**MICROCONTROLLER TRAINER KIT**

**8051 Development Board**

 89V51RD2 8 bit microcontroller

 Used as Programmer as well as Development Board

 A 9 pin D type female connector for RS232 Serial
   i/o interface UART experiments for flash programming

 Power Connector (+5V and gound)

 Stepper motor interface

 A push button switch is for reset

 4 push button switches

 8 LEDs interfaced

 16 switches

 RTC ( Real Time Clock )

 4 seven segment display

 ADC ( Analog to Digital Converter )

 LCD Display

**ALS-SDA-51ME**

|  |  |
| --- | --- |
| CPU | 8031 / 8051 operating at 11.0592 MHz |
| MEMORY | EPROM1 32KB bytes with monitor softwareEPROM2 Optional – 32KB ROMRAM1 32 KB Data RAM |
| I/O PARALLEL | 48 I/O lines using two 8255 |
| I/O SERIAL | 0ne RS232 compatible interface |
| TIMER | Three 16 bit counter /timer using 8253 |
| KEYBOARD | Consisting of 28 numbers of computer grade keys |
| DISPLAY | Six numbers of seven segment displays |
| BUS SIGNALS | All bus signals are terminated in berg stick. Controller specific lines like port 1 lines TO T1, INTO, INT1, etc. are terminated in a burg stick header |
| MONITOR SOFTWARE | 32KB of powerful user friendly monitor software with keyboard and serial modes |

**ALS-SDA-51MEL STANDALONE 8031/51 TRAINER**

|  |  |
| --- | --- |
| CPU | 8031 / 8051 operating at 11.0592 MHz |
| MEMORY | EPROM1 32KB bytes with Monitor Software |
| EPROM2 | Optional – 32KB ROM |
| RAM1 | 32 KB Data RAM |
| RAM2 | 32 KB Program/Data RAM |
| I/O PARALLEL | 48 I/O lines using two 8255 |
| I/O SERIAL | 0ne RS232 compatible interface |
| TIMER | Three 16 bit counter /timer using 8253 |
| KEYBOARD | External PC-AT Keyboard |
| DISPLAY | Alphanumeric LCD module(2 Lines x 16 characters) |
| BUS SIGNALS | All bus signals are terminated in FRC connectors. On chip port lines P1.0 to p1.7 TO, T1, INT1, INTO are also terminated |
| MONITOR SOFTWARE | 32KB of system monitor, which allows the user to enter, verify, debug or execute the program either from the on-board PC keyboard and display or through serial mode. On-line assembler using PC keyboard and LCD display |

**ALS-SDA-51LC**

|  |  |
| --- | --- |
| CPU | 8031 / 8051 operating at 11.0592 MHz |
| EPROM | One JEDEC compatible 28 pin socket to provide upto 32K bytes memory using 27256 with monitor software |
| RAM1 | One JEDEC compatible 28 pin socket to provide 32kb of DATA Memory |
| RAM2 | One JEDEC compatible 28 pin socket to provide 32kb of DATA Memory |
| I/O PARALLEL | 24 I/ O lines using one 8255 terminated in 26 pin berg headers |
| I/O SERIAL | One RS-232C compatible interface, using USART-8251A with programmable baud rates through 8253 programmable timer. These lines are terminated in a 9-pin D type female connector. |
| TIMER | Three 16 bit counter/timer using 8253 programmable timer |
| KEYBOARD | Consists of 28 numbers of keys with tops. |
| DISPLAY | Six numbers of bright seven-segment displays for address and data. |
| BUS SIGNALS | All address,data and control signals are terminated in a 50pin berg Header for user expansion. Controller specific lines like port lines,T0,T1,INT1 etc are also terminated in this connector. All signals are marked with suitable legends |
| MONITOR SOFTWARE | 32K bytes of user friendly monitor software that allows |
| POWER SUPPLY | Power adapter socket provided. |

**ALS-SDA-AT89C51ED2 SINGLE CHIP MICROCONTROLLER BOARD**

 Flash programmable AT89C51Ed2 micro controller with operating frequency
  of 11.0592 Mhz. The controller has 64KB of In-System Programmable flash
  memory, 1792 bytes of external (XDATA) RAM and 2048 bytes of EEPROM.
  On-chip peripherals like Timers, SPI interface, Programmable Counter Array
  (compare/capture & PWM), UART and general purpose I/O ports provide
  enhanced features.

 On-board LED's

 On-board push-button switches

 16 X 2 Line LCD Alphanumeric Display

 RS 232C compatible Serial Interface for communication, ISP

 SPI compatible 2 channels 12-bit ADC with Temperature Sensor Interface.

 A 26 pin FRC connector CN3 connected to Ports 0, 1 and 2 of the controller
  for easy interface to ALS standard external interfaces.

 In System Programming capability

 Compact and elegant enclosure

 Operates off 5V DC power

**MSP430 MICROCONTROLLER TRAINER KIT**

**Features of MSP430F449**

 16-bit RISC CPU enables new applications at a fraction of the code size

 On-chip - 60KB+256 byte flash Program memory

 512 bytes RAM

 SPI interface

 16 bit TimerA with 3 capture/compare

 16 bit TimerB with 7 capture/compare

 Two External Interrupts

 Supply voltage supervisor

 Low supply voltage range 1.8V to 3.6V

**Features of MSP430F449**

 Alphanumeric , 2 line x 16 character LCD display with back lighting

 Hexadecimal keypad organized as 4 rows x 4 columns

 DAC0800 based 8-bit DAC interface

 One ADC (ADC0809) with a Potentiometer for one variable analog input & Temperature measurement channel using Sensor IC LM335

 Four level Elevator simulator interface

 Stepper motor and DC motor control interface. Stepper motor and DC motor are supplied with evaluation board

 6-digit multiplexed 7-segment display interface

 On chip UART based serial interface using USB-to-Serial IC

 A Push button switch for External Interrupt testing

 One LED provided for general purpose indication

 Three 10 pin FRC connectors connected to Ports 2, 3 and 4 of the controller

 One 26 pin FRC carrying Controller ports 2, 3 and 4 lines , to connect to ALS standard NIFC interfaces

 A Slide switch to select either program mode or run mode

 Test Points on PCB for monitoring

**ALS-SDA-ATMEGA128-EVAL-01 ATMEGA MICROCONTROLLER KIT**

 16x2 alphanumeric display (LCD) with back lighting.

 4x4 Keypad Interface.

 Circuit to test on-chip Compare, Capture, PWM and Comparator.

 RS232C Serial interface through on chip UART0 and 9 pin D-sub connector.

 5 VDC Relay Interface.

 On-board multiturn preset to study on-chip 12-bit ADC.

 On Board Thermistor, LDR Interface Circuit.

 Suitable Proximity sensor interface circuit.

 On-board interface to SPI compatible 12-bit ADC device.

 On-board interface to I2C compatible NVROM.

 On-board DC Motor and Stepper Motor interface.