

Programming with DSP Processors TMS320C6713/TMS320C6416 on CCS

This course is mainly deals with programming on TMS320C6713/TMS320C6416 DSP Starter Kit (DSK) using CCS, which is a low-cost development platform designed to speed the development of high precision applications based on TI's TMS320C6XXX floating point DSP generation.

COURSE CONTENT :

Introduction to MATLAB®

- Quick overview on MATLAB® architecture and computing environment
- Data types and operators in MATLAB®
- Array and matrix operations
- Functions
- Structures
- Plots

Introduction to Digital Signal Processing

- Introduction to signals and systems
- Sampling and Quantization
- Overview of Digital Signal Processing
- Windowing Techniques
- Filtering

Introduction to DSK

- Why Special Purpose processor for DSP
- History of TMS Series
- What is Code Composer Studio
- Difference Between Floating and Fixed Point Processors
- An Introduction to TMS320C6713
- An Introduction to TMS320C6416

DSK(TMS320C6X) Architecture

- Von Neumann Architecture and Harvard architecture
- Concerns on Fixed Point Processors (Quantization Error)
- Functional Units
- Pipelining
- Registers
- Interrupts
- McBSP's
- DMA

Hands on DSK

- Introduction to CCS
- Quick Test of DSK
- Difference between Compiler, Linker, Assembler
- Detailed Explanation of Support Files
- Building a small Project (hello world)
- Generation of Sinusoid using DIP switch and explanation of the program
- Illustration of Watch Window, GEL file
- Few Experiments on Sine generation program using DIP Switch

Plotting with CCS

- Generation of Sine and Plotting with CCS
- Usage of Circular Buffer
- Usage of Hardware Interrupt int_11

Profiling with CCS

- Dot Product of Two Arrays
- Implementing Variable watch
- Setting up Break Points
- Profiling Printf function

Real Time Implementation

- Input with Onboard AIC23 Stereo Codec
- TLV320AIC23 Onboard Stereo Codec
- Example Program to Illustrate onboard Stereo Codec using Hardware Interrupt and explanation of the program using McBSP's.
- Example Program to Illustrate onboard Stereo Codec using polling and explanation of the program using McBSP's
- Example program to illustrate Multi Channelled McBSP's.
- Examples Illustrating Echo and Delay
- Example illustrating sine generation using table created by MATLAB
- Few assignments (Square generation and ramp generation using table created by MATLAB and CCS plotting

Real time Implementation

- Generation of amplitude Modulated signal using C6713 DSK
- Generation of Pseudorandom Noise using C6713 DSK
- recording Voice using external Memory(SDRAM)

FIR filters

- Real Time Convolution
- FIR Implementation of LP HP BP BS Using DSK 6713 DSK
- FIR Implementation using Pseudorandom Noise sequence as input to filter and output stored in memory

- Two Notch filters recovering the Corrupted Input
 - Voice Scrambler using Filtering and Modulation
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IIR and Adaptive Filters

- IIR filtering using cascaded direct form -II
 - Adaptive Filters
 - What is Adaptive Filter
 - Application of adaptive Filters
 - Least Mean Square Algorithm and RMS
 - Noise Cancellation , System Identification
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Implementation of Adaptive Filters

- Implementing Adaptive Filter for sinusoidal Noise cancellation on DSK 6713
 - Adaptive FIR Filter for System ID of a Fixed FIR as an Unknown System
 - Adaptive FIR for System ID of a Fixed FIR as an Unknown System with Weights of an Adaptive Filter Initialized as an FIR Bandpass-Plotting with CCS
 - Adaptive FIR for System ID of Fixed IIR as an Unknown System
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DSP/BIOS

- What id DSP BIOS?
- Uses of DSP BIOS
- Sine Generation with DIP Switch Control Through DSP/BIOS
- Blinking of LEDs at Different Rates Using DSP/BIOS
- Sine Generation Using BIOS to Set Up Interrupt INT11