Product	AMD	Type	VFD-C2000	Security Level	☑General ☐High ☐Top
				No.	N/A
Issued by	SC	Author	John Zuo	Release Date	5th July, 2012

CanOpen Master Remote IO Function for C2000

Devices and tools:

Inverter：VFD007C23A， 2PCS （Firmware V9.020 D12272）

C2000 Optional Card: EMC-PG01U (2PCS)　EMC-COP01(2PCS)

PM motor：ECMA-C30602ES　2PCS

Operation Steps:

1. Setting necessary Parameters for C2000+PM motor with PG01U. (Please kindly refer to the announcements related to C2000+PM with PG01U)
2. Set 00-02=6 to reset the program of PLC inside C2000 (Both C2000).
3. Set 00-02=7 to reset the CanOpen Configuration for Both C2000.
4. Set the necessary Parameters for C2000 CanOpen Master:

| Parameters	Descriptions	Value
09-37	CanOpen Speed	0 (1M)
09-45	CanOpen Master Function	1 (enabled)
09-46	CanOpen Master Address	100 (Default)

Besides：

- please go to PLC mode for master.
- After the procedures above, please repower the master C2000.

5. Set the necessary Parameters for C2000 CanOpen slave:

Parameters	Descriptions	Value

00-20	Source of the Master Frequency Command	6 (for Canopen)	
00-21	Source of the Operation Command	3 (for Canopen)	
02-13	Output Relay 1	50(for CanOpen)	
03-20	Multi-function output 1(AFM1)	20(for CanOpen)	
03-23	Multi-function output 2(AFM2)	20(for CanOpen)	
09-36	CanOpen Slave Address	1	
09-37	CanOpen Speed	0 (1M)	
09-40	CanOpen Decoding Method	1 (for DS402)	

6. Wiring C2000 Master and Slave together based on EMC-COP01.
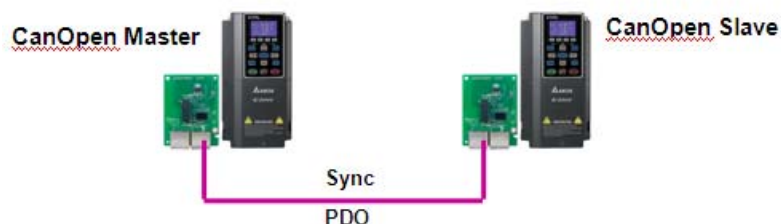
7. Understanding the CanOpen Master Slave Special Auxiliary Relays M.

Relays	Descriptions
M1034	Enable CanOpen Real Time Control
M1059	CanOpen Master Setting Complete
M1060	Initializing CanOpen Slave
M1061	Initializing CanOpen Slave Failed

Besides, there are many Special Registers for CanOpen Master. There is a very clear explanation in our C2000 manual. The ones from D1070~D1099 and D2000~D2799 must be set correctly, otherwise, the CanOpen Master can't be fulfilled.

Some key Registers can be introduced here:

Registers	Descriptions	Remarks
D1090	Synchronous cycle setting	D1090>=(1M/Rate)*(N/4)[A]

D1091	The station for initialization during Initializing process	Bit0~7 is the mapping for 1~8 Channel[B]
D2034	Transmission setting of slave No. n=0	For TXPDO Transmission Setting[C]
D2067	Transmission setting of slave No. n=0	For RXPDO Transmission Setting[C]

A. Rate is the value you set in 09-37, and N is the PDO number in your loop.

B. Channel one is D2000~D2099, Channel two is D2100~D2199……. Channel eight is D2700~D2799.

C. D2034+n*100 is for eight channels TXPDO Transmission Setting.

D2067+n*100 is for eight channels RXPDO Transmission Setting.

They all abide by the structure as below, and the En is for enable the mode you choosing, the number is the PDO Index number (e.g. 6040H 607AH….). The difference is D2034+n*100 is to regard the TXPDO as targets, but D2067+n*100 is to regard the RXPDO as targets.

	PDO4		PDO3		PDO2		PDO1	
	Torque		Position		Remote I/O		Speed	
Bit	15	14 ~ 12	11	10 ~ 8	7	6 ~ 4	3	2 ~ 0
Definition	En	Number	En	Number	En	Number	En	Number

And the detailed indexes information for PDO1 ~ PDO4 as follows:

| TXPDO							
PDO4 (Torque Mode)		PDO3 (Position Mode)		PDO2 (Remote I/O)		PDO1 (Speed Mode)	
Description	Special D	Description	Special D	Description	Special D	Description	Special D
Control Word	D2008+n100	Control Word	D2008+n100	Slave MO	D2027+n100	Control Word	D2008+n100
Tor. Target	D2017+n100	Pos. Target	D2020+n100 D2021+n100	Slave AO1	D2031+n100	Freq. Com.	D2012+n100
Control Mode	D2010+n100	Control Mode	D2010+n100	Slave AO2	D2032+n100		

RXPDO							
PDO4 (Torque Mode)		PDO3 (Position Mode)		PDO2 (Remote I/O)		PDO1 (Speed Mode)	
Description	Special D	Description	Special D	Description	Special D	Description	Special D
Status Word	D2009+n100	Status Word	D2009+n100	Slave MI	D2026+n100	Status Word	D2009+n100
Rel. Torque	D2018+n100	Rel. Position	D2022+n100 D2023+n100	Slave AI1	D2028+n100	Freq. Com.	D2013+n100
Rel. Mode	D2011+n100	Rel. Mode	D2011+n100	Slave AI2	D2029+n100		
				Slave AI3	D2030+n100		

8. Programming C2000 CanOpen Master PLC.
   - Choose Communication—Edit Register Memory(T,C,D) in WPLSoft.
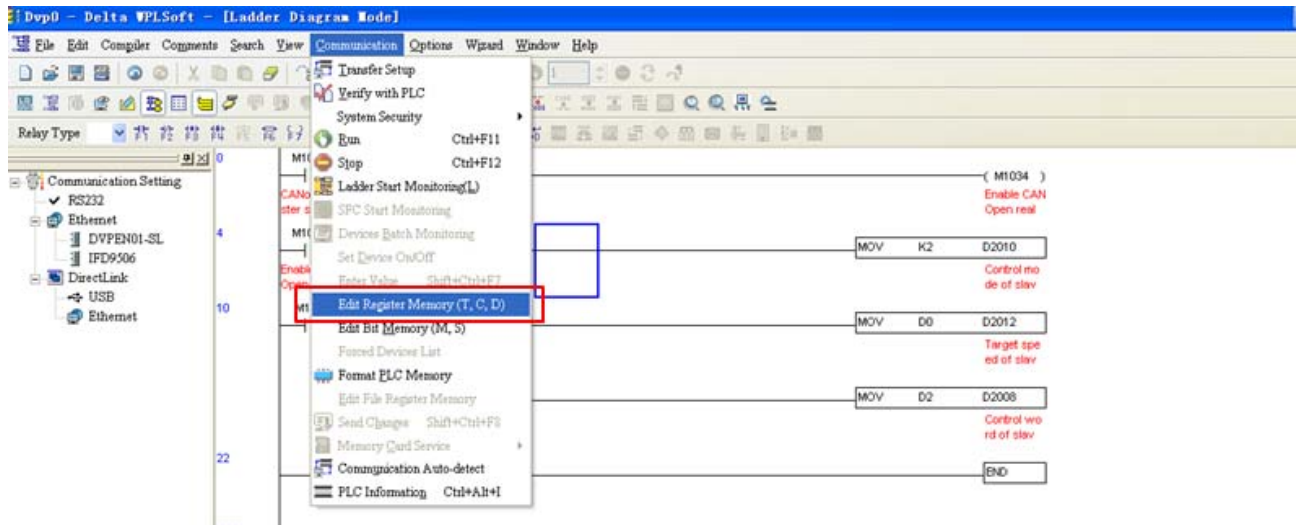

   - Click Transmit, and choose D1070~D1099 D2000~D2799, and click the "Read from PLC Device Register" for reading the D1070~D1099 D2000~D2799 from Current PLC.
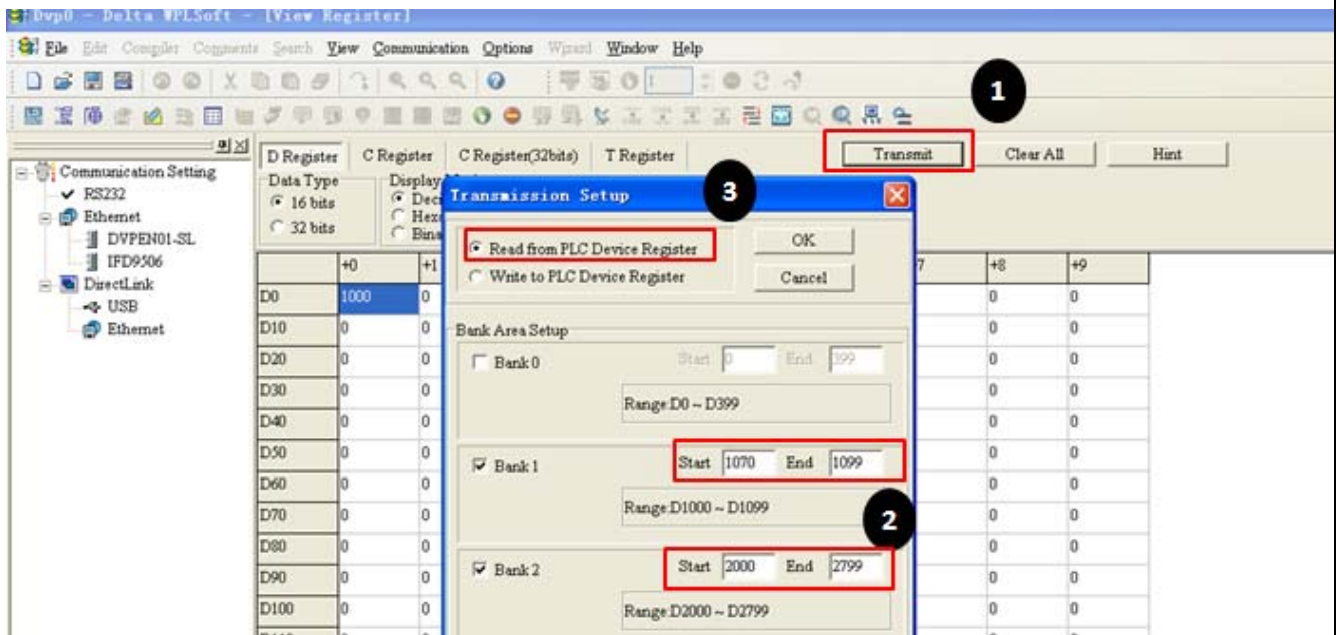
   - When Reading complete, don't change the value of D1070~D1099 which are very less something to do with application setting. But D2000~D2799 should be set carefully based on your CanOpen Configuration. In this case, CanOpen Slave address is 1 and I choose D2000~D2099 as the operation registers. So I set D1090=8, D1091=1(Bit 0=1 for D2000~D2099), D2034=BAH (Speed mode +Remote IO mode), D2067=CAH(Speed mode +Remote IO mode). Please use "Edit Register Memory" to set these D since they are configurations, and other D can be set in your program.
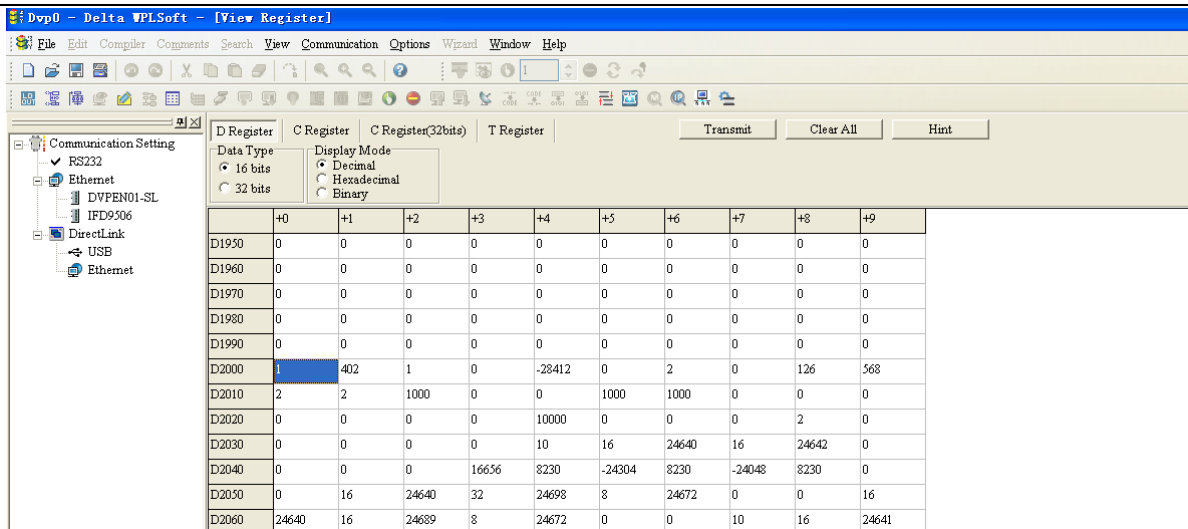
- Click Transmit, and choose D1070~D1099 D2000~D2799, and click the "Write to PLC Device Register" for writing the D1070~D1099 D2000~D2799 to Current PLC.
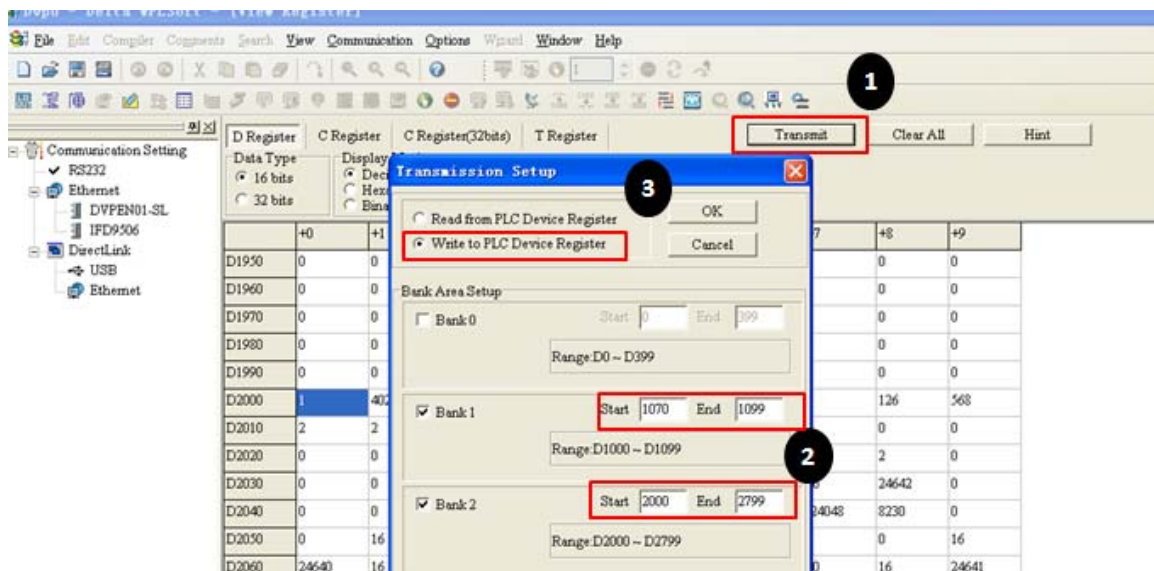
- Making the ladder steps for C2000 CanOpen Master. In this case, I realize the CanOpen Master-Slave Remote IO (with Speed mode) control, and I use D2012 for speed command, D2008 for Control word.
  For any CanOpen Master application in C2000, M1059 M1060 M1061 M1034 must be used correctly, and otherwise the application can't be fulfilled.

  Please refer to the CanOpen Master sample program in Remote IO Mode.

Attentions:

A. What are the channels in C2000 for AI1 AI2 AI3 and AO1 AO2?

AI1 is AVI, AI2 is ACI, AI3 is AUI.

AO1 is AFM1, AO2 is AFM2.

B. Why must we set Pr02-13=50 Pr03-20=20 Pr03-23=20?

In this case, we want to control the AFM1 AFM2 MO output by CanOpen TXPDO. So Pr03-20 and Pr03-23 is set to 20 both for CanOpen control. Besides, in this case, I choose realy 1 as the MO I control, so Pr02-12 must be set to 50 for CanOpen control.

C. How can we know the MO control is successful or not?

When you finish the MO control, you can read the parameter value Pr02-51 for judging whether the value is successfully set to MO TXPDO index. And the MO bits can be follows.
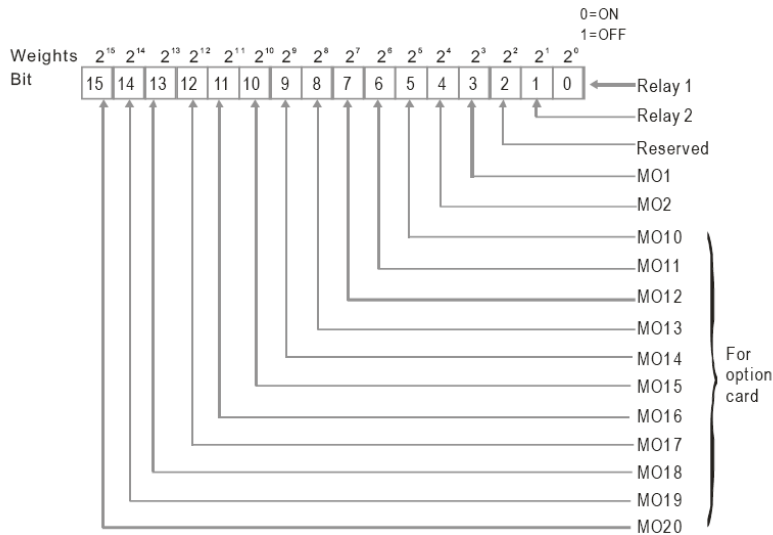
D. How can we know the MI reading is successful or not?

When you finish the MI reading, you can refer to the Pr02-50 for judging whether the MI RXPDO index display is the same as the value of 02-50. And the MI bits can be follows: