

**Overview**

In this unit your students should:

- learn to appreciate the distinction between block and circuit diagrams
- use block diagrams to analyse circuits which contain a logic gate
- use block diagrams and truth tables to design circuits which contain a logic gate

This should not require more than 2 hours of class time.

Hour	Suggested Activity
1	<p>Introduce the idea of block diagrams as a means of making the incomprehensible comprehensible. You could open up an old PC and discuss how it can be distilled into a block diagram.</p> <p>Get students to work through the <b>Systems Diagrams</b> exercises.</p> <p>Ask students to study <b>1.4</b> from the text book and answer question 1 on page 16 of the text book before the next session.</p>
2	<p>Students should spend this session working through the two remaining Systems Diagrams questions on page 17 of the text book. The questions have a gradient of difficulty, with question 3(e) as the hardest - it should give your brighter students an opportunity to show what they can do.</p> <p>Ask students to revise <b>Simple Digital Systems</b> for a formal test next session.</p>

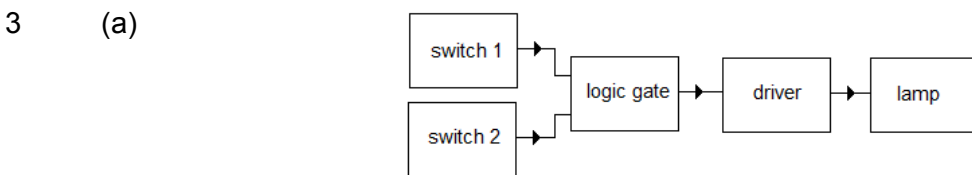
**Model Answers**

- 1 (a) Block diagrams only show the flow of information through a system, circuit diagrams show the electrical connections required between the components.
- (b) Block diagrams allow you to focus on the function of a block without having to deal with the complexities of how that function is achieved at component level.



switch R	B	switch L	A	P	LED
open	1	open	1	0	off
closed	0	closed	0	1	on

- (c) The LED doesn't glow only when neither of the switches is being pressed. It glows when either or both of the switches are pressed.



- (b) Switches 1 and 2 output a particular signal only when each switch is pressed. The logic gate combines the outputs of the switches and provides signal for the driver. The driver sinks current from the lamp when its input is high. The lamp glows when it has a current.



switch	S1
pressed	0
released	1

- (d)
- (e) The voltage at each input of the NOR gate is only low when the switch is pressed. The output of the gate only goes high when both inputs are low, putting the MOSFET into its low resistance state, allowing current in the lamp to make it glow.

