TYPES OF ROMS

There are three main types or ROMs and they differ in the way they are programmed:

- **Mask ROM:** Contents programmed at factory according to the desired specification, and no changes are possible afterwards. This type is uneconomical for small quantities because the vendor charges the customer a special fee for custom masking the particular ROM.

- **PROM:** User programmable using a PROM programme*r*. Once programmed the contents can not be changed. The factory settings are all 1's and the user sets specified bits to 0's by blowing up fusible links. Fairly economical for small quantities.

- **EPROM:** User programmable and erasable by means of ultraviolet radiation (**UV EPROM**) or electrical pulses (**EEPROM**). It use an n-MOS memory array with isolated-gate structure. The isolated gate has no electrical connections and can store electrical charge for indefinite periods of time. Erasure of data bits is done by removing the gate charge.

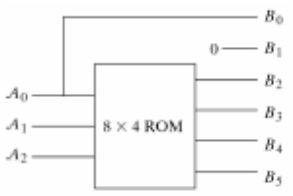
1. Design a combinational circuit using a ROM. The circuit accepts a 3-bit number and generates an output binary number equal to the square of the input number.

   The first step is to generate the truth table of the combinational circuit:

Inputs			Outputs						
A_2	A_1	A_0	B_6	B_5	B_4	B_3	B_2	B_1	B_0	Decimal
0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	1	1	1
0	1	0	0	0	0	1	0	0	4	4
0	1	1	0	0	1	0	0	1	9	9
1	0	0	0	1	0	0	0	0	16	16
1	0	1	0	1	1	0	0	1	25	25
1	1	0	1	0	0	1	0	0	36	36
1	1	1	1	1	0	0	0	1	49	49

Only outputs *B*3 – *B*6 need be generated with a ROM, the other two are readily obtained. The ROM required must be of size 8 X 4.

The ROM realization is shown below:



The following truth table specifies the information needed for programming the ROM:

A_2	A_1	A_0	B_5	B_4	B_3	B_2
0	0	0	0	0	0	0
0	0	1	0	0	0	0
0	1	0	0	0	0	1
0	1	1	0	0	1	0
1	0	0	0	1	0	0
1	0	1	0	1	1	0
1	1	0	1	0	0	1
1	1	1	1	1	0	0

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