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).



Note: This wiki page is only applicable for CC3200-SDK v0.5.2 and upward releases. For documentation on older SDKs' examples, refer corresponding file in <cc3200-sdk-installation-location>\cc3200-sdk\docs\examples\

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()
{
.
.
.
.
// staring simplelink
sl_Start(NULL, NULL, InitCallback);
.
```

```
.

// Connecting to WLAN AP - Set with static parameters defined at the top

// After this call we will be connected and have IP address
sl_WlanConnect(SSID_NAME, strlen(SSID_NAME), 0, &secParams, 0);

/* 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);

.
.
.
.
```

Check Device acquired IP-address

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</pre>
```

```
return -1;
//Connect to the server IP and port number
iStatus = sl_Connect(iSockID, ( SlSockAddr_t *)&sAddr, iAddrSize);
if ( iStatus < 0 )
// error
return -1;
}
//Send packet using the sl_Send API call
iStatus = sl_Send(iSockID, g_cBsdBuf, sTestBufLen, 0 );
if( iStatus <= 0 )
{
// error
return -1;
}
/*****************
 * Put a break point here to check if device has
 * sent the specified no. of TCP packets
 ************************************
//closing the socket after sending 1000 packets
sl_Close(iSockID);
return 0;
```

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
return -1;</pre>
```

```
iStatus = sl_Bind(iSockID, (SlSockAddr_t *)&sLocalAddr, iAddrSize);
if( iStatus < 0 )
// error
return -1;
iStatus = sl_Listen(iSockID, 0);
if( iStatus < 0 )
{
return -1;
iStatus = sl_SetSockOpt(iSockID, SL_SOL_SOCKET, SL_SO_NONBLOCKING, &lNonBlocking, sizeof(lNonBlocking));
iNewSockID = SL_EAGAIN;
while( iNewSockID < 0 )</pre>
iNewSockID = sl_Accept(iSockID, ( struct SlSockAddr_t *)&sAddr, (SlSocklen_t*)&iAddrSize);
if( iNewSockID == SL_EAGAIN )
UtilsDelay(10000);
else if( iNewSockID < 0 )</pre>
// error
return -1;
iStatus = sl_Recv(iNewSockID, g_cBsdBuf, iTestBufLen, 0);
if( iStatus <= 0 )
// error
return -1;
/********************
 * Put a break point here to check if device has
 * recieved the specified no. of TCP packets
 sl_Close(iNewSockID);
sl_Close(iSockID);
```

```
return 0;
}
```

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:

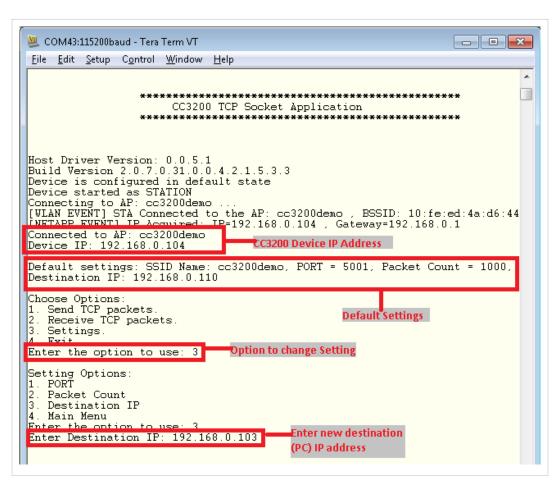
- **Port**: Enumerated COM port (CC3200LP Dual port)

- 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=180036 Contributors: A0221015, Beatrice, Codycooke, Jitgupta, Malokyle

Image Sources, Licenses and Contributors

File:Cc31xx cc32xx return home.png Source: http://processors.wiki.ti.com/index.php?title=File:Cc31xx_cc32xx_return_home.png License: unknown Contributors: A0221015

File: Cc32xx return sample apps.png Source: http://processors.wiki.ti.com/index.php?title=File: Cc32xx_return_sample_apps.png License: unknown Contributors: A0221015

File:Light bulb icon.png Source: http://processors.wiki.ti.com/index.php?title=File:Light bulb icon.png License: unknown Contributors: DanRinkes, PagePusher

Image:CC32xx TCP_Socket_Terminal_SDK_0p5p2.png Source: http://processors.wiki.ti.com/index.php?title=File:CC32xx_TCP_Socket_Terminal_SDK_0p5p2.png License: unknown Contributors: Jitgupta

License

THE WORK (AS DEFINED BELOW) IS PROVIDED UNDER THE TERMS OF THIS CREATIVE COMMONS PUBLIC LICENSE ("CCPL" OR "LICENSE"). THE WORK IS PROTECTED BY COPYRIGHT AND/OR OTHER APPLICABLE LAW. ANY USE OF THE WORK OTHER THAN AS AUTHORIZED UNDER THIS LICENSE OR COPYRIGHT LAW IS PROHIBITED.

BY EXERCISING ANY RIGHTS TO THE WORK PROVIDED HERE, VOU ACCEPT AND AGREE TO BE BOUND BY THE TERMS OF THIS LICENSE. TO THE EXTENT THIS LICENSE MAY BE CONSIDERED TO BE A CONTRACT, THE LICENSOR GRANTS YOU THE RIGHTS CONTAINED HERE IN CONSIDERATION OF YOUR ACCEPTANCE OF SUCH TERMS AND CONDITIONS.

License

1. Definitions

- *Adaptation* means a work based upon the Work, or upon the Work and other pre-existing works, such as a translation, adaptation, derivative work, arrangement of music or other alterations of a literary or artistic work, or phonogram or performance and includes cinematographic adaptations or any other form in which the Work may be recast, transformed, or adapted including in any form recognizably derived from the original, except that a work that constitutes a Collection will not be considered an Adaptation for the purpose of this License.

 In time-leation with a moving image (*ynching*) will be considered an Adaptation for the purpose of this License.

 The purpose of the selection and arrangement of their contents, constitute intellectual creations, in which the Work is included in its entirety in unmodified form along with one or more other contributions, each constituting separate and independent works in themselves, which together are assembled into a collective whole. A work that constitutes a Collection will not be considered an Adaptation (as defined below) for the purposes of this License.

 Creative Commons Sompatible Licenses means a license that is listed at http://creative/commons.org/conventments/en/commons.org/conventments/en/commons.org/conventments/en/commons/

2. Fair Dealing Rights

Nothing in this License is intended to reduce, limit, or restrict any uses free from copyright or rights arising from limitations or exceptions that are provided for in connection with the copyright protection under copyright law or other applicable laws.

3. License Grant

and conditions of this License, Licensor hereby grants You a worldwide, royalty-free, non-exclusive, perpetual (for the duration of the applicable copyright) license to exercise the rights in the Work as stated

- to Reproduce the Work, to incorporate the Work into one or more Collections, and to Reproduce the Work as incorporated in the Collections; to create and Reproduce Adaptations provided that any such Adaptation, including any translation in any medium, takes reasonable steps to clearly label, demarcate or otherwise identify that changes were made to the original Work. For example, a translation could be marked "The original work was translated from English to Spanish," or a modification could indicate "The original work has been modified."; to Distribute and Publicly Perform the Work including as incorporated in Collections; and, to Distribute and Publicly Perform Adaptations.

 For the avoidance of doubt.

- i. Non-waivable Compulsory License Schemes. In those jurisdictions in which the right to collect royalties through any statutory or compulsory licensing scheme cannot be waived, the Licensor reserves the exclusive right to collect such royalties for any exercise by You of the rights granted under this License;
 ii. Waivable Compulsory License Schemes. In those jurisdictions in which the right to collect royalties through any statutory or compulsory licensing scheme can be waived, the Licensor waives the exclusive right to collect such royalties for any exercise by You of the rights granted under this License; and,
 iii. Voluntary License Schemes. The Licensor waives the right to collect royalties through any statutory or compulsory licensing scheme can be waived, the Licensor waives the exclusive right to collect such royalties for any exercise by You of the rights granted under this License; and,
 iii. Voluntary License Schemes. The Licensor waives the right to collect royalties through any statutory or compulsory licensing scheme can be waived, the Licensor waives the exclusive right to collect such royalties for any exercise by You of the rights granted under this License; and.

 The above rights may be exercised in all media and formats whether now known or hereafter devised. The above rights include the right to make such modifications as are technically necessary to exercise the rights in other media and formats. Subject to Section 8(f), all rights not expressly granted by Licensor are hereby reserved.

4. Restrictions

granted in Section 3 above is expressly made subject to and limited by the following restrictions:

- Restrictions
 license granted in Section 3 above is expressly made subject to and limited by the following restrictions:

 You may Distribute or Publicly Perform the Work only under the terms of this License. You must include a copy of, or the Uniform Resource Identifier (URI) for, this License with every copy of the Work You Distribute or Publicly Perform. You may not offer or impose any terms on the Work that restrict the terms of this License or the ability of the recipient of the Work to exercise the rights granted to that recipient under the terms of the License. Perform the Work, You may not impose any effective technological measures on the Work that restrict the ability of a recipient of the Work from You to exercise the rights granted to that recipient under the terms of the License. This Section 4(a) applies to the Work as incorporated in a Collection, but this does not require the Collection apart from the Work itself to be made subject to the terms of this License. If You create a Collection, upon notice from any Licensor You must, to the extent practicable, remove from the Adaptation any credit as required by Section 4(c), as requested. You may Distribute or Publicly Perform and Adaptation only under the terms of; (i) this License; (ii) a later version of this License with the same License Elements as this License; (iii) a Creative Commons Compatible License. (iii) a Creative Commons Compatible License. If you license the Adaptation only or (iii) to (iii) (ii

Elegise (1)git to hirds caughations) due to some tree.

S. Representations, Warranties and Disclaimer

UNLESS OTHERWISE MUTUALLY AGREED TO BY THE PARTIES IN WRITING, LICENSOR OFFERS THE WORK AS-IS AND MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND CONCERNING THE WORK, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF TITLE, MERCHANTIBILITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT, OR THE ABSENCE OF LATENT OR OTHER DEFECTS, ACCURACY, OR THE PRESENCE OF ABSENCE OF ERRORS, WHETHER OR NOT DISCOVERABLE. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO SUCH EXCLUSION MAY NOT APPLY TO YOU.

6. Limitation on Liability

EXCEPT TO THE EXTENT REQUIRED BY APPLICABLE LAW, IN NO EVENT WILL LICENSOR BE LIABLE TO YOU ON ANY LEGAL THEORY FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR EXEMPLARY DAMAGES ARISING OUT OF THIS LICENSE OR THE USE OF THE WORK, EVEN IF LICENSOR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

License

7. Termination

This License and the rights granted hereunder will terminate automatically upon any breach by You of the terms of this License, Individuals or entities who have received Adaptations or Collections from You under this License, however, will not have their licenses terminated provided such individuals or entities remain in full compliance with those licenses. Sections 1, 2, 5, 6, 7, and 8 will survive any termination of this License. Subject to the above terms and conditions, the license granted here is perpetual (for the duration of the applicable copyright in the Work). Notwithstanding the above, License reserves the fight to release the Work under different license terms or to stop distributing the Work at any time; provided, however that any such election will not serve to withdraw this License (or any other license that has been, or is required to be, granted under the terms of this License), and little license that has been and the license terms of this License. The license is the license term of the license terms of this License (or any other license that has been, or is required to be, granted under the terms of this License).

- VISCEIBINEOUS

 Each time You Distribute or Publicly Perform the Work or a Collection, the Licensor offers to the recipient a license to the Work on the same terms and conditions as the license granted to You under this License.

 Each time You Distribute or Publicly Perform an Adaptation, Licensor offers to the recipient a license to the original Work on the same terms and conditions as the license granted to You under this License.

 If any provision of this License is invalid or unenforceable under applicable law, it shall not affect the validity or enforceability of the remainder of the terms of this License, and without further action by the parties to this agreement, such provision shall be reformed to the minimum extent necessary to make such provision shall and enforceable.

 No term or provision of this License shall be deemed waived and no breach consented to unless such waiver or consents that the entire agreement between the parties with respect to the Work licensed here. There are no understandings, agreements or representations with respect to the Work not specified here. Licensor shall not be bound by any additional provisions that may appear in any communication from You. This License may not be modified without the mutual written agreement of the Licensor and You.

 The rights granted under, and the subject matter referenced, in this License were drafted utilizing the terminology of the Berne Convention of Literary and Artistic Works (as amended on September 28, 1979), the Rome Convention of 1961, the WIPO Copyright Treaty of 1996, the WIPO Performances and Phonograms Treaty of 1996 and the Universal Copyright Convention (as revised on July 24, 1971). These rights and subject to the Correct of the Protection in which the License terms are sought to be enforced according provisions of the implementation of the societation in which the License terms are sought to be enforced according provisions of the implementation of those treaty provisions in the applicable handonal law. If the standard suite of r