PDS/tDS-700 Series

Linux User Manual

Warranty

All products manufactured by ICP DAS are warranted against defective materials for a period of one year from the date of delivery to the original purchaser.

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1. PDS/tDS-700 Static Library Function Description

Before user use the library, user should configure and check the network configuration of PDS/tDS-700 module with demo “eSearch” first. The static library is the collection of function calls of the PDS/tDS-700 series for linux kernel 2.6.x system. The application structure is presented as below figure “Figure 1-1”. The user application program developed by C (C++) language can call library “libpds700.a” for x86 or “libpds700_64.a” for x64 or “libpds700_arm.a” for arm linux PC. And then static library will call the module command to access the hardware system.

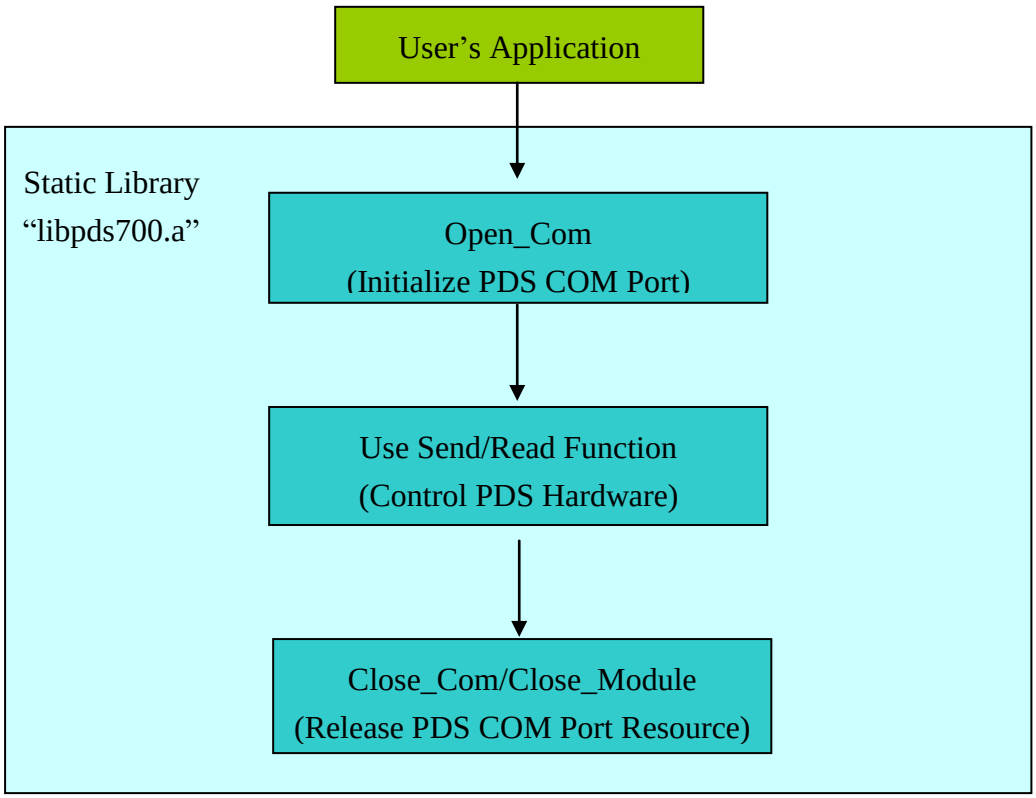


Figure 1-1

1.1 Table of ErrorCode and ErrorString

Table 1.1

Error Code	Error ID	Error String
0	PDS700_NOERROR	OK (No error!)
1	PDS700_OPENCOMERROR	Initializing PDS COM error
2	PDS700_CMDPORTERROR	The PDS/tDS-700 command port over range
3	PDS700_COMNUMBERERROR	The PDS/tDS-700 COM port over range
4	PDS700_OPENSOCKETERROR	Creating socket error
5	PDS700_CONNECTSOCKETERROR	Connecting socket error
6	PDS700_GETHOSTNAMEERROR	Getting PDS/tDS-700 host name error
7	PDS700_SETCOMBAUDERROR	Setting the baud rate of COM port error
8	PDS700_SETCOMDATAFORMATERROR	Setting the data format of COM port error
9	PDS700_SETCMDRETURNMODEERROR	Setting the response mode of PDS/tDS-700 error
10	PDS700_CLOSECOMSOCKETERROR	Closing COM socket error
11	PDS700_CLOSECMDSOCKETERROR	Closing command socket error
12	PDS700_SENDSTRINGERROR	Sending string from the PDS/tDS-700 COM port error
13	PDS700_READSTRINGERROR	Reading string from the PDS/tDS-700 COM port error
14	PDS700_SETSERVERIPERROR	Setting the IP address of PDS/tDS-700 error
15	PDS700_SETSERVERGATEWAYERROR	Setting the gateway of PDS/tDS-700 error
16	PDS700_SETSERVERSUBMASKER	Setting the sub-network

	ROR	mask of PDS/tDS-700 error
17	PDS700_CLEARBUFFERERROR	Clear COM port buffer error
18	PDS700_NORESPONSE	The PDS/tDS-700 no response

1.2 Function Descriptions

Table 1.2

Library Function
WORD Open_Com(pds_mod_t *PDSMod, char *ServerIP, WORD CommandPort, WORD ServerCOM, DWORD Baudrate, BYTE Data, BYTE Parity, BYTE Stop);
WORD Close_Com(pds_mod_t *PDSMod, WORD ServerCOM);
WORD Open_CAN(pds_mod_t *PDSMod, char *ServerIP);
WORD Close_CAN(pds_mod_t *PDSMod);
WORD Close_Module(pds_mod_t *PDSMod);
char * Get_PDS_Library_Version(void);
WORD Get_PDS_MiniOS_Version(pds_mod_t *PDSMod, char *MiniOSVer);
WORD Get_PDS_Vxcomm_Version(pds_mod_t *PDSMod, char *VxcommVer);
WORD Get_PDS_Module_Name(pds_mod_t *PDSMod, char *ModuleName);
WORD Get_PDS_COM_Info(pds_mod_t *PDSMod, WORD ServerCOM);
WORD Get_PDS_Server_Network_Info(pds_mod_t *PDSMod);
WORD Reset_PDS_Module(pds_mod_t *PDSMod);
WORD Set_PDS_Server_IP(pds_mod_t *PDSMod, char *NewServerIP);
WORD Set_PDS_Server_Gateway(pds_mod_t *PDSMod, char *NewServerGateway);
WORD Set_PDS_Server_SubMask(pds_mod_t *PDSMod, char *NewServerSubMask);
WORD Clear_PDS_Buffer(pds_mod_t *PDSMod, int Port);
WORD Send_Read_String(pds_mod_t *PDSMod, WORD ServerCOM, char Out_String[], char In_String[]);

WORD Send_String(pds_mod_t *PDSMod, WORD ServerCOM, char Out_String[]);
WORD Read_String(pds_mod_t *PDSMod, WORD ServerCOM, char In_String[]);
WORD Send_Modbus(pds_mod_t *PDSMod, WORD ServerCOM, char Out_String[], char Out_len);
WORD Read_Modbus(pds_mod_t *PDSMod, WORD ServerCOM, char In_String[], char In_len);
WORD Send_Binary(pds_mod_t *PDSMod, WORD ServerCOM, char Out_String[], int len);
WORD Read_Binary(pds_mod_t *PDSMod, WORD ServerCOM, char In_String[], int len);
WORD Send_CAN_Msg(pds_mod_t *PDSMod, char* can_msg);
WORD Read_CAN_Msg(pds_mod_t *PDSMod, char *In_String);

1.3 Library FUNCTIONS

1.3.1 Open_Com

- **Description:**
  This function is used to configure and open a PDS/tDS-700 Server COM port for service by Ethernet. The COM port must be called up before users can begin sending/receiving commands through it.
- **Syntax:**
  WORD Open_Com(pds_mod_t *PDSMod, char *ServerIP, WORD CommandPort, WORD ServerCOM, DWORD Baudrate, BYTE Data, BYTE Parity, BYTE Stop);
- **Parameter:**
  PDSMod: [output] A structure pointer.
  ServerIP: [input] The IP address of PDS/tDS-700 server.
  CommandPort: [input] PDS/tDS-700 command port is 10000.
  ServerCOM: [input] The number of PDS/tDS-700 COM port.
  Baudrate: [input] The baud of PDS/tDS-700 COM port.
  Data: [input] 5/6/7/8 data bit
  Parity: [input] 0=None Parity, 1=Odd Parity, 2=Even Parity
  Stop: [input] 1=1-stop, 2=2-stop
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.2 Close_Com

- **Description:**
  This function is used to close and release COM port resources. It must be called before exiting the application program.
- **Syntax:**
  WORD Close_Com(pds_mod_t *PDSMod, WORD ServerCOM);
- **Parameter:**
  PDSMod: [input] A structure pointer.
  ServerCOM: [input] The number of PDS/tDS-700 COM port.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section

1.1 Error Code").

1.3.3 Open_CAN

- **Description:**
  Open CAN device for service by Ethernet (support I-7054D for now).
  You should call up before send & read can messages.
- **Syntax:**
  WORD Open_CAN(pds_mod_t *PDSMod, char *ServerIP)
- **Parameter:**
  PDSMod: [input] A structure pointer.
  ServerIP: [input] The IP address of PDS/tDS-700 server
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.4 Close_CAN

- **Description:**
  This function is used to close and release CAN port resources.
  It must be called before exiting the application program.
- **Syntax:**
  WORD Close_CAN(pds_mod_t *PDSMod)
- **Parameter:**
  PDSMod: [input] A structure pointer.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.5 Close_Module

- **Description:**
  To release PDS/tDS-700 module and all COM ports resources.
- **Syntax:**
  WORD Close_Module(pds_mod_t *PDSMod);
- **Parameter:**
  PDSMod: [input] A structure pointer.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.6 Get_PDS_Library_Version

- **Description :**
  To get the version of PDS/tDS-700 linux library.
- **Syntax :**
  char * Get_PDS_Library_Version(void);
- **Parameter :**
  None
- **Return:**
  Return the PDS/tDS-700 library version.

1.3.7 Get_PDS_MiniOS_Version

- **Description :**
  To read the MiniOS7 version of PDS/tDS-700 server.
- **Syntax :**
  WORD Get_PDS_MiniOS_Version(pds_mod_t *PDSMod, char *MiniOSVer);
- **Parameter :**
  PDSMod: [input] A structure pointer.
  MiniOSVer: [output] The MiniOS7 version of PDS/tDS-700 server.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.8 Get_PDS_Vxcomm_Version

- **Description :**
  To read the VxComm.exe version of PDS/tDS-700 server.
- **Syntax :**
  WORD Get_PDS_Vxcomm_Version(pds_mod_t *PDSMod, char *VxcommVer);
- **Parameter :**
  PDSMod: [input] A structure pointer.
  VxcommVer: [output] The VxComm.exe version of PDS/tDS-700 server.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.9 Get_PDS_Module_Name

- **Description :**
  To read the PDS/tDS-700 module name.
- **Syntax :**
  WORD Get_PDS_Module_Name(pds_mod_t *PDSMod, char *ModuleName);
- **Parameter :**
  PDSMod: [input] A structure pointer.
  ModuleName: [output] The name of PDS/tDS-700 module.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.10 Get_PDS_COM_Info

- **Description :**
  To read the COM port Configuration of PDS/tDS-700 server.
- **Syntax :**
  WORD Get_PDS_COM_Info(pds_mod_t *PDSMod, WORD ServerCOM);
- **Parameter :**
  PDSMod: [input] A structure pointer.
  ServerCOM: [input] The number of PDS/tDS-700 COM port.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.11 Get_PDS_Server_Nerwork_Info

- **Description :**
  To read the network configuration of PDS/tDS-700 server.
- **Syntax :**
  WORD Get_PDS_Server_Network_Info(pds_mod_t *PDSMod);
- **Parameter :**
  PDSMod: [input] A structure pointer.None.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section

1.1 Error Code").

1.3.12 Reset_PDS_Module

- **Description :**
  To restart the PDS/tDS-700 server.
- **Syntax :**
  WORD Reset_PDS_Module(pds_mod_t *PDSMod);
- **Parameter :**
  PDSMod: [input] A structure pointer.None.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.13 Set_PDS_Server_IP

- **Description :**
  To configure the IP address of PDS/tDS-700 server.
- **Syntax :**
  WORD Set_PDS_Server_IP(pds_mod_t *PDSMod, char *NewServerIP);
- **Parameter :**
  PDSMod: [input] A structure pointer.
  NewServerIP: [input] The new IP address of PDS/tDS-700 server.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.14 Set_PDS_Server_Gateway

- **Description :**
  To configure the new gateway of PDS/tDS-700 server.
- **Syntax :**
  WORD Set_PDS_Server_Gateway(pds_mod_t *PDSMod, char *NewServerGateway);
- **Parameter :**
  PDSMod: [input] A structure pointer.
  NewServerGateway: [input] The new gateway of PDS/tDS-700 server.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section

1.1 Error Code").

1.3.15 Set_PDS_Server_SubMask

- **Description :**
  To configure the new sub-network mask of PDS/tDS-700 server.
- **Syntax :**
  WORD Set_PDS_Server_SubMask(pds_mod_t *PDSMod, char *NewServerSubMask);
- **Parameter :**
  PDSMod: [input] A structure pointer.
  NewServerSubMask: [input] The new submask of PDS/tDS-700 server.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.16 Clear_PDS_Buffer

- **Description :**
  Clear comport buffer of PDS/tDS-700 server.
- **Syntax :**
  WORD Clear_PDS_Buffer(pds_mod_t *PDSMod, int Port);
- **Parameter :**
  PDSMod: [input] A structure pointer.
  Port: [input] Comport number of PDS/tDS-700 server.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.17 Send_Read_String

- **Description :**
  To send and receive string from PDS/tDS-700 server.
- **Syntax :**
  WORD Send_Read_String(pds_mod_t *PDSMod, WORD ServerCOM, char Out_String[], char In_String[]);
- **Parameter :**
  PDSMod: [input] A structure pointer.
  ServerCOM: [input] The COM port number of PDS/tDS-700 server.
  Out_String: [input] The sending string.

In_String: [Output] Receiving the response string from the modules.

- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.18 Send_String

- **Description :**
  To send string from the COM port of PDS/tDS-700 server.
- **Syntax :**
  WORD Send_String(pds_mod_t *PDSMod, WORD ServerCOM, char Out_String[]);
- **Parameter :**
  PDSMod: [input] A structure pointer.
  ServerCOM: [input] The COM port number of PDS/tDS-700 server.
  Out_String: [input] The sending string.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.19 Read_String

- **Description :**
  To receive from the COM port of PDS/tDS-700 server.
- **Syntax :**
  WORD Read_String(pds_mod_t *PDSMod, WORD ServerCOM, char In_String[]);
- **Parameter :**
  PDSMod: [input] A structure pointer.
  ServerCOM: [input] The COM port number of PDS/tDS-700 server.
  In_String: [output] The receiving string from the PDS/tDS-700 server.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.20 Send_Modbus

- **Description :**
  To send Modbus protocol from the COM port of PSD-700 server.
- **Syntax :**
  WORD Send_Modbus(pds_mod_t *PDSMod, WORD ServerCOM, char Out_String[], char Out_len);
- **Parameter :**
  PDSMod: [input] A structure pointer.
  ServerCOM: [input] The COM port number of PDS/tDS-700 server.
  Out_String: [input] The sending string.
  Out_len:[input] The “Out_String “ string length.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.21 Read_Modbus

- **Description :**
  To receive Modbus protocol from the COM port of PDS/tDS-700 server.
- **Syntax :**
  WORD Read_Modbus(pds_mod_t *PDSMod, WORD ServerCOM, char In_String[], char In_len);
- **Parameter :**
  PDSMod: [input] A structure pointer.
  ServerCOM: [input] The COM port number of PDS/tDS-700 server.
  In_String: [output] The receiving string from the PDS/tDS-700 server.
  In_len:[input] The “In_String” string length.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.22 Send_Binary

- **Description :**
  To send raw data to the COM port of PDS/tDS-700 server.
- **Syntax :**
  WORD Send_Binary(pds_mod_t *PDSMod, WORD ServerCOM, char Out_String[], int len);

- **Parameter :**

  PDSMod: [input] A structure pointer.

  ServerCOM: [input] The COM port number of PDS/tDS-700 server.

  Out_String: [output] The sending string.

  In_len:[input] The “Out_String” string length.

- **Return:**

  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.23 Read_Binary

- **Description :**

  To receive raw data from the COM port of PDS/tDS-700 server.

- **Syntax :**

  WORD Read_Binary(pds_mod_t *PDSMod, WORD ServerCOM, char In_String[], int len);

- **Parameter :**

  PDSMod: [input] A structure pointer.

  ServerCOM: [input] The COM port number of PDS/tDS-700 server.

  In_String: [output] The receiving string from the PDS/tDS-700 server.

  In_len:[input] The “In_String” string length.

- **Return:**

  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.24 Send_CAN_Msg

- **Description :**

  To send CAN message from the CAN port of remote server.

- **Syntax :**

  WORD Send_CAN_Msg(pds_mod_t *PDSMod, char* can_msg)

- **Parameter :**

  PDSMod: [input] A structure pointer.

  can_msg: [output] Send CAN message to remote server.

- **Return:**

  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

1.3.25 Read_CAN_Msg

- **Description :**

  To receive raw data from the COM port of PDS/tDS-700 server.

- **Syntax :**

  WORD Read_CAN_Msg(pds_mod_t *PDSMod, char *In_String)

- **Parameter :**

  PDSMod: [input] A structure pointer.

  In_String: [output] The receiving string from the remote server.

- **Return:**

  Return 0 means success, others means failure (Please refer to "Section 1.1 Error Code").

2. PDS/tDS-700 Library Demo For Linux

The PDS/tDS-700 library package provided the demo code in the package directory “examples” (Please refer to Table 2.1).

Table 2.1

Directory Path	File Name	Description
include	pds700.h	The header of PDS/tDS-700 library.
lib	libpds700.a	PDS/tDS-700 library for x86 Linux PC.
	libpds700_64.a	PDS/tDS-700 library for x64 Linux PC.
	libpds700_arm.a	PDS/tDS-700 library for arm x86 Linux PC.
doc	PDS700-Linux-Manual.pdf	The linux manual for PDS/tDS-700 library.
examples	pds_info.c	Show PDS/tDS-700 server information.
	pds_send_read.c pds_send_read2.c	Sending and Receiving string from PDS/tDS-700 server.
	pds_send_read_modbus.c	Sending and Receiving Modbus protocol from PDS/tDS-700 server.
	pds_send_read_binary.c	Sending and Receiving raw data from PDS/tDS-700 server.
	pds_set_net	Reset the network configuration of PDS/tDS-700 server.
	pds_send_can	Send CAN message to remote server.
	pds_read_can	Receive CAN message from remote server.
	eSearch	Get current subnet pds/tds modules information (IP, Submask, Gateway, MAC address)
	pds_clear_buffer	Clear a specific comport buffer

2.1 Demo code “pds_info”

This demo program would show the information of PDS/tDS-700 server. Please refer to figure 2-1

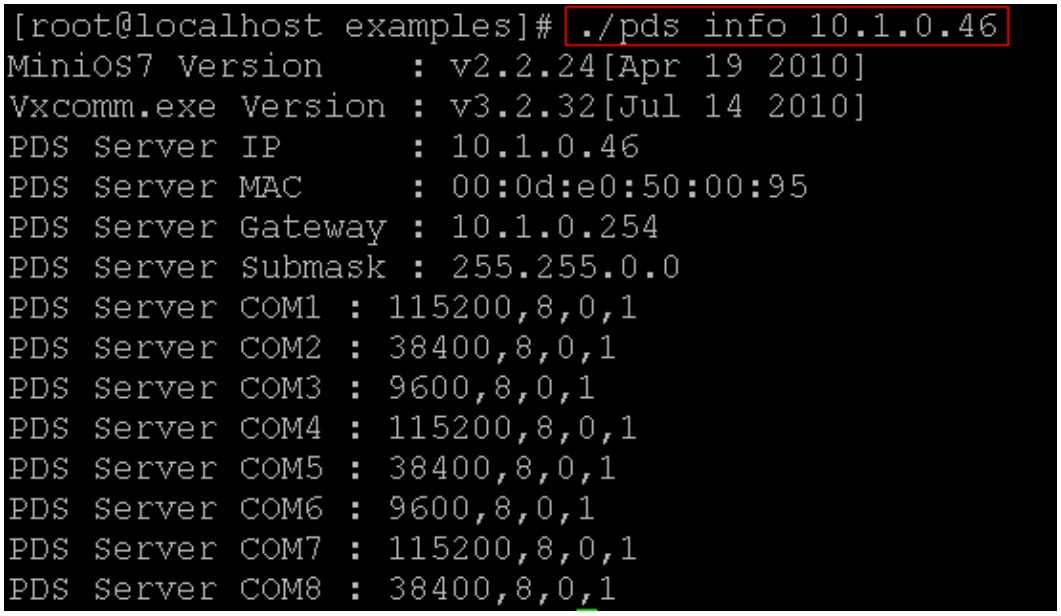


Figure 2-1

2.2 Demo code “pds_send_read”

This “pds_send_read” and “pds_send_read2” demo program would send and receive string from the COM port 1 of PDS/tDS-700 server. Please refer to figure 2-2.

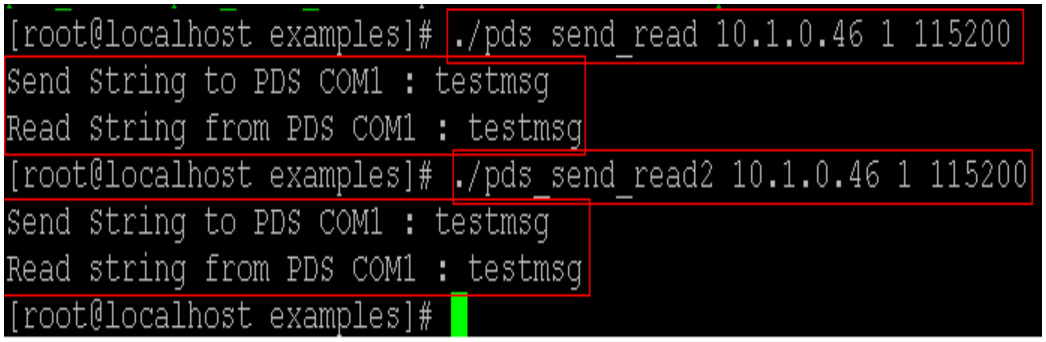


Figure 2-2

2.3 Demo code “pds_send_read_modbus”

This demo program would send and receive modbus protocol from the COM port 1 of PDS/tDS-700 server. Please refer to figure 2-3.

```
[root@localhost examples]# ./pds_send_read_modbus 10.1.0.17 1 115200
Send modbus to PDS COM1 :
send_cmd[0] 0x1    NetID
send_cmd[1] 0x3    Function code
send_cmd[2] 0x1    Modbus address high byte
send_cmd[3] 0xe2   Modbus address low byte
send_cmd[4] 0x0    Channel number high byte
send_cmd[5] 0x2    Channel number low byte
send_cmd[6] 0x65   CRC
send_cmd[7] 0xc1   CRC
Read modbus from PDS COM1 :
receive_cmd[0] 0x1     NetID
receive_cmd[1] 0x3     Function code
receive_cmd[2] 0x4     Byte conunt
receive_cmd[3] 0x17    Data Hi (address 482)
receive_cmd[4] 0x0     Data Low (address 482)
receive_cmd[5] 0x0     Data Hi (address 483)
receive_cmd[6] 0x70    Data Low (address 483)
receive_cmd[7] 0xfe    CRC
receive_cmd[8] 0x63    CRC
```

Figure 2-3

2.4 Demo code “pds_send_read_binary”

This demo program would send and receive raw data from the COM port 1 of PDS-tDS-700 server. Please refer to figure 2-4.

```
[root@localhost examples]# ./pds_send_read_binary 10.1.0.58 1
Send Binary to PDS COM1 :   0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
Read Binary from PDS COM1 : 0 1 2 3 4 5 6 7 8 9
Read Binary from PDS COM1 : 10 11 12 13 14 15 16 17 18 19
```

Figure 2-4

2.5 Demo code “pds_set_net”

This demo program would reset the network configuration of PDS/tDS-700 server. Please refer to figure 2-5

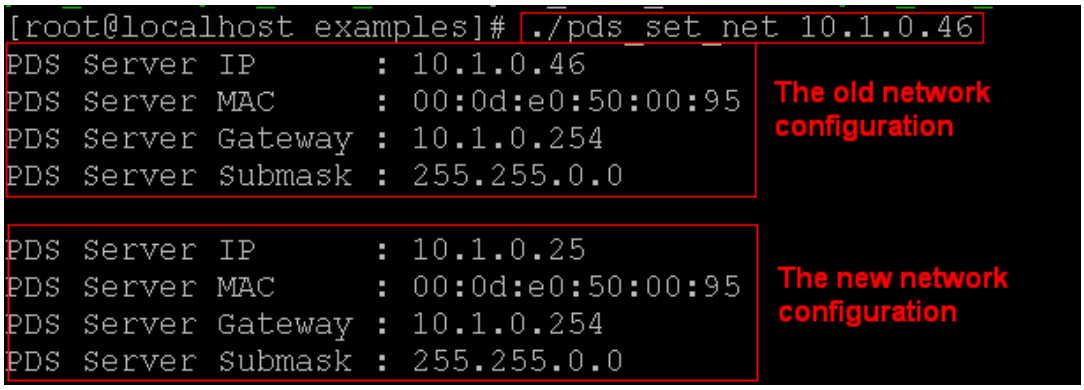
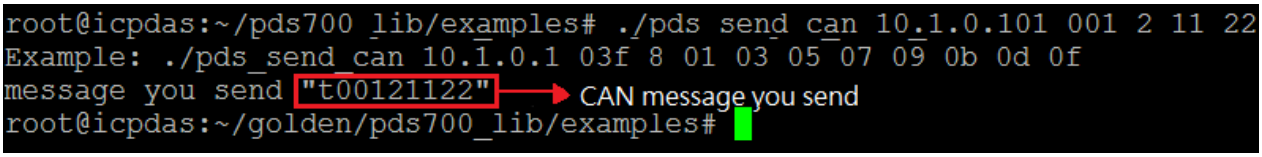


Figure 2-5

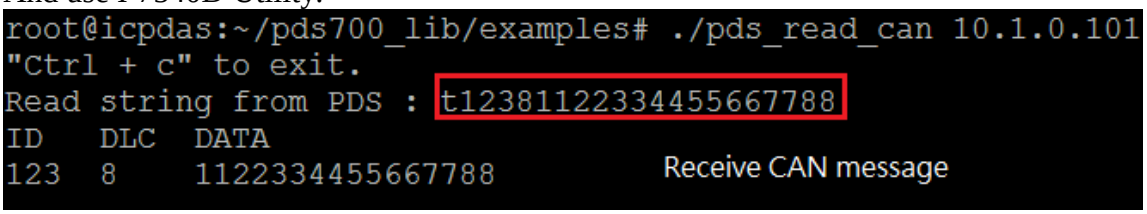
2.6 Demo code “pds_send_can”

This demo program have to set IP & baud rate first, you can set above two parameter in Windows, refer to https://www.icpdas.com/web/product/download/industrial_communication/can_bus/converter/ethernet/i-7540d/document/manual/I-7540D_UserManual_en.pdf
And use I-7540D Utility.



2.7 Demo code “pds_read_can”

This demo program have to set IP & baud rate first, you can set above two parameter in Windows, refer to https://www.icpdas.com/web/product/download/industrial_communication/can_bus/converter/ethernet/i-7540d/document/manual/I-7540D_UserManual_en.pdf
And use I-7540D Utility.



2.8 Demo code “eSearch”

This demo program shows modules information (IP, submask, gateway) in your sub-netmask

```
root@winson:~/pds700_lib/examples# ./eSearch
List modules in submask
NAME=tDS-715_RevB
IP=10.1.0.9         MASK=255.255.0.0    GATEWAY=10.1.0.254  MAC=00:0d:e0:12:34:56
NAME=PDS-782
IP=10.1.102.235     MASK=255.255.0.0    GATEWAY=10.1.0.254  MAC=00:0d:e0:50:02:9e
NAME=PDS-782
IP=10.1.102.234     MASK=255.255.0.0    GATEWAY=10.1.0.254  MAC=00:0d:e0:50:02:ba
```

2.9 Demo code “pds_clear_buffer”

This demo program shows clear comport buffer status.

```
root@winson-G41M-ES2L:~/pds700_lib/examples# ./pds_clear_buffer 192.168.2.234 1
Clear COM1 buffer OK.
```