CC32xx TCP Socket Application

Overview

A CC3200 device can communicate over network using standard communication protocols such as TCP and UDP. This can be accomplished without even using a Real Time Operating System (RTOS).



Application details

This particular application illustrates how this device can be used as a client or server for TCP communication. Developers/users can refer the function or re-use them while writing new application. The device will connect to an AP (access point), with SSID for AP stored as a macro in the application. Initially, the application implements a TCP client and sends 1000 TCP packets to a socket address, port number and ip address specified as macros. Zero will be the expected return code.

A different return code would mean that socket error has occurred.

Default setting is defined as in following MACROs, which can be changed either in source code or at runtime.

Source Files briefly explained

- main.c main file calls simplelink APIs to connect to the network, create socket and use it to communicate over TCP by acting as a TCP client or server.
- pinmux.c pinmux file to mux the device to configure UART peripheral
- startup ccs.c CCS specific vector table implementation for interrupts.
- startup_ewarm.c IAR workbench specific vector table implementation for interrupts.

Code flow

Connection

```
void main()
{
...
lRetVal = sl_Start(0, 0, 0);
...
// Connecting to WLAN AP - Set with static parameters defined at common.h
// After this call we will be connected and have IP address
lRetVal = WlanConnect();
...
/* following calls depend on user's input at runtime */
// Before proceeding, please make sure to have a server waiting on PORT_NUM
```

```
BsdTcpClient(PORT_NUM);

// After calling this function, you can start sending data to CC3200 device IP

// address on PORT_NUM

BsdTcpServer(PORT_NUM);
...
}
```

TCP Client

```
int BsdTcpClient(unsigned short usPort)
. . .
//Open a socket with standard parameters
iSockID = sl_Socket(SL_AF_INET, SL_SOCK_STREAM, 0);
if ( iSockID < 0 )
{
// error
ASSERT_ON_ERROR (TCP_CLIENT_FAILED);
}
//Connect to the server IP and port number
iStatus = sl_Connect(iSockID, ( SlSockAddr_t *)&sAddr, iAddrSize);
if(iStatus < 0)
{
// error
ASSERT_ON_ERROR(sl_Close(iSockID));
ASSERT_ON_ERROR (TCP_CLIENT_FAILED);
}
// sending packet
iStatus = sl_Send(iSockID, g_cBsdBuf, sTestBufLen, 0 );
if( iStatus <= 0 )
{
// error
ASSERT_ON_ERROR(sl_Close(iSockID));
ASSERT_ON_ERROR (TCP_CLIENT_FAILED);
}
//closing the socket after sending 1000 packets
ASSERT_ON_ERROR(sl_Close(iSockID));
return SUCCESS;
}
```

Sending the TCP Packets is a simple four step process

- 1. Open the socket
- 2. Connect to the server

- 3. Send the packets
- 4. Close the socket

TCP Server

```
int BsdTcpServer(unsigned short usPort)
{
. . .
iSockID = sl_Socket(SL_AF_INET,SL_SOCK_STREAM, 0);
if( iSockID < 0 )
// error
ASSERT_ON_ERROR(TCP_SERVER_FAILED);
iStatus = sl_Bind(iSockID, (SlSockAddr_t *)&sLocalAddr, iAddrSize);
if( iStatus < 0 )
{
// error
ASSERT_ON_ERROR(sl_Close(iSockID));
ASSERT_ON_ERROR(TCP_SERVER_FAILED);
iStatus = sl_Listen(iSockID, 0);
if( iStatus < 0 )
ASSERT_ON_ERROR(sl_Close(iSockID));
ASSERT_ON_ERROR(TCP_SERVER_FAILED);
iStatus = sl_SetSockOpt(iSockID, SL_SOL_SOCKET, SL_SO_NONBLOCKING, &lNonBlocking, sizeof(lNonBlocking));
if( iStatus < 0 )
ASSERT_ON_ERROR(sl_Close(iSockID));
ASSERT_ON_ERROR(TCP_SERVER_FAILED);
iNewSockID = SL_EAGAIN;
while( iNewSockID < 0 )
iNewSockID = sl_Accept(iSockID, ( struct SlSockAddr_t *)&sAddr, (SlSocklen_t*)&iAddrSize);
if( iNewSockID == SL_EAGAIN )
UtilsDelay(10000);
else if( iNewSockID < 0 )</pre>
{
// error
```

```
ASSERT_ON_ERROR(sl_Close(iNewSockID));

ASSERT_ON_ERROR(cl_Close(iSockID));

ASSERT_ON_ERROR(TCP_SERVER_FAILED);

}

iStatus = sl_Recv(iNewSockID, g_cBsdBuf, iTestBufLen, 0);

if( iStatus <= 0 )

{

// error

ASSERT_ON_ERROR(sl_Close(iNewSockID));

ASSERT_ON_ERROR(sl_Close(iSockID));

ASSERT_ON_ERROR(TCP_SERVER_FAILED);

}

...

ASSERT_ON_ERROR(sl_Close(iNewSockID));

ASSERT_ON_ERROR(sl_Close(iNewSockID));

ASSERT_ON_ERROR(sl_Close(iNewSockID));

return SUCCESSS;

}
```

Steps for receiving TCP Packets from TCP client are as follows

- 1. Open the socket
- 2. Create a TCP server
- 3. listen for connection
- 4. accept a connection
- 5. receive packets
- 6. Close the socket

Usage

• Setup a serial communication application (HyperTerminal/TeraTerm). For detail info visit Terminal setup

Note: Disable PC anti-virus while running iperf.

On the host PC. The settings are:

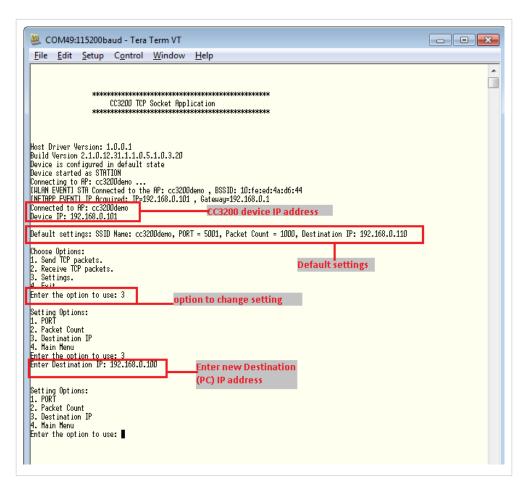
- **Port**: Enumerated COM port (CC3200LP Dual port)

- Baud rate: 115200

- Data: 8 bit- Parity: None- Stop: 1 bit

- Flow control: None

- Run this application (tcp_socket) from IAR/CCS or Flash the bin file to device.
- Connect a PC to same AP over which device has connected.
- Get the ip address of the PC and fill this value for IP_ADDR macro or change the setting as specified in snapshot-



- Change the other setting (port, SSID name, packet count) as per requirement.
- Choose the options
 - 1: Send TCP packets
 - 2: Receive TCP packets

after selecting above options run **iperf** command on PC command prompt as given in TeraTerm/HyperTerminal screen.

• Observe the execution flow to understand the working.

Limitations/Known Issues

None.

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