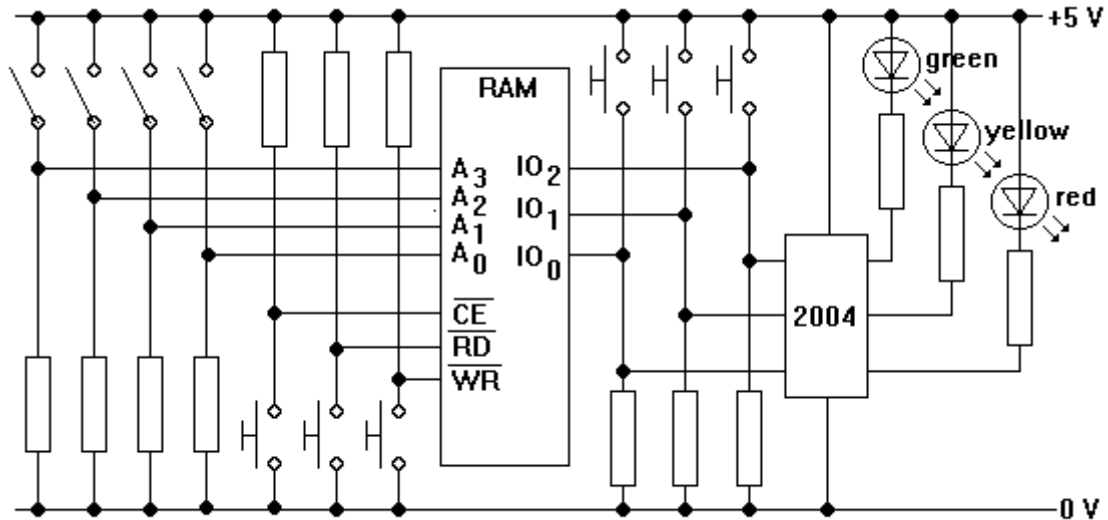


## Programming a RAM chip

The circuit you will be assembling is shown below. The RAM can be any static RAM i.c. which holds more than sixteen three-bit words with the standard 3-bit control bus. Most 2048 8 RAMs have the pinout of a 6116 i.c.



- 1 Start off by setting up the **data switches** as follows. On the far right-hand end of your breadboard, insert the LEDs, driver, three switches and 1 k $\Omega$  pull-down resistors. Check that each LED glows when its switch is pressed.
- 2 Place your RAM i.c. on the breadboard. Connect it to the supply rails. Connect any of the address inputs which you aren't going to use to either +5 V or 0 V.
- 3 Set up the four DIL switches and their 2.2 k $\Omega$  pull-down resistors connected to the four address inputs. Use a voltmeter to check that each **address switch** can be used to feed 1's and 0's into the address inputs.
- 4 Now set up the three push switches and 4.7 k $\Omega$  pull-up resistors which fix the state of the control bus. Use a voltmeter to check that each control line goes low and high when the relevant **control switch** is pressed and released.
- 5 Test your circuit by entering 010 at location 0000 as follows:
  - set the address bus to 0<sub>h</sub>
  - hold  $\overline{WR}$  low and keep it there
  - make the yellow LED glow by pressing its switch
  - pulse  $\overline{CE}$  low
  - release all of the control and data switches
  - pull both  $\overline{CE}$  and  $\overline{RD}$  low; if all is well, only the yellow LED should glow.
- 6 Try entering different 3-bit words at a variety of locations. Check that you can read them out again.
- 7 Program the RAM with a 16 step traffic light sequence. Then use a 1 Hz oscillator and a binary counter to run the LEDs through the sequence.