CMR Engineering College

UGC AUTONOMOUS

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Department of Electronics and Communication Engineering

Advanced TMS320C6748 DSP Kits.

It is excellent that your labs now include the **Texas Instruments TMS320C6748 DSP Kits**. While the Cortex-M3 boards you are using are great for general-purpose control, the **C6748** is a powerhouse specifically designed for high-end mathematical signal processing.

Below is a technical overview and documentation draft you can use for your college website to showcase this advanced facility.

Facility Spotlight: Advanced Digital Signal Processing (DSP) Lab

Overview

Our laboratory is equipped with the **Texas Instruments TMS320C6748 DSP Development Kits (LCDK)**. This platform is a high-performance, low-power fixed- and floating-point processor based on the **C674x DSP Core**. It is the industry standard for students and researchers working on real-time analytics, biometric sensing, and professional audio/video processing.

Core Technical Specifications

The TMS320C6748 is designed to execute complex mathematical algorithms with high efficiency.

- **Processor Speed:** Up to **456 MHz** performance.
- **Architecture:** C674x Floating-Point VLIW (Very Long Instruction Word) DSP Core.
- **Memory:** * **On-board:** 128 MB DDR2 SDRAM and 128 MB NAND Flash.
  - **Cache:** Two-level cache architecture (32KB L1P, 32KB L1D, and 256KB L2) to minimize data bottlenecks.
- **Precision:** Supports both **Fixed-Point** performance and **IEEE Floating-Point** precision (Single and Double Precision) in the same device.
- **Hardware Accelerators:** Dedicated hardware for Single-cycle multiplication (32×32 bits) and high-speed Signal Processing instructions.

Key Peripheral Interfaces

The development kit is a complete "system-on-module" that allows students to interface with various real-world signals:

- **Audio:** Integrated **AIC3106 Stereo Codec** with Line-In, Line-Out, and MIC-In 3.5mm jacks for real-time audio filtering.
- **Video:** Supports VGA output and composite video input for image processing experiments.
- **Connectivity:** 10/100 Ethernet, USB 2.0 (OTG and Host), and SATA for high-speed data logging.
- **Storage:** MicroSD card slot for loading large datasets or OS kernels.

Integrated Curriculum & Experiments

Students utilizing these kits will move from theoretical MATLAB simulations to real-time hardware execution in the following areas:

1. **Signal Synthesis:** Generating Sine, Square, and Triangle waves using Look-up Tables (LUT) and Direct Digital Synthesis (DDS).
2. **Filter Design:** Implementing Real-time FIR (Finite Impulse Response) and IIR (Infinite Impulse Response) filters.
3. **Frequency Analysis:** Performing N-Point Fast Fourier Transforms (FFT) and Discrete Fourier Transforms (DFT) on live audio signals.
4. **Advanced Analytics:** Exploring face detection, fingerprint recognition, and audio echo cancellation algorithms.

> **Lab Software:** All workstations are equipped with **Texas Instruments Code Composer Studio (CCS)**, providing a robust environment for C/C++ development, real-time debugging, and hardware profiling.

Student Quick-Start Checklist

- **Step 1:** Connect the C6748 LCDK to the PC via the USB-to-UART port for console access.
- **Step 2:** Use an external **XDS100/XDS110 Emulator** via the 14-pin JTAG header for programming.
- **Step 3:** Initialize the **StarterWare** libraries to access on-board peripherals without a complex OS.