

A



A-level

COMPUTER SCIENCE

Paper 2

7517/2

Insert

TABLE 1 for use in answering Question 10

FIGURE 8 for use in answering Question 14.1

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**TABLE 1 –
Standard AQA assembly language instruction set**

LDR Rd, <memory ref>	Load the value stored in the memory location specified by <memory ref> into register d.
STR Rd, <memory ref>	Store the value that is in register d into the memory location specified by <memory ref>.
ADD Rd, Rn, <operand2>	Add the value specified in <operand2> to the value in register n and store the result in register d.
SUB Rd, Rn, <operand2>	Subtract the value specified by <operand2> from the value in register n and store the result in register d.
MOV Rd, <operand2>	Copy the value specified by <operand2> into register d.
CMP Rn, <operand2>	Compare the value stored in register n with the value specified by <operand2>.
B <label>	Always branch to the instruction at position <label> in the program.
B<condition> <label>	Branch to the instruction at position <label> if the last comparison met the criterion specified by <condition>. Possible values for <condition> and their meanings are: EQ: equal to NE: not equal to GT: greater than LT: less than

AND Rd, Rn, <operand2>	Perform a bitwise logical AND operation between the value in register n and the value specified by <operand2> and store the result in register d.
ORR Rd, Rn, <operand2>	Perform a bitwise logical OR operation between the value in register n and the value specified by <operand2> and store the result in register d.
EOR Rd, Rn, <operand2>	Perform a bitwise logical XOR (exclusive or) operation between the value in register n and the value specified by <operand2> and store the result in register d.
MVN Rd, <operand2>	Perform a bitwise logical NOT operation on the value specified by <operand2> and store the result in register d.
LSL Rd, Rn, <operand2>	Logically shift left the value stored in register n by the number of bits specified by <operand2> and store the result in register d.
LSR Rd, Rn, <operand2>	Logically shift right the value stored in register n by the number of bits specified by <operand2> and store the result in register d.
HALT	Stops the execution of the program.

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LABELS: A label is placed in the code by writing an identifier followed by a colon (:). To refer to a label, the identifier of the label is placed after the branch instruction.

Interpretation of `<operand2>`

`<operand2>` can be interpreted in two different ways, depending on whether the first character is a # or an R:

- # – use the decimal value specified after the #, eg #25 means use the decimal value 25.
- R_m – use the value stored in register _m, eg R6 means use the value stored in register 6.

The available general purpose registers that the programmer can use are numbered 0 to 12.

FIGURE 8

LETTER	ENCODING
A	11000
B	10011
C	01110
D	10010
E	10000
F	10110
G	01011
H	00101
I	01100
J	11010
K	11110
L	01001
M	00111

LETTER	ENCODING
N	00110
O	00011
P	01101
Q	11101
R	01010
S	10100
T	00001
U	11100
V	01111
W	11001
X	10111
Y	10101
Z	10001

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