

Normal mode

Normal mode timer counter is the simplest mode of operation, this time waveform generation mode control bit WGM1 [3: 0] = 0 Count maximum value TOP for MAX (0xFFFF). In this mode, a counting mode for each clock count plus an increment, when the counter reaches TOP After the spill back BOTTOM Re-start accumulating. The count value TCNT1 The same count clock becomes zero set timer counter's overflow flag TOV1 . In this mode TOV1 The first sign is like 17 Count bit, but will only be set is not cleared. Overflow interrupt service routine will automatically clear TOV1 Logos, software can use it to improve the resolution of the timer counter. Normal mode is not to be considered a special case, a new count value can be written at any time.

Set up OC1x Pin data direction register as an output a comparison signal to obtain an output OC1x Waveform. when COM1x = 1

When, flips compare match OC1x Signal, in this case the frequency waveform may be calculated using the following formula:

$$f_{oc1xnormal} = f_{sys} / (2 * N * 65536)$$

among them, N It represents the prescale factor (1 , 8 , 64 , 256 or 1024).

Output Compare unit can be used to generate interrupts, but does not recommend the use of interrupts in the normal mode, it will take up too much CPU time.

CTC mode

Set up WGM1 [3: 0] = 4 or 12 When the timer counter 1 enter CTC mode. when WGM1 [3] = 0 The count maximum TOP for OCR1A , when WGM1 [3] = 1 The count maximum TOP for ICR1 . Below WGM1 [3: 0] = 4 As an example to describe CTC Mode In this mode, a counting mode for each clock count plus an increment, when the value of the counter TCNT1 equal TOP When the counter is cleared. This mode allows the user to easily control the frequency of the compare match output also simplifies the operation of the external event count.

When the counter reaches TOP Output Compare match flag OCF1 is set, an interrupt will be generated when the corresponding interrupt enable bit is set.

Can be updated in the interrupt service routine OCR1A register. In this mode OCR1A Do not use double buffering, the counter prescaler to work under no or

very low prescaler will be updated as close to the maximum value of the minimum time to be careful. If you write OCR1A The value is less than the time TCNT1

When the value of the counter will miss the compare match. Before a match occurs the next comparison, the first counter had counted to MAX And then from BOTTOM

To start counting OCR1A . And normal mode, as the count value back 0x0 The count clock in the set TOV1 Mark.

Set up OC1x Pin data direction register as an output a comparison signal to obtain an output OC1x Waveform. Frequency waveform may be calculated using the following formula:

$$f_{oc1xctc} = f_{sys} / (2 * N * (1 + OCR1A))$$

among them, N It represents the prescale factor (1 , 8 , 64 , 256 or 1024). As can be seen from the formula, when set OCR1A for 0x0 And when no prescaler, allowing for maximum frequency $f_{sys} / 2$ The output waveform.

when WGM1 [3: 0] = 12 When the WGM1 [3: 0] = 4 Similarly, just and OCR1A Related replaced ICR1 It can be.