

CBCAN

SDO and NMT Service PLC Interface

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CBCAN SDO and NMT Service PLC Interface

1. Overview

The current Winproladder design does not provide the SDO and NMT service ladder instructions which are sometimes the necessary functions for some applications. The purpose of this document is to provide the PLC interface of the SDO/NMT service which required for users who need to implement the two services in their ladder programs.

2. SDO Service

The PLC registers R3700~R3769 are reserved for SDO service when CBCAN module is used on MBs PLC family. The major required information to issue a SDO service are SDO slave's node ID (R3702), index and sub-index of slave's object dictionary (R3703 and R3704), the size of data to be read or write (R3705), and the data itself (R3706~R3769). After this information is input to corresponding registers, the last step is to write R3700 with "CA0Eh" to trigger the SDO service.

The execution results of SDO service will be also shown on the same registers. The detailed description for execution results and register functions are shown on the Table 2 below.

Table 1: PLC Registers for SDO Service

Sequence #	Register	Function
1	R3700	Execute Flag = CA0EH
2	R3701	Command. SDO Read=5055 SDO Write = 5066
3	R3702	Node ID(station number, 0~127. If =0, this node)
4	R3703	Object Index (0~65535)
5	R3704	Object sub-index (0~255)
6	R3705	Object data size: 1 ~ 128 Byte. Data size to Write or max. data buffer size for read
7	R3706	Data word #0
8	R3707	Data word #1
.	.	.
70	R3769	Data word #63

Table 2: Registers Status after SDO Service Execution

Sequence #	Register	Function	
		Read	Write
1	R3700	Result Code* ₁	
2	R3701	No Change	
3	R3702		
4	R3703		
5	R3704		
6	R3705	Actual read data size	No Change
7	R3706	Data word #0* ₂	No Change* ₂
8	R3707	Data word #1* ₃	No Change* ₃
.	.	.	No Change
70	R3769	Data word #63	No Change

*₁: Result Code: OK = 0, CMD_CODE_ERR = 1, NODE_ID_ERR = 2, SDO_EXEC_ERR = 4.

*₂: SDO error code low word if execution is Failed (Result Code= 4)

*₃: SDO error code high word if execution is Failed (Result Code= 4)

Table 3: SDO Error Code

Error Code Name	Error Value	Description
ABORT_TIME_OUT	0x05040000L	SDO service Time out
ABORT_NO_OBJ	0x06020000L	No such object
ABORT_RO	0x06010002L	Attempt to write a read-only object
ABORT_SYS_LENGTH	0x06040047L	Data length exceed system allow
ABORT_NO_SEGEMNT	0x06010000L	Not support segment transfer
ABORT_OBJ_LENGTH	0x06070010L	Not match object length
ABORT_SYNC	0x05040001L	Command specifier not valid
ABORT_TOGGLE_BIT	0x05030000L	Toggle bit not alternated
ABORT_PARM_LENGTH	0x06070012L	Length of service parameter too high
ABORT_WO	0x06010001L	Attempt to read a write-only object
ABORT_READ_LENGTH	0x05040005L	Object length too big to read

3. NMT Service

The NMT Service is done by using the SDO service with a specified object index “0x1F82” (write service) or “0x300C” (read service). The detailed steps and register descriptions are as follows.

NMT Management Service – Issue a NMT command to specified node(s)

SDO write (R3701): With Object index (R3703) = 0x1f82

R3704: Sub-Index n	Description
n = 1 ~ 127	Node with node ID n to be requested
n = 128	Request all nodes

R3702: Do not care.

R3706: Command Code	NMT Service Description
5 or 1	Start Remote Node
4 or 2	Stop Remote Node
127 or 128	Enter Pre-Operational State
6 or 129	Reset Node
7 or 130	Reset Communication

Get NMT state service - Get the NMT state of specified node

SDO read (R3701): With Object index (R3703) = 0x300c

Sub-index (R3704) = 0

Node ID (R3702): Requested node ID

Execution Result (R3700 and R3706):

Register	Value	Description
R3700	0	OK
	Not 0	Not OK
R3706 (Only valid when R3700 is 0)	4	Stopped
	127	Pre-operational
	5	Operational
	6	Not detected

4. Example – NMT Service (Start Remote)

The ladder example program below shows how to issue a NMT command to start all remote CANopen nodes on the network. To issue the “Start Remote” command, register values should be set as shown in the following table.

Table 4: Registers values of Start Remote command

Register	Value	Description
R3701	5066	Write command
R3703	1F82H	NMT service index
R3704	128	Request all nodes
R3706	5	Start Remote Node

After completing the registers as shown on the Table 4, the last step is to write R3700 with value CA0Eh to trigger the NMT command. The “17.CMP” function on the first network of the ladder example is only used as a trigger of the NMT service and is not a necessary instruction.

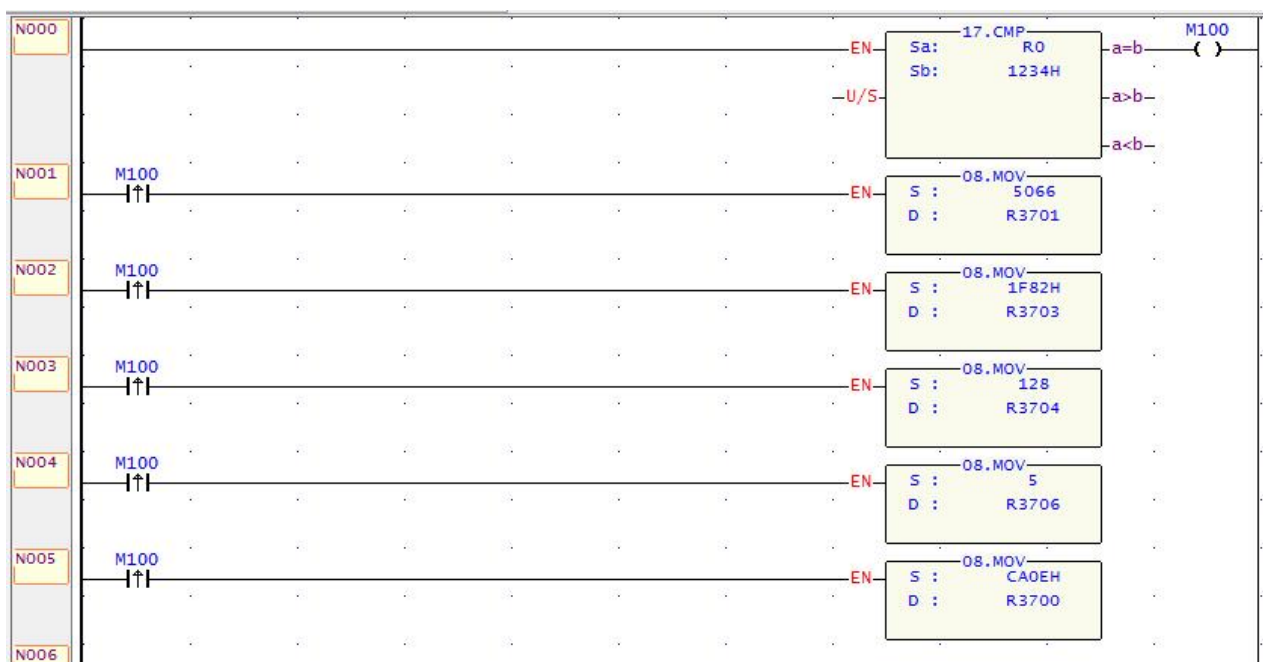


Figure 1: NMT Start Remote command – Ladder program example