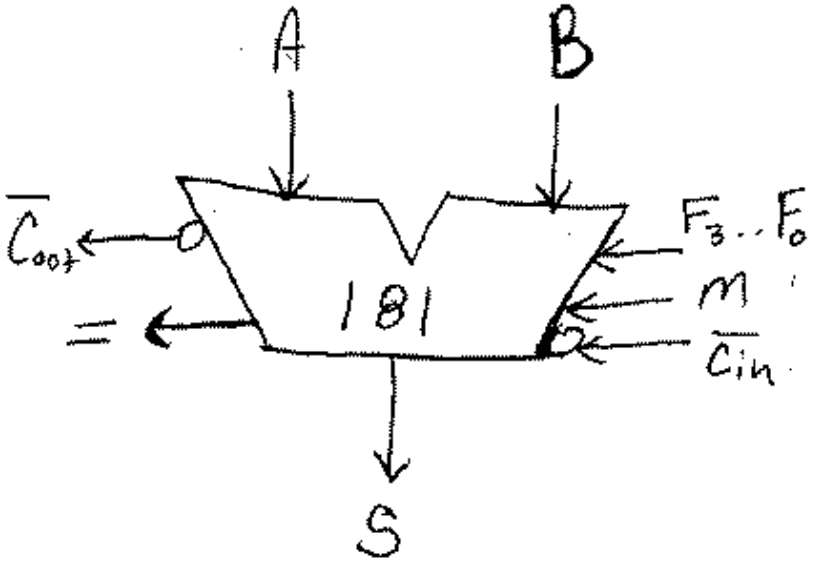
Table A2.3 Function decoding: 74181 ALU inputs and functions.

Control inputs				Function performed if $M = 0$ (arithmetic)	Function performed if $M = 1$ (logical)
F_3	F_2	F_1	F_0		
0	0	0	0	$A + 1 - \overline{C}$	$\overline{A}$
0	0	0	1	$(A \text{ OR } B) + 1 - \overline{C}$	$\overline{(A \text{ OR } B)}$
0	0	1	0	$(A \text{ OR } \overline{B}) + 1 - \overline{C}$	$\overline{A} \text{ AND } B$
0	0	1	1	$-\overline{C}$	00000000
0	1	0	0	$A + (A \text{ AND } \overline{B}) + 1 - \overline{C}$	$\overline{(A \text{ AND } B)}$
0	1	0	1	$(A \text{ OR } B) + (A \text{ AND } \overline{B}) + 1 - \overline{C}$	$\overline{B}$
0	1	1	0	$A - B - \overline{C}$	$A \text{ XOR } B$
0	1	1	1	$(A \text{ AND } \overline{B}) - \overline{C}$	$A \text{ AND } \overline{B}$
1	0	0	0	$A + (A \text{ AND } B) + 1 - \overline{C}$	$\overline{A} \text{ OR } B$
1	0	0	1	$A + B + 1 - \overline{C}$	$\overline{(A \text{ XOR } B)}$
1	0	1	0	$(A \text{ OR } B) + (A \text{ AND } B) + 1 - \overline{C}$	B
1	0	1	1	$(A \text{ AND } B) - \overline{C}$	$A \text{ AND } B$
1	1	0	0	$A + A + 1 - \overline{C}$	11111111
1	1	0	1	$(A \text{ OR } B) + A + 1 - \overline{C}$	$A \text{ OR } \overline{B}$
1	1	1	0	$(A \text{ OR } \overline{B}) + A + 1 - \overline{C}$	$A \text{ OR } B$
1	1	1	1	$A - \overline{C}$	A

Table A2.4 Useful ALU functions.

Control inputs						
F_3	F_2	F_1	F_0	$\overline{C}$	M	Output
0	0	1	1	1	1	00000000
1	1	0	0	1	1	11111111
1	1	1	1	1	1	A
1	0	1	0	1	1	B
1	1	1	1	1	0	$A - 1$
0	0	0	0	0	0	$A + 1$
1	0	0	1	1	0	$A + B$
0	1	1	0	0	0	$A - B$
1	0	1	1	1	1	$A \text{ AND } B$
1	1	1	0	1	1	$A \text{ OR } B$
0	1	1	0	1	1	$A \text{ XOR } B$
0	0	0	0	1	1	$\overline{A}$ (1's complement)