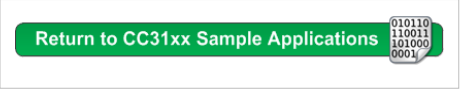
CC32xx TCP Socket Application

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.

```
'#define SSID_NAME       "cc3200demo"
#define IP_ADDR         0xc0a80167
#define PORT_NUM        5001
#define TCP_PACKET_COUNT    1000'
```

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 )
{
// error
```

```
ASSERT_ON_ERROR(sl_Close(iNewSockID));
ASSERT_ON_ERROR(sl_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(iSockID));

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

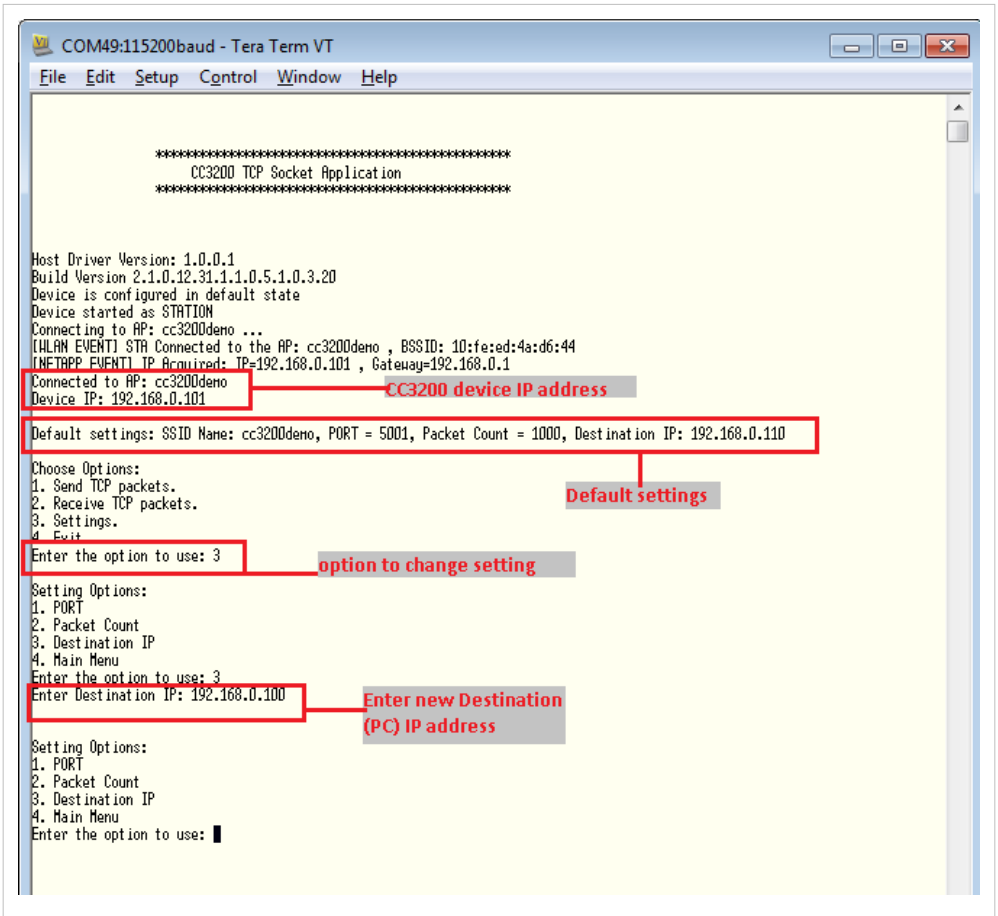
Usage

- 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.

Article Sources and Contributors

CC32xx TCP Socket Application *Source*: http://processors.wiki.ti.com/index.php?oldid=184856 *Contributors*: A0221015, Beatrice, Codycooke, Jitgupta, Malokyle

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