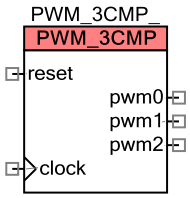
Single Counter PWM with Three Compare Outputs

TriCompPWM v1.00

Features



- Three compare outputs
- Intended for RGB LED Control
- Efficient resource usage

General Description

This Component implements a PWM with 3 compare outputs in a single UDB. See the Functional Description section for a Timing Diagram.

Input/Output Connections

Pin	Type	Function
resetHW	Input	reset
clock	Input	twice the operating frequency of the PWM
pwm0	Output	pwm corresponding to 1st compare value
pwm1	Output	pwm corresponding to 2nd compare value
pwm2	Output	pwm corresponding to 3rd compare value

Component Parameters

Parameter Name	Default Value	Description
EnableReset	False	Enables an optional reset terminal

Application Programming Interface

Application Programming Interface (API) routines allow you to configure the component using software. The following table lists and describes the interface to each function. The subsequent sections cover each function in more detail.

By default, PSoC Creator assigns the instance name “PWM_3CMP_1” to the first instance of this component in a given design. You can the rename the instance to any unique value that follows the syntactic rules for identifiers. The instance name becomes the prefix of every global function name, variable, and constant symbol. For readability, the instance name used in the following table is “PWM_3CMP.”

Function	Description
PWM_3CMP_Start()	Enable Component and set up initial configuration
PWM_3CMP_ReadPeriod()	Read period value for PWM1
PWM_3CMP_WritePeriod()	Write period value for PWM1
PWM_3CMP_ReadComparex()	Read compare value for PWMx (x = 0, 1, 2)
PWM_3CMP_WriteComparex()	Write compare value for PWMx (x = 0, 1, 2)
PWM_3CMP_WriteIntensityx()	Write intensity value for PWMx (x = 0, 1, 2)
PWM_3CMP_Write_RGB()	Write 24-bit RGB value to pwm0, pwm1, pwm2 respectively
PWM_3CMP_ReadCounter0()	Read current counter value
PWM_3CMP_WriteCounter0()	Write current counter value

void PWM_3CMP_Start(void)

Description: Configures/Initializes the PWM, sets up its initial period

Parameters: None

Return Value: None

Side Effects: None

void PWM_3CMP_Write_RGB(uint32 color)

Description: Function to simplify writing an RGB value to the PWM. The 32-bit color is encoded as 0x00RRGGBB, where R is pwm0, G is pwm1 and B is pwm2

Parameters: 32-bit color encoded as 0x00RRGGBB, where R is pwm0, G is pwm1 and B is pwm2

Return Value: None

Side Effects: None

All the rest of the ‘functions’ are implemented as macros.

void PWM_3CMP_WriteIntensityx(uint8 intensity)

Description: Meant for ease of use with LEDs – larger value implies more brightness (x = 0,1, or 2)

Parameters: uint8 intensity value

Return Value: None

Side Effects: None

uint16 PWM_3CMP_ReadPeriod (void)

Description: Reads the period value of counter

Parameters: None

Return Value: uint16 period value

Side Effects: None

void PWM_3CMP_WritePeriod (uint16 period)

Description: Writes the period value of counter

Parameters: uint16 period value

Return Value: None

Side Effects: None

uint16 PWM_3CMP_ReadComparex(void)

Description: Reads the compare value of pwm x (x = 0, 1, or 2)

Parameters: None

Return Value: uint16 compare value

Side Effects: None

void PWM_3CMP_WriteComparex(uint16 compare)

Description: Writes the compare value of pwm x (x = 0, 1, or 2)

Parameters: uint16 compare value to be written

Return Value: None

Side Effects: None

uint16 PWM_3CMP_ReadCounter0(void)

Description: Reads the counter value

Parameters: None

Return Value: uint16 counter value

Side Effects: None

void PWM_3CMP_WriteCounter0(uint16 value)

Description: Writes the counter value

Parameters: uint16 counter value to be written

Return Value: None

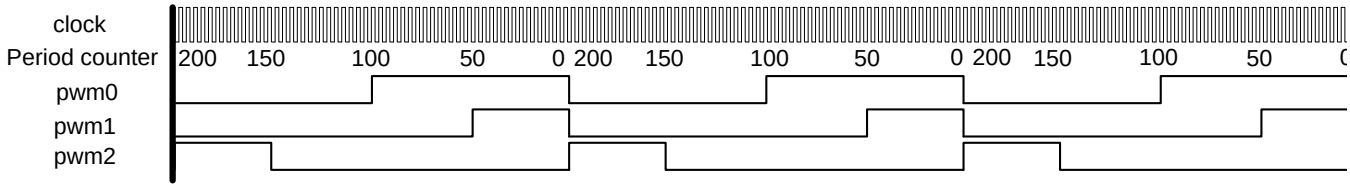
Side Effects: None

Functional Description

The PWM_3CMP implements a single period-counter, triple compare 8-bit PWM in a single UDB.

Figure 1 shows the behavior of the PWM_3CMP Component with a period of 200 and compare0, compare 1, compare2 as 100, 50 and 50, respectively.

Figure 1. Custom PWM_3CMP Component Behavior



Notable Facts

- The PWM_3CMP is implemented as a down-counter with a less-than compare function (i.e. only when the period counter is less than the compare value is the PWM output asserted)
- The PWM_3CMP period counter updates at half the frequency of the ‘clock’ input (due to the implementation)

Resources

Resource Type				
Datapath Cells	**Macrocells**	**P Terms**	**Status Cells**	**Control Cells**
1	3	7	0	0

API Memory Usage

Minimal. TBD

Support

PSoC Creator Community Components are developed and supported by the Cypress Developer Community. Go to www.cypress.com/CommunityComponents to discuss this and other Community Components.