | --- |
| Data Type | Description |
| unsigned char u8 | This is unsigned integer it’s range from 0 up to 255 |

## BIT\_MATH.h

### Symbol <#defines>

SET\_BIT(var,bitno) : this macro is used to set(set it to one) certain bit it takes the u8 variable which include desired bit and number of bit that we want to set.

CLR\_BIT(var,bitno): this macro is used to clear (set it to zero)certain bit it takes the u8 variable which include desired bit and number of bit that we want to set

# *Static Design*

## Files

### Used Files

|  |  |
| --- | --- |
| FILE NAME | Description |
| TimersH.c | This file contains APIs definition and addresses of used registers and |
| TimersH.h | This file contains APIs prototype and component configurations |

### Files Inclusion

Timer\_H.h

Timer\_H.c

BIT\_MATH.h

STD\_TYPES.h

## Symbol Define <#define>

|  |  |
| --- | --- |
| Req ID | TIM\_001 |
| Covers | HLD\_004 |
| Name | WGM00 - WGM01 |
| Type | Unsigned integer |
| Range | 0-255 |
| Description | Represent bits of TCCRO register these bits used to choose timer mode |

|  |  |
| --- | --- |
| Req ID | TIM \_001 |
| Covers | HLD\_004 |
| Name | TCCR0- TCNT0- OCR0- TIMSK- TIFR |
| Type | Unsigned integer |
| Range | 0-255 |
| Description | This symbols are for timer\_0 registers addresses |

|  |  |
| --- | --- |
| Req ID | TIM \_002 |
| Covers | HLD\_004 |
| Name | CS02-CS01-CS00 |
| Type | Unsigned integer |
| Range | 0-255 |
| Description | Represent bits of TCCRO register these bits used to choose prescaler. |

|  |  |
| --- | --- |
| Req ID | TIM \_003 |
| Covers | HLD\_004 |
| Name | OCF0 |
| Type | Unsigned integer |
| Range | 0-255 |
| Description | Represent bit in TIFR register .this bit used as flag that indicate the matching happened |

|  |  |
| --- | --- |
| Req ID | TIM \_004 |
| Covers | HLD\_004 |
| Name | OCIE0 |
| Type | Unsigned integer |
| Range | 0-255 |
| Description | Represent bit of TIMSK register used to enable compare match interrupt |

|  |  |
| --- | --- |
| Req ID | TIM \_005 |
| Covers | HLD\_004 |
| Name | Intial\_Value |
| Type | Unsigned integer |
| Range | 0-255 |
| Description | U8 value to set TCNT0 with initial value |

|  |  |
| --- | --- |
| Req ID | TIM \_006 |
| Covers | HLD\_004 |
| Name | Compare\_Value |
| Type | Unsigned integer |
| Range | 0-255 |
| Description | U8 value stored in OCR register |

## Interface (Services)

|  |  |  |  |
| --- | --- | --- | --- |
| Req ID | TIM \_007 | | |
| Covers | HLD\_004 | | |
| Name/protoTypes | void TIMER\_0\_Init\_And\_Run (void) | | |
| Service ID | 0x00 | | |
| Re-entrant / Non re- entrant | Non re-entrant | | |
| Synchronous/Asynchronous | Synchronous | | |
| Return Value | | ---------- | ---------- |
| Input parameter | | ---------- | ---------- |
| Output parameter | | ---------- | ---------- |
| Input /Output Parameter | | ---------- | ---------- |

# *Configuration Parameters*

## Pre-compile time

### #define TCCR0 \*((volatile u8\*)0x53)

### #define TCNT0 \*((volatile u8\*)0x52)

### #define OCR0 \*((volatile u8\*)0x5C)

### #define TIMSK \*((volatile u8\*)0x59)

### #define TIFR \*((volatile u8\*)0x58)

### #define FOCO 7

### #define WGM00 6

### #define COM01 5

### #define COM00 4

### #define WGM01 3

### #define CS02 2

### #define CS01 1

### #define CS00 0

### #define OCF0 1

### #define OCIE0 1

### #define Intial\_Value 0

### #define Compare\_Value 124

## Link time

### < el variable el const ely bn3ml beh configuration zy fel dio>

# *History*

<The changes happened in the documents>

**Appendix A: Glossary**