



### SPECIFICATIONS:

- This DSP trainer kit uses Texas Instruments TMS320C6745 DSP chip a 375 MHz device delivering up to 3648 million instructions per second (MIPs) and MFLOPS
- This DSP Trainer is specifically designed in a modular and user friendly format with many on board interfaces.

### HARDWARE

- JTAG supported via USB
- TLV320AIC23B programmable stereo codec.
- Two 3.5mm audio jacks for microphone and speaker
- Expansion port for plug-in modules.
- Power supply : +5V, ±12V, GND
- 8 DIP switches for inputs and 8 LED indication for output
- Provision for manual Reset
- On board 4\*4 LED matrix
- On board white noise source of amplitude 0 5Vpp
- On board 20\*2 character LCD display.
- On board 7 segment displays.
- On board RTC interface : I2C based RTC section.
- On board phone keypad : 0 to 9 digits and \*, # characters.
- Code composer studio for the TMS320C6745 is included.

### NOTE:

- JTAG to USB Programming cable for DSP has to be purchased separately.

Note: Specifications are subject to change.

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### EXPERIMENTS:

- To study the architecture of DSP chips - TMS320C6X instructions.
- To verify linear and circular convolution.
- To design FIR (LP/HP/BP) filters using windowing technique
  - (a) Using rectangular window
  - (b) Using triangular window
  - (c) Using kaiser window
- To implement IIR(HP/LP/BP) using following window.
  - (a) Chebyshev filter
  - (b) Butterworth filter
- N-point FFT algorithm
- N-point DFT and IDFT of given sequence.
- Frequency response of system which is given in transfer function and differential form.
- Power spectrum density.
- Generation of sine wave.
- DFT and IFFT using DIT and DIF methods.
- Auto-correlation, cross-correlation and it's property.
- Sampling of sine signal.
- Amplitude modulation, frequency modulation and FSK modulation.
- FIR filter using Blackman and hamming window.
- Generation of square wave
- Implementation of decimation, interpolation and I/D sampling rate converter.
- Impulse response of 1<sup>st</sup> and 2<sup>nd</sup> order system.
- Addition and removal of noise.
- Spectrogram of audio or sine signal.
- Generation of DTMF signals and spectrogram of DTMF signal
- RTC displayed on LCD
- Signal companding using  $\mu$ -law.
- Generation of sinusoidal wave based on recursive differential equation.
- Generation of sinusoidal through filtering.
- To find the FFT of given signal.
- FIR filter using Fourier series expansion method.

### Image processing

- Digital image fundamentals
- Image enhancement.
- Image filtering
- Image reconstruction
- Color image processing
- Image compression
- Image Segmentation
- Morphology image processing.