Procedure to create project using Code Composer Studio V5.3(Real-time input – From Signal Generator or Microphone)

*Create a **New-Folder** for your project inside **CCS Folder***

1. Double click on **CCStudio** Icon.
2. Click on **Browse** and select proper location to save the project.
3. Click **ok**.

*Make sure that **Project Explorer Window** is visible if not click on **Restore Icon***

4. Click on **Project→**Select **New CCS project**.
5. Type **Project_Name**.
6. Family **C6000**.
7. Variant →**DSK6713**(Select from 2nd Box).
8. Connection →**Spectrum Digital DSK-EVM -eZdsponboard USB Emulator→**Click **Finish**
9. Right Click on **Project_Name→**Select **Properties→**go to **Build→**Expand **C6000 Compiler**
10. Select **Processor Options→**In **Target processor version→** type "**6713**"
11. Expand **C6000 Linker→**Click on **File Search Path**.
12. Click on +(Include Library File)→Click on **File system→** select **csl6713.lib→**Click **Open→** ok
13. Click on +(Include Library File)→Click on **File system→** select **dsk6713bsl.lib→**Click **Open→** ok
14. Click **Ok**
15. Right click on **Project_Name→** Select **add files→**go to **C-drive→**
16. Open **dsk6713** folder→Open **include** folder→ select **dsk6713.h**and **dsk6713_aic23.h→** Click **Open**
17. Click **Ok (Let the selection be as "Copy Files"** which is default)
18. Click on **File→** Click on **New→**Select **DSP/BIOS v5.x Configuration File**

*Make sure that your **Project_Name** is displayed under **Project** option, **if not** click on **Browse** and **select** you **Project***

19. Click Next → Type **6713** in **Filter Platforms→**select **ti.platforms.dsk6713 →** Click **Finish**

Click on **ok/yes** on the **windows which pop-up** after this step even if there is **error window**

Writing code:

1. **Type :**

```
#define CHIP_6713 1
#include "dsk6713.h"            // Header file for initialize function
#include "dsk6713_aic23.h"   // Header file for other functions

void main()
{
        // 1. Initialize Kit


        // 2. Open CODEC


        // 3. Set Sampling Frequency


        while(1)
        {
                // 4. Read Input


                // 5. Write Output


        } // End of While Loop

}// End of Main Function
```

2. **Double click on dsk6713.h and copy "***dsk6713_init();"* **and paste it below** *//1. Initialize kit* **in the main program. Note: DO NOT COPY "***void***".**

3. **Double click on dsk6713_aic23.h and copy "***DSK6713_AIC23_CodecHandle DSK6713_AIC23_openCodec(intid,DSK6713_AIC23_Config *Config);"* **and paste it below** *//2. Open CODEC* **in the main program.**

4. **Double click on dsk6713_aic23.h and copy "***DSK6713_AIC23_setFreq(DSK6713_AIC23_CodecHandle hCodec, Uint32 freq);"* **and paste it below** *//3. Set Sampling Frequency* **in the main program. Note: DO NOT COPY "***void***".**

5. **Double click on dsk6713_aic23.h and copy "***DSK6713_AIC23_read(DSK6713_AIC23_CodecHandleh Codec, Uint32 *val)"* **and paste it below** *//4. Read Input* **in the main program. Note: DO NOT COPY "Int16".**

6. **Double click on dsk6713_aic23.h and copy**

   "*DSK6713_AIC23_write(DSK6713_AIC23_CodecHandle hCodec, Uint32 val);"* **and paste it below** *//5. Write Output* **in the main program. <u>Note</u>: DO NOT COPY "Int16".**

7. **Copy "***DSK6713_AIC23_CodecHandle***" (a data type) and paste it before void main and after leaving space type "***h***" (a variable of data type** *DSK6713_AIC23_CodecHandle)* **.i.e., "***DSK6713_AIC23_CodecHandle h".*

8. **Copy "***Uint32***" (a data type) and paste it before void main and after leaving space, type "***val***" (a variable of data type** *Uint32).* **i.e., "***Uint32 val".*

9. **Copy "***DSK6713_AIC23_Config***" (a data type) and paste it before void main and after leaving space type "***c***" (a variable of data type** *DSK6713_AIC23_Config)* **.i.e., "***DSK6713_AIC23_Config c".*

10. **Double click on dsk6713_aic23.h copy default config from opening brace '{' till closing brace '}' values and paste it as shown:**

```
"DSK6713_AIC23_Config c = { \
  0x0017,   /* Set-Up Reg 0      Left line input channel volume control */  \
            /* LRS    0         simultaneous left/right volume: disabled */\
            /* LIM    0         left line input mute: disabled */         \
            /* XX     00        reserved */                               \
            /* LIV    10111     left line input volume: 0 dB */           \
                                                                          \
  0x0017,   /* Set-Up Reg 1      Right line input channel volume control */ \
            /* RLS    0         simultaneous right/left volume: disabled */\
            /* RIM    0         right line input mute: disabled */        \
            /* XX     00        reserved */                               \
            /* RIV    10111     right line input volume: 0 dB */          \
                                                                          \
  0x01f9,   /* Set-Up Reg 2      Left channel headphone volume control */   \
            /* LRS    1         simultaneous left/right volume: enabled */ \
            /* LZC    1         left channel zero-cross detect: enabled */ \
            /* LHV    1111001   left headphone volume: 0 dB */           \
                                                                          \
  0x01f9,   /* Set-Up Reg 3      Right channel headphone volume control */  \
           /* RLS    1         simultaneous right/left volume: enabled */ \
            /* RZC    1         right channel zero-cross detect: enabled */\
           /* RHV    1111001   right headphone volume: 0 dB */           \
                                                                          \
 0x0011,    /* Set-Up Reg 4      Analog audio path control */             \
            /* X      0         reserved */                              \
            /* STA    00        sidetone attenuation: -6 dB */           \
            /* STE    0         sidetone: disabled */                    \
            /* DAC    1         DAC: selected */                         \
            /* BYP    0         bypass: off */                           \
            /* INSEL  0         input select for ADC: line */            \
            /* MICM   0         microphone mute: disabled */             \
```

```
            /* MICB    1        microphone boost: enabled */            \
                                                                        \
  0x0000,    /* Set-Up Reg 5      Digital audio path control */          \
            /* XXXXX   00000     reserved */                        \
            /* DACM    0        DAC soft mute: disabled */           \
            /* DEEMP   00       deemphasis control: disabled */       \
            /* ADCHP   0        ADC high-pass filter: disabled */     \
                                                                    \
  0x0000,   /* Set-Up Reg 6      Power down control */                \
            /* X       0       reserved */                      \
            /* OFF     0       device power: on (i.e. not off) */   \
            /* CLK     0       clock: on */                      \
            /* OSC     0       oscillator: on */                 \
            /* OUT     0       outputs: on */                    \
            /* DAC     0       DAC: on */                        \
            /* ADC     0       ADC: on */                        \
            /* MIC     0       microphone: on */                 \
            /* LINE    0       line input: on */                 \
                                                                \
  0x0043,    /* Set-Up Reg 7      Digital audio interface format */    \
            /* XX      00       reserved */                      \
            /* MS      1       master/slave mode: master */         \
            /* LRSWAP  0       DAC left/right swap: disabled */     \
            /* LRP     0       DAC lrp: MSB on 1st BCLK */          \
            /* IWL     00       input bit length: 16 bit */         \
            /* FOR     11       data format: DSP format */          \
                                                                    \
  0x0081,    /* Set-Up Reg 8      Sample rate control */              \
            /* X       0       reserved */                      \
            /* CLKOUT  1       clock output divider: 2 (MCLK/2) */  \
            /* CLKIN   0       clock input divider: 2 (MCLK/2) */   \
            /* SR,BOSR 00000     sampling rate: ADC  48 kHz DAC  48 kHz */  \
            /* USB/N   1       clock mode select (USB/normal): USB */     \
   0x0001    /* Set-Up Reg 9      Digital interface activation */      \
            /* XX..X   00000000  reserved */                      \
            /* ACT     1       active */                        \
};"
```

<u>Note</u>: semicolon ';' should be there after closing brace '}' indicating termination of line**.**

11. In the main program

i) **Replace** "0x0011" **with** "0x0015".

ii) **Replace** *"DSK6713_AIC23_CodecHandle hCodec"* **with "***h".*

iii) **Replace** *"DSK6713_AIC23_Config *Config"* **with** *"&c".*

iv) **Replace** *"Uint32 *val"* **with** *"&val".*

v) **Replace** *"Uint32 val"* **with** *"val".*

vi) **Replace***"Uint32 freq"* **with required frequency values. Refer /*Frequency Definitions*/ in dsk6713_aic23.h.**

vii) **Replace "***DSK6713_AIC23_CodecHandle DSK6713_AIC23_openCodec(int id, DSK6713_AIC23_Config *Config);"***with** *"h=DSK6713_AIC23_openCodec(0, &c).*

12. Once completed the entire code should look as below

```
#define CHIP_6713 1
#include "dsk6713.h"                    // Header file for initialize function
#include "dsk6713_aic23.h"// Header file for other functions

DSK6713_AIC23_CodecHandle h;
DSK6713_AIC23_Config c ={ \
  0x0017,    /* Set-Up Reg 0      Left line input channel volume control */  \
             /* LRS    0        simultaneous left/right volume: disabled */\
             /* LIM    0        left line input mute: disabled */         \
             /* XX     00       reserved */                               \
             /* LIV    10111    left line input volume: 0 dB */           \
                                                                          \
  0x0017,    /* Set-Up Reg 1      Right line input channel volume control */ \
             /* RLS    0        simultaneous right/left volume: disabled */\
             /* RIM    0        right line input mute: disabled */        \
             /* XX     00       reserved */                               \
             /* RIV    10111    right line input volume: 0 dB */          \
                                                                          \
  0x01f9,    /* Set-Up Reg 2      Left channel headphone volume control */   \
             /* LRS    1        simultaneous left/right volume: enabled */ \
             /* LZC    1        left channel zero-cross detect: enabled */ \
             /* LHV    1111001  left headphone volume: 0 dB */            \
                                                                          \
  0x01f9,    /* Set-Up Reg 3      Right channel headphone volume control */  \
            /* RLS    1        simultaneous right/left volume: enabled */ \
             /* RZC    1        right channel zero-cross detect: enabled */\
            /* RHV    1111001  right headphone volume: 0 dB */           \
                                                                          \
  0x0015,    /* Set-Up Reg 4      Analog audio path control */              \
             /* X      0        reserved */                               \
             /* STA    00       sidetone attenuation: -6 dB */            \
             /* STE    0        sidetone: disabled */                     \
             /* DAC    1        DAC: selected */                          \
             /* BYP    0        bypass: off */                            \
             /* INSEL  0        input select for ADC: line */             \
             /* MICM   0        microphone mute: disabled */              \
             /* MICB   1        microphone boost: enabled */              \
                                                                          \
  0x0000,    /* Set-Up Reg 5      Digital audio path control */             \
             /* XXXXX  00000     reserved */                               \
             /* DACM   0        DAC soft mute: disabled */                \
             /* DEEMP  00       deemphasis control: disabled */           \
             /* ADCHP  0        ADC high-pass filter: disabled */         \
                                                                          \
  0x0000,    /* Set-Up Reg 6      Power down control */                     \
             /* X      0        reserved */                               \
             /* OFF    0        device power: on (i.e. not off) */        \
             /* CLK    0        clock: on */                              \
             /* OSC    0        oscillator: on */                         \
             /* OUT    0        outputs: on */                            \
             /* DAC    0        DAC: on */                                \
             /* ADC    0        ADC: on */                                \
             /* MIC    0        microphone: on */                         \
```

```
                /* LINE    0         line input: on */                    \
                                                                          \
    0x0043,      /* Set-Up Reg 7       Digital audio interface format */        \
                /* XX      00        reserved */                          \
                /* MS      1         master/slave mode: master */             \
                /* LRSWAP  0         DAC left/right swap: disabled */         \
                /* LRP     0         DAC lrp: MSB on 1st BCLK */              \
                /* IWL     00        input bit length: 16 bit */              \
                /* FOR     11        data format: DSP format */               \
                                                                          \
    0x0081,      /* Set-Up Reg 8       Sample rate control */                \
                /* X       0         reserved */                          \
                /* CLKOUT  1         clock output divider: 2 (MCLK/2) */      \
                /* CLKIN   0         clock input divider: 2 (MCLK/2) */       \
                /* SR,BOSR 00000     sampling rate: ADC  48 kHz DAC  48 kHz */ \
                /* USB/N   1         clock mode select (USB/normal): USB */   \
   0x0001       /* Set-Up Reg 9       Digital interface activation */          \
                /* XX..X   00000000   reserved */                          \
                /* ACT     1         active */                            \
};

Uint32 val;

void main()
{
        // 1. Initialize Kit
        DSK6713_init();

        // 2. Open CODEC
        h = DSK6713_AIC23_ openCodec(0, &c);

        // 3. Set Sampling Frequency
        DSK6713_AIC23_setFreq(h, 1);   // value '1' for 8kHz Sampling Rate

        while(1) // To read values continuously
        {
                // 4. Read Input
                DSK6713_AIC23_read(h, &val);

                // 5. Write Output
                DSK6713_AIC23_write(h, val);

        } // End of While Loop

}// End of Main Function
```

To run the program:

1. Right click on **Project Name**→Click on **Build Project**
   *Check for errors in "**Problems**" window. Rectify the errors if any and build once again. Don't proceed until you have **zero errors**, you can ignore warnings*
2. Click on **View**→ Select **Target Configuration**→Expand **User Defined**
3. Right click on **C6713DSK.ccxml**→Select **Launch Selected Configuration**
   *CC Studio will migrate from **Edit Perspective** to **Debug Perspective***
4. Click on **Run**→Select **Connect Target**
5. Click on **Run**→Select **Load**→ Select **Load Program**→Click on **Browse Project**
6. Expand **Project_Name**→Expand Debug →Select **Project_Name.out** file→Click **Ok→Ok**
7. Click on **Run**→ Select **Resume**.