



quite arbitrary address, and clearly any of the Compukit's 65,536 addresses could be decoded in this way; although of course since 17-input AND gates are not readily available, one would be forced to use a combination of gates to achieve the same effect in a practical circuit.

There are two further factors which must be considered in decoding for an interface, both of which relate to the R/W (Read/Write) signal. The circuit of Fig. 1.2 will give an output at any time that the address 61208 appears on the address bus. Thus, executing POKE 61208, X or Y=PEEK (61208), would both cause an output from the decoding circuit. But in most applications it is useful to distinguish between read and write operations. If, for example, we are using the signal to trigger a set of latches to give a data output, we will only want this to occur in response to a POKE command, whereas if it were used to turn on a tristate buffer for the input of data to the CPU, we would want this to occur exclusively in response to a PEEK statement.

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90 REM HEX-DEC-HEX CONVERTER
95 REM PE UK101 INTERFACING PROG NO 1
100 FORA=1TO16:PRINT:NEXT
110 PRINT,"HEX-DEC-HEX CONVERTER"
115 PRINT:PRINT:PRINT
120 PRINT" IS DATA HEX OR DECIMAL ?"
125 INPUT" ENTER H OR D";Y$
130 IFY$="D"THENGOSUB550:GOTO165
140 IFY$="H"THENGOSUB550:GOTO350
150 PRINT:PRINT" NOT RECOGNISED: ENTER AGAIN"
160 GOTO120
162 REM
163 REM DEC TO HEX ROUTINE
164 REM
165 PRINT:PRINT
166 INPUT" DECIMAL DATA PLEASE";N
168 IFN=0THEN350
170 A=INT(N/4096)
180 A1=A*4096
190 B=INT((N-A1)/256)
200 B1=B*256
210 C=INT((N-A1-B1)/16)
220 C1=C*16
230 D=N-A1-B1-C1
240 X$="0123456789ABCDEF"
250 PRINT,"HEX EQUIVALENT= ";
260 PRINTMID$(X$,A+1,1);
270 PRINTMID$(X$,B+1,1);
280 PRINTMID$(X$,C+1,1);
290 PRINTMID$(X$,D+1,1)
300 GOTO165
350 REM
360 REM HEX TO DEC ROUTINE
370 REM
390 PRINT:PRINT:PRINT
400 INPUT" HEX DATA PLEASE";H$
402 IFH$="0"THEN165
403 I=LEN(H$)<>4THENPRINT:PRINT" 4 DIGIT FORMAT ONLY":GOTO400
405 N=0
410 X$="0123456789ABCDEF"
420 FORJ=1TO4
430 FORI=1TO16
440 IPMID$(H$,J,I)=MID$(X$,I,1)THEN460
450 NEXTI
455 PRINT:PRINT" CHARACTER NOT IDENTIFIED - RE DO"
456 GOTO390
460 N=N+(I-1)*16+(4-J)
470 NEXTJ
480 PRINT,"DECIMAL EQUIVALENT= ";N
490 GOTO390
500 END
550 PRINT:PRINT:PRINT" NOTE THAT ENTERING A ZERO WHEN"
560 PRINT" DATA IS REQUESTED REVERSES FUNCTION"
570 RETURN

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Table 1.1 Hex/Dec. and D/H converter program

Address	Description
0000-02FF	Scratchpad RAM for operating system
0300	Start of Basic Workspace
1FFF	End of On-board RAM
9FFF	End of Possible Ram expansion
A000-BFFF	Basic Interpreter
D000-D3FF	Video RAM
DF0D	Polled keyboard
F000, F001	ACIA serial port
F800-FFFF	Monitor ROM

Differentiation between the two can be achieved by using the R/W line at Compukit's expansion socket. This goes high during a Read Cycle, and low during a Write Cycle. The configuration in Fig. 1.3 would derive two separate Chip Select lines from the output of the circuit in Fig. 1.2, one for a Read to the address 61,208, and one for a Write. As may be seen, even though the two resulting decoded lines share the same address in the Compukit's memory map, they could be used for entirely different purposes. The Write might be used to trigger latches driving a D/A converter, while the Read might