Document Title	Specification of TIMER0 Driver
Document Owner	METAWARE
Document Version	1.0.0

1 Introduction

This Software Specification (SWS) provides an overview of the functionalities, APIs and configurations of AVR ATmega32 TIMER0 driver

2 Requirements

- AVR ATmega32 microcontroller
- AVR-GCC compiler

3 Functional Specification

- The AVR ATmega32 TIMER0 driver provides general-purpose services like starting and stopping timers for a specific time either in normal or CTC modes with the option to either toggle, set or clear the pin to which its compare match channel is connected.

- The driver also provides synchronous services achieved by the general-purpose normal mode such as the busy wait function that blocks the microprocessor for a specific time and this could be achieved by calling of:

  TIMER0_u8SetBusyWait_ms

  And passing the desired time required to block the microprocessor to it in ms

- It also provides specific-purpose services like generating Pulse Width Modulation (PWM) signals on the output compare match channel pin of TIMER0 with desired frequency and duty cycle values as this could be possible by calling of:

  TIMER0_u8StartPWM

  And passing desired duty cycle to it.

4 API Description

4.1 Imported types

Module	Header File	Imported Type
Commons	std_types.h	uint8
	std_sypes.h	sint8
	std_types.h	uint16
	std_types.h	sint16
	std_types.h	uint32
	std_types.h	sint32
	std_types.h	uint64
	std_types.h	sint64
	std_types.h	float32
	std_types.h	float64
	std_types.h	boolean

4.2 Function definitions

This is a list of functions provided for upper layers

4.2.1 TIMER0_vidInit

Service Name	TIMER0_vidInit
Syntax	void TIMER0_vidInit(void)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	None
Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	Initialize Timer0 based on selected configurations from config file
Available via	TIMER0_Interface.h

4.2.2 TIMER0_vidStart

Service Name	TIMER0_vidStart
Syntax	void TIMER0_vidStart(void)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	None
Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	Start Timer0 by setting Timer0 prescaler selected from config file
Available via	TIMER0_Interface.h

4.2.3 TIMER0_vidStop

Service Name	TIMER0_vidStop
Syntax	void TIMER0_vidStop(void)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	None
Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	Stop Timer0
Available via	TIMER0_Interface.h

4.2.4 TIMER0_vidSetPreloadValue

Service Name	TIMER0_vidSetPreloadValue
Syntax	void TIMER0_vidSetPreloadValue(uint8 Copy_u8PreloadValue)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	Copy_u8PreloadValue
Parameters (inout)	None

Parameters (out)	None
Return value	None
Description	Set preload value for Timer0
Available via	TIMER0_Interface.h

4.2.5 TIMER0_vidSetCompareMatchValue

Service Name	TIMER0_vidSetCompareMatchValue
Syntax	void TIMER0_vidSetCompareMatchValue(uint8 Copy_u8CompareMatchValue)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	Copy_u8CompareMatchValue
Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	Set compare match value for Timer0
Available via	TIMER0_Interface.h

4.2.6 TIMER0_u8ReadTimerValue

Service Name	TIMER0_u8ReadTimerValue
Syntax	uint8 TIMER0_u8ReadTimerValue(void)
Sync/Async	Synchronous
Reentrancy	Reentrant
Parameters (in)	None
Parameters (inout)	None
Parameters (out)	None
Return value	uint8
Description	Read Timer/Counter0 Value
Available via	TIMER0_Interface.h

4.2.7 TIMER0_vidEnableOverflowInterrupt

Service Name	TIMER0_vidEnableOverflowInterrupt
Syntax	void TIMER0_vidEnableOverflowInterrupt(void)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	None
Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	Enable Timer0 Overflow Interrupt
Available via	TIMER0_Interface.h

4.2.8 TIMER0_vidDisableOverflowInterrupt

Service Name	TIMER0_vidDisableOverflowInterrupt
Syntax	void TIMER0_vidDisableOverflowInterrupt(void)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	None
Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	Disable Timer0 Overflow Interrupt
Available via	TIMER0_Interface.h

4.2.9 TIMER0_vidEnableCompareMatchInterrupt

Service Name	TIMER0_vidEnableCompareMatchInterrupt
Syntax	void TIMER0_vidEnableCompareMatchInterrupt (void)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	None
Parameters (inout)	None

Parameters (out)	None
Return value	None
Description	Enable Timer0 Compare Match Interrupt
Available via	TIMER0_Interface.h

4.2.10 TIMER0_vidDisableCompareMatchInterrupt

Service Name	TIMER0_vidDisableCompareMatchInterrupt
Syntax	void TIMER0_vidDisableCompareMatchInterrupt (void)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	None
Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	Disable Timer0 Compare Match Interrupt
Available via	TIMER0_Interface.h

4.2.11 TIMER0_u8SetOverflowCallback

Service Name	TIMER0_u8SetOverflowCallback
Syntax	uint8 TIMER0_u8SetOverflowCallback(void(*Copy_pvTIMER0OverflowFunc)(void))
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	void(*Copy_pvTIMER0OverflowFunc)(void)
Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	Register application callback function that will be called immediately once Timer0 overflow ISR is triggered
Available via	TIMER0_Interface.h

4.2.12 TIMER0_u8SetCompareMatchCallback

Service Name	TIMER0_u8SetCompareMatchCallback
Syntax	uint8 TIMER0_u8SetCompareMatchCallback(void(*Copy_pvTIMER0CompareMatchFunc)(void))
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	void(*Copy_pvTIMER0CompareMatchFunc)(void)
Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	Register application callback function that will be called immediately once Timer0 compare match ISR is triggered
Available via	TIMER0_Interface.h

4.2.13 TIMER0_u8SetBusyWait_ms

Service Name	TIMER0_u8SetBusyWait_ms
Syntax	uint8 TIMER0_u8SetBusyWait_ms(uint32 Copy_u32DelayTime_ms)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	uint32 Copy_u32DelayTime_ms
Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	A function used to block the processor for some time in milli-second based on passed value of time in milli-second
Available via	TIMER0_Interface.h

4.2.14 TIMER0_u8StartPWM

Service Name	TIMER0_u8StartPWM
Syntax	uint8 TIMER0_u8StartPWM(uint8 Copy_u8DutyCyclePercentage)
Sync/Async	Synchronous
Reentrancy	Non-Reentrant
Parameters (in)	uint8 Copy_u8DutyCyclePercentage

Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	Start to generate PWM from Timer0
Available via	TIMER0_Interface.h