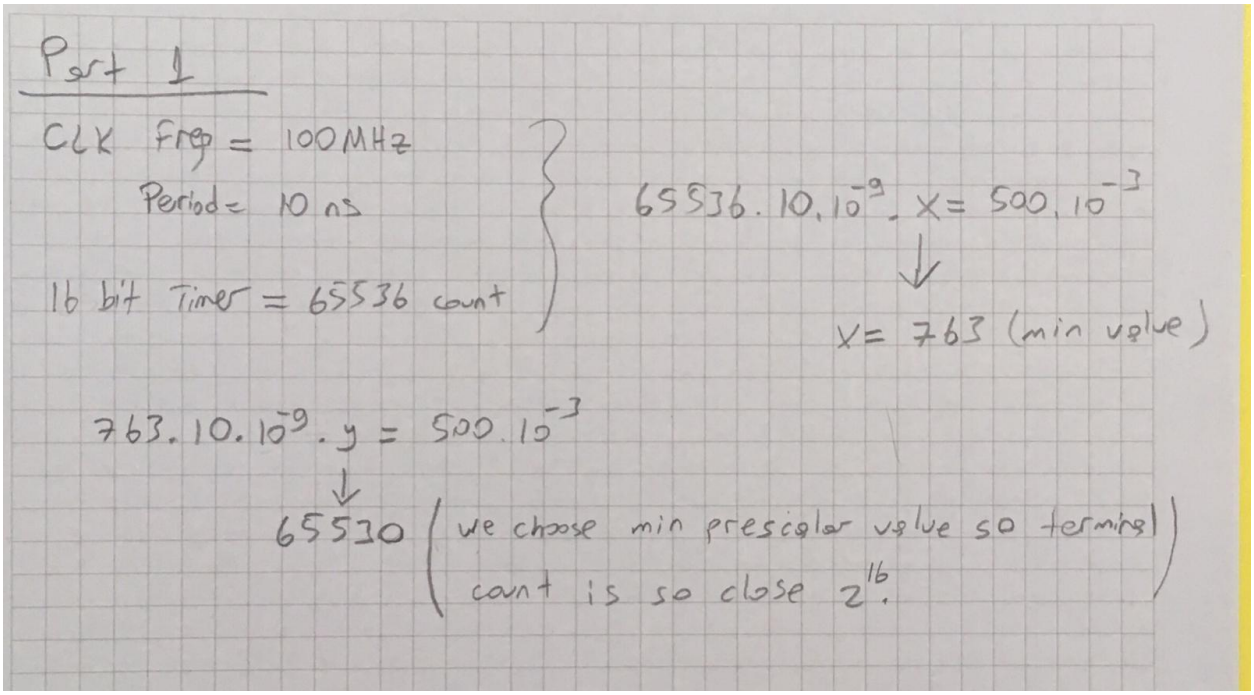
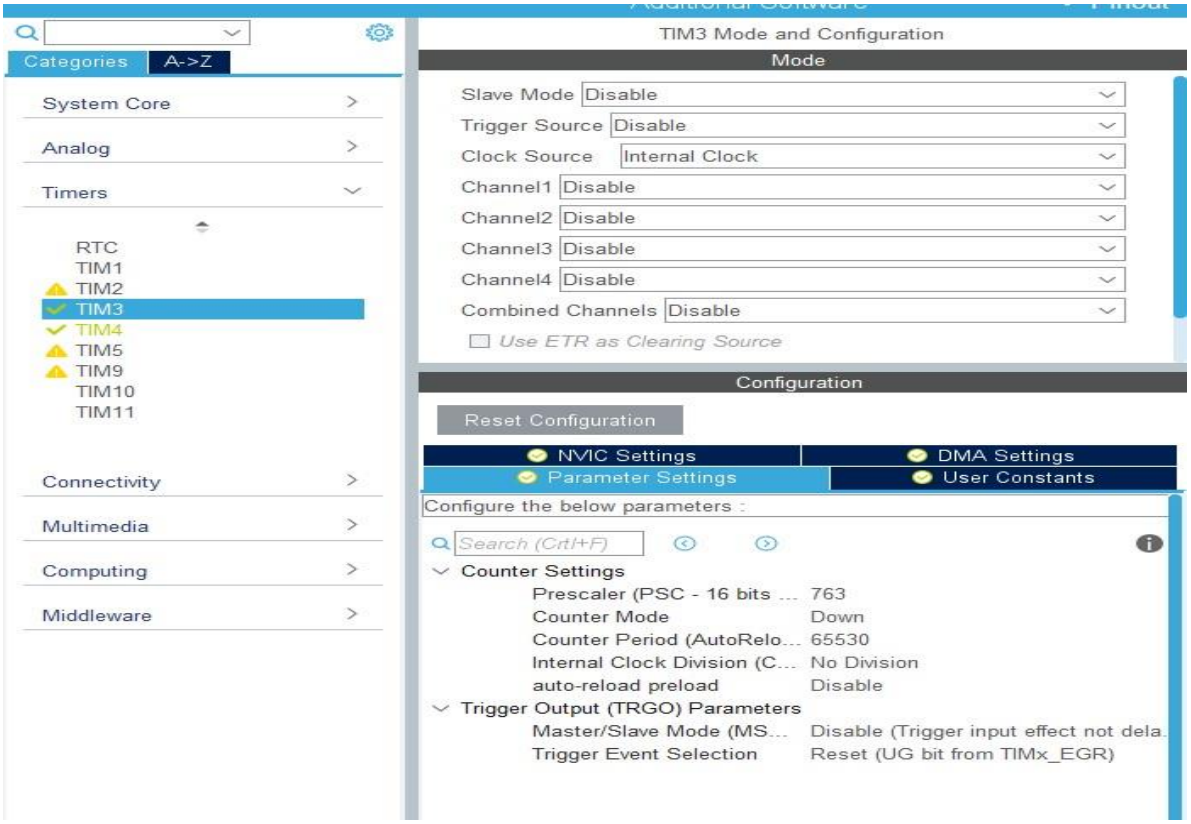
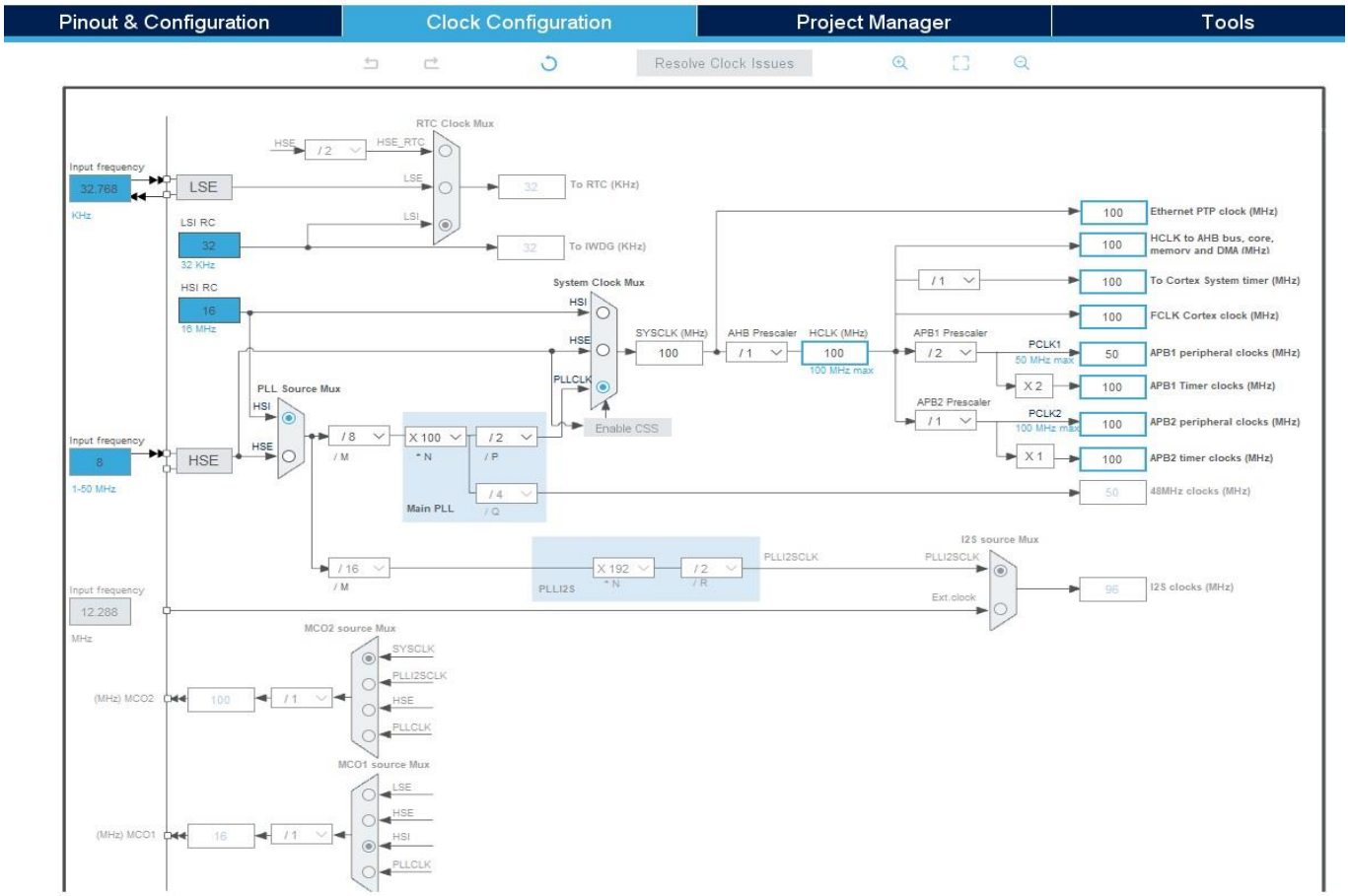
Part 1


Part 1
CLK Freq = 100MHz
Period = 10 ns
16 bit Timer = 65536 count
65536 . 10 . 10^-9 . X = 500 . 10^-3
X = 763 (min value)
763 . 10 . 10^-9 . y = 500 . 10^-3
65530
we choose min prescaler value so terminal count is so close 2^16.


Categories
A->Z
System Core
Analog
Timers
RTC
TIM1
TIM2
TIM3
TIM4
TIM5
TIM9
TIM10
TIM11
Connectivity
Multimedia
Computing
Middleware
TIM3 Mode and Configuration
Mode
Slave Mode Disable
Trigger Source Disable
Clock Source Internal Clock
Channel1 Disable
Channel2 Disable
Channel3 Disable
Channel4 Disable
Combined Channels Disable
Use ETR as Clearing Source
Configuration
Reset Configuration
NVIC Settings
DMA Settings
Parameter Settings
User Constants
Configure the below parameters :
Search (Crtl+F)
Counter Settings
Prescaler (PSC - 16 bits ... 763
Counter Mode Down
Counter Period (AutoRelo... 65530
Internal Clock Division (C... No Division
auto-reload preload Disable
Trigger Output (TRGO) Parameters
Master/Slave Mode (MS... Disable (Trigger input effect not dela...
Trigger Event Selection Reset (UG bit from TIMx_EGR)



You can see result of part 1 by watching led blinking.

Part 2

Part 2

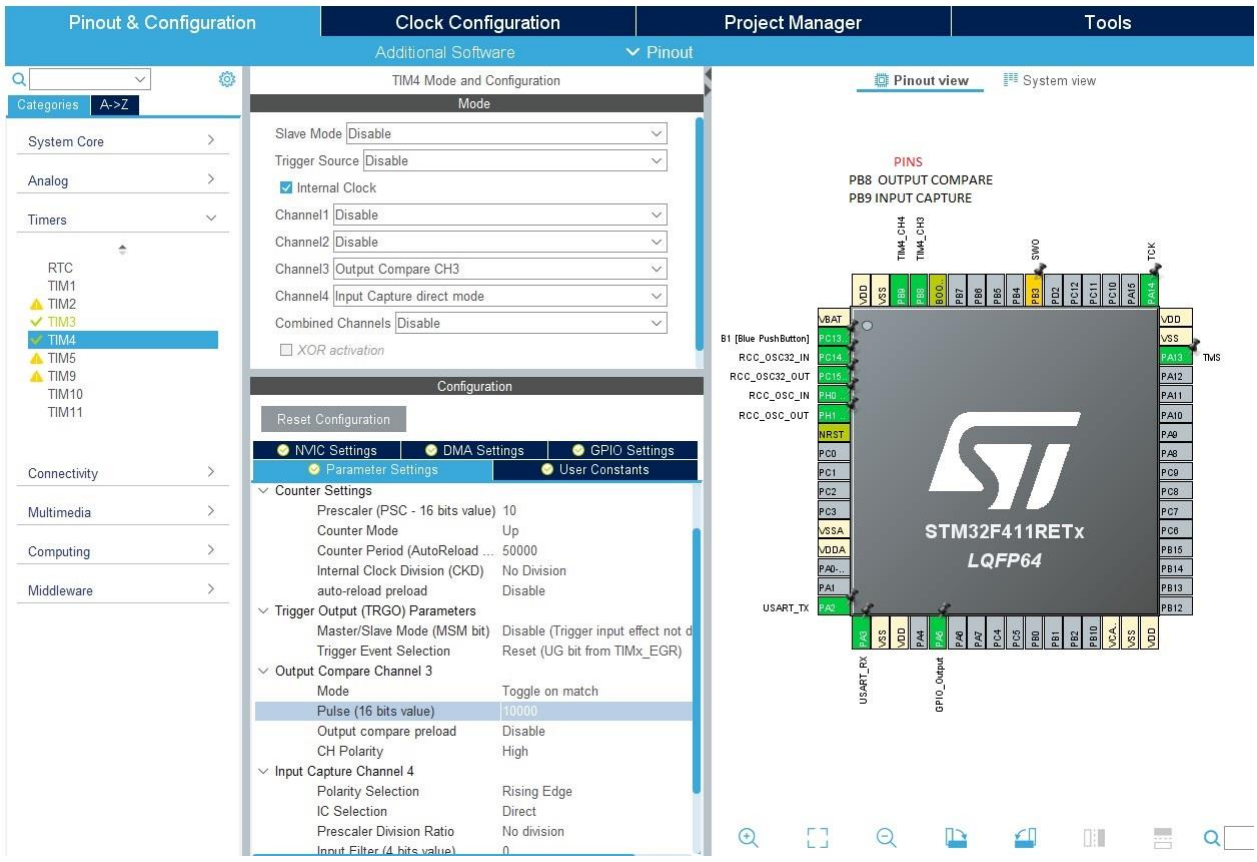
CLK Freq = 100 MHz
Prescaler = 10
} 10 MHz → Period = 100 ns

$100.10^{-9}.\ x = 1.10^{-3}$ (1 ms)

$x = 10000$ pulse

With this clock, every 10 000 pulse means 1ms. Every time measured 10000 pulse with output compare, clock make 1 toggle. 1 toggle rise + 1 toggle fall = 1 period. Input capture gets in interrupt when rising edge. Output compare gets in interrupt when rising and falling edge, In output compare interrupt callback function increases pulse value. In one period pulse value will be increased two time but input capture read it one time. So we have to divide by 2 differences between two input capture value.

Freq = CLK / (diff/2)



VarViewer1

Variable Name	Address/Expression	Read Value
IC_Value1	0x20000028	10000
IC_Value2	0x2000002c	30000
difference	0x20000030	10000
frequency	0x20000034	1000

Part 2 and part 3 tested together. Generated 1ms square wave was given to input capture and calculated frequency. Implemented code segments are in main.c and stm32f4xx_it.c (TIM4_IRQHandler and TIM3_IRQHandler functions).