

SOP

DSP C5517 Demo SOP

2017/8/7

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Outline

- SW required stuffs.
- HW required stuffs.
- How to bring up?
- Demo steps..
- Demo issues... (need Ron to comment.)

SW Required stuffs

- C55x CSL (3.07.00 or greater)
 - <http://www.ti.com/tool/sprc133>
- DSP/BIOS 5.42.02.10
 - http://software-dl.ti.com/dsps/dsps_public_sw/sdo_sb/targetcontent/dspbios/5_42_02_10/index_FDS.html
- Code Composer Studio 6.1.3
 - http://processors.wiki.ti.com/index.php/Download_CCS
- CGT for C5500 4.4.1
 - This needs to be installed from CCS.
- XDCTools 3.24.05.48
 - http://software-dl.ti.com/dsps/dsps_public_sw/sdo_sb/targetcontent/rtsc/3_24_05_48/index_FDS.html
- XDAIS 7.24.00.04
 - http://software-dl.ti.com/dsps/dsps_public_sw/sdo_sb/targetcontent/xdais/7_24_00_04/index_FDS.html
- AER 17.0.0.0 (C55x, CPU rev 3.3)
 - <http://www.ti.com/tool/telecomlib>
- VOLIB 2.1.0.1(C55x, CPU rev 3.3)
 - <http://www.ti.com/tool/telecomlib>

Patching patch 1...

Download the patch from this wiki.

http://processors.wiki.ti.com/index.php/C55x_CSL_Audio_Pre-Processing#How_to_Build_the_Demo

OSDisk (C:) > TI > c55_lp > c55_csl_3.07 > demos > audio-preprocessing > c5517

Search c5517

Share with New folder

Name	Date modified	Type	Size
.ccsproject	3/10/2017 11:30 AM	CCSPROJECT File	1 KB
.cdtbuild	3/10/2017 11:30 AM	CDTBUILD File	15 KB
.cdtbuild_initial	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
.cdtproject	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
.project	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
.project_initial	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
.xdchelp	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
AudioCodec_DMA.c	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
bf_rt_bios_cfg.tcf	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
codec_aic3254.c	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
codec_aic3254.h	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
codec_pcm186x.c	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
codec_pcm186x.h	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
csl_i2c_ioExpander.c	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
evm5515.h	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
IdleLoop.h	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
macros.ini_initial	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
pll_control.c	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
pll_control.h	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
sample_rate.h	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB
VC5505_I2S.cmd	3/10/2017 11:30 AM	CDTBUILD_INITIAL ...	15 KB

C5517_TIDEP-0077_VoiceProcessing_patch2

Rio_Shared_Folder_2014 > DSP_Stuffs > From_Pop_Audio_DSP_Stuffs > C5517_TIDEP-0077_VoiceProcessing_patch2 > C5517_TIDEP-0077_VoiceProcessing_patch2

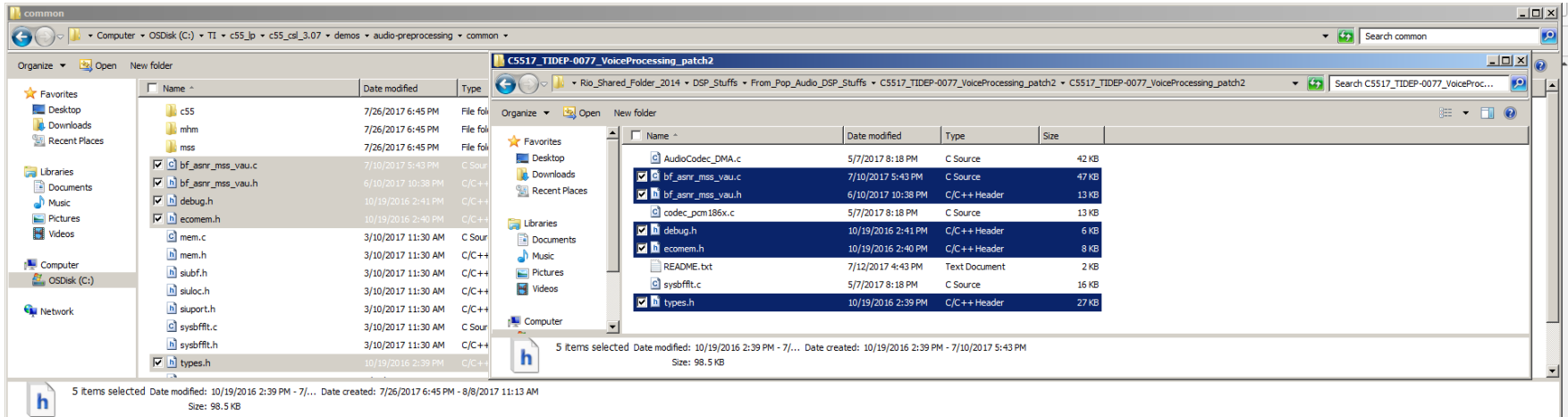
Search C5517_TIDEP-0077_VoiceProc...

Organize Open New folder

Name	Date modified	Type	Size
AudioCodec_DMA.c	5/7/2017 8:18 PM	C Source	42 KB
bf_asnr_mss_vau.c	7/10/2017 5:43 PM	C Source	47 KB
bf_asnr_mss_vau.h	6/10/2017 10:38 PM	C/C++ Header	13 KB
codec_pcm186x.c	5/7/2017 8:18 PM	C Source	13 KB
debug.h	10/19/2016 2:41 PM	C/C++ Header	6 KB
ecomem.h	10/19/2016 2:40 PM	C/C++ Header	8 KB
README.txt	7/12/2017 4:43 PM	Text Document	2 KB
sysbffit.c	5/7/2017 8:18 PM	C Source	16 KB
types.h	10/19/2016 2:39 PM	C/C++ Header	27 KB

3 items selected Date modified: 5/7/2017 8:18 PM Date created: 5/7/2017 8:18 PM
Size: 69.8 KB

Patching patch 2...



The screenshot shows two Windows Explorer windows. The left window displays a directory structure with files like `bf_asnr_mss_vau.c`, `debug.h`, and `ecomem.h`. The right window shows a selected set of files including `AudioCodec_DMA.c`, `bf_asnr_mss_vau.c`, `bf_asnr_mss_vau.h`, `codec_pcm186x.c`, `debug.h`, `ecomem.h`, `README.txt`, `sysbfft.c`, and `types.h`.

The default CSL package audio preprocessing demo located at `C:\ti\c55_jpic55_csl_3.07\demos\audio-preprocessing` did not have the source code for the Dynamic Range Compression (DRC) module. The following files need to be added to `C:\ti\c55_jpic55_csl_3.07\demos\audio-preprocessing\common` in order to include DRC functionality: `debug.h`, `types.h`, `ecomem.h`, `bf_asnr_mss_vau.c`, `bf_asnr_mss_vau.h`.

NOTE: These patch files will no longer be needed once CSL 3.08 is released since they will be incorporated into the release source code.

The replacement files are located here [Media:C5517_TIDEP-0077_VoiceProcessing_patch2.zip](#)

More about processing algorithms

The application will use AER & VOLIB APIs for its noise reduction processing needs. The following steps are performed for noise reduction:

- Read 2/4/6 audio input from the Circular Microphone Array Board (CMB)
- Generate 2/4/6 virtual mics using BF (Beamforming)
- Apply ASNR (Adaptive Signal Noise Reduction) on each virtual mic
- Use MSS (Multiple Source Selection) to select the best virtual mic from the 12 virtual mics
- Do DRC (Dynamic Range Compression) on the best virtual mic
- Send the processed audio and by-passed audio input to on board codec (C5517 EVM, P9, HP out(left/right channels))

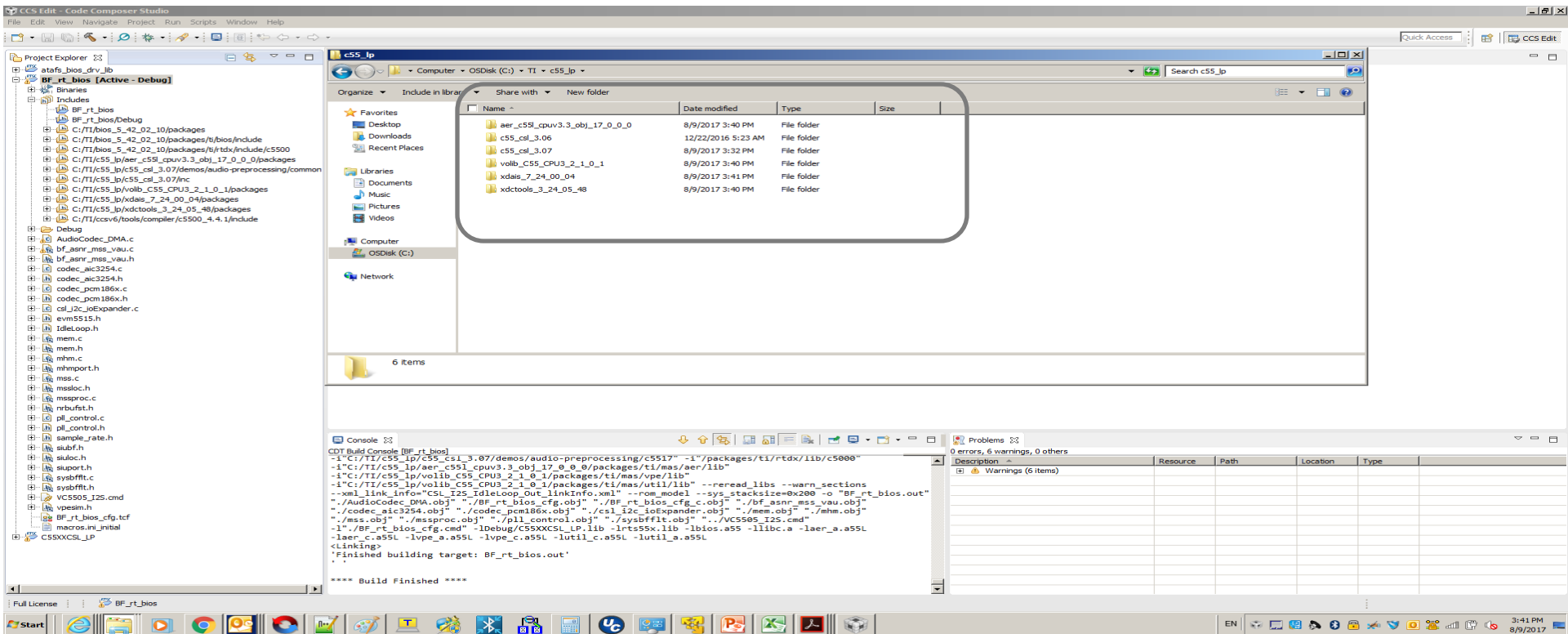
Framework for Audio Pre-processing

Patch reference...

- The default CSL package audio preprocessing demo located at *C:\ti\c55_ip\c55_csl_3.07\demos\audio-preprocessing* is not configured for the 4 microphone Linear Microphone Board (LMB), instead it was configured for a larger 8 microphone Circular Microphone Board (CMB). Thus, certain files need to be replaced in the source code to ensure correct filter coefficients and initialization of the hardware. The following files need to be replaced: **AudioCodec_DMA.c**, **codec_pcm186x.c** and **sysbffit.c**.
- The default CSL package audio preprocessing demo located at *C:\ti\c55_ip\c55_csl_3.07\demos\audio-preprocessing* did not have the source code for the Dynamic Range Compression (DRC) module. The following files need to be added to *C:\ti\c55_ip\c55_csl_3.07\demos\audio-preprocessing\common* in order to include DRC functionality: **debug.h**, **types.h**, **ecomem.h**, **bf_asnr_mss_vau.c** ,**bf_asnr_mss_vau.h**.

Installed components at the “right” place..

- All the components are needed to be put as the following path:
- C:\TI\c55_lp
 - For example:
 - C:\TI\c55_lp\aer_c55l_cpu3.3_obj_17_0_0_0
 - C:\TI\c55_lp\c55_csl_3.07
 - C:\TI\c55_lp\volib_C55_CPU3_2_1_0_1
 - C:\TI\c55_lp\xdais_7_24_00_04
 - C:\TI\c55_lp\xdctools_3_24_05_48

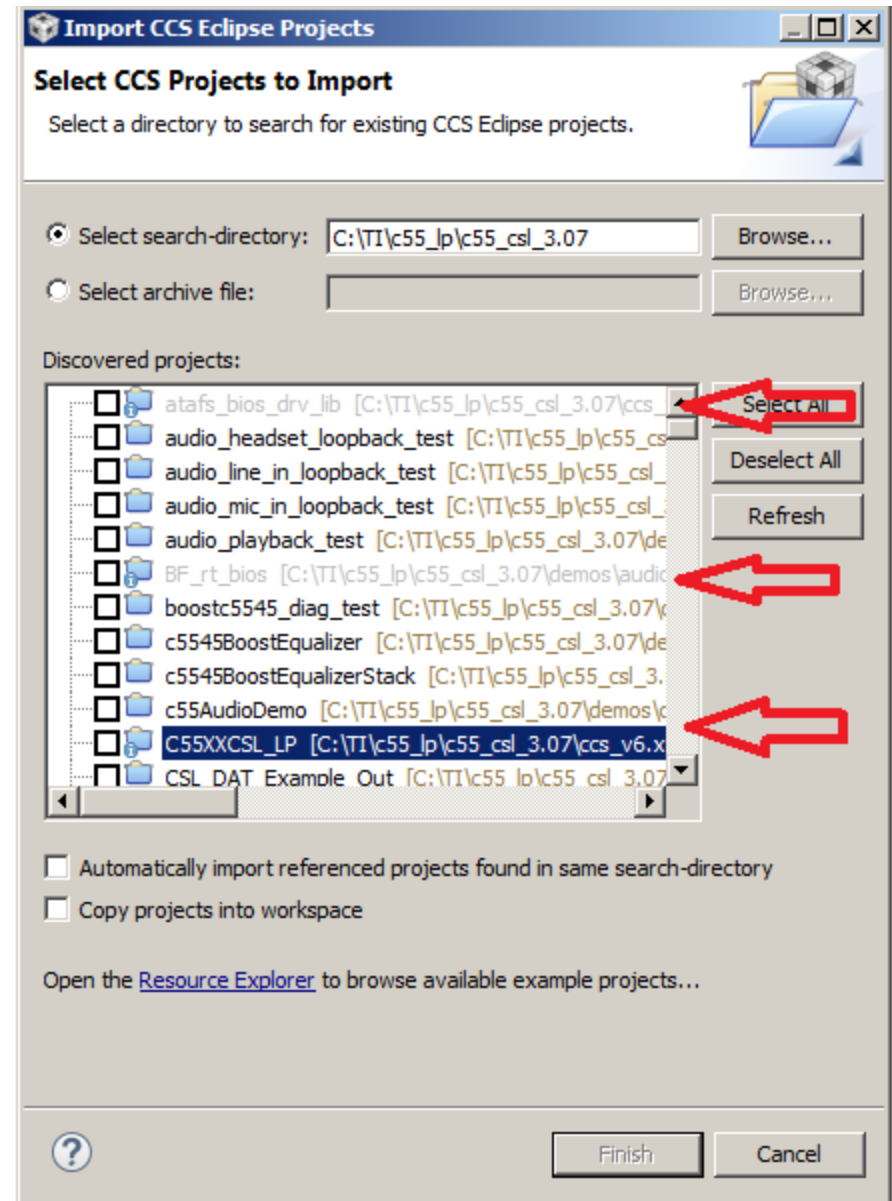


Training movie..

- Training Movie:
 - <https://training.ti.com/voice-processing-tools-and-software-k2g-and-c5517-designs>

Import 3 projects.

- Import path:
 - C:\TI\c55_lp\c55_csl_3.07
 - Import those 3 projects:
 - Atafs
 - BR_rt_bios
 - C55XCSL_LP



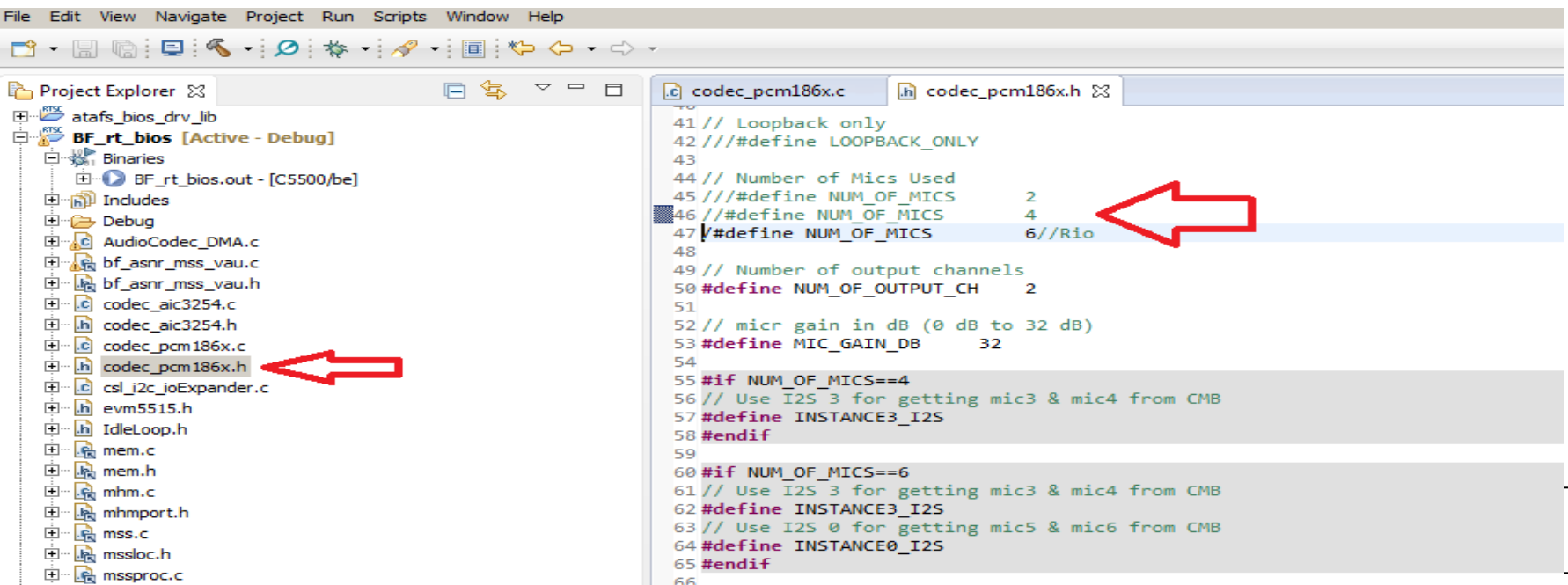
Changing the numbers of MIC

The current demo needs to set as “4” mics.

Set as “6” mics will have the “heap is not enough issue”.

Please see this E2E posted by me:

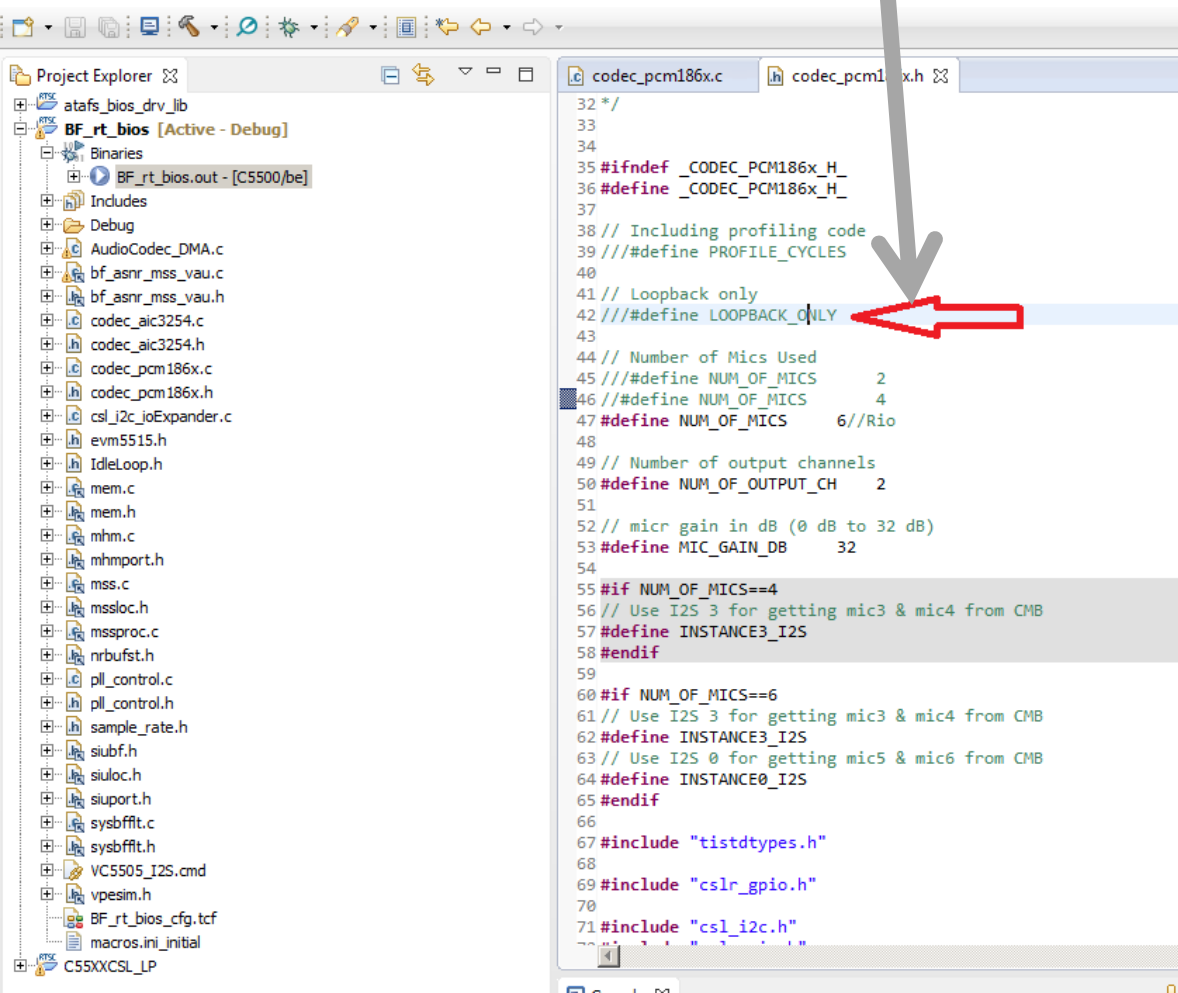
<https://e2e.ti.com/support/dsp/c5000/f/109/p/616968/2272820#2272820>



```
File Edit View Navigate Project Run Scripts Window Help
Project Explorer
atafs_bios_drv_lib
BF_rt_bios [Active - Debug]
  Binaries
  BF_rt_bios.out - [C5500/be]
  Includes
  Debug
  AudioCodec_DMA.c
  bf_asnr_mss_vau.c
  bf_asnr_mss_vau.h
  codec_aic3254.c
  codec_aic3254.h
  codec_pcm186x.c
  codec_pcm186x.h
  csl_j2c_ioExpander.c
  evm5515.h
  IdleLoop.h
  mem.c
  mem.h
  mhm.c
  mhimport.h
  mss.c
  mssloc.h
  mssproc.c
codec_pcm186x.c
41 // Loopback only
42 ///#define LOOPBACK_ONLY
43
44 // Number of Mics Used
45 ///#define NUM_OF_MICS 2
46 ///#define NUM_OF_MICS 4
47 #define NUM_OF_MICS 6//Rio
48
49 // Number of output channels
50 #define NUM_OF_OUTPUT_CH 2
51
52 // micr gain in dB (0 dB to 32 dB)
53 #define MIC_GAIN_DB 32
54
55 #if NUM_OF_MICS==4
56 // Use I2S_3 for getting mic3 & mic4 from CMB
57 #define INSTANCE3_I2S
58 #endif
59
60 #if NUM_OF_MICS==6
61 // Use I2S_3 for getting mic3 & mic4 from CMB
62 #define INSTANCE3_I2S
63 // Use I2S_0 for getting mic5 & mic6 from CMB
64 #define INSTANCE0_I2S
65 #endif
66
```

Loop back testing?

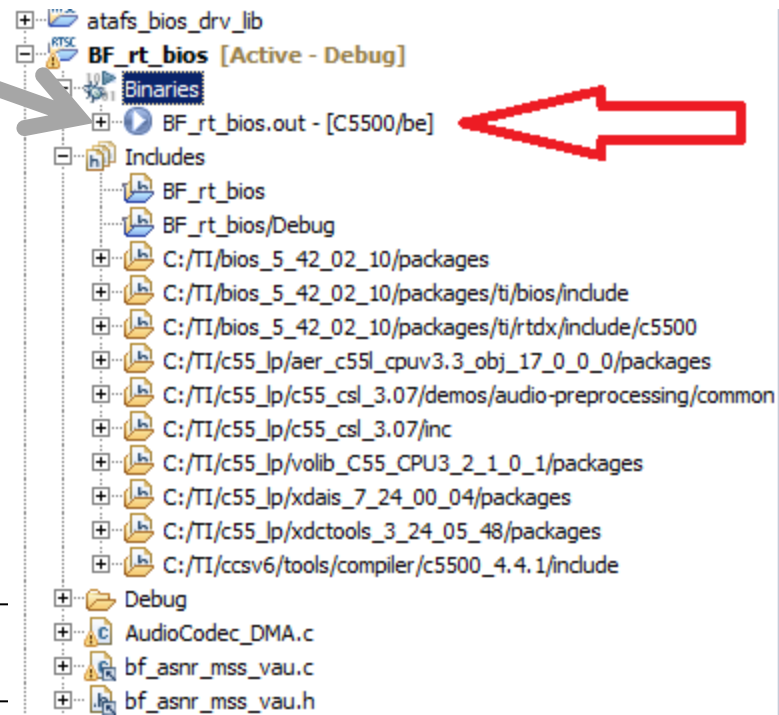
Enable this define for loopback testing.



```
32 */
33
34
35 #ifndef _CODEC_PCM186X_H_
36 #define _CODEC_PCM186X_H_
37
38 // Including profiling code
39 // #define PROFILE_CYCLES
40
41 // Loopback only
42 // #define LOOPBACK_ONLY
43
44 // Number of Mics Used
45 // #define NUM_OF_MICs      2
46 // #define NUM_OF_MICs      4
47 #define NUM_OF_MICs      6//Rio
48
49 // Number of output channels
50 #define NUM_OF_OUTPUT_CH  2
51
52 // micr gain in dB (0 dB to 32 dB)
53 #define MIC_GAIN_DB      32
54
55 #if NUM_OF_MICs==4
56 // Use I2S 3 for getting mic3 & mic4 from CMB
57 #define INSTANCE3_I2S
58 #endif
59
60 #if NUM_OF_MICs==6
61 // Use I2S 3 for getting mic3 & mic4 from CMB
62 #define INSTANCE3_I2S
63 // Use I2S 0 for getting mic5 & mic6 from CMB
64 #define INSTANCE0_I2S
65 #endif
66
67 #include "tistdtypes.h"
68
69 #include "cslr_gpio.h"
70
71 #include "csl_i2c.h"
72
```

Building

- Build those 2 projects first:
 - Atafs
 - C55XCSL_LP
- Build this demo in the last step:
 - BF_rt_bios.
 - It should have no problem if any thing is correct.



Loading the code: Step1

- Be sure the CCS has installed the “Spectrum Digital XDS all stuffs”.
- Otherwise, the target configuration will not be launched.

General Setup
This section describes the general configuration about the target.

Connection: Texas Instruments XDS560 Debug Probe

Board or Device: **Data Snapshot Viewer**

- Spectrum Digital C2000 XDS510LC Emulator
- Spectrum Digital DSK-EVM PLUS onboard USB Emulator
- Spectrum Digital DSK-EVM-eZdsp onboard USB Emulator
- Spectrum Digital XDS510 Parallel Port-PCI Emulator
- Spectrum Digital XDS510USB Emulator
- Spectrum Digital XDS510USB Emulator TI-JSC
- Spectrum Digital XDS560V2 STM LAN Emulator
- Spectrum Digital XDS560V2 STM TRAVELER Emulator
- Spectrum Digital XDS560V2 STM USB Emulator
- Spectrum Digital XDSPRO LAN Emulator
- Spectrum Digital XDSPRO USB Emulator
- Spectrum Digital eZdsp2812 Parallel Port Emulator
- Stellaris In-Circuit Debug Interface
- TI MSP430 USB1 [Default]
- TI MSP430 USB2
- TI MSP430 USB3
- Texas Instruments XDS100v1 USB Debug Probe
- Texas Instruments XDS100v2 USB Debug Probe
- Texas Instruments XDS100v3 USB Debug Probe
- Texas Instruments XDS110 USB Debug Probe
- Texas Instruments XDS2xx LAN Debug Probe
- Texas Instruments XDS2xx USB Debug Probe
- Texas Instruments XDS2xx USB Onboard Debug Probe
- Texas Instruments XDS560 Debug Probe**
- Texas Instruments XDS560 Debug Probe, 2-Pin cJTAG with External Converter
- Texas Instruments XDS560 Debug Probe, 20-pin Rev-D Cable

Note: Support for

Loading the code: Step2

- Import the ccxml: **C5517EVM_Onboard_Emulator.ccxml**

The screenshot displays the Code Composer Studio interface. The 'Select files to import' dialog is the central focus, showing a file list with columns for Name, Type, Size, and Date created. The file 'C5517EVM_Onboard_Emulator.ccxml' is highlighted. The background shows the Project Explorer on the left with a tree view of files, the Console window at the bottom with output text, and the Problems window on the right showing 6 warnings. A grey arrow points from the text in the list item above to the corresponding file in the dialog.

Name	Type	Size	Date created
C5515EVM_Onboard_Emulator.ccxml	CCXML File	2 KB	8/9/2017 3:30 PM
C5517EVM_Onboard_Emulator.ccxml	CCXML File	2 KB	8/9/2017 3:30 PM
C5535_eZDSP.ccxml	CCXML File	2 KB	8/9/2017 3:30 PM

```
Console
C5517EVM_Onboard_Emulator.ccxml:CI0
0
Buffers allocated by SIU for NSS1:
Buffer Size(twords) Alignment Volatile address
0 180 1 no 0x1
...Initializing DRC
Buffers allocated by SIU for drc:
Buffer Size(twords) Alignment Volatile address
0 74 1 no 0x1
1 640 1 yes 0x1
2 32 0 no 0x1
3 150 0 no 0x1
4 10 1 no 0x1
Done with DRC
Pumping PC lineout to the HP Output Started!!
```

Problems: 0 errors, 6 warnings, 0 others

Description	Resource	Path	Local
Warnings (6 items)			

Updates Available: Updates are available for your software. Click to review and install updates. Set up Reminder options.

Loading the code: Step3

- The connection should be:
 - → **Spectrum Digital DSK-EVM-ezdsp onboard USB emulator.**
 - → **TMSC320C5517** should be checked

The screenshot displays the Code Composer Studio (CCS) interface. The main window shows the 'Basic' configuration tab for the target. The 'Connection' is set to 'Spectrum Digital DSK-EVM-ezdsp onboard USB Emulator'. In the 'Board or Device' list, 'TMSC320C5517' is selected with a checkmark. The console window at the bottom shows the following output:

```
CCS17EVM_Onboard_Emulator.ccm:CI0
0 1 no 0x0
...Initializing DRC
Buffers allocated by SIU for drc:
Buffer Size(words) Alignment Volatile address
0 180 1 no 0x1
...Initializing DRC
Buffers allocated by SIU for drc:
Buffer Size(words) Alignment Volatile address
0 1 74 no 0x1
1 640 1 yes 0x1
2 32 0 no 0x1
3 150 0 no 0x1
4 10 1 no 0x1
Done with DRC
Pumping PC lineout to the HP Output Started!
```

The console also shows a warning: 'Warnings (6 items)'. The 'Updates Available' dialog box is visible in the bottom right corner, indicating that updates are available for the software.

Loading the code: Step4

- Go to advanced setup to set the gel file as: **c5517evm_07062011.gel**.
- Click “Save”

The screenshot displays the Code Composer Studio interface. The 'Target Configuration' dialog box is open, showing the 'Advanced' tab. The 'Initialization script' field is highlighted, and a large grey arrow points to the 'Browse...' button next to it. The console window at the bottom shows the following output:

```
0 94 1 no 0x0
...
Buffers allocated by SIU for MSS:
Buffer Size(twords) Alignment Volatile address
0 480 1 no 0x1
...
...Initializing DRCC
Buffers allocated by SIU for drc:
Buffer Size(twords) Alignment Volatile address
0 74 1 no 0x1
1 640 1 yes 0x1
2 32 0 no 0x1
3 150 0 no 0x1
4 10 1 no 0x1
Done with DRCC
Pumping PC lineout to the HP Output Started!
```

An 'Updates Available' notification is visible in the bottom right corner of the window.

Loading the code: Step5

- Right click the “C5517EVM_Onboard_Emulator.ccxml”.
- Click the “Launched selected configuration”.

The screenshot displays the Code Composer Studio (CCS) interface. The main window shows the configuration for the 'C5517EVM_Onboard_Emulator.ccxml' target. The 'Basic' tab is selected, showing the 'General Setup' section with the following details:

- Connection: Spectrum Digital DSK-EVM-eZdsp onboard USB Emulator
- Board or Device: TMS320C5517 (selected)

The 'Advanced Setup' section is also visible, showing the 'Save Configuration' and 'Test Connection' options. A context menu is open over the 'C5517EVM_Onboard_Emulator.ccxml' file in the 'Target Configurations' pane, with 'Launch Selected Configuration' highlighted. The console shows the output of the configuration process, including buffer allocation for MSS and DRC, and the start of the HP output.

```
Console
C5517EVM_Onboard_Emulator.ccxml:CIO
0
0 94 1 no 0x0
Buffers allocated by SIU for MSS:
Buffer Size(twords) Alignment Volatile address
0 180 1 no 0x1
...initializing DRC
Buffers allocated by SIU for drc:
Buffer Size(twords) Alignment Volatile address
0 74 1 no 0x1
1 640 1 yes 0x1
2 32 0 no 0x1
3 150 0 no 0x1
4 10 1 no 0x1
Done with DRC
Pumping PC lineout to the HP Output Started!!
```

Target Configurations

- Projects
- User Defined
- AM335_IDK_Rio_Test.ccxml
- AM335_StarterWare.ccxml
- C5517EVM_Onboard_Emulator.ccxml

Click the New button to create a new target configuration file. Click [here](#) to hide this message.

Updates Available

Updates are available for your software. Click to review and install updates. Set up [Reminder options](#)

Loading the code: Step6

- Follow the red arrow place, to select the “connect target”.

The screenshot displays the CCS Debug interface for a project named 'CS517EVM_Onboard_Emulator.ccmml'. The 'Project Explorer' on the left shows a tree view of source files, with 'BF_rt_bios' selected. The main workspace shows the 'Basic' configuration tab for the target, which is currently 'Spectrum Digital DSK-EVM-eZdsp onboard USB Emulator'. A context menu is open over the target name, with a red arrow pointing to the 'Connect Target' option. The console at the bottom shows the build output for 'BF_rt_bios.out', indicating that the build is finished.

Connect Target (Ctrl+Alt+Enter)

- Disconnect Target (Ctrl+Alt+Enter)
- Enable global Breakpoints
- Enable Halt-On-Reset
- Enable OS Debugging
- Open GEL Files View
- Hide core(s)
- Show all cores
- Group core(s)
- Sync group core(s)
- Ungroup core(s)
- Rename...
- Remove All Terminated
- Relaunch
- Edit CS517EVM_Onboard_Emulator.ccmml...
- Terminate and Remove
- Terminate/Disconnect All

Basic

General Setup

This section describes the general configuration about the target.

Connection: Spectrum Digital DSK-EVM-eZdsp onboard USB Emulator

Board or Device: type filter text

- TMS320CS505
- TMS320CS506
- TMS320CS507
- TMS320CS509
- TMS320CS509A
- TMS320CS510
- TMS320CS510A
- TMS320CS514
- TMS320CS515
- TMS320CS517
- TMS320CS532

TMS320CS517 16-bit Fixed point ultra low power DSP

Test Connection

To test a connection, all changes must have been saved, the configuration file contains no errors and the connection type supports this function.

Alternate Communication

type filter text

Console

```
CDT Build Console [BF_rt_bios]
-I"C:/TI/c55_lp/c55_csl_3_07/demos/audio-preprocessing/c5517" -i"/packages/ti/rtdx/lib/c5000"
-I"C:/TI/c55_lp/aer_c551_cpu3_3_obj_17_0_0/packages/ti/mas/aer/lib"
-I"C:/TI/c55_lp/volib_C55_CPU3_2_1_0_1/packages/ti/mas/vpe/lib"
-I"C:/TI/c55_lp/volib_C55_CPU3_2_1_0_1/packages/ti/mas/util/lib" --reread_libs --warn_sections
--xml_link_info="CSL_I25_IdleLoop_Out_linkInfo.xml" --rom_model --sys_stacksize=0x2000 -o
"BF_rt_bios.out" "/AudioCodec_DMA.obj" "/BF_rt_bios_cfg.obj" "/BF_rt_bios_cfg.c.obj"
"/BF_asnr_mss_vau.obj" "/codec_aic3254.obj" "/codec_pcm186x.obj" "/csl_i2c_ioExpander.obj"
"/mem.obj" "/mhm.obj" "/mss.obj" "/mssproc.obj" "/pll_control.obj" "/sysbfft.obj"
"/VC5905_I25.cmd" "-I"/BF_rt_bios_cfg.cmd" -ldebug/CS5XXCSL_LP.lib -lrts55x.lib -lbios.a55
-llibc.a -laer.a.a55L -laer_c.a55L -lpe.a.a55L -lutil_c.a55L -lutil_a.a55L
<Linking>
Finished building target: BF_rt_bios.out
**** Build Finished ****
```

Loading the code: Step7

- The result should be like this.

The screenshot displays the Code Composer Studio (CCS) interface during a debug session. The Project Explorer on the left shows the project structure for 'BF_rt_bios'. The Debug console in the center shows the loaded code for 'CS517EVM_Onboard_Emulator.ccxml'. The Console window at the bottom displays the following output:

```
CS517EVM_Onboard_Emulator.ccxml
C55xx: GEL Output: Configure PLL (100.01 MHz).
C55xx: GEL Output: Enabling clocks to all peripherals.
C55xx: GEL Output: PLL Init Done (100.01 MHz).
C55xx: GEL Output: Target Connection Complete.
```

The Console window also shows a 'Problems' tab with a tree view of the project structure. A yellow 'Updates Available' notification is visible in the bottom right corner.

Loading the code: Step8

- Go to the red arrow place.
- Load the “BF_rt_bios.out”

The screenshot shows the CCS Debug interface. A red circle highlights the 'Load Program' button in the toolbar, with a red arrow pointing to it. The 'Load Program' dialog box is open, showing the program file path: `C:\Users\user\Documents\audio-preprocessing\c5517\Debug\BF_rt_bios.out`. The console output shows the following messages:

```
C5517EVM_Onboard_Emulator.ccmml
C55xx: GEL Output: Configure PLL (100.01 MHz).
C55xx: GEL Output: Enabling clocks to all peripherals.
C55xx: GEL Output: PLL Init Done (100.01 MHz).
C55xx: GEL Output: Target Connection Complete.
```

The console also shows an error message: "No source available for '0xff7128'" and a "View Disassembly..." button.

Name	Type	Value	Location

Updates Available: Updates are available for your software. Click to review and install updates. Set up Reminder options.

Loading the code: Step9

- It shows the debugging...

The screenshot displays the Code Composer Studio interface during a debugging session. The main window shows the source code for `AudioCodec_DMA.c` at line 247, where the `main()` function is being executed. The console window at the bottom shows the following output:

```
CS517EVM_Onboard_Emulator.ccm1
CS5xx: GEL Output: Configure PLL (100.01 MHz).
CS5xx: GEL Output: Enabling clocks to all peripherals.
CS5xx: GEL Output: PLL Init Done (100.01 MHz).
CS5xx: GEL Output: Target Connection Complete.
```

The 'Variables' window on the right shows a table with the following data:

Name	Type	Value	Location
m	char *	0x00000000	Register XAR3

The 'Console' window also shows a 'Problems' pane with a tree view of the project structure, including `AM335_IDK_Rio_Test.ccm1`, `AM335_StarterWare.ccm1`, and `CS517EVM_Onboard_Emulator.ccm1`.

Loading the code: Step10

- Click the “green” play button.
- The console log should show this → **Started !!**.

The screenshot shows the CCS Debug interface with the following components:

- Project Explorer:** Shows the project structure for 'BF_rt_bios'. Files include 'AudioCodec_DMA.c', 'bf_asnr_mss_vau.c', 'codecc_alc3254.c', 'codecc_pcm186x.c', 'csl_j2c_ioExpander.c', 'evm5515.h', 'idleLoop.h', 'mem.c', 'mem.h', 'mhm.c', 'mhmport.h', 'mss.c', 'mssoc.c', 'nbuifst.h', 'pl_control.c', 'pl_control.h', 'sample_rate.h', 'subf.h', 'suloc.h', 'support.h', 'sysbfft.c', 'sysbfft.h', 'YCS505_I2S.cmd', 'vpe5im.h', 'BF_rt_bios_cfg.tcf', and 'macros.ini_initial'.
- Code Editor:** Displays the source code for 'AudioCodec_DMA.c'. The code includes comments and function definitions for enabling peripherals and bypassing audio input.
- Console:** Shows the output of the program. The output includes:

```
... Initializing DAC
Buffers allocated by SIU for drc:
Buffer Size(twords) Alignment Volatile address
0 74 1 no 0x1
1 640 1 no 0x1
2 32 0 0x1
3 150 0 0x1
4 10 1 0x1
Done with DRC
Pumping PC lineout to the HP Output Started!!
```
- Toolbar:** The green play button is highlighted with a red circle.
- Variables Table:** Shows a table with columns for Name, Type, Value, and Location.
- Problems:** Shows a list of projects and target configurations.
- Updates Available:** A notification box in the bottom right corner.

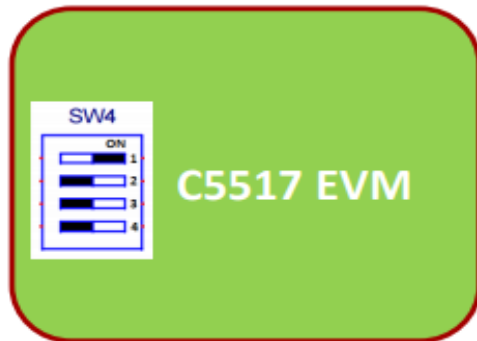
HW Preparation

Please follow this wiki to wire the signals...

http://processors.wiki.ti.com/index.php/C55x_CSL_Audio_Pre-Processing#How_to_Build_the_Demo

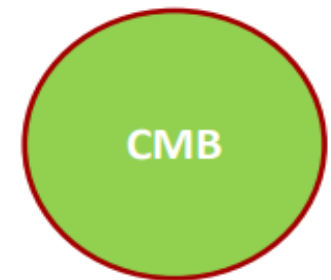
Hardware

C5517 EVM connections to the CMB (6 mics)



J28_Pin1_Pin3 (jumper off)
J28_Pin2_Pin4 (jumper off)
J29_Pin1_Pin3 (jumper on)
J29_Pin2_Pin4 (jumper on)
J30_Pin1_Pin3 (jumper on)
UART_EN (no jumper)

Header/Pin	Pin
J10 - 5	GND
J10 - 9	3.3V
J14 - 16	I2C SCL
J14 - 20	I2C SDA
J27 - 3	Bit Clock
J27 - 4	Frame Clock
J30 - 2	Data 1
J31 - 2	Frame Clock
J31 - 3	Bit Clock
J31 - 1	Data 3
J27 - 1	Bit Clock
J27 - 2	Frame Clock
J28 - 2	Data 2



CMB Jumper Settings

J3 - ON
J10 - ON
J11 - ON
J8 (Pins 1&2) - ON
J8 (Pins 3&4) - OFF

Wired Pin tables...

Power

CMB	C5517 EVM	
CMB_3.3V	J10_Pin9	3.3V
CMB_GND	J10_Pin5	Ground

Signal For Mic1 & Mic2

CMB	C5517 EVM	
CMB_SCL	J14_Pin16	I2C SCL
CMB_SDA	J14_Pin20	I2C SDA
CMB_BCLK	J27_Pin3 (no jumper)	Bit Clock
CMB_LRCLK	J27_Pin4 (no jumper)	Frame Clock
CMB_DATA1	J30_Pin2 (no jumper)	Data 1
	J29_Pin1_Pin3 (jumper on)	
	J29_Pin2_Pin4 (jumper on)	
	J30_Pin1_Pin3 (jumper on)	

Signal For Mic3 & Mic4

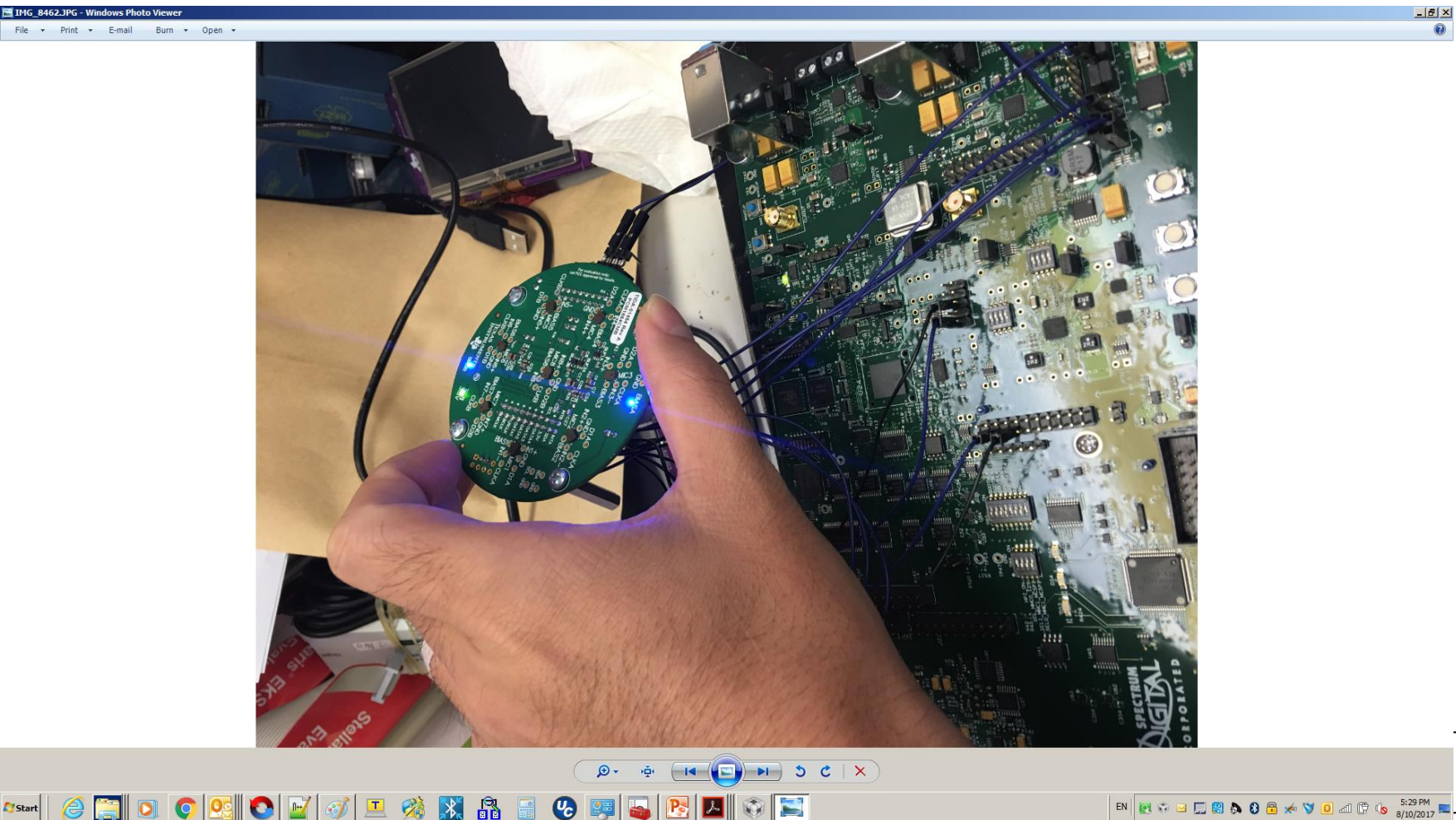
CMB	C5517 EVM	
I2S_BCLK	J31_Pin3	Bit Clock
I2S_LRCLK	J31_Pin2	Frame Clock
CMB_DATA3	J31_Pin1	Data 3
	UART_EN (no jumper)	

Signal For Mic5 & Mic6

CMB	C5517 EVM	
I2X_USB_BCLK	J27_Pin1	Bit Clock
I2X_USB_LRCLK	J27_Pin2	Frame Clock
CMB_DATA2	J28_Pin2	Data 2
	J28_Pin1_Pin3 (no jumper)	
	J28_Pin2_Pin4 (no jumper)	

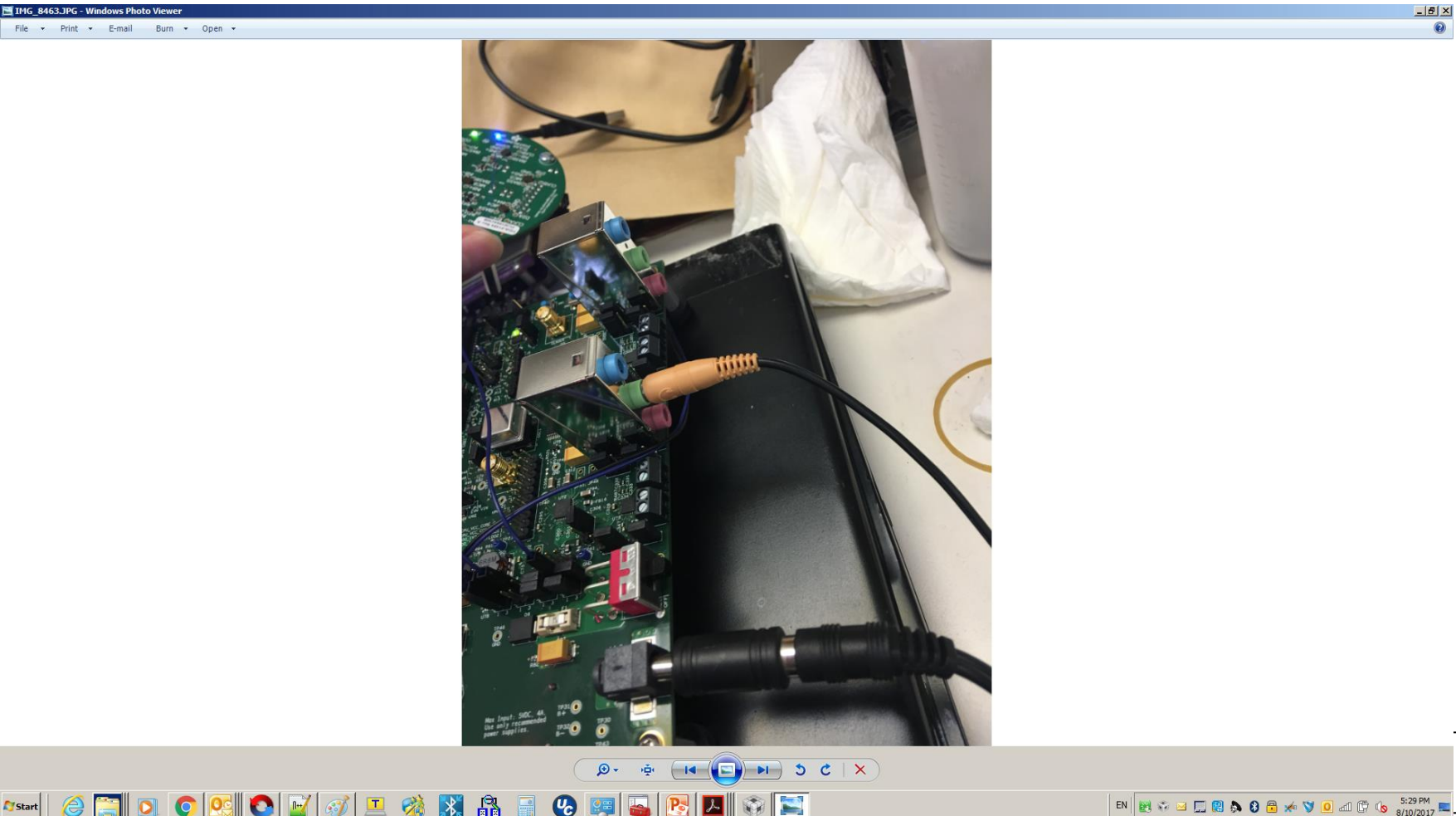
Demo result

- The CMD board should have 2 blue LED, 1 green LED.



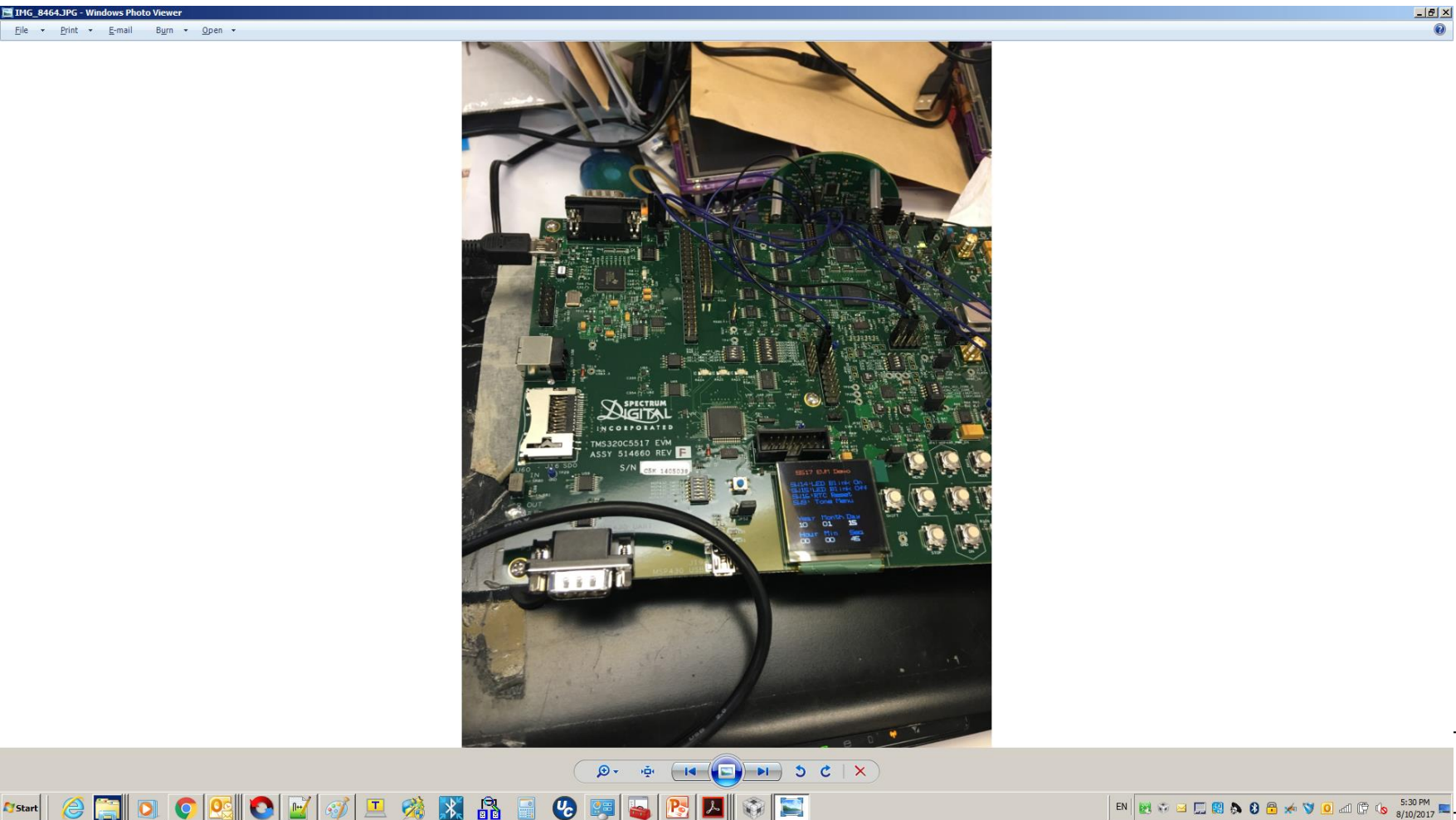
Demo result

- Connect the ear phone to the P9 green port.
- You should hear the sound if you hit the mics.



Demo result

- The C5517 LCD should have the LCD showing.




Demo movie

- Please go to youtube.
- Search “TI CC517 dsp mic bean forming.”.
- Or visit here:
 - <https://www.youtube.com/watch?v=7Jyd2z6aG1M>

Secure | <https://www.youtube.com/watch?v=7Jyd2z6aG1M>

YouTube



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