Key Features:

- Building control circuits and PC control programming

- Introduces electronic control techniques

- Control of a D.C. motor, direction control

- Temperature control

- ADC and DAC converters

- Keypad input

- Audible and visual indictors

- Several other projects with varying complexity

- Control from a PC or Microcontroller

- Switched faults

The Multi Applications Board (MAB) contains a variety of experiments on one board and is ideal for learning how to interface a PC or Microcontroller to applications. The techniques of controlling data transmission, keyboard entry, digital sound production, D.C. motors, heaters, and visual displays can be controlled using a PC with a programming language, the MAB can also be used as target for a microcontroller. This involve the fundamentals of microprocessor or computer programming, such as decision making, D to A and A to D conversion, open and closed loop control, creating delay loops, using subroutines and event counting.

The MAB Primary components are: a 12V d.c. motor, this is used for closed-loop control to drive a fan which cools a heater/resistor to a set temperature. Several other elements are on the MAB these include a Piezo buzzer, TTL monitor, a bank of logic switches, a logic probe power point, a strain gauge and amplifier, a bar-graph and a seven segment display, switched faults and a potentiometer that can be used as an analogue input.

Curriculum Coverage

- System overview
- Connection instructions
- Connecting to a PC using an interface card
- Application board electronics
- Switched inputs
- LED output port bit indicator
- The Analogue to Digital Converter
  - Types of ADC
  - The successive approximation converter
  - The ADC0804 applications board circuit
- The temperature sensor
- The heater circuit

- The strain gauge, the strain gauge circuit
- The Digital to Analogue Converter
  - The ZN425E circuit
- The buzzer
- The seven segment display - the bargraph
- Matrix keypad
- The DC motor
  - Pulse Width Modulation
  - Variable speed using P.W.M.
  - The D.C. motor circuit
- The speed sensing circuit
- Switched faults

Labworks

- Switched inputs
- Control of an output port
- Use of the Analogue to Digital Converter
- Use of the temperature sensor
- Digital to Analogue Converter

- Control of the buzzer frequency
- Driving the seven segment display unit
- Keypad scanning
- Pulse Width Modulation control of the DC motor unit
- Closed loop control of the DC motor unit

Specification

Inputs	8 x digital inputs; 2 x analogue inputs
Outputs	8 x digitals outputs; 4 x analogue outputs
	2x Counter Timer Channels (CTC)
Motor speed/direction control	Direction control and Pulse Width Modulated speed control, from counter timer chip
Motor specification	12V d.c.
Temperature element	Vitreous enamel wire-wound resistor 6W, maximum surface temperature: 80ºC
Temperature sensor	LM35DZ linear. Output is amplified to a 0-5V temperature to voltage linear scale
Strain gauge	Gauge plus compensating gauge
Keypad	12 Button matrix. 0-9, * and #. 9 connections for scanning operation
Pot	1 Meg linear
TTL monitor	8-Bit LED indication
Logic switches	8-bit DIP selector switch
Seven segment display	Dual seven segment (red L.E.D) 10 control codes per number (20 in total)
DAC	Range: 8bit: full scale error: $\pm$ 1LSB; output settling time:100ns
ADC	Range: 8-bit: max error: $\pm$ 1-bit; reference: 2.5V; max conversion rate: 8770/second
Piezo buzzer	12V sounder
Logic probe	5V connection posts
Connectors	1 x 40-way IDC digital connection
	1 x 26-way IDC analogue connection
	1 x 2 screw terminals for power input
Power supply requirements	12v d.c. @ 2A fused

Required

A suitable PC with minimum; Pentium processor, 1GB RAM, 20GB HDD, CDROM Drive and Windows XP or above

Ordering Information

Model Number:	**MAB**
Consists of:	1 x Multi applications board
	1 x 12V d.c. power supply unit
	1 x 2.1mm adapter lead
	1 x User manual
	1 x Software CD

Weights and Dimensions

Un-Packed		**Packed**	
Approximate Dimensions (mm)	225W x 60D x 285H	Approximate Dimensions (mm)	400W x 300D x 300H
Approximate Weights	1.0Kg	Approximate Weights	6Kg