CIC-910A
PSoC TRAINING LAB

Simple, Easy, Fast, and Fun

PSoC (Programmable System on a Chip) is one of the most innovative technologies nowadays. Instead of selecting a traditional MCU with fixed peripherals, or designing a circuit with discrete analog and digital components, the designer can select a single off-the-shelf PSoC on a complete project for mixed-signal applications. Additionally, the unique ability to generate the exact peripheral components and the features of programmable interconnect and reuse of on-chip resources not only lowers the cost of materials, but also reduces the design cycle and the inventory risky.

K&H realized the highly demand of the PSoC training facility in the educational market and designed CIC-910A PSoC Training Lab to meet this need. The introduced CIC-910A Training Course focuses on digital/analog system integration specification in order to bridge the gap between these design worlds and to provide a step in educating system architects for realizing mixed-signal SoCs. The training lab helps users to understand PSoC operating theory and PSoC application design flow. With various I/O peripherals and versatile experiments, users are able to learn PSoC programming and hardware implementation in a very efficient way.

Features

1. CIC-910A adopts Cypress chip Cy8c27443 (28 pins) powerful Harvard architecture processor with following specialized features:
   (1) M8C processor speed up to 24 MHz
   (2) Providing 12 Analog and 8 digital PSoC blocks
   (3) 16K Bytes flash program storage with 50,000 erase/write cycles
   (4) 256 Bytes SRAM data storage
   (5) Making good trade-offs between price and performance
2. Providing various I/Os (keypad, servo motor, LCD display, Infrared Transceiver, etc) for versatile experiments and reserving additional pins for self-exercise and advanced designs.
3. The experiments utilize most of the PSoC function blocks for the exercise, giving users opportunity to design analog, digital or mixed signal applications.
4. I/O components are selected by 8-bit / 4-bit jumpers, easy for operating and performing the experiment.
5. Circuit board and PSoC chip is secured in plastic housing, preventing of being damaged.

Specifications

1. PSoC (Cy8c27443)
   (1) ADCs
      a. ADCIN14 (14-Bit Incremental ADC)
      b. ADCINC12 (12-Bit Incremental ADC)
      c. ADCINCVR (7- to 13-Bit Variable Resolution Incremental ADC)
      d. DELSIG8 (8-Bit Delta Sigma ADC)
      e. DELSIG11 (11-Bit Delta Sigma ADC)
      f. DUALADC (Dual Input 7- to 13-Bit Incremental ADC)
      g. SAR6 (6-Bit SAR ADC)
      h. TRIADC (Triple Input 7- to 13-Bit Incremental ADC)
   (2) Amplifiers
      a. AMPINV (Inverting Amplifier)
      b. CMPPRG (Programmable Threshold Comparator)
      c. INSAMP (Instrumentation Amplifier)
      d. PGA (Programmable Gain Amplifier)
   (3) Analog Comm
      a. DTMFDialer (DTMF Dialer Analog Output)
   (4) Counters
      a. Counter 8/16/24/32
   (5) DACs
      a. DAC 6/8/9 (6/8/9-Bit Voltage Output DAC)
      b. MDAC 6/8 (6/8-Bit Voltage Output Multiplying DAC)
   (6) Digital Comm
      a. CRC 16 (16-Bit CRC Generator)
      b. I2CHW (I2C Hardware Block)
      c. I2Cm
      d. IrDARX
      e. IrDATX
      f. RX 8 (8-Bit Serial Receiver)
      g. SPIM (SPI Master)
      h. SPIS (SPI Slave)
      i. TX 8 (8-Bit Serial Transmitter)
      j. UART
   (7) Filters
      a. BPF2 (Two-Pole Band Pass Filter)
      b. LPF2 (Two-Pole Low Pass Filter)

(8) Generic
   a. SCBLOCK (Analog Switched Capacitor PSoC Block)
(9) Misc Digital
   a. DigInv (Digital Inverter)
   b. E2PROM
   c. LCD
(10) MUXs
   a. AMUX4(4 to 1 Analog Multiplexer)
   b. RefMux(Reference Multiplexer)
(11) PWMs
   a. PWM 8/16(8/16- Bit Pulse Width Modulator)
   b. PWMDB 8/16(8/16- Bit PWM Dead Band Generator)
(12) Random Seq
   a. PRS 8/16/24/32(Pseudo Random Sequence Generator)
(13) Temperature
   a. Flash Temp(Internal Temperature Sensor Measurement)
(14) Timers
   a. Timer 8/16/24/32

2. I/O peripheral circuits
   a. 4-Digit Common Cathode 7-Segments Display
   b. 20x2 LCD Character LCD Back-light
   c. 8 LEDs
   d. Audio Amplifier
   e. 3 A/D input circuit
   f. 4 D/A output circuit
   g. RTC circuit
   h. DTMF decode circuit
   i. 12V DC motor
   j. IrDA Infrared Transceiver
   k. RS-232C Interface
   l. 4x4 Keypad switch
   m. 4 Tact switches
   n. 8-bit DIP switch
   o. LonWorks Neuron Chip CY7C53150 (optional)
   p. Wireless CYWUSB6934 (optional)

List of Experiments

1. GPIO Introduction
2. LED Controlled by GPIO
3. Tact Switch and LED Controlled by GPIO
4. DIP Switch and LED Controlled by GPIO
5. 7-Segment Display Controlled by GPIO
6. LCM Control
7. PWM Control
8. DAC Control
9. ADC Control
10. Random Generator
11. Timer
12. Counter
13. UART
14. IrDA Infrared Transceiver
15. DTMF
16. I2C
17. Applications
18. LonWorks(optional)
19. Wireless(optional)

Main Unit

1. I/O units are selected and connected by 1/4/8-bit jumpers, easy for performing the experiment
2. All the I/O units including components, symbols and functional block mounted on main board not only for safety but also for the convenience of experiment
3. Main board and PSoC chip is secured in plastic housing, preventing of accidentally being damaged
4. Offering a slide switch for downloading program file, either into PSoC chip or ICE-Cube through USB
5. Offering output power rated at +5 / +12 volts
6. Comprehensive experiment manual

Accessories

1. CIC-910A Lab Project File CD (include PSoC Cy8c27443 and Cy8c29466 source file)
2. USB A-B Type cable
3. RS-232 cable
4. 2mm-2mm test lead
5. Experiment manual
6. AC power cord
7. 1/4/8-bit jumper

Optional

1.PSoC ICE-Cube

a. Emulation with Cy8c29xxx seamlessly
b. By addition we also provide CY3207 POD to emulate with Cy8c27xxx

2.CI-93001 Wireless Module

Wireless USB™ LS 2.4GHz DSSS Radio System on a Chip adopts Cypress CYWUSB6934 chip for the benefit of transceiver at the same module. Either through SPI protocol for data transition or through Cypress USB, Cypress PSoC could handle digital/analog wireless data control easily.

1. 2.4-GHz CDMA radio transceiver
2. GFSK modem
3. Dual DSSS Baseband
4. Very low external parts count
5. Simple SPI slave microcontroller interface (Max. 2MHz)
6. Data throughput up to 62,500 bps
7. 10 meter range
8. -90 dBm receive sensitivity
9. 0 dBm output power
10. 2.7 to 3.6V operating voltage
11. 13 MHz±50 ppm clock pulse
12. Min. working current 1μA
13. 32 bit ID

3.CI-93002 LonWorks Control Module

1. Processor Neuron : 3150 Chip
2. Transceiver Type : TP/FT-10
3. Processor Input Clock : 10MHz
4. Operating Input Voltage : +5VDC
5. Operating Input Current : 120mA typical
6. Flash Memory : 32K
7. SRAM : 24K
8. Service Interface : Service button