

## Electronics Communication Engineering



### RC Phase Shift Oscillator

- To design RC Phase Shift Oscillator with R and C values
- Provision to connect different values of R and C and to verify the frequency
- Built in Power Supply and Wooden closed cabinet



### JFET Characteristics

- Built in 0-6V Power Supply in the input side and 0-30V Power Supply in the output side
- To carryout drain output characteristics and transfer characteristics of JFET experiments
- Provision to connect necessary desk top meters externally, Wooden closed cabinet



### UJT Characteristics

- Built in 0-12V Power Supply in the input side and 0-30V Power Supply in the output side
- To carryout Emitter Characteristics of a UJT experiment
- Provision to connect necessary desk top meters externally, Wooden closed cabinet



### SCR Characteristics

- Built in 0-12V Power Supply in the input side and 0-30V Power Supply
- To carryout experiment on VI Characteristics of SCR
- To find latching and holding currents
- Built in Power Supplies and Wooden closed cabinet



### Photo Device Characteristics

- To carryout LDR Characteristics experiment
- To carryout Photo Diode Characteristics experiment
- To carryout Photo Transistor Characteristics experiment
- Provision to connect necessary desk top meters externally



### DIAC & TRIAC Characteristics

- Built in 0-6V Power Supply in the input side and 0-30V Power Supply in the output side for TRIAC Characteristics
- 0-45V Power Supply for DIAC Characteristics
- Provision to connect necessary desk top meters externally



### Wheatstone Bridge

- Wheat stone Bridge circuit to find the unknown resistance
- Provision to balance the bridge using built in decade resistance and standard resistances
- Provision to connect externally the galvanometer to check the balancing of bridge



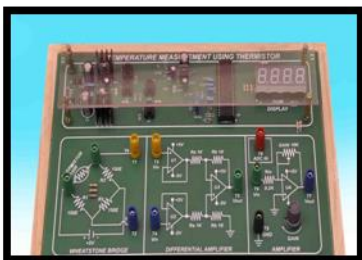
### Strain gauge

- Strain gauge fitted with cantilever beam
- Applying strain using weights in terms of 100 gms.
- Measurement of strain using DC Bridge method and Signal Conditioner
- Instrumentation amplifiers, 3 1/2 digit display to view strain
- Test points to measure the signals



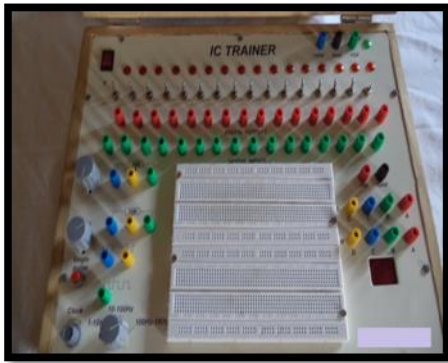
### Load Cell

- Strain gauge based Load Cell to measure up to 5 Kg
- Measurement of strain using DC Bridge method and Signal Conditioner
- Instrumentation amplifiers, 3 1/2 digit display to view weight
- Test points to measure the signals
- 10 nos. of weight of 100 gms, Built in Power Supplies and wooden closed cabinet



### Thermistor

- Disc type Thermistor (NTC) used in a Wheatstone Bridge
- Instrumentation amplifier
- 3 1/2 digit display to view the temperature
- Built in Power Supplies and wooden closed cabinet
- Glass Thermometer



### IC Trainer

- Two IC Bread boards to accommodate 16 numbers of 16 pin ICs
- +5V, 1A and  $\pm 15V$ , 200 mA DC Regulated Power Supply
- 16 numbers of De bounced Switch inputs
- 16 numbers of Buffered LED outputs
- 1Hz to 10 Hz, 10 Hz to 100 Hz and 100 Hz to 1 KHz Variable Clock Generator
- 100 msec. Single pulse output (buffered +ve and -ve outputs)
- 2 nos. of Seven Segment Displays with BCD inputs
- 2 nos. of Potentiometers to use it as variable resistor or as potential divider



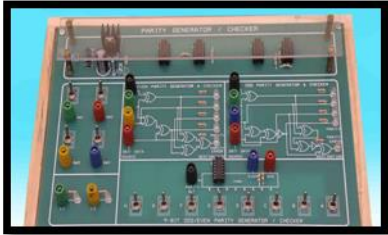
### Encoder & Decoder

- To wire 2 to 4 decoder and 4 to 2 encoder using basic gates
- To test 3 to 8 Decoder using IC 74138 for its operation
- To test 8 to 3 Priority Encoder using IC 74148 for its operation
- Necessary signal inputs and LED outputs
- Built in Power Supply and wooden closed cabinet



### Multiplexer & Demultiplexer

- To wire 2 to 1 multiplexer and 1 to 2 demultiplexer using basic gates
- To test 8 to 1 Multiplexer using IC 4051
- To test 1 to 8 Demultiplexer using IC 4051
- Necessary signal inputs and LED outputs
- Built in Power Supply and wooden closed cabinet



### Parity Generator

- To wire 3 bit Parity generator and reader using logic gates
- To test 8 bit Parity generator and reader using IC
- Signal inputs and LED outputs
- Built in Power Supply and wooden closed cabinet



### 4 bit Ripple counter

- To wire 4 bit Asynchronous counter using 4 nos. of Flip-Flops
- To wire Feedback circuit to design modulo-n counter and test
- Clock and reset signals and LED outputs
- Built in Power Supply and wooden closed cabinet



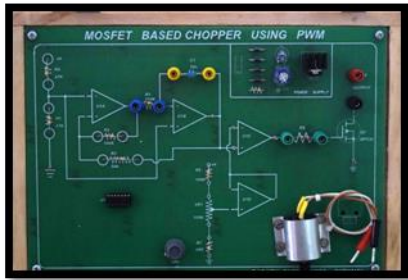
### Phase Angle Control of SCR

- To wire Resistance control circuit
- To wire Resistance and Capacitance control circuit
- To wire Line Synchronized UJT Relaxation Oscillator control with AC load
- Built in Power supplies and wooden closed cabinet



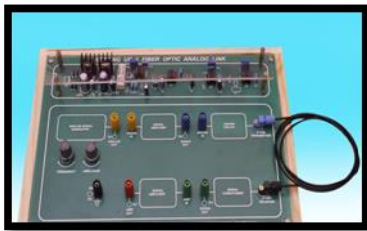
### PAM Generation

- Audio Oscillator 1 KHz and 2 KHz
- Sampling Pulse generator 4KHz, 8KHz, 16KHz, 32KHz and 64KHz
- Dual and Single Polarity sampling output
- Reconstruction of signal using Low Pass Filter and AC Amplifier
- Built in Power Supplies and wooden closed cabinet



### **PWM Based DC Chopper**

- Square Wave Generator
- Integrator to generate the Ramp
- Comparator with DC Voltage as one input
- MOSFET Switch to switch on the Load
- Small DC Motor as Load
- Built in Power supplies and wooden closed cabinet



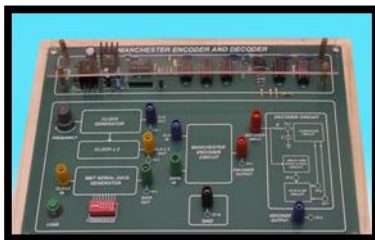
### **Analog Link**

- Built in Audio Oscillator for generating analog input
- Fiber Optic Link using LED Transmitter,
- One Meter Fiber Cable, Photo Diode R Amplifier in the Receiver stage
- Built in Power Supplies and wooden closed cabinet



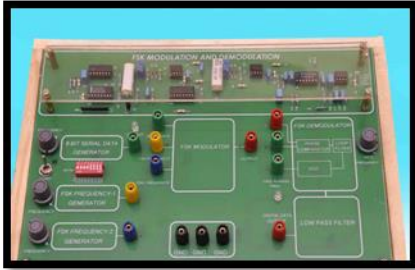
### **LED & Photo Diode**

- LED VI Characteristics for different colour LEDS
- Photo Diode VI Characteristics
- Built in Power Supplies and wooden closed cabinet



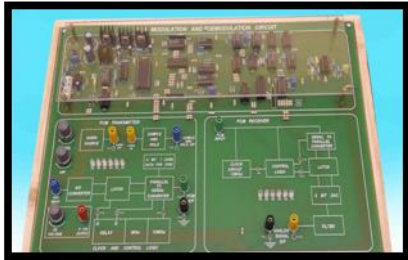
### **Manchester Encoder**

- Clock Generator
- Serial data Generator
- Manchester Encoder
- Manchester Decoder
- Test points to measure the signals at different stages
- Built in Power Supplies and wooden clo



### **FSK Transmitter**

- 8 bit serial Data generator using DIP switch
- FSK Frequency Generator (2 sine wave Frequencies), FSK Transmitter
- FSK Receiver using PLL and low pass filter
- Built in Power Supplies and wooden closed cabinet







### **PCM**

- Audio Signal 1 KHz,
- 8 bit A/D Conversion,
- Latch and Parallel to Serial conversion, PCM Signal generation
- Clock recovery and Synchronization Circuit
- Serial to Parallel conversion
- Latch and D/A Conversion



### **Microcontroller**

- 89C52 micro controller, 12 MHz, Built in 8K Flash ROM and 256 bytes internal RAM
- 8279 based display / keyboard
- 8 function keys, 16 hex keys and 6 digits seven segment display
- 3 nos. of 8 bit ports for the user (8255) in the expansion connector
- Timer 0 pulse input push switch and Int 0 input push switch
- Serial Facility and windows based Software to download Hex file from PC to Kit

	<p style="text-align: center;"><b>Digital I/O</b></p> <ul style="list-style-type: none"> <li>➤ 8 nos. of high quality toggle switches and 8 nos. of LEDs. Input devices LDR, Reed Relay, Push Button and Opto Interrupter, Output Relay, Opto Coupler, Piezo Buzzer and Speaker</li> </ul>
	<p style="text-align: center;"><b>DC Motor</b></p> <ul style="list-style-type: none"> <li>➤ Speed control circuit using PWM technique and Small DC motor</li> <li>➤ Thumb Wheel Switch for duty cycle input and H Bridge output for driving DC Motor</li> <li>➤ Control switches to give control inputs (direction and speed)</li> </ul>
	<p style="text-align: center;"><b>ADC &amp; DAC</b></p> <ul style="list-style-type: none"> <li>➤ Thermistor LM 35 input in one channel, 0-5V variable input in another channel</li> <li>➤ 8 LEDs to see the digital output, Necessary control signals for ADC 0809</li> <li>➤ Amplifier for measuring the temperature in Binary</li> <li>➤ One channel DAC output, 8 bit input from the controller, External Power supply needed</li> </ul>
	<p style="text-align: center;"><b>Matrix Keyboard &amp; 7 Segment</b></p> <ul style="list-style-type: none"> <li>➤ 4 X 4 Matrix 16 Key Keyboard, 6 Seven Segment Display</li> </ul>





### **VLSI**

- **Xilinx Spartan 3E Family FPGA (250K gates),**
- **JTAG Programming through parallel port**
- on board PROM to store the program
- 3 nos. edge sensitive switches, manual clock, on board clock
- ISE 9.1i Webpack software for programming either in VHDL or Verilog, Simulate and Synthesis
- 24 I/O in expansion socket for interfacing external application
- Power Supply, Cabinet and detailed user manual and sample programs



### **Embedded Lab**

- ARM 7 – LPC 2148 Controller
- 4 x 4 Matrix Keyboard, Buzzer and Relay, 2 line Text LCD display
- User External Interrupt, Timer/Counter Switch inputs,
- Single digit seven segment display
- I2C device interface for Serial EEPROM,
- I2C interface for 7 Segment display and Real time clock
- Temperature sensor LM 35, Provision to test On-chip ADC,
- PWM Signal output
- Serial Port for transmission from Kit and reception from PC
- Serial Port for In System Programming facility