

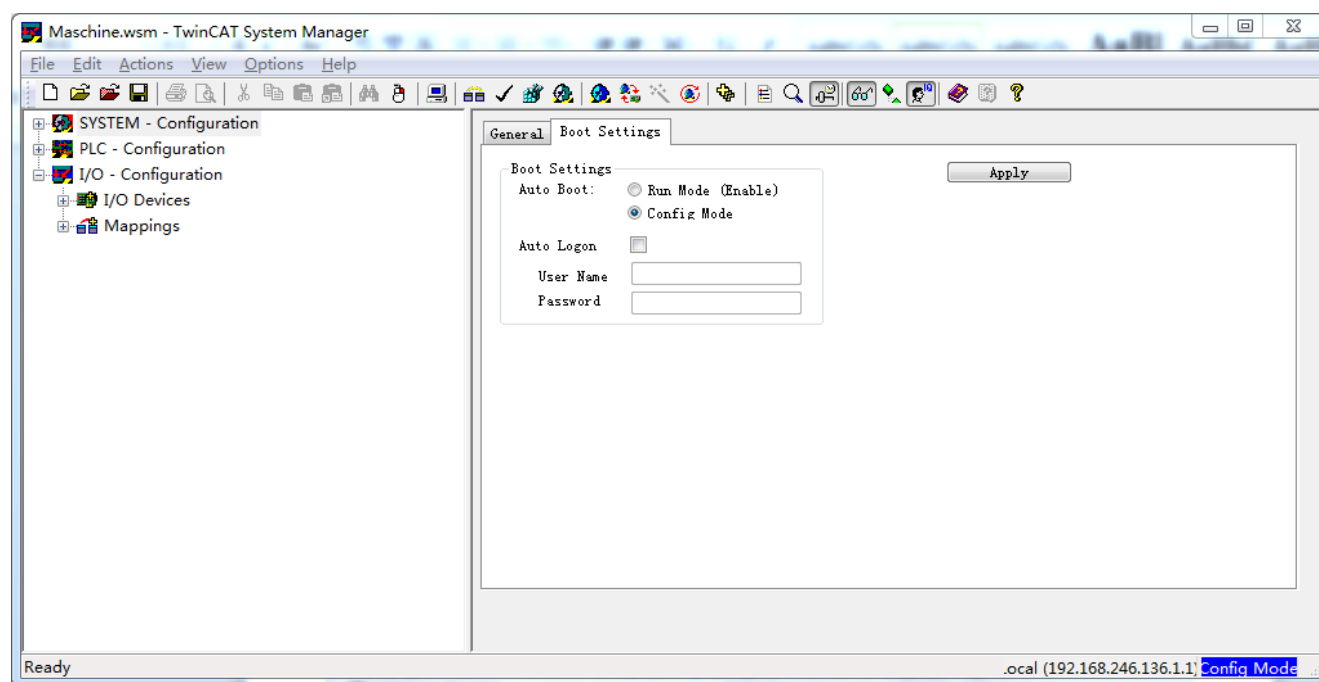
Ethercat communication guide between Backhoff NC series and Kinco Servo

1. Devices connection

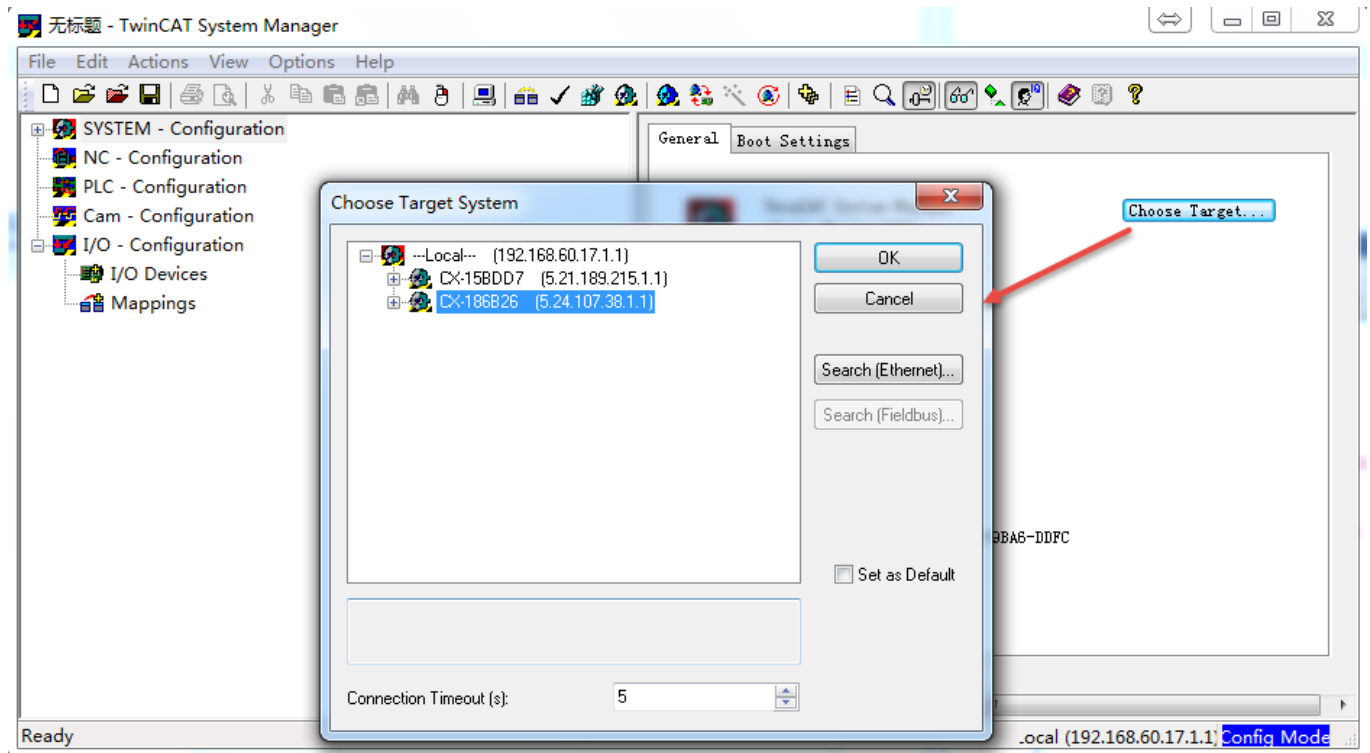
Before open software, copy Kinco servo device file Kinco_servo.xml to the installation folder of Twincat software of NC series controller. Default folder is: C:\TwinCAT\Io\EtherCAT.

2. Parameters setting in controller

Open Twincat System Manager software.



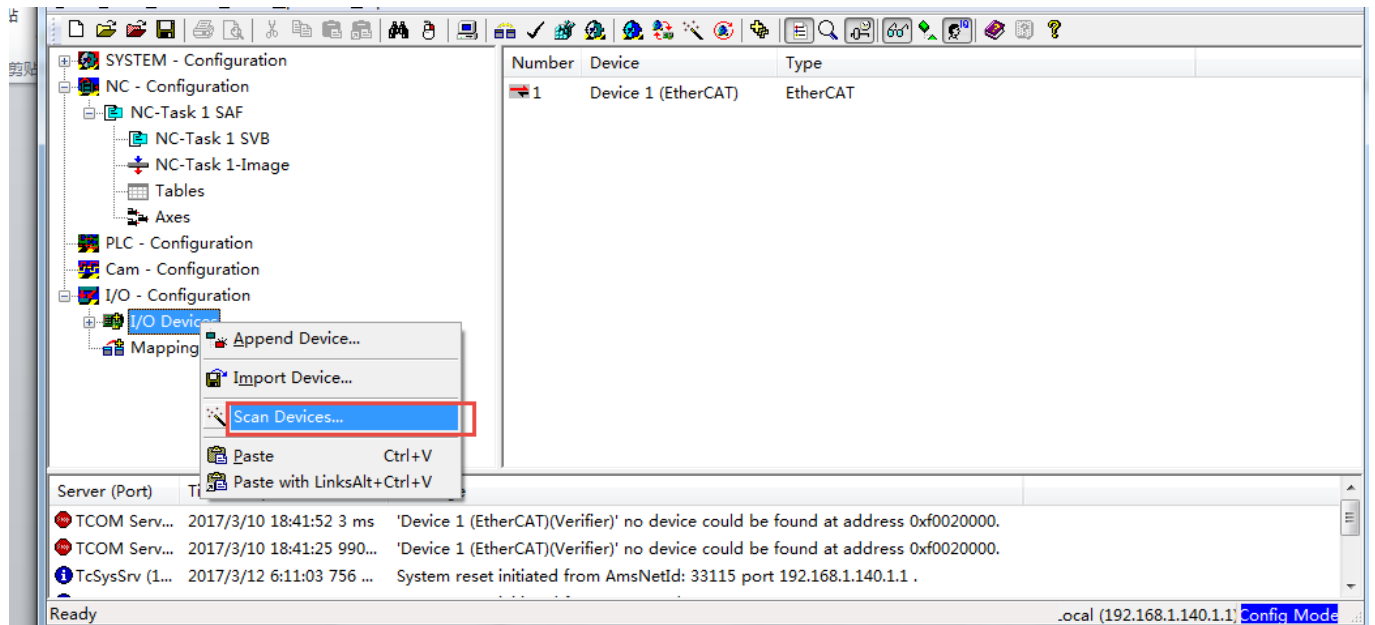
Choose target, here we use CX5020 controller as example.



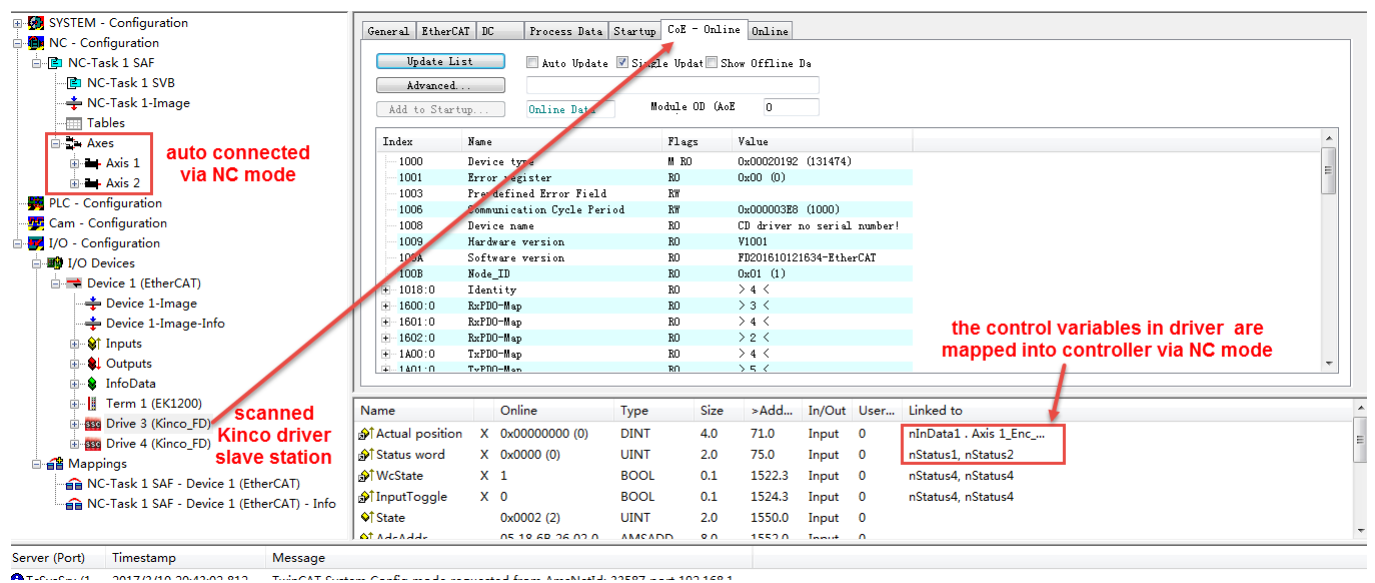
If the controller isn't under config mode, click below icon to switch to that mode.



Right click I/O Devices, choose Scan Devices to scan Ethercat slave station. Click YES for Scan boxes when it finds slave stations. If the Ethercat port of controller rightly connects with Kinco driver, Kinco FD box can be seen under device folder and driver has connected with controller via NC mode automatically.



Scan result:



At right side, there is COE-Online as above, we can set parameters here for driver.

2010:0	Group_DIO	RO	> 39 <
2010:01	Group_DIO.Din_Polarity	RW	0xFFFF (65535)
2010:02	Group_DIO.Din_Simulate	RW	0x0000 (0)
2010:03	Group_DIO.Din1_Function	RW	0x0000 (0)
2010:04	Group_DIO.Din2_Function	RW	0x0000 (0)
2010:05	Group_DIO.Din3_Function	RW	0x0000 (0)
2010:06	Group_DIO.Din4_Function	RW	0x0000 (0)
2010:07	Group_DIO.Din5_Function	RW	0x0000 (0)
2010:08	Group_DIO.Din6_Function	RW	0x0000 (0)
2010:09	Group_DIO.Din7_Function	RW	0x0000 (0)

Make sure synchronous clock mode (301102=1) is opened and set synchronous cycle = 2ms (301101=1). Recommend to use 1ms (301101=0) or 2ms (301101=1). For 4ms and 8ms, they lose the signification of using Ethercat. Kinco servo driver supports 1,2,4,8ms synchronizing period only, even controller can support more.

3011:0	Group_CAN	RO	> 8 <
3011:01	Group_CAN.ECAN_Sync_Cycle	RW	0x01 (1)
3011:02	Group_CAN.ECAN_Sync_Clock	RW	0x01 (1)
3011:03	Group_CAN.ECAN_Sync_Shift	RW	0x00 (0)
3011:04	Group_CAN.Sync_TPDO_Diff	RW	0

Must configure the monitoring PDO as below:

1600:0	RxPDO-Map	RO	> 2 <
1600:01	SubIndex 001	RO	0x607A:00, 32
1600:02	SubIndex 002	RO	0x6040:00, 16
1600:03	SubIndex 003	RO	---
1600:04	SubIndex 004	RO	---
1600:05	SubIndex 005	RO	---
1600:06	SubIndex 006	RO	---
1600:07	SubIndex 007	RO	---
1600:08	SubIndex 008	RO	---
1601:0	RxPDO-Map	RO	> 4 <
1602:0	RxPDO-Map	RO	> 2 <
1A00:0	TxPDO-Map	RO	> 2 <
1A00:01	SubIndex 001	RO	0x6064:00, 32
1A00:02	SubIndex 002	RO	0x6041:00, 16
1A00:03	SubIndex 003	RO	---
1A00:04	SubIndex 004	RO	---
1A00:05	SubIndex 005	RO	---
1A00:06	SubIndex 006	RO	---
1A00:07	SubIndex 007	RO	---
1A00:08	SubIndex 008	RO	---

Above, the relative parameters of driver are set finished. If it is the first time setting for driver, we need to set 2FF001=1 and 2FF003=1 at last and then parameters in driver will be valid after reboot driver.

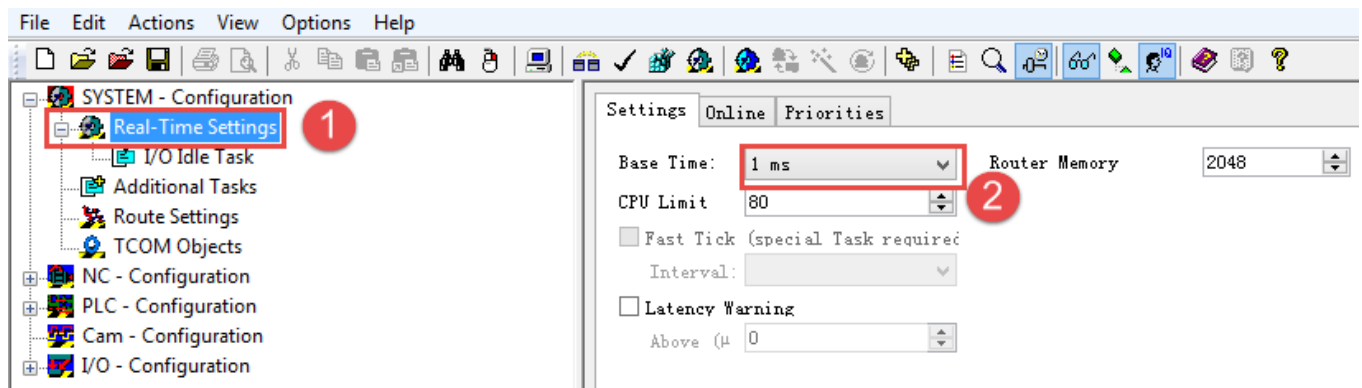
2FF0:0	Group_Store	RO	> 21 <
2FF0:01	Group_Panel.Store_Data	RW	0x01 (1)
2FF0:02	Group_Panel.Store_Calibrate_...	RW	0x00 (0)
2FF0:03	Group_Panel.Store_Motor_Data	RW	0x01 (1)

During control servos, if needing to adjust performance parameters like PI of servo, it can be set in COE-Online as below. But all parameters mapped here are internal unit of servo. For the detail of unit, please refer to Kinco servo user manual.

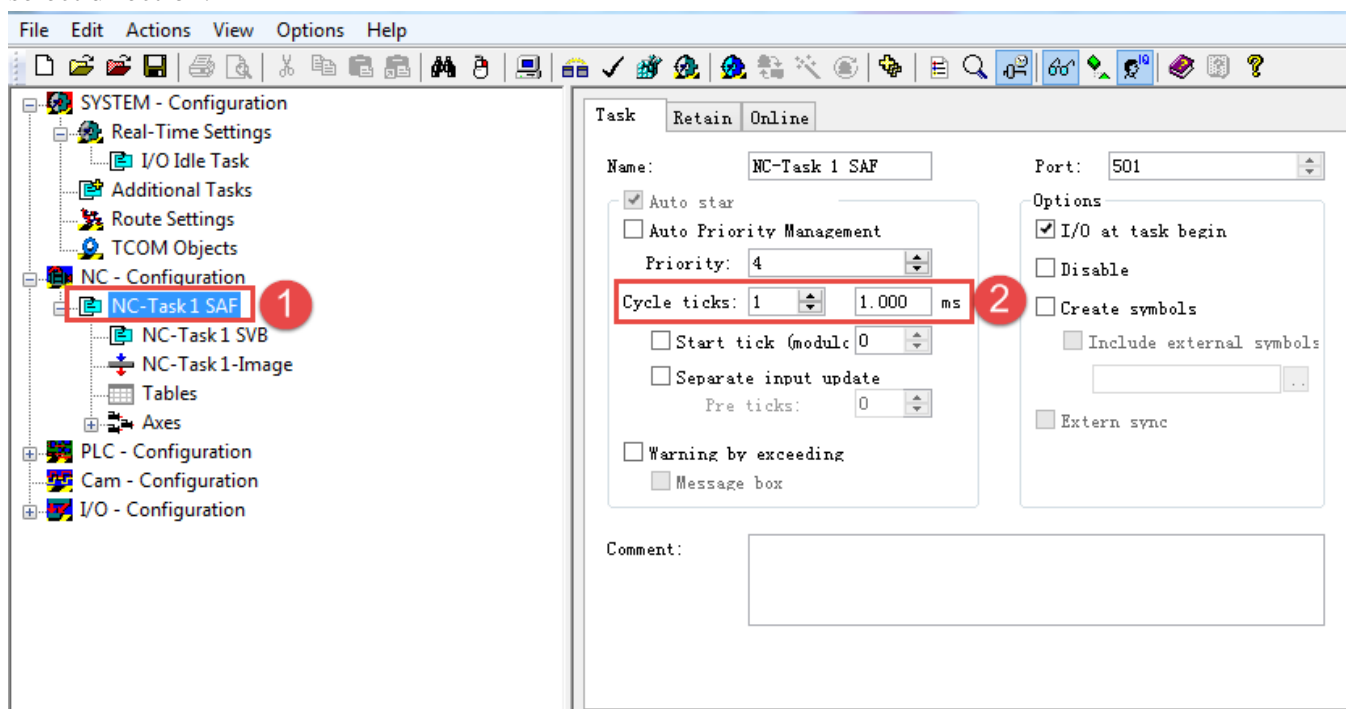
+	60F9:0	Group_Speed_Loop	RO	> 43 <
+	60FB:0	Group_Position_Loop	RO	> 14 <

Please use Kinco Servo software to monitor and set more parameters when they can't find in COE-Online.

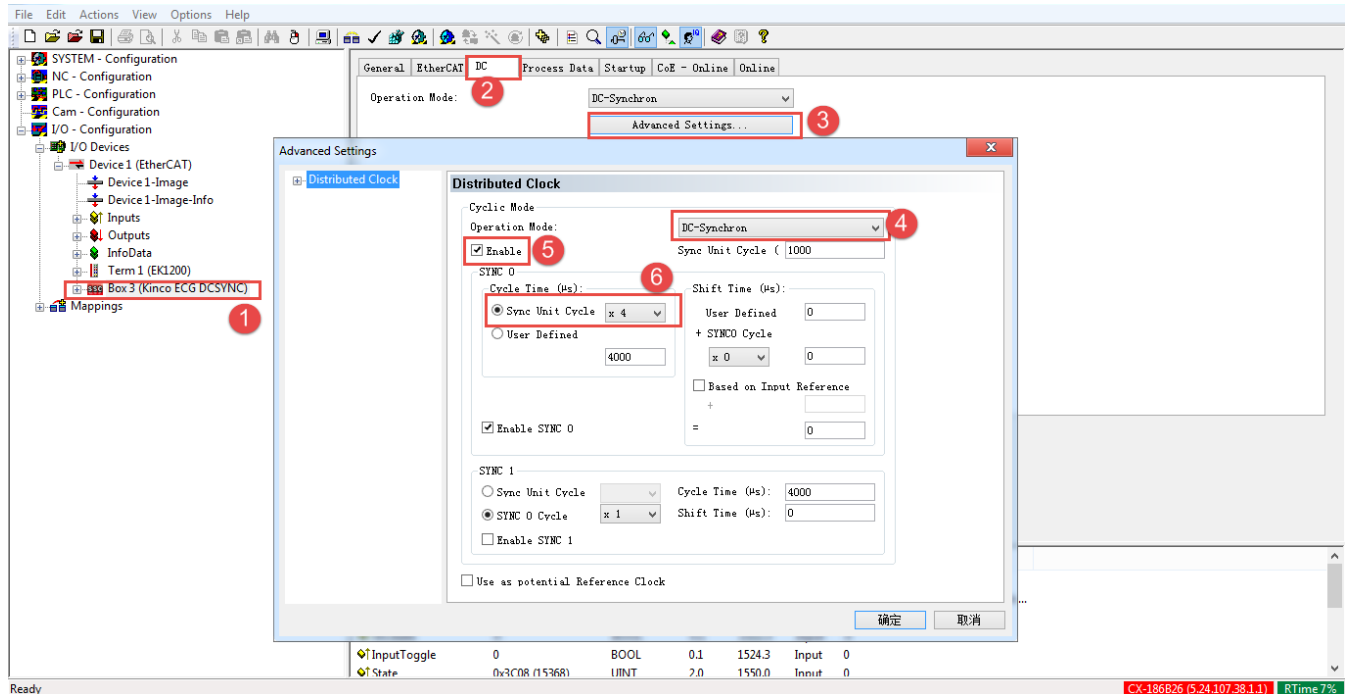
Set basic cycle time of PLC to 1ms



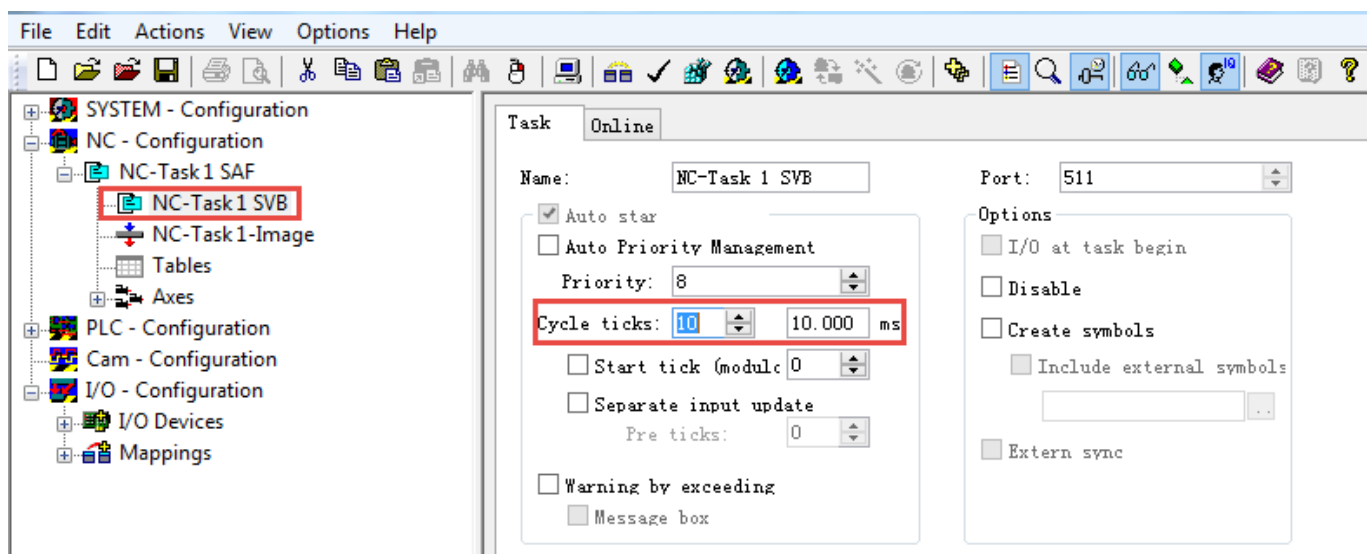
Set NC PTP control period. Generally speaking, the NC period is NC Task SAF period. Here, it is set to 1ms. At this part, TwinCAT NC is used to calculate position, speed and acceleration speed and select direction.



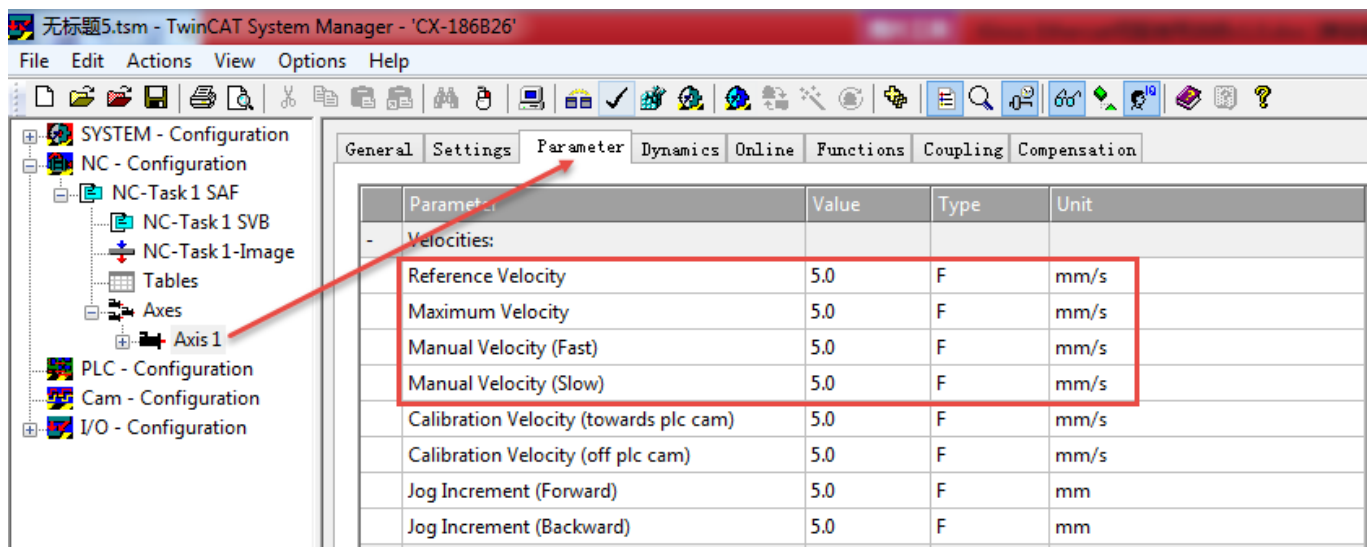
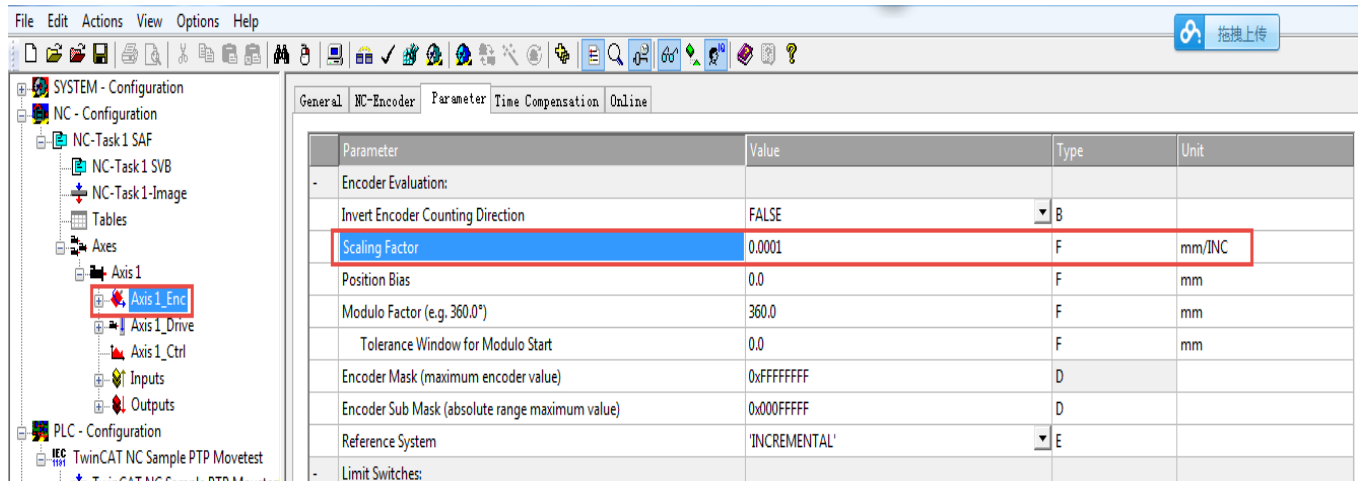
Click Enable for Sync Clock, should be noted that the setting of Cycle Time here must be same with ECAN sync cycle(the value in 301101 also) in driver. For example if the sync cycle is 2(4ms) then here should be 4. It will make the servo vibrated when running if the cycle is different.



Another NC cycle is NC Task SVB cycle, the typical value is 10ms. In this task, TwinCAT NC is used to plan the pathway and check this pathway to see if it is reasonable or not. The priority of TwinCAT NC task is higher than TwinCAT PLC.



Set the unit of NC. In Axis 1_Enc, Scaling Factor which means the distance for each pulse feedback from encoder should be set. For example, Kinco servo motor has 10000 pulses for a round and if the moving distance is 1mm, then the Scaling Factor should be $1/10000=0.0001\text{mm/Inc}$. If the real position increase 10mm, then target position in servo should increase 100000INC also. Normally, it needs to set some relative speed parameters for NC control in Axis, else the servo may show alarm.



As the shown above, setting speed to 5.0mm/s, then the speed of servo should be $5.0/0.0001=50000\text{inc/S}=300\text{RPM}$.

Now we finish all the setting for Kinco Ethercat servo under NC mode of Backhoff and then the next step is to program a project control Kinco servo.