T4 CONTROL TRAINING BOARD

USB cable connector

9V power connector

test points

LDR input

variable resistor input

temperature input

push switch inputs

piezo sounder

motor outputs

LED outputs

stepper motor output

darlington output
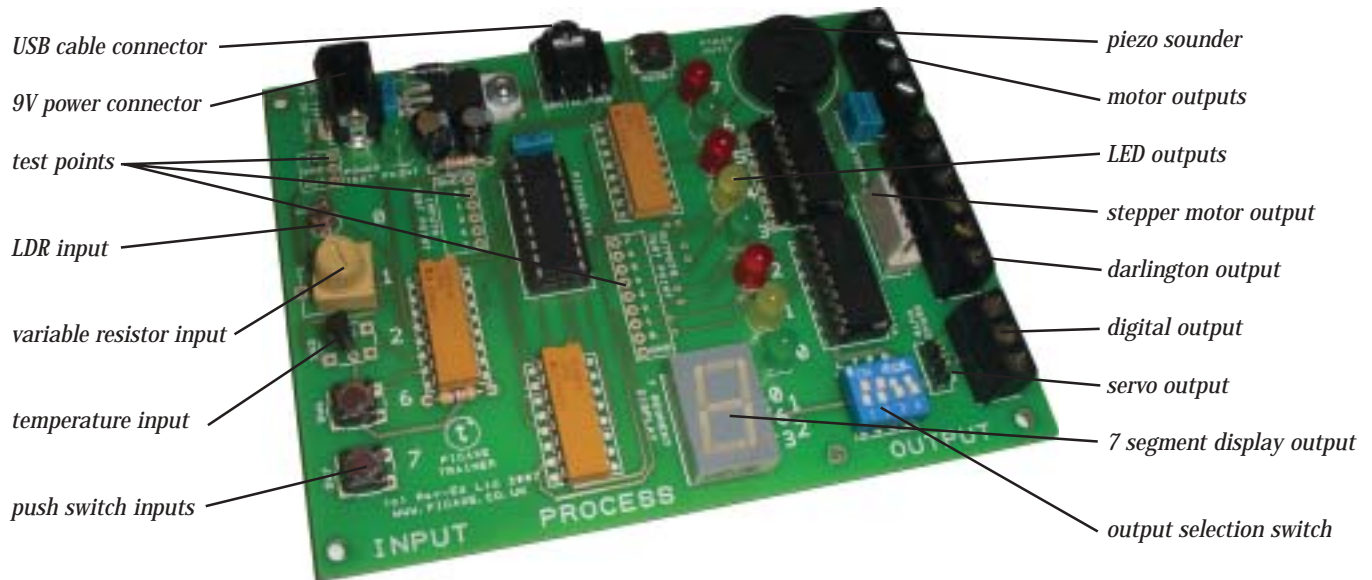
digital output

servo output

7 segment display output

output selection switch

The **t4 Control Training Board** has been specifically designed to meet the requirements of the t4 Technology curriculum in Ireland. However, as it is a general purpose training board, it may also be utilised in many other courses. The training board can be used with any software application that supports the PICAXE hardware, including the free PICAXE Programming Editor and/or Logicator for PICs software.

The training board is supplied with both analogue and digital inputs, as well as a range of output devices.

The training board provides a complete tutorial system based around the PICAXE-18X technology. Free training resources and tutorials are provided in the PICAXE manual (part 1 - Getting Started).

KEY FEATURES:

- LED on each output (can be enabled/disabled)
- 7 Segment Display output (can be enabled/disabled)
- Piezo sounder output (can be enabled/disabled)
- Servo output connector
- Stepper motor output connector
- 4 Darlington driver buffered outputs
- 2 reversible motor driver outputs
- LDR light sensor analogue input
- DS18B20 temperature sensor input
- variable resistor analogue input
- push switch inputs
- input, output and power test points

The AXE056 'starter kit' contains the following parts:
- AXE055   t4 Control Training Board
- AXE027   USB download cable
- PWR009A   5V DC power supply (UK/EIRE style plug)

ORDER CODES:

It is recommended that new users purchase the starter pack, part AXE056

This contains the following parts:
1x AXE055   t4 Training Board
1x AXE027   USB download cable
1x PWR009A   9V Power Supply

A discounted educational 'starter 5 pack' is also available (part AXE057)

This contains the following parts:
5x AXE055   t4 Training Board
5x AXE027   USB download cable
5x PWR009A   9V Power Supply

The tutorial/manual can be downloaded free of charge from the PICAXE website **www.picaxe.co.uk**

OUTPUT OPTIONS:

The t4 Training Board is designed to be compatible with the following optional output devices:

Solar DC Motor	- GBX007
(optional propeller)	- GWC040
Buzzer	- SPE005
Stepper Motor	- GBX008
Servo	- GBX010
Serial LCD	- AXE033
MP3 Music Module	- USB030

The stepper motor and servo are supplied pre-fitted with appropriate connectors to fit directly onto the headers on the t4 Training Board.

The other outputs are connected via wires to the screw terminal blocks provided on the training board.

ORDERING:

All parts can be ordered online at **www.techsupplies.co.uk**

All schools/colleges in the UK and EIRE also have automatic 30 day accounts. Fax your official order to Revolution Education Ltd for immediate despatch.

Tel (UK):   01761 430044
Fax (UK):   01761 430045

Tel (World):   +44 1761 430044
Fax (World):   +44 1761 430045

Email: sales@rev-ed.co.uk

For further PICAXE information please see the PICAXE website: www.picaxe.co.uk

Teaching Materials

The Teaching Materials comprise 15 sheets, designed to cover all the main features of the Logicator version 3 software:

Switching Outputs (1) and (2)
Digital Inputs (1) and (2)
Analogue Inputs (1) and (2)
Procedures (1) and (2)
Timing
Counting (1) and (2)
Interrupts (1) and (2)
Monitoring Analogue Input
EEPROM

All of the sheets can be used with the T-board with Digital and Analogue Inputs (AXE055).

The programming techniques and new commands introduced are shown at the start of each sheet.

Help Sheets

The Teaching Materials sheets give instructions for using the Logicator commands, but the basics of building and editing programs (moving commands; deleting; cut, copy and paste, line-drawing) together with instructions for test running and downloading programs to the T-board are presented together on the three Help Sheets.

These sheets are referred to in the Teaching Materials, so pupils should have copies of them.

Programs

The Logicator programs which are used on the Teaching Materials sheets are labelled Fig 1 to Fig 20. All of these programs can be opened in Logicator, from the "T-board programs" folder.

Extensions

Most of the Teaching Materials sheets include Extension activities. Suggested solution programs for these activities can also be opened in Logicator, from the "T-board programs" folder, as listed below. Note that this list also includes some additional suggested programs.

Switching Outputs (2) Extensions:1 - simply re-open the Wait commands and type in different times as required.
2 - see Ext1.plf; 3 – see Ext2.plf

Digital Inputs (1) – the program shown in Fig 3 can be extended to turn the T-board into a very simple electronic musical instrument, as shown in Ext3.plf

Digital Inputs (2) Extension – see Ext4.plf

Analogue Inputs (2) Extensions:1 – see Ext5.plf
2 – see Ext6.plf

Procedures (2) – All that is required for this development is to change the setting of the Decision command so that it checks when switch 2 is unpressed (i.e. when the card is opened). Pupils could extend the activity further by programming a different tune.

Timing Extension – To time for 15 seconds, set the Do Proc command to repeat 15 times. To time for a minute, set it to repeat 60 times.

Counting (2) Extension – see Ext7.plf

EEPROM – Two more complex examples of systems using this technique are shown in: Ext8.plf and Ext9.plf.

Ext8.plf is a programmable combination lock. To open the lock, three switches must be pressed in the correct order (6,7,2). The sequence is stored in the EEPROM.

Ext9.plf. is a very simple data logging system. It stores a reading from the light sensor each time you press switch 7 (to a maximum of 4 readings). If you press switch 2, the number and value of each reading is displayed in binary form by the LEDs on the T-board. You can freeze the display by holding down switch 6.