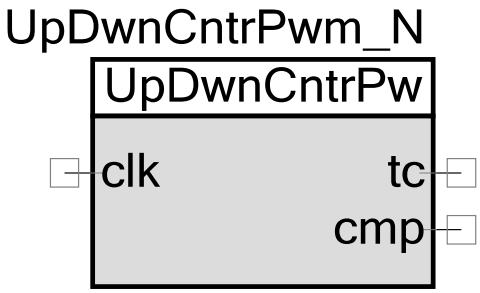
8-Bit Up/Down Counter and PWM (UpDwnCntrPwm)

1.0

Features

- Counts Up or Down
- Terminal Count Output
- Compare (PWM) Output.
- Count direction may be changed at runtime.



General Description

The UpDwnCntrPwm is a simple 8-bit counter that is capable of both up and down operation. It can also be used as a single output PWM. This component was created to help new users understand out to develop simple components using UDB Datapaths.

Input/Output Connections

This section describes the various input and output connections.

clk – Input

Clock input to run the counter.

tc – Output

This signal goes high when the internal counter equals zero when counting down, and goes high when the counter reaches the period when counting up. .

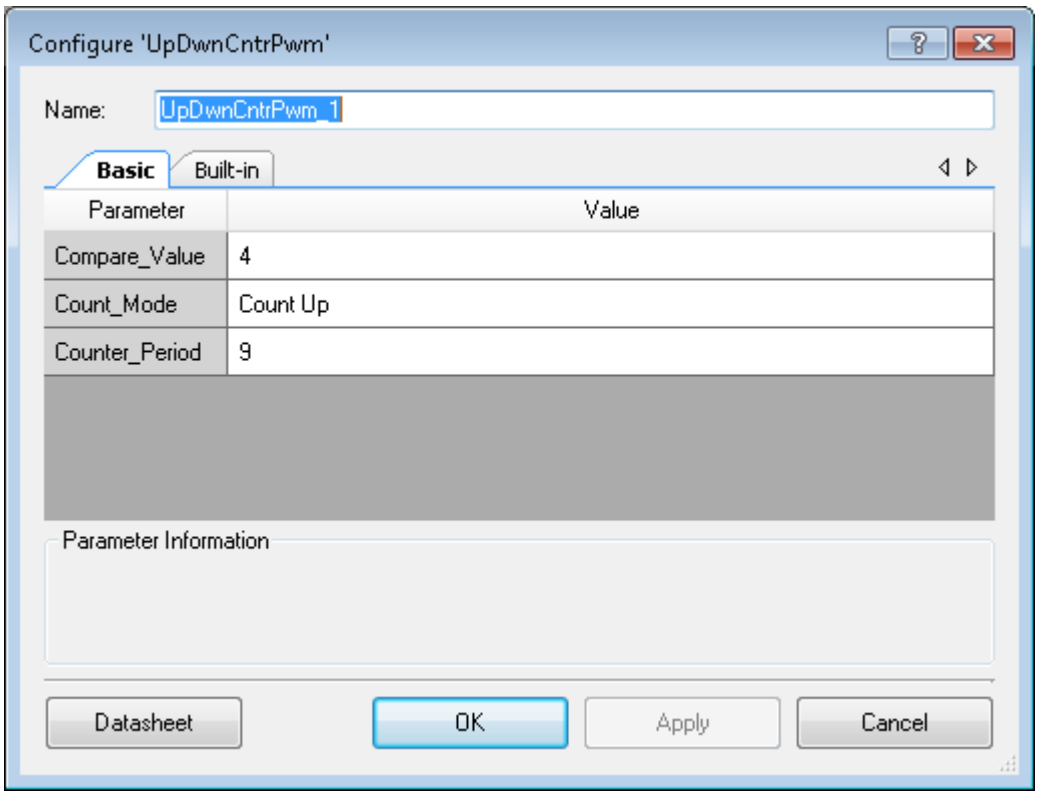
cmp – Output

The Compare (cmp) goes high when the counter is less than the compare. This output is used as a PWM output.

Parameters and Setup

Drag a UpDwnCntrPwm component onto your design and double-click it to open the Configure dialog.

Figure 1 Configure UpDwnCntrPwm Dialog



The UpDwnCntrPwm component provides the following parameters.

Compare_Value

This parameter determines what value will be used to compare to the internal counter, to generate the PWM output “cmp”. The valid range for this parameter is 1 to 255.

Count_Mode (Up or Down)

This parameter selects the direction of the counter, up or down.

Counter_Period

This parameter determines the length of the counter period as a number of clocks+1. If a period of 120 clocks is desired, enter 119. The valid range for this parameter is 1 to 255.

Resources

PSoC UDB resources used.

Resource	Amount Used	Percent PSoC Resource Used
Macrocells	1	0.52%
Unique Product Terms	2	0.52%
Datapaths	1	4.17%
Control Register	1	4.17%
Status Register	0	0%

Application Programming Interface

This component does not include APIs for programming but instead provides register definitions so that the user can easily set parameters during program execution time.

Sample Firmware Source Code

The following is a C language example demonstrating the basic functionality of the UpDwnCntrPwm component. This example assumes the component has been placed in a design with the default name " UpDwnCntrPwm _1."

Note If you rename your component you must also edit the example code as appropriate to match the component name you specify.

```
#include <device.h>

void main()
{
    /* Set Period to 10 clock cycles */
```

```
    UpDwnCntrPwm_1_Period_Reg = 9;

    /* Set compare value at 6 */
    UpDwnCntrPwm_1_Compare_Reg = 6;

    /* Set counter to Up mode and compare more to “<=”  */
    UpDwnCntrPwm_1_Control_Reg = UpDwnCntrPwm_1_CNTL_CNT_UP;

    for(;;)
    {
        /* Place your application code here. */
    }
}
```

Registers

The functions provided support most of the common runtime functions required for most applications. The following register references provide brief descriptions for the advanced user.

UpDwnCntrPwm_Control_Reg

Bits	7	6	5	4	3	2	1	0
Value	Not Used							Up/Down

- Up/Down: Select counter direction (0 = Down, 1 = Up).

UpDwnCntrPwm _Period_Reg

Bits	7	6	5	4	3	2	1	0
Value	Data[7:0]							

- Data[7:0]: Counter Period Register.

UpDwnCntrPwm _Compare_Reg

Bits	7	6	5	4	3	2	1	0
Value	Data[7:0]							

- Data[7:0]: Counter Compare Register.

Component Changes

This section lists the major changes in the component from the previous version.

Version	Description of Changes	Reason for Changes / Impact
1.00		Initial document

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