CANopen Demo tool – User manual

Software version 1.0.0.0

Revision history

Version	Revised Date	Author	Description
1.0	2015/09/30	Rocky	- 1st release

Table of contents

1. Introduction

1.1. Basic specifications

CiA301   CANopen application layer and communication profile

1.2. Support CANbus board (see Table 1)

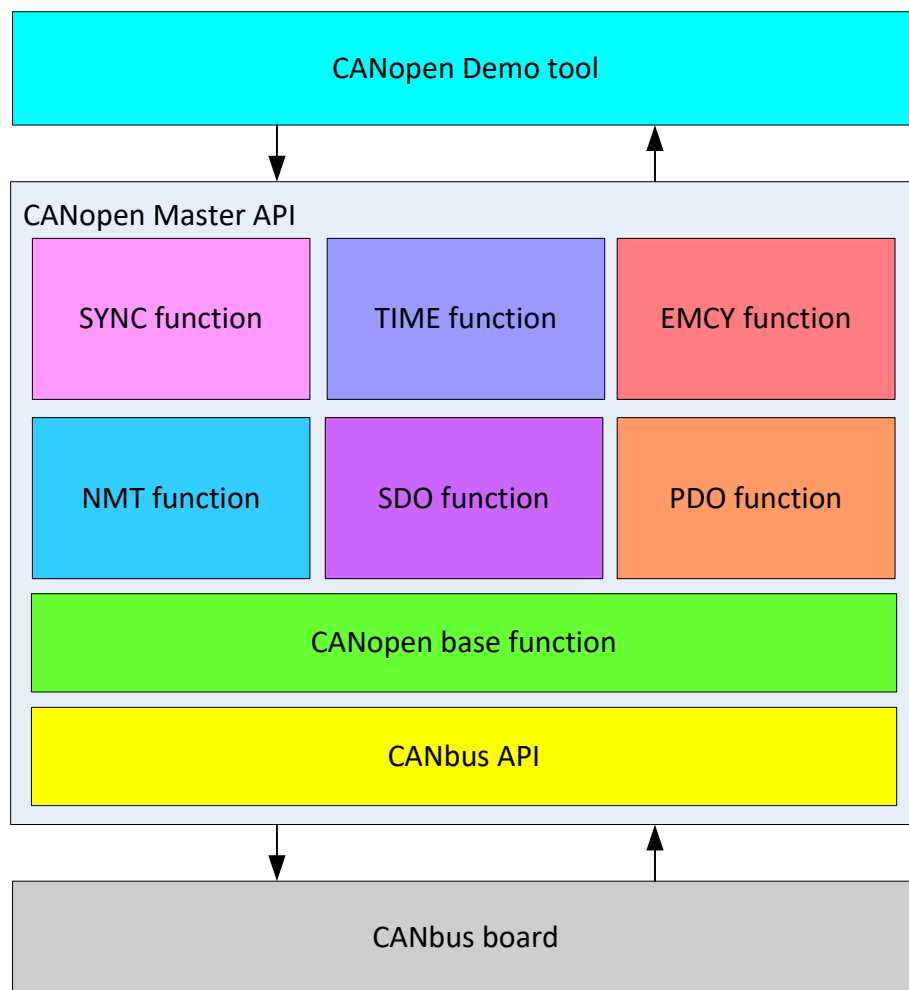| Board	Interface	Note
AX93700-CS	COM to CAN	Module
AX93700-CU	USB to CAN	Module
iCON101-CS	COM to CAN	Device
iCON101-CU	USB to CAN	Device
AX92903	USB to CAN	Mini-card

Table 1

1.3. Architecture (See Figure 1)

Figure 1

1.4. Device states and communication objects

The below table specifies the relation between states and communication objects. Services on the listed communication objects may only be executed if the CANopen devices involved in the communication are in the appropriate states. (See Table 2)

	Pre-operational	Operational	Stopped
PDO function		X	
SDO function	X	X	
SYNC function	X	X	
TIME function	X	X	
EMCY function	X	X	
NMT control NMT error control	X	X	X

(X:Support)

Table 2

1.5. Overview

CANopen Demo tool support NMT/SDO/PDO function and EMCY/Event/Error list. (See Figure 2)
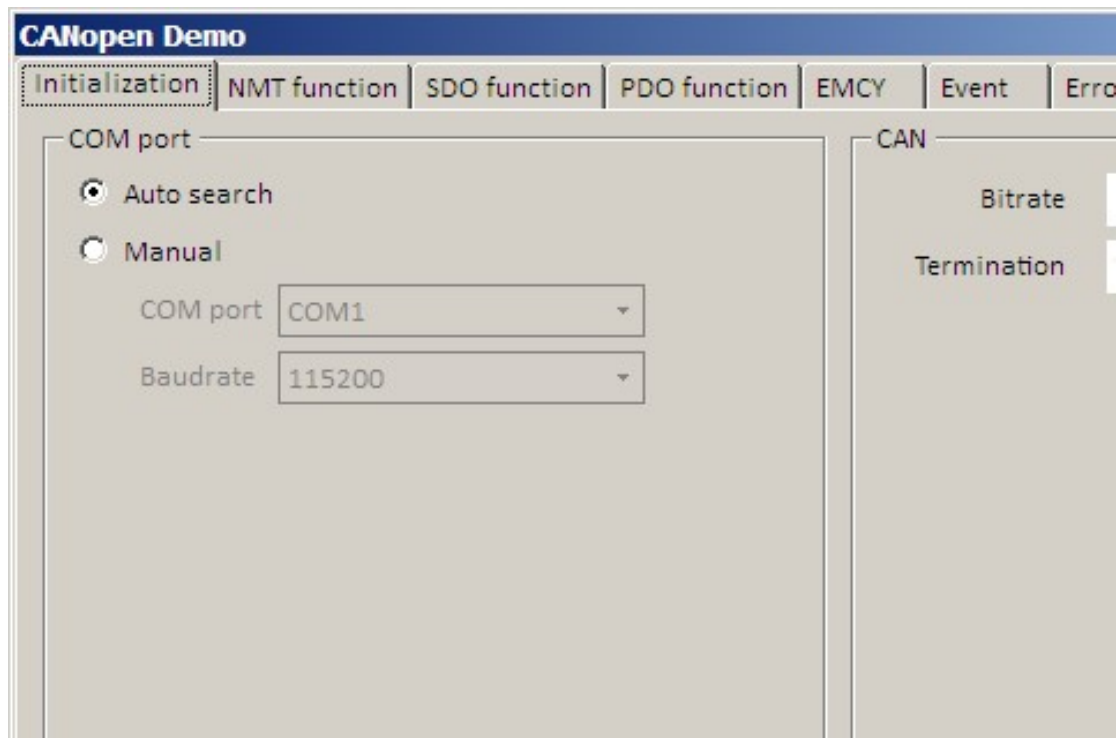
Figure 2

2. Initial CANopen

➢ Select Auto-search or Manual and press "Connect" button. (See Figure 3)
➢ After the connection is completed, select Bitrate and Termination and press "Initial CANopen" button. (See Figure 4)
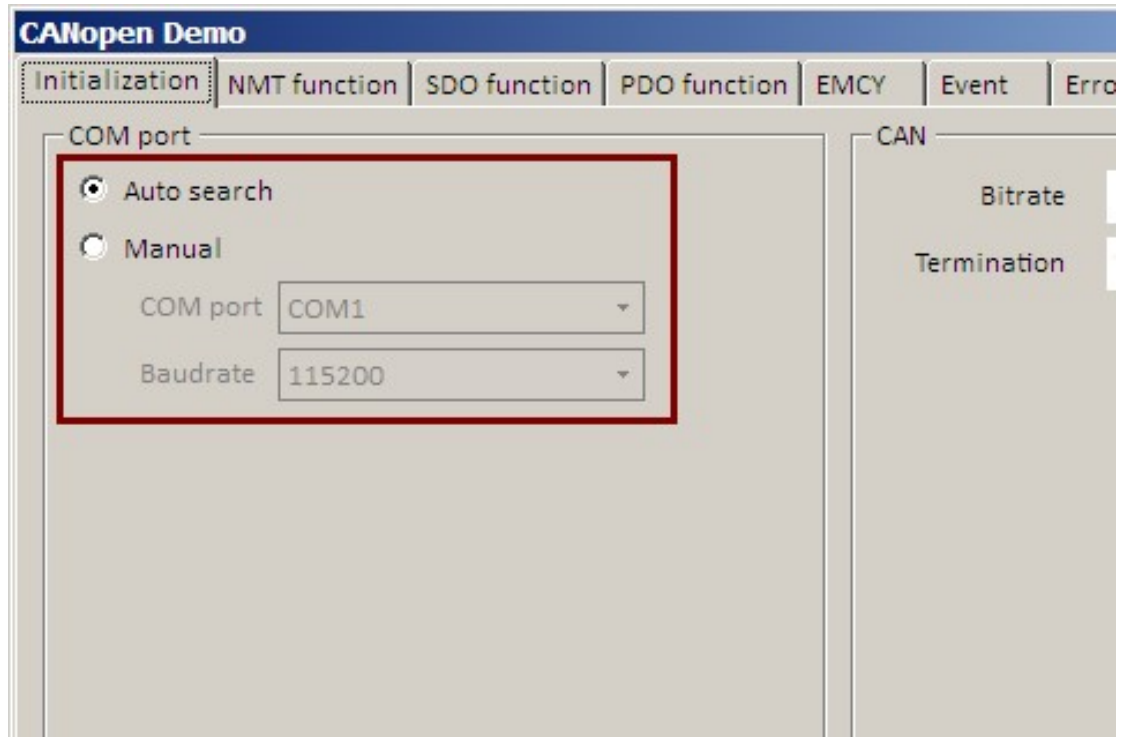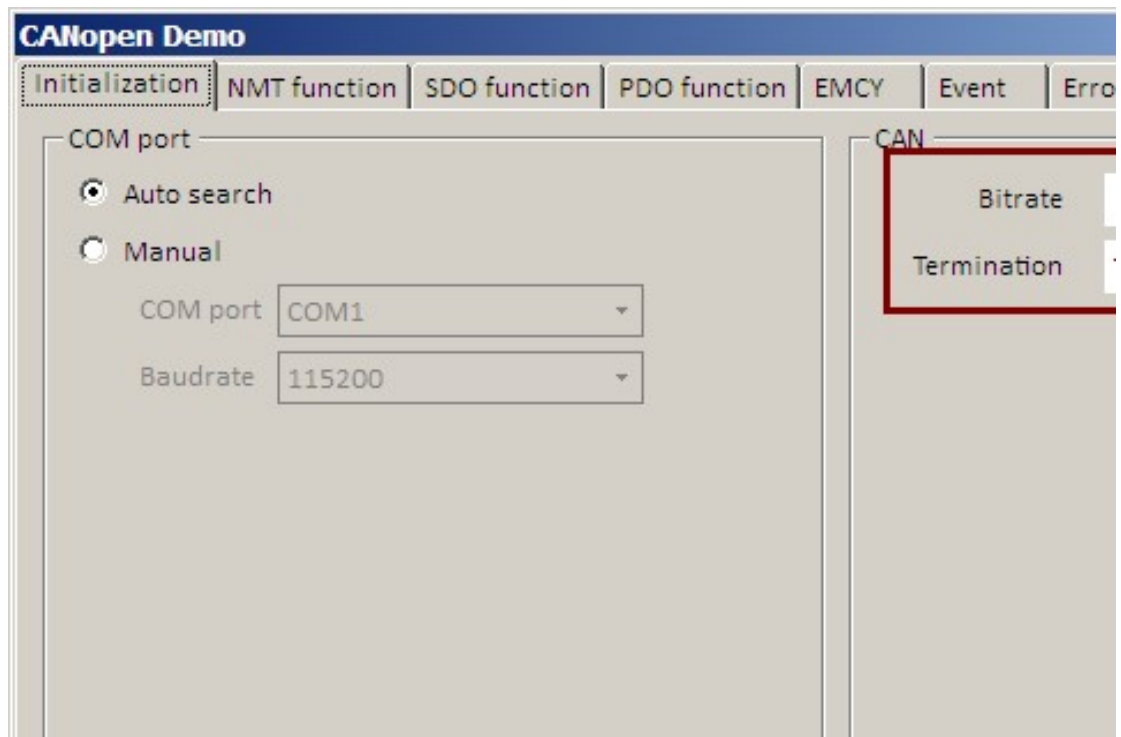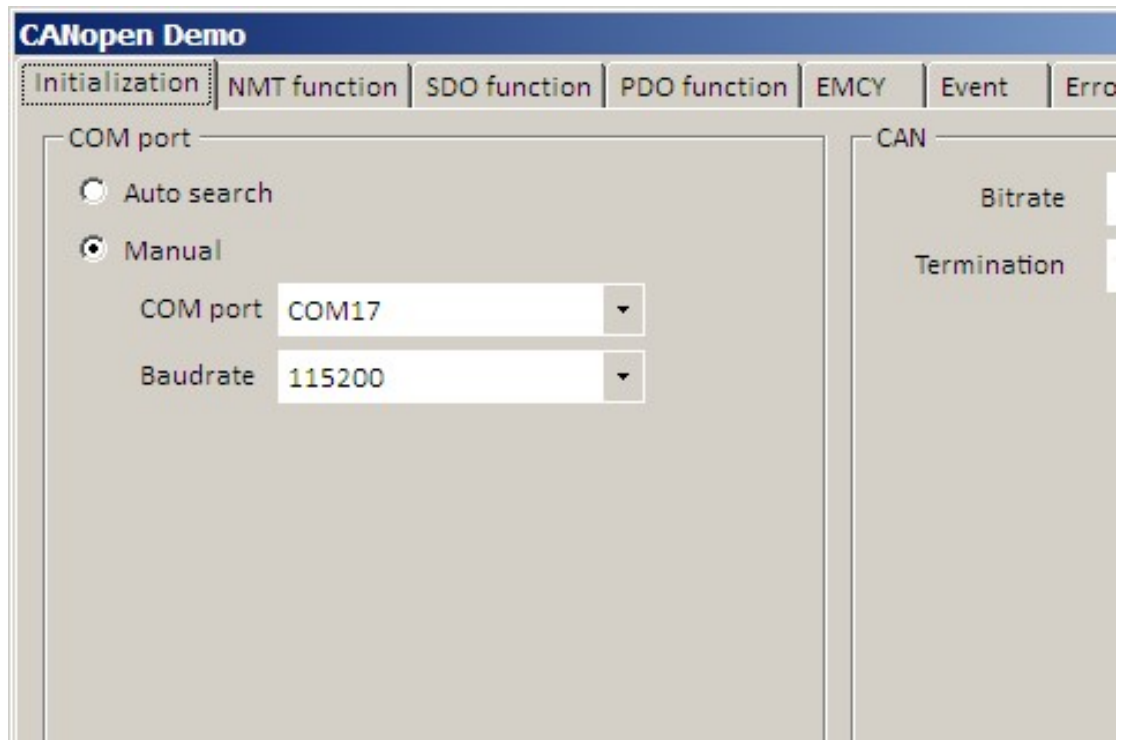

Figure 3

Figure 4

3. Release CANopen

➢ Press "Release CANopen" button. (See Figure 5)

Figure 5

4. Network management (NMT)

➢ NMT function support Add/Delete node function and support Start node/Stop node/Enter Pre-operational/Reset Communication/Reset node function and Get state. (See Figure 6)
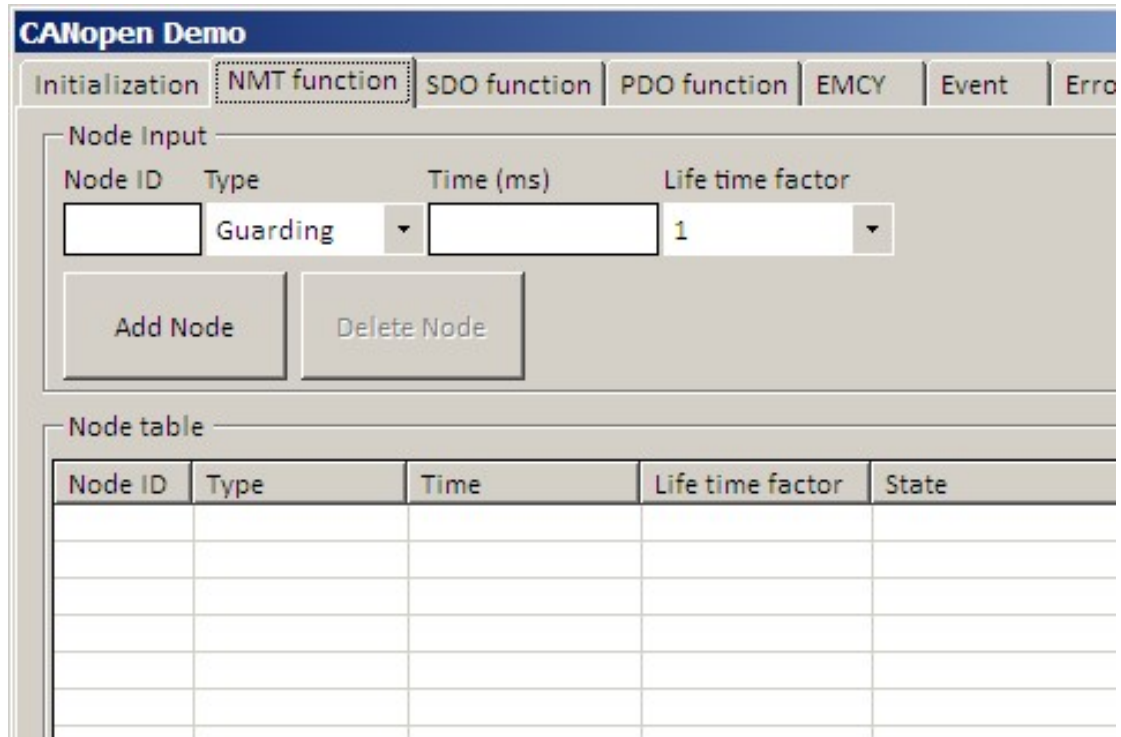
Figure 6

4.1. Add node

➤ Input Node-ID/Type/Time/Life time factor data and press "Add Node" button. (See Figure 7)

Figure 7

4.2. Delete node

➢ Select a node from node table and press "Delete Node" button. (See Figure 8)

Figure 8

4.3. Get state

➢ Select a node from node table and press "Get State" button. (See Figure 9)

Figure 9

4.4. Start node

➢ Select a node from node table and press "Start node" button. (See Figure 10)

Figure 10

4.5. Enter pre-operational

➢ Select a node from node table and press "Enter pre-operational" button.
    (See Figure 11)

Figure 11

4.6. Stop node

➢ Select a node from node table and press "Stop node" button. (See Figure 12)

Figure 12

4.7. Reset communication

➢ Select a node from node table and press "Reset communication" button.
(See Figure 13)

Figure 13

4.8. Reset node

➢ Select a node from node table and press "Reset node" button. (See Figure 14)

Figure 14

5. Service data object (SDO)

SDO function support Add/Delete SDO function and support Get/Set SDO function.

(See Figure 15)

Figure 15

5.1. Add SDO

➢ Input Node-ID/Index/Sub-Index/Len/Byte data and press "Add SDO Object" button. (See Figure 16)

Figure 16

5.2. Delete SDO

➢ Select a object from SDO list and press "Delete SDO Object" button.
   (See Figure 17)

Figure 17

5.3. Update SDO data byte

➢ Select a object from SDO list and update data byte of PDO then press "Update data byte" button. (See Figure 18)
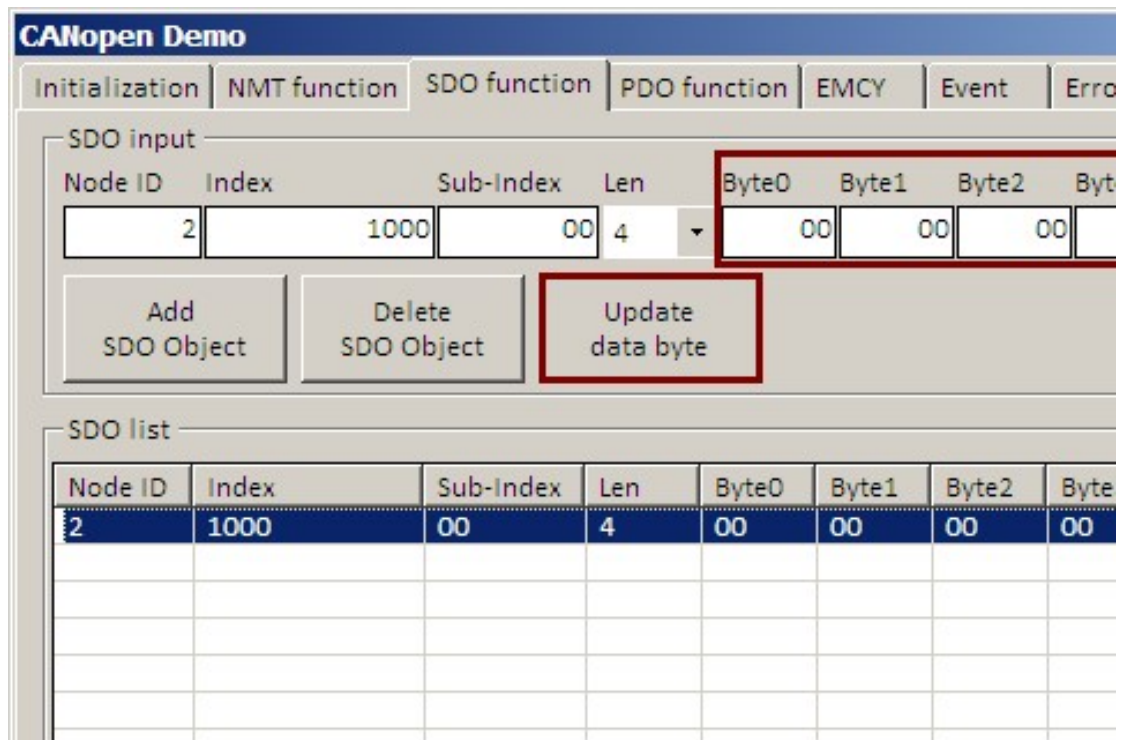
Figure 18

5.4. Get SDO

➢ Select a object from SDO list and press "Get SDO" button. (See Figure 19)

➢ Get data will be show in list
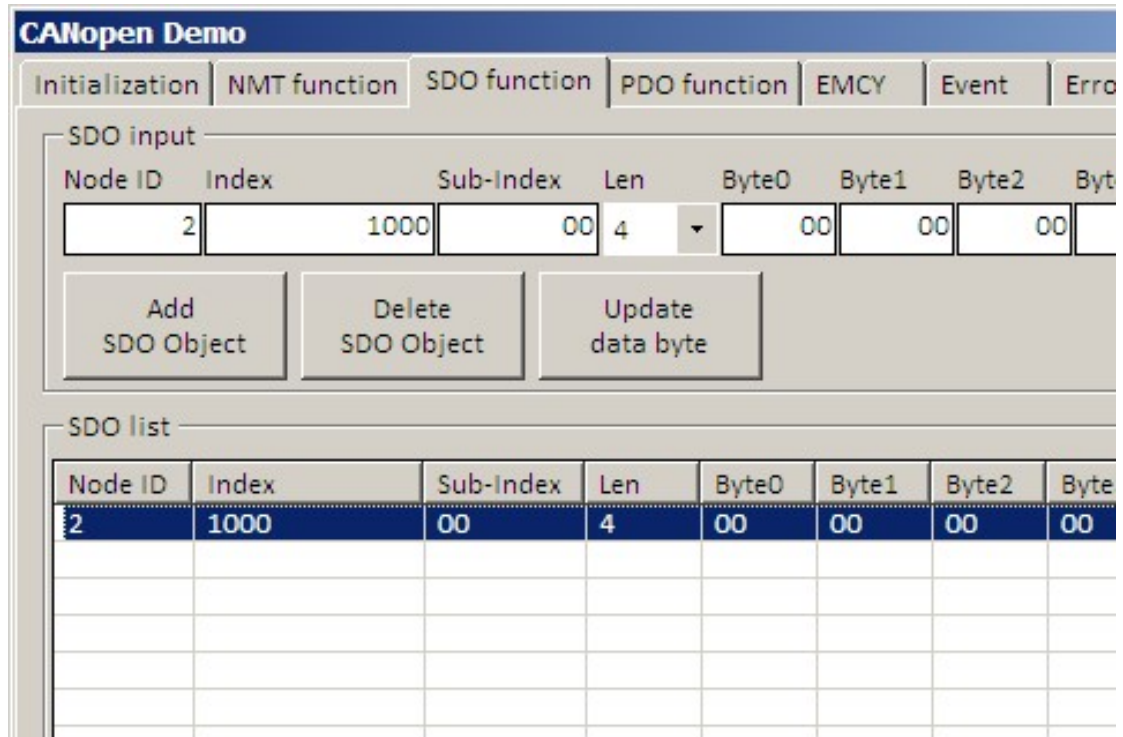
Figure 19

➢ If it fail to get SDO will be switch to Error page. (Figure 20)

Figure 20

5.5. Set SDO

➢ Select a object from SDO list and press "Set SDO" button. (See Figure 21)
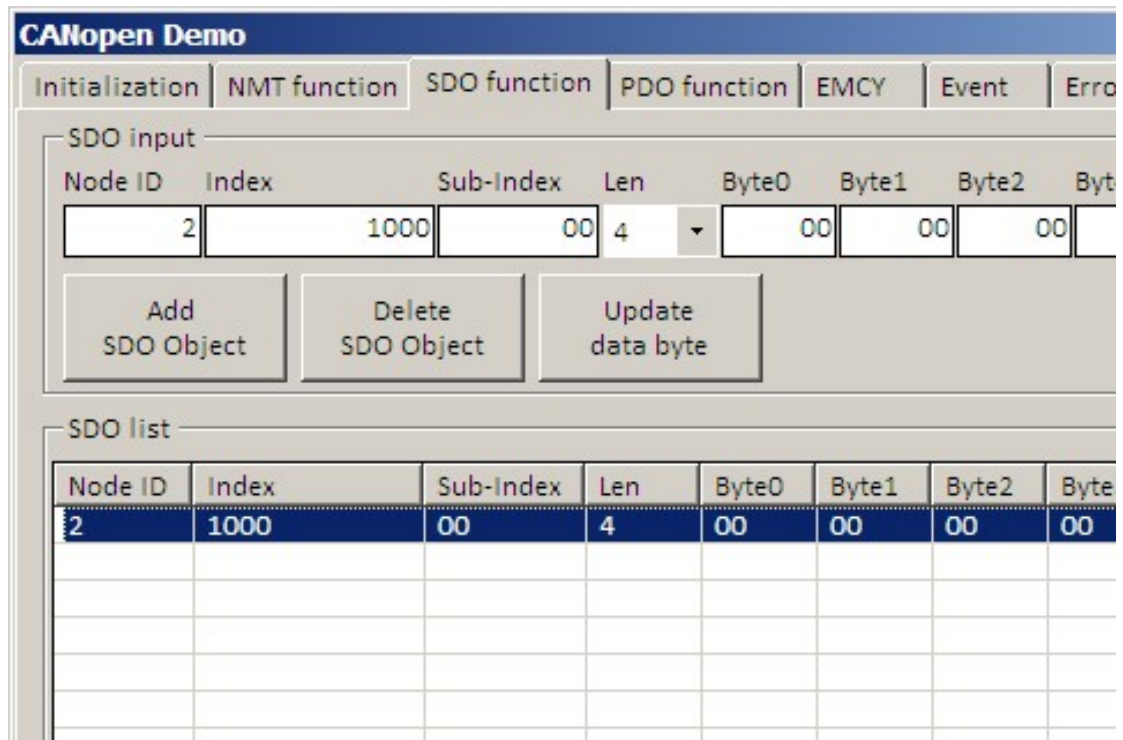
Figure 21

➢ If it fail to set SDO will be switch to Error page. (Figure 22)
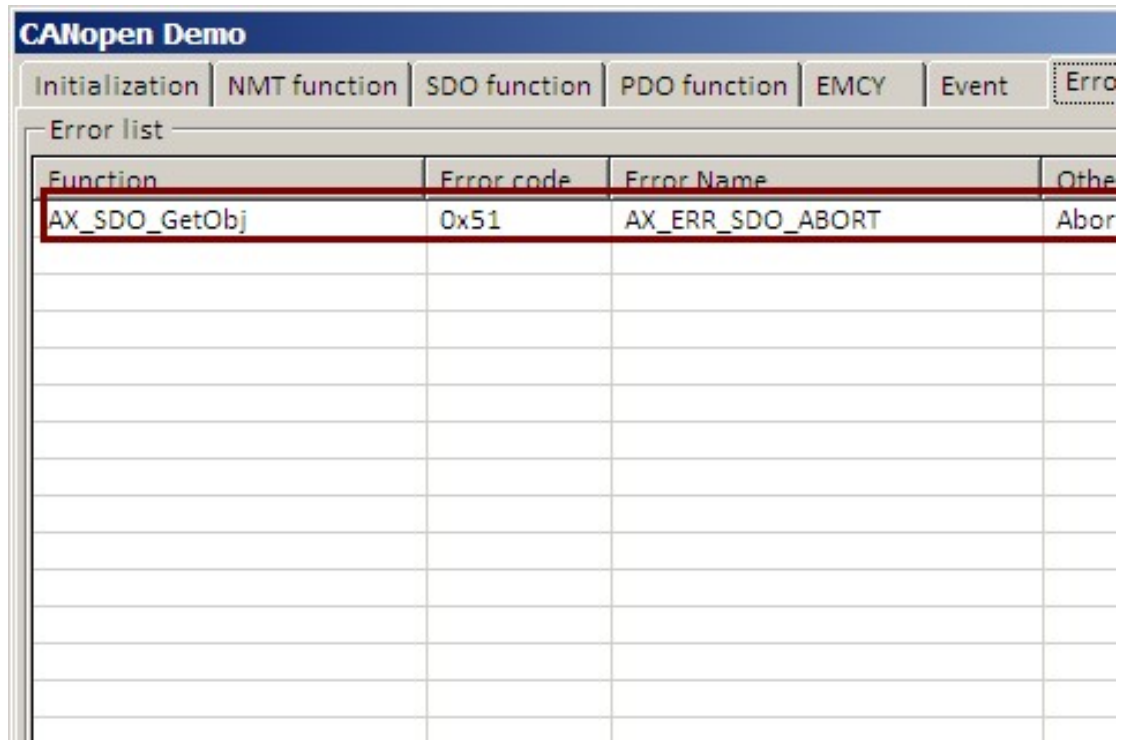
Figure 22

6. Process data object (PDO)

PDO function support Add/Delete PDO function and support Get/Set PDO function.

(See Figure 23)

Figure 23

6.1. Add PDO

➢ Input Node-ID/PDO-No/Type/Mode/Len/CANID/Byte data and press "Add PDO Object" button. (See Figure 24)

Figure 24

6.2. Delete PDO

➢ Select a object from PDO list and press "Delete PDO Object" button.
(See Figure 25)
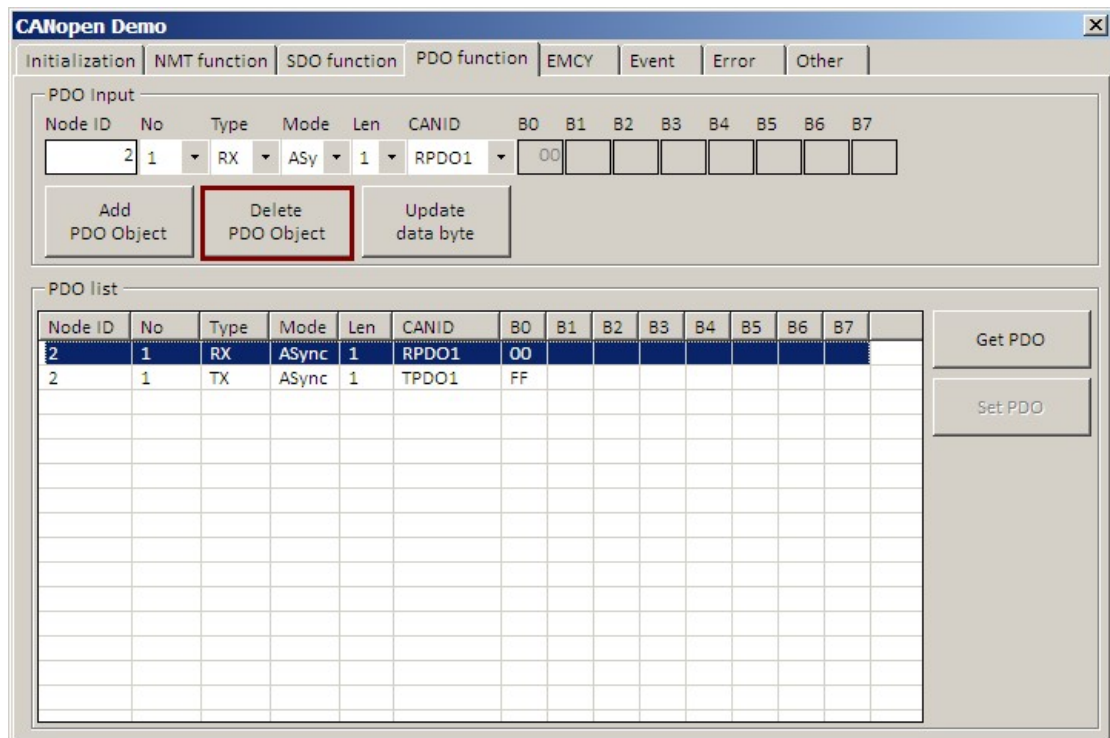
Figure 25

6.3. Update PDO data byte

➢ Select a object from PDO list and update data byte of PDO then press "Update data byte" button. (See Figure 26)
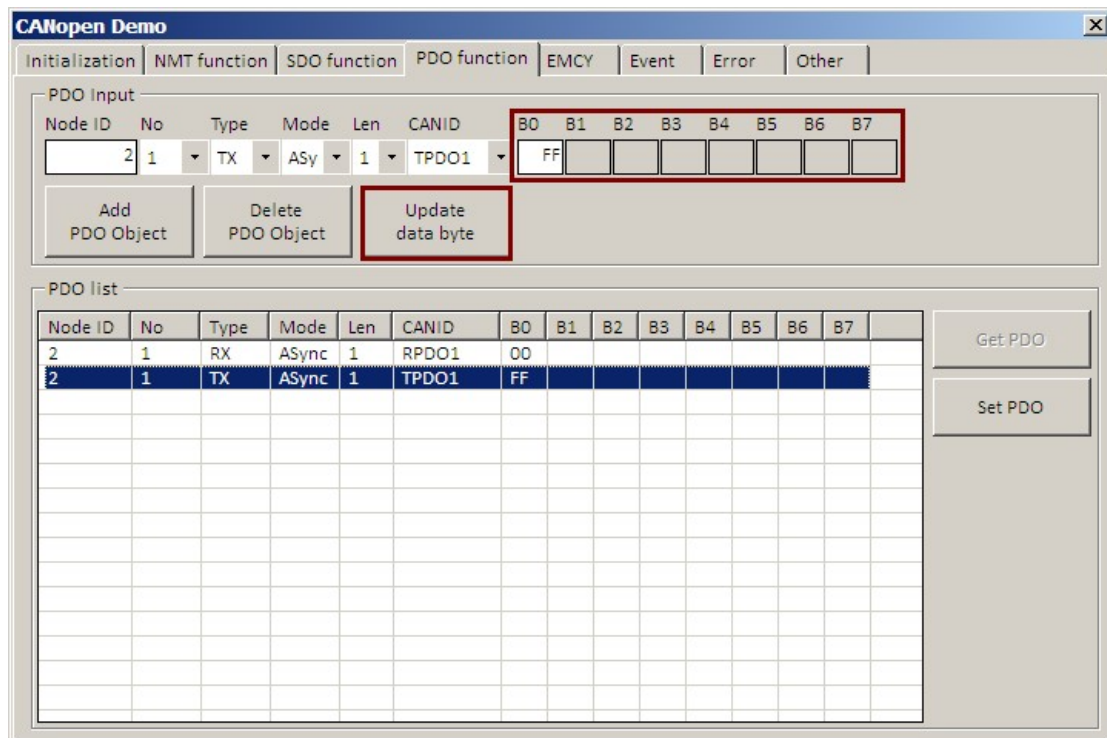
Figure 26

6.4. Get PDO

➢ Select a RX-object from PDO list and press "Get PDO" button. (See Figure 27)

➢ Get data will be show in list
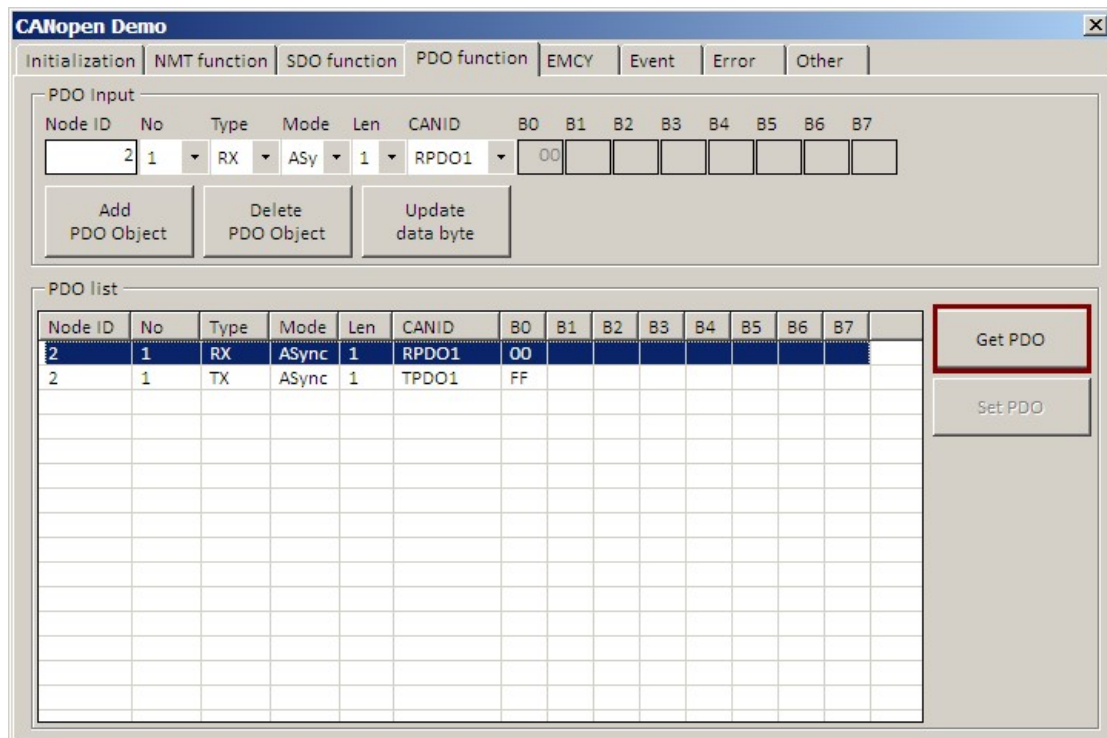
Figure 27

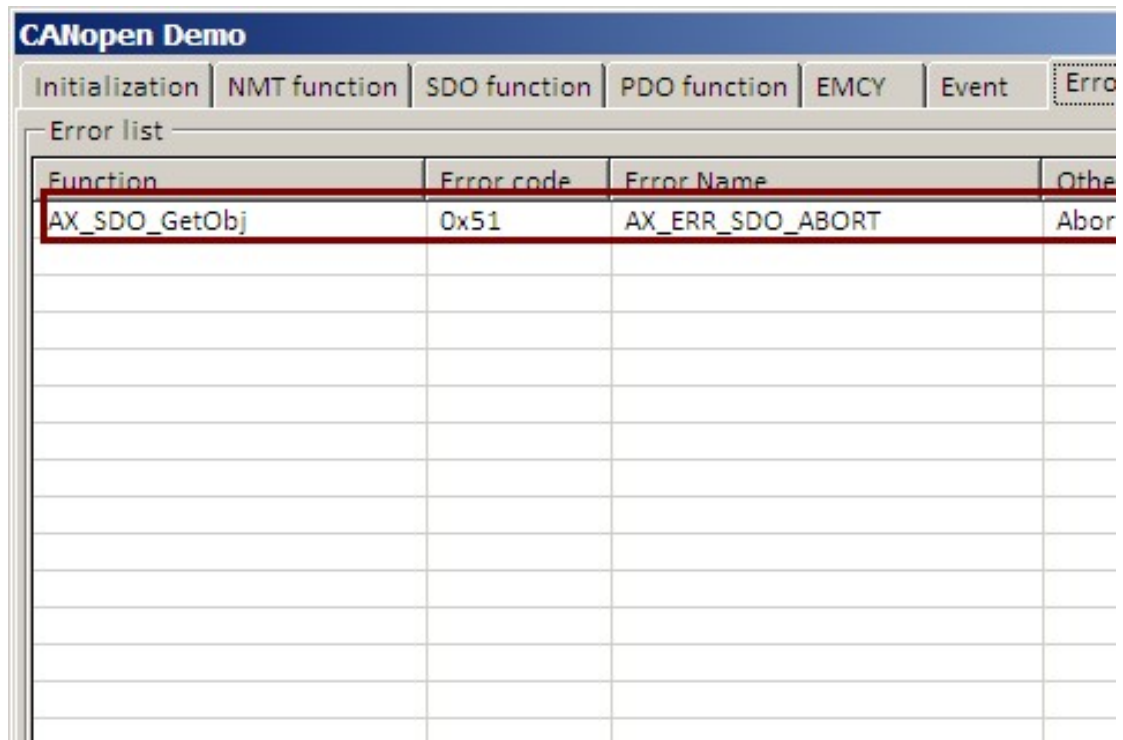➢ If it fail to get PDO will be switch to Error page. (Figure 28)
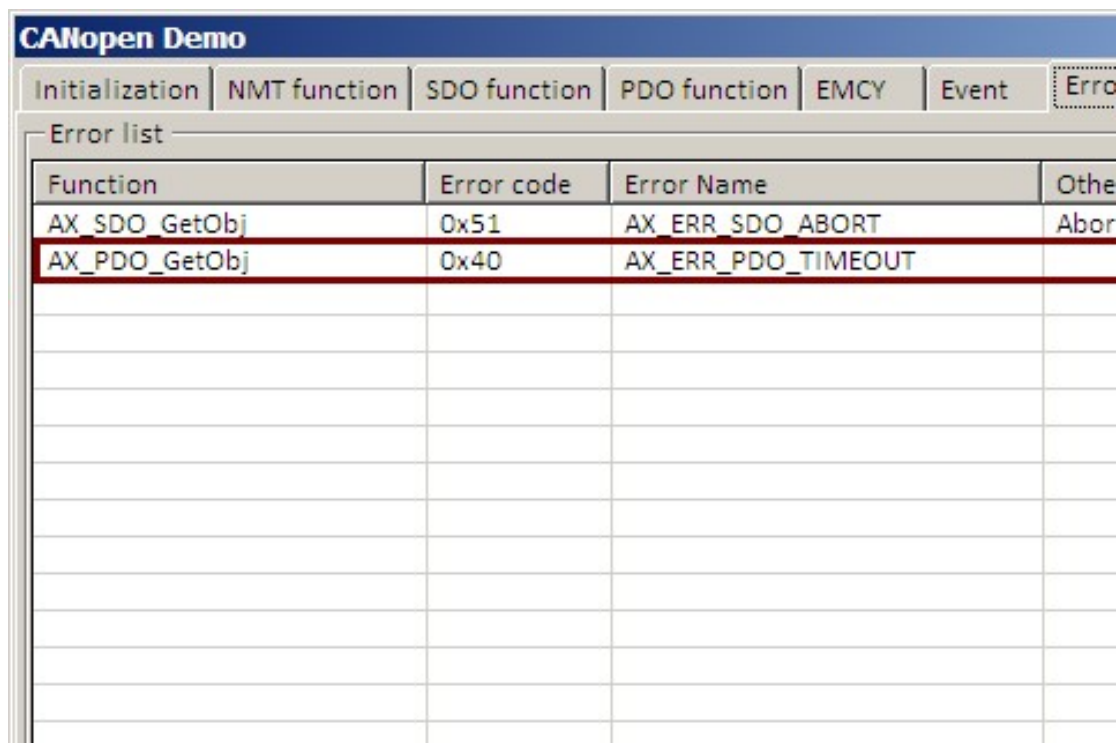
Figure 28

6.5. Set PDO

➢ Select a TX-object from PDO list and press "Set PDO" button. (See Figure 29)
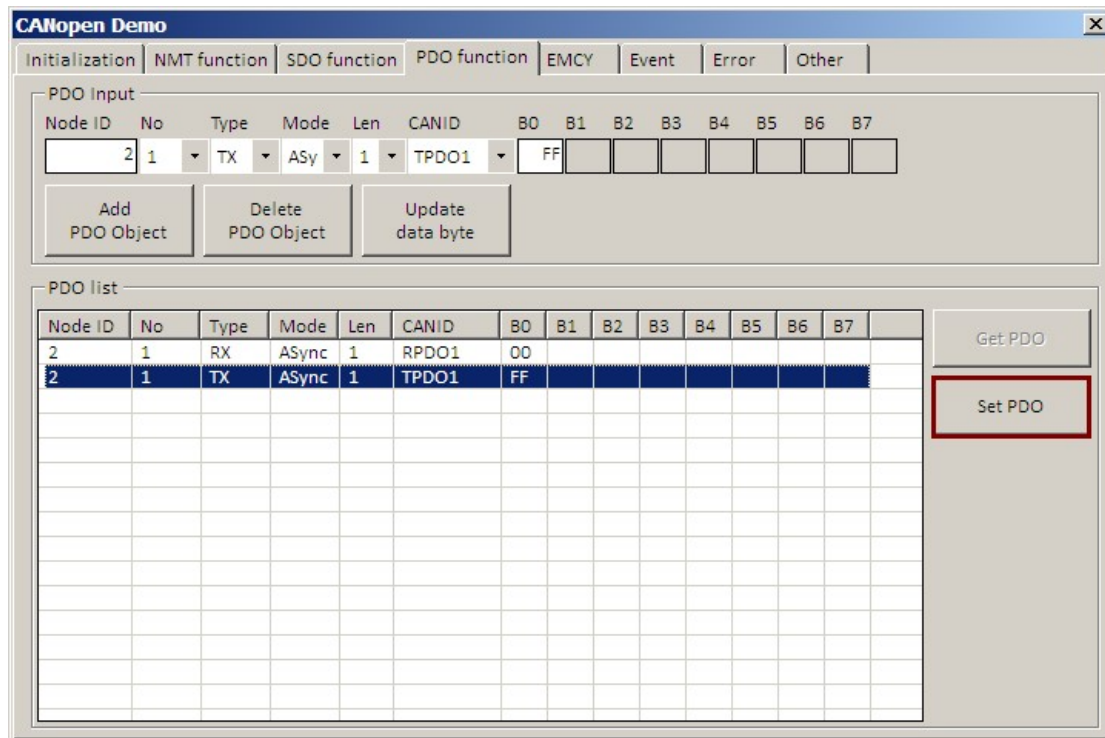
Figure 29

➢ If it fail to get PDO will be switch to Error page. (Figure 30)
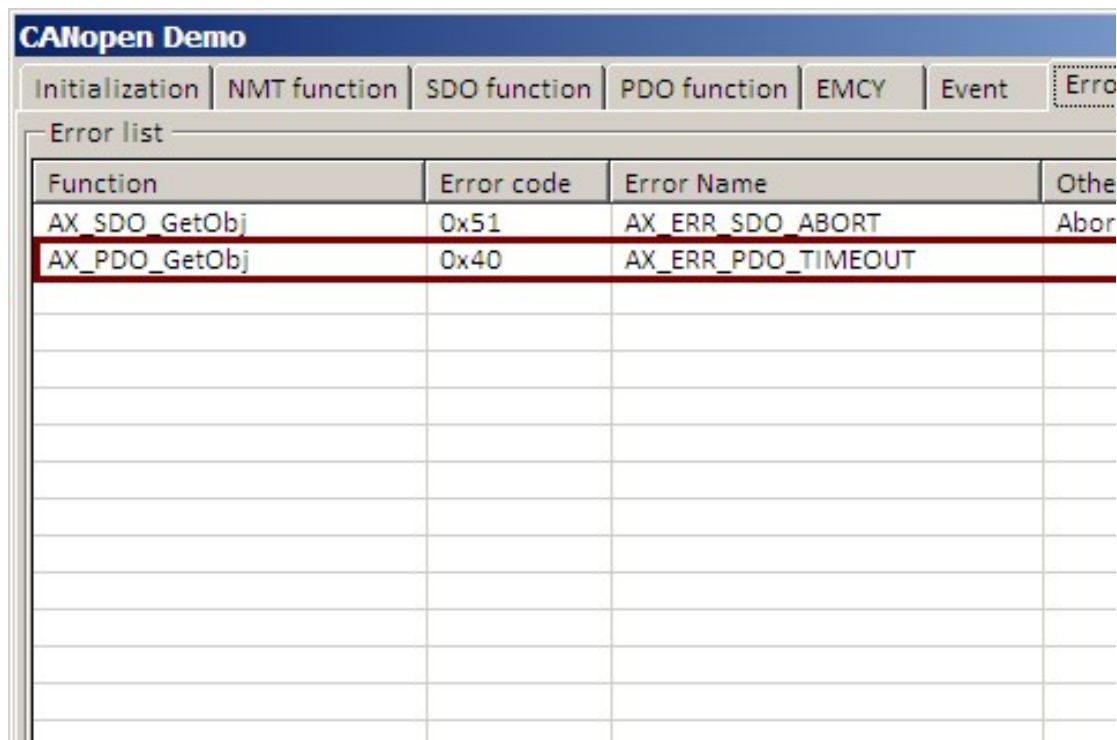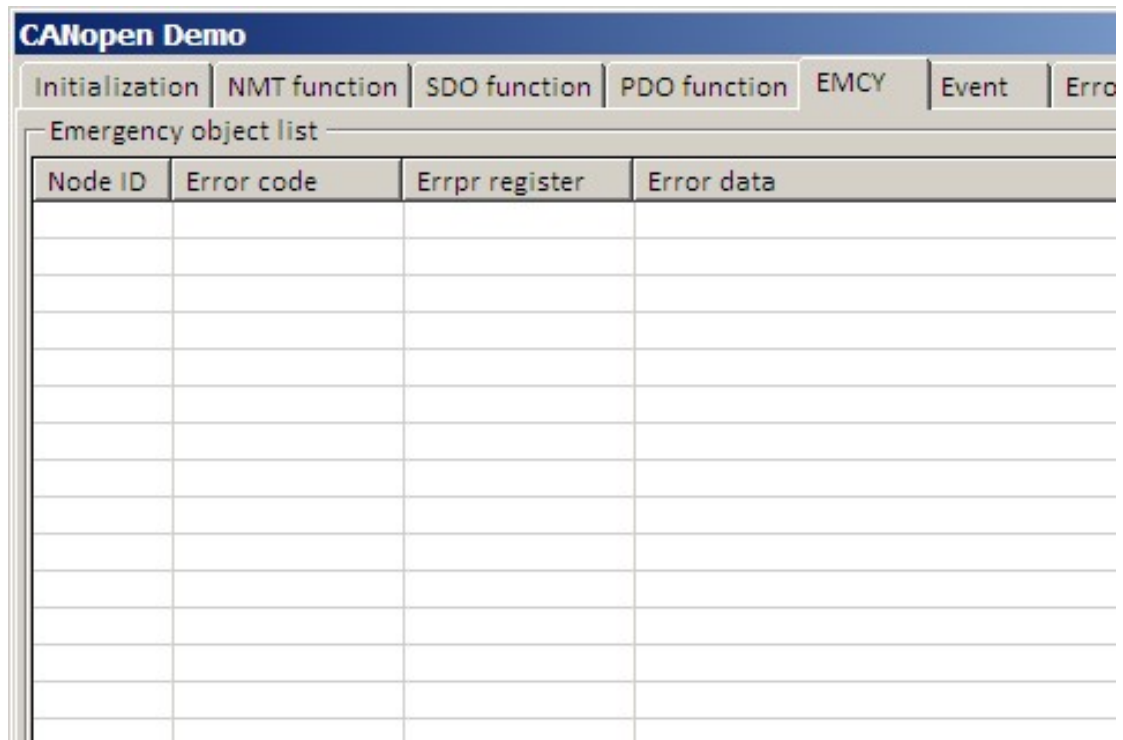
Figure 30

7. Emergency object (EMCY)

EMCY list will be receive EMCY object of all node. (See Figure 31)
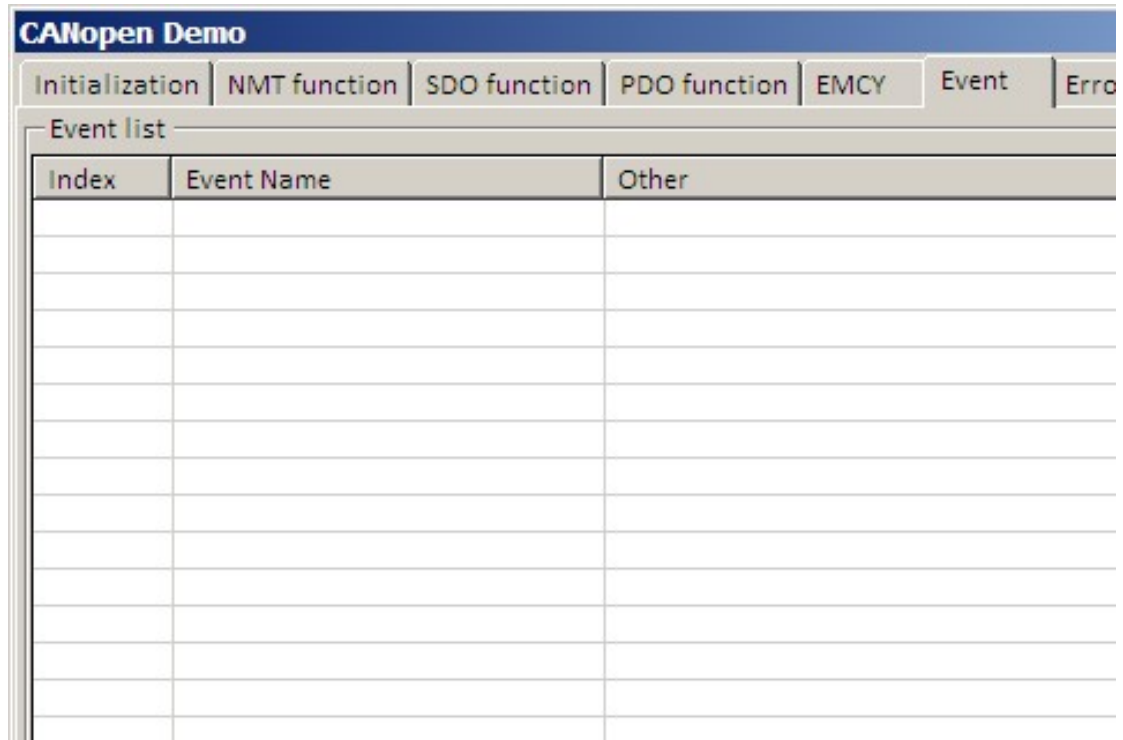
Figure 31

8. Event list

Event list will be receive Event of API. (See Figure 32)

All event index will be show Table 3.

Figure 32
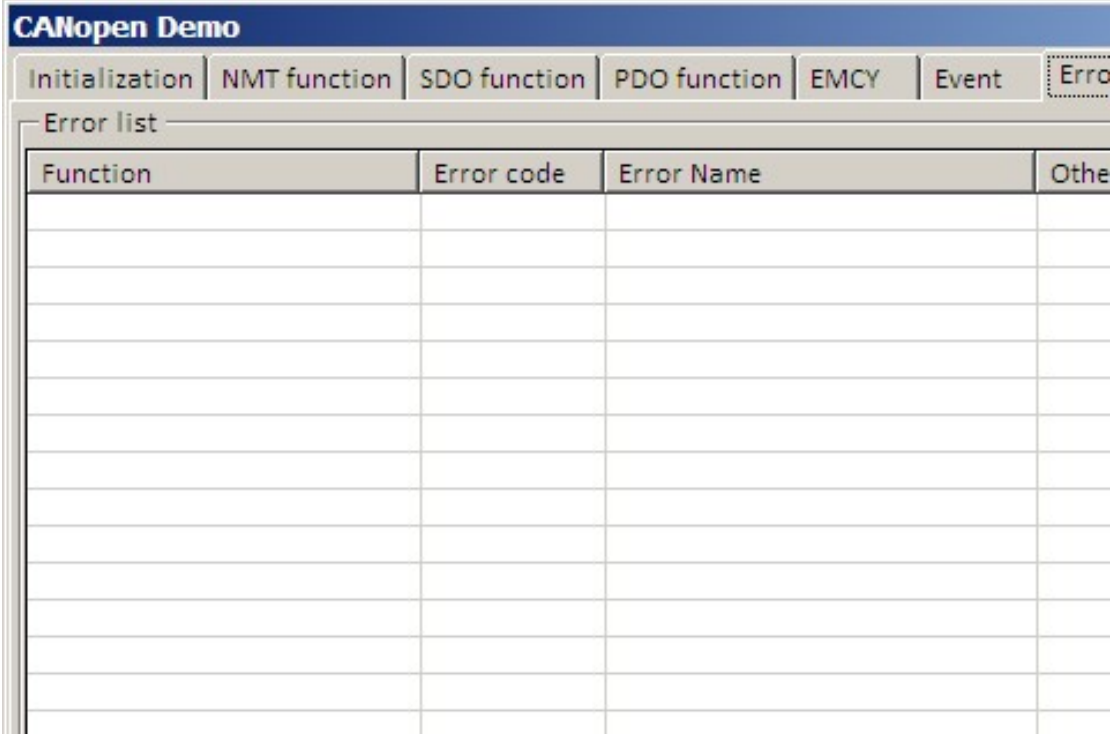
Name	Value	Description	Return value
AX_EVT_NMT_NODE_GAURDING	0x0101	Guarding error	INT(Node ID)
AX_EVT_NMT_HEARTBEAT	0x0102	Heartbeat error	INT(Node ID)
AX_EVT_EMCY	0x0401	EMCY event	NULL
AX_EVT_PDO_RX	0x0501	RPDO event	NULL

Table 3

9. Error list

Error list will be showing all error of Demo tool. (See Figure 33)

All error code will be show Table 4.
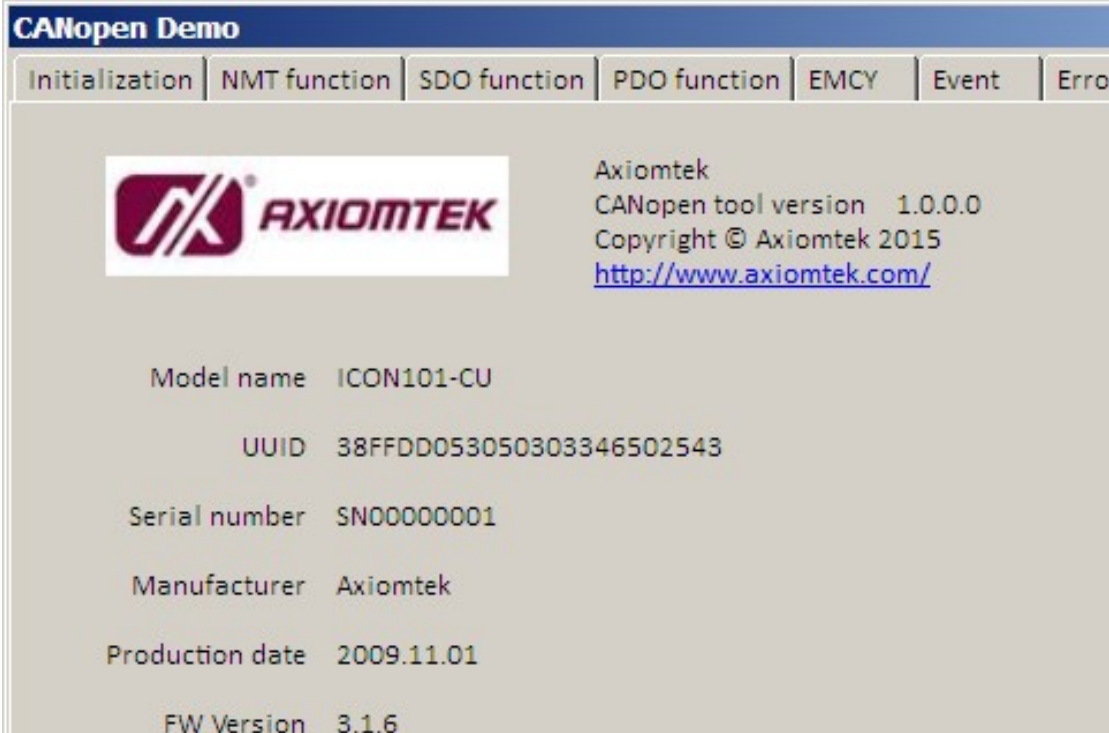
Figure 33

Name	Value	Description
AX_ERR_NONE	0x0000	No error
AX_ERR_BUSY	0x0001	Function busy
AX_ERR_PARA	0x0002	Parameters error
AX_ERR_CONNECTED	0x0010	Device has been connected
AX_ERR_DISCONNECTED	0x0011	Device has been disconnected
AX_ERR_QUEUEEMPTY	0x0012	Queue empty
AX_ERR_UNINITIALIZED	0x0013	CANopen has not been initalized
AX_ERR_THREADFAIL	0x0014	Resume thread error
AX_ERR_CAN_OPENED	0x0020	CAN-port has been opened
AX_ERR_CAN_CLOSED	0x0021	CAN-port has been closed
AX_ERR_CAN_BITRATE	0x0022	Set bitrate error of CAN
AX_ERR_CAN_CONFIG	0x0023	Set configuration error of CAN
AX_ERR_CAN_TERMIN	0x0024	Set termination error of CAN
AX_ERR_CAN_ID	0x0025	Set CAN-ID error of CAN
AX_ERR_CAN_MASK	0x0026	Set CAN-mask error of CAN
AX_ERR_CAN_TX	0x0027	Send message error of CAN
AX_ERR_CAN_RX	0x0028	Receive message error of CAN
AX_ERR_CAN_TIMEOUT	0x0029	Response timeout of CAN
AX_ERR_NMT_NODEEXIST	0x0030	NMT-node is exist
AX_ERR_NMT_NODENOTEXIST	0x0031	NMT-node is not exist
AX_ERR_PDO_TIMEOUT	0x0040	PDO timeout
AX_ERR_PDO_OBJEXIST	0x0041	Object is exist in PDO list
AX_ERR_PDO_OBJNOTEXIST	0x0042	Object is not exist in PDO list
AX_ERR_PDO_CANIDEXIST	0x0043	CANID is exist of object in PDO list
AX_ERR_SDO_TIMEOUT	0x0050	SDO timeout
AX_ERR_SDO_ABORT	0x0051	SDO abort
AX_ERR_SDO_FORMAT	0x0052	SDO format error
AX_ERR_EVENT_SYNC	0x1000	Sync object error
AX_ERR_EVENT_PDO	0x1001	Sync PDO error
AX_ERR_EVENT_TIME	0x1002	Time object error

Table 4

10. Other page

Information of Demo tool & Device. (See Figure 34)

Figure 34