CIC-500

DSP Development And Experiment System

CIC-500 is a DSP development system designed for learning DSP hardware implementations. The system combines both DSP chip for signal processing and FPGA chip for I/O control. With various built-in I/Os and several implementation examples, ranging from basic DSP theory to advanced DSP applications, users are able to learn DSP implementations efficiently.

**SN-510PP
DSP JTAG Emulator**

CIC-520 DSP Interface and Control Unit

1. SN-DSP54B DSP Interface Control Board
   (1) Open collector power IC : ULN 2803 50V/500 mA x 8
   (2) Analog signal inputs   : Microphone amplifier
   (3) Audio input amplifier and DTMF generator
   (4) 4 sets of pulse generator: A, B, C and D
   (5) 8 DIP switches for data input and 8 LEDs for displaying
       output state
   (6) 4-digit 7-segment LED display, 4x4 keypad

2. SN-DSP542D Control Unit
   (1) CPU   : TMS320C542, 40 MHz operating
                  frequency against RFI interference
   (2) Internal memory   : 10 K x 16 DRAM
                  : 2 K x 16 Boot ROM
   (3) External memory   : 32 K x 8 EPROM for program
                  storage and stand-alone
                  : 32 K x 16 Catch SRAM for
                  memory expansion
   (4) A/D and D/A converters: TLC320AC01, 14 Bit-CODEC
   (5) HPI Interface   : Centronics Print port for program
                  loading and debugging
   (6) TDM   : Serial port

3. SN-PLDE2 CPLD-EPF8K Interface Unit
   (1) FPGA device: ALTERA FLEX 8000 series - EPF8282
                 ALC84-4, 84 pin
   (2) Maximum 8 K x 4 SEEPROM for program storage
   (3) RS-232 cable for program download
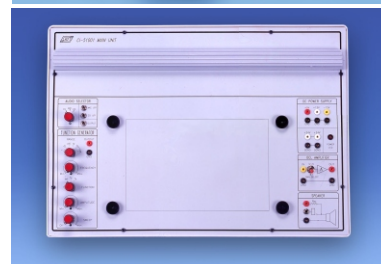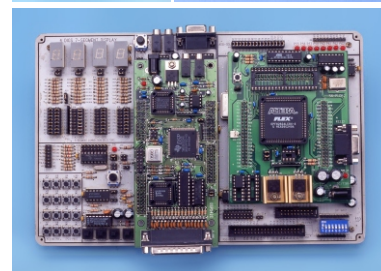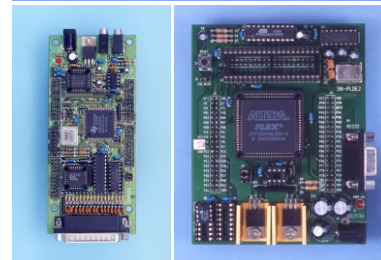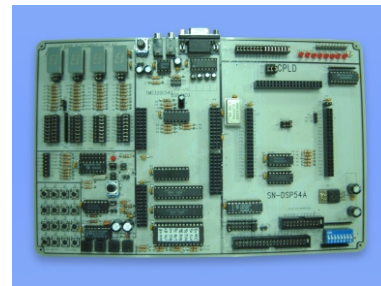
CI-51001

Main Unit (CI-51001)

1. Function Generator:
(1) Range　　　　　　: 1 Hz ~ 100 KHz
(2) Output waveform : sine, square, triangle and sweep
(3) Adjustable signal amplitude

2. OCL Amplifier:
(1) Available gain　　: 1 and 10
(2) Driving output　　: $\pm$12V/1A (max) with current limit overload protection
(3) Direct coupling I/O with auto zero voltage compensation
(4) Capable of driving DC servo motor, PWM for temperature control and high power speaker

3. Audio Selector :
FG, MIC and CD player input

4. Speaker :
0.5 W/ 8 Ω input plug (2 mm/3.5∅)

5. Fixed DC Power :
(1) Output voltage/current : +5V/1A, $\pm$12V/0.5A, +24V/1.0A (ground independent output)
(2) Output overload protection:
Output overload and short protection, auto power off

6. Module fixed slide rail :
Length 380 mm

Optional Modules

1. DC Servo PWM Control (CI-53001)
(1) DC 12 V/500 mA servo motor with external driver
(2) Coaxial encoder A and B phase 100 P/REV, output pulse 5V, 4 times frequency
(3) F/V converter for speed detection and fix-speed control
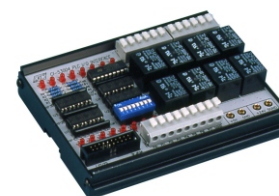(4) Speed controlled by FPGA and DSP

2. Step Motor Control (CI-53002)
(1) Step motor(5V/1Asingle-phase,5lines)
(2) Available for full-step and half step driving of single-pole, double-pole and single / double-pole circuit
(3) PWM with constant current and high speed driving control
(4) Position controlled by FPGA and DSP

3. Temperature Control (CI-53003)
(1) PWM power driving control (24 V/1 A) for loading resistor heating
(2) SSR for zero point ON/OFF isolation to drive AC circuit (110 V/1 A) for load heating
(3) DC 12 V/1.7 W fan for temperature control
(4) AD590 for temperature sensing and temperature detecting(100 mV/1°C)
(5) Temperature controlled by FPGA and DSP

4. PLC I/O Interface (CI-53004)
(1) 8 isolated input switches monitored by LED
(2) Convert 24 V/0 V input to 5 V/0 V digital level for FPGA isolation input
(3) 8 isolated output coupling with relay and monitored by LED
(4) Mechatronics application controlled by FPGA and DSP

5. OCL Amplifier (CI-53006)
(1) Available for gain 1 and 10 for different signal power amplification
(2) Driving output: $\pm$12 V/1 A (max) with overload protection
(3) Direct coupling I/O with auto zero compensation voltage
(4) Capable of driving DC servo motor, PWM for temperature control and high power speaker

CI-53001　　　　　　CI-53002

CI-53003　　　　　　CI-53004

CI-53006

Development Software Features

1. Windows 95/98/2000/ XP (see package information)
2. Built-in TMS320C5X algebraic assembler allow users to perform the following programming functions: editing, assembling, linking, disassembling, modifying, loading, debugging and testing
3. The contents of registers and memory can be displayed, modified and filled by the user
4. Source program code can be assembled in INTEL HEX format and then loaded into external EEPROM to form a stand-alone system
5. Other functions: Infinite break point setting, Step Into, Step Over, Step Out, RUN, HALT and RESET
6. FPGA programming and simulation by Altera MAX+PLUS®II

List of Experiment

1. Sampling theory
2. TMS320C542 assembly language
3. Testing convolution integration
4. Discrete fourier transform (DFT) and fast fourier transform (FFT)
5. Fast algorithm for correlation and convolution
6. Finite impulse response (FIR) filter
7. Infinite impulse response (IIR) filter
8. Designing oscillator with digital process
9. Low-Frequency spectrum analysis
10. Designing waveform generator
11. A-LAW and μ-LAW compandor
12. Speech compress, encode control development
13. Peripheral application control :
    (1) DC Servo PWM Control
    (2) Step Motor Control
    (3) Temperature Control
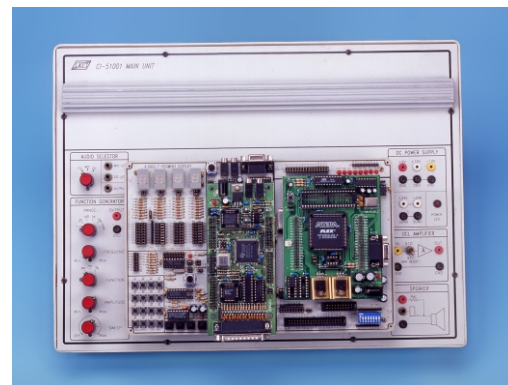   (4) PLC I/O Interface Control

Accessories

1. RS-232 cable x 1 set
2. Interface connect bus x 1 set
3. Experiment lead x 1 set
4. Adapter x 1 set
5. Operation manual

Order Information

1. CIC-520 DSP Simple Version Package:
   Include CIC-520, SN-510PP, development software and accessories
2. CIC-500 DSP Standard Version Package:
   Include CIC-520, CI-51001, SN-510PP, development software and accessories
3. CIC-500 DSP Complete Version Package:
   Include CIC-520, CI-51001, optional modules, SN-510PP, development software and accessories
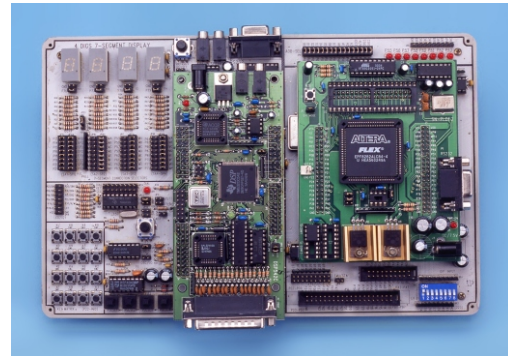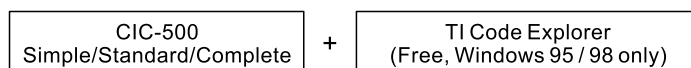

CIC-520 DSP Simple Version

CIC-500 DSP Standard Version

Package Information:

Windows 95 / 98 Users:

CIC-500 Simple/Standard/Complete	+	TI Code Explorer (Free, Windows 95 / 98 only)

Windows 2000 / XP Users:

CIC-500 Simple/Standard/Complete	+	TI Code Composer Studio (120 Days Trial, Windows 2000 / XP)	+	SN-510PP DSP JTAG Emulator