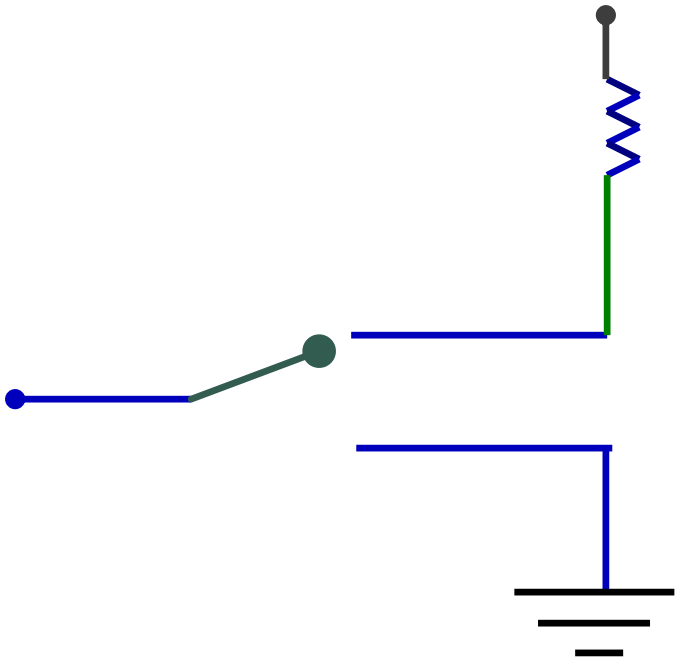
PROTEUS SYSTEM DESIGN EXAMPLE

A 8086 based system checks a set of 8 switches (SW1- SW8) every 1 second and displays the no. of switch that is closed(assume only 1 switch is closed at a time) – if no switch is closed – 0 is displayed.

SWITCH – SINGLE POLE DOUBLE THROW SWITCH

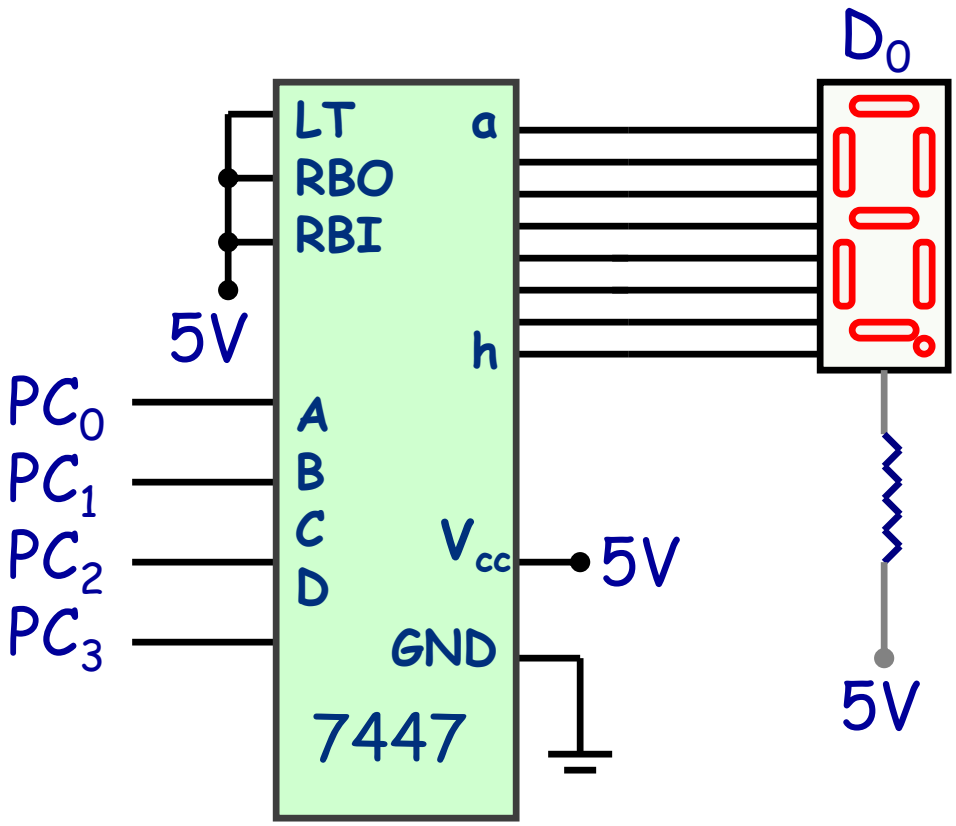


INTERFACE TO SWITCH

- 8 switches
- PB_0 – PB_7 (SW1 – SW8)

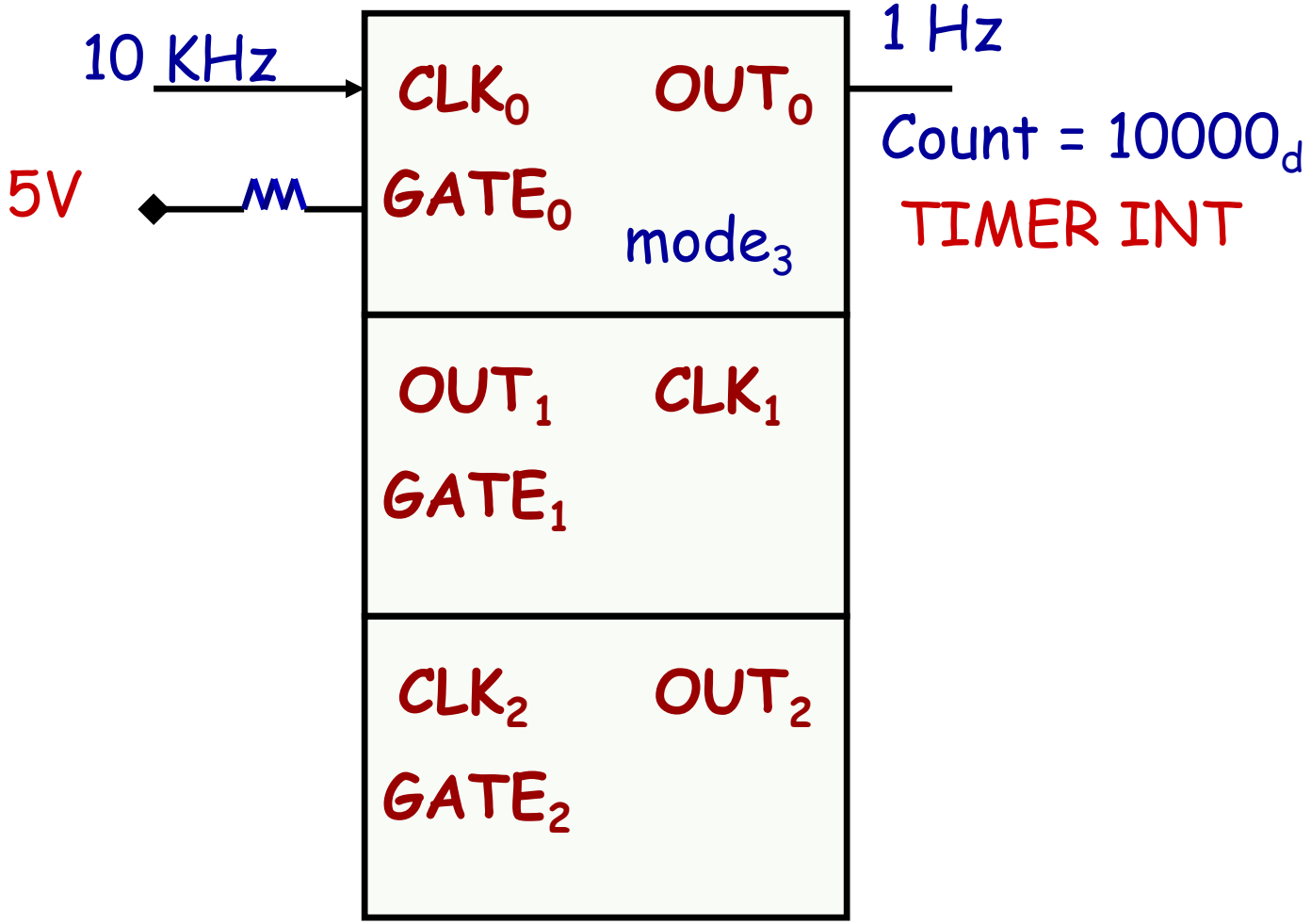
7 SEGMENT DISPLAY

- 1 – seven segment displays
- 1- 7447
- Requires 4-bit


D0
LT
RBO
RBI
5V
a
h
PC0
PC1
PC2
PC3
A
B
C
D
Vcc
5V
GND
7447
5V

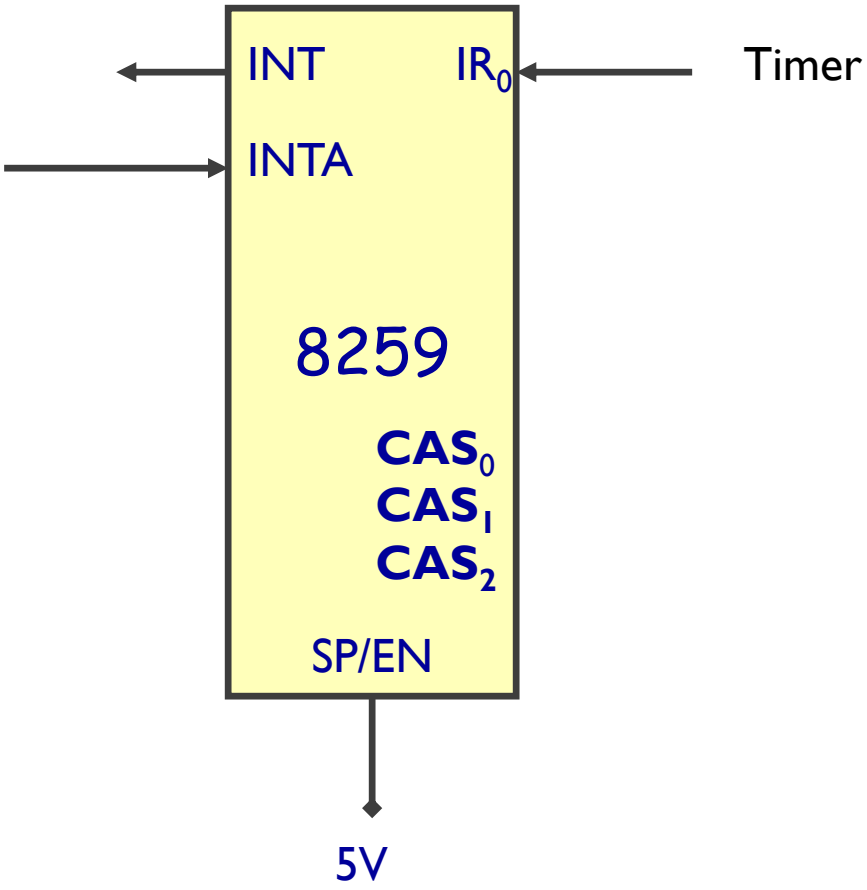
1 SEC INTERRUPT

- Use 8253 as only that is available in proteus
- Clock has to be generated using pulse generator using 10KHz – if a higher frequency is used – pulse will not be proper- as rise and fall time of pulse in proteus can be set to a minimum of 1µs – and the rise and fall time are should be less than 1 % of frequency.


10 KHz
5V
CLK0
GATE0
OUT0
mode3
1 Hz
Count = 10000d
TIMER INT
OUT1
CLK1
GATE1
CLK2
OUT2
GATE2

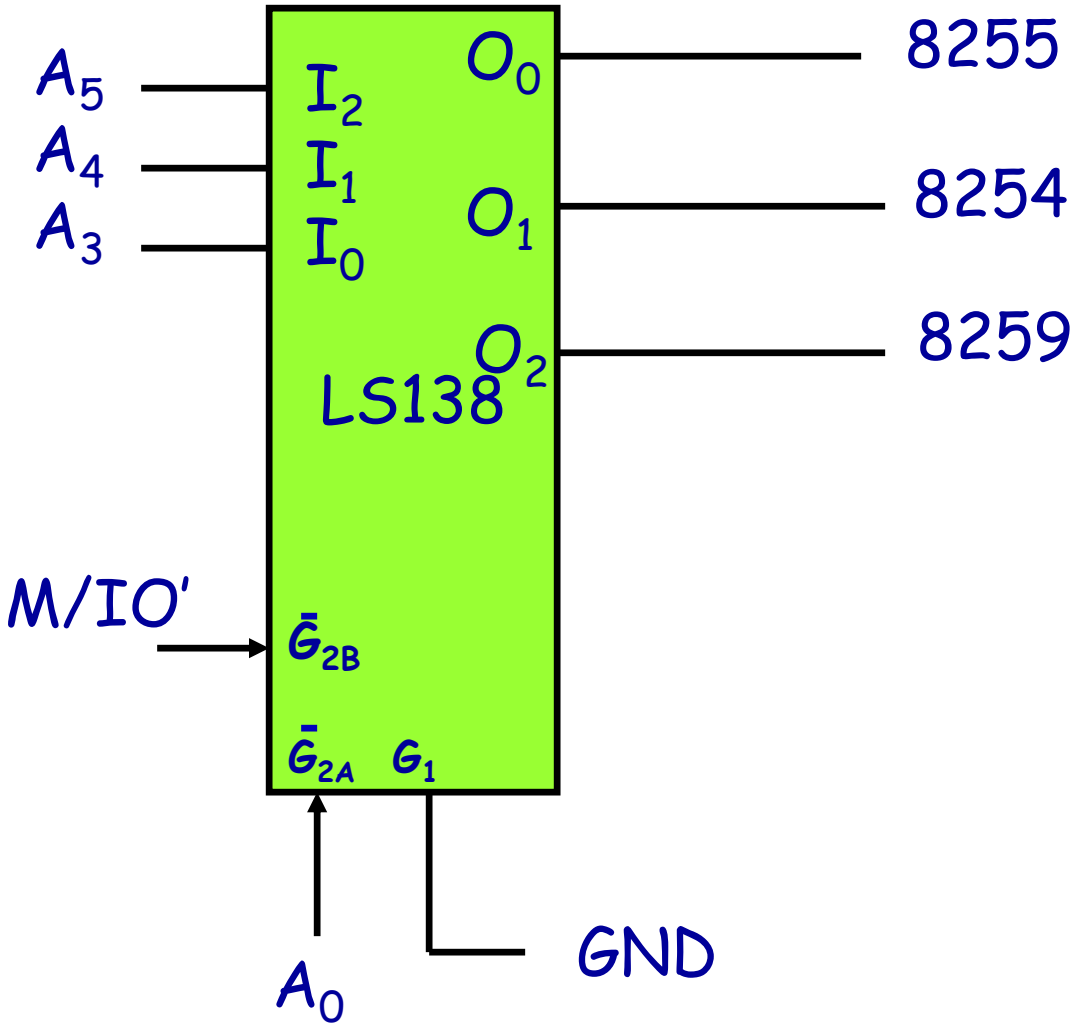
INTERRUPT GENERATION

- Use 8259


INT
IR0
Timer
INTA
8259
CAS0
CAS1
CAS2
SP/EN
5V

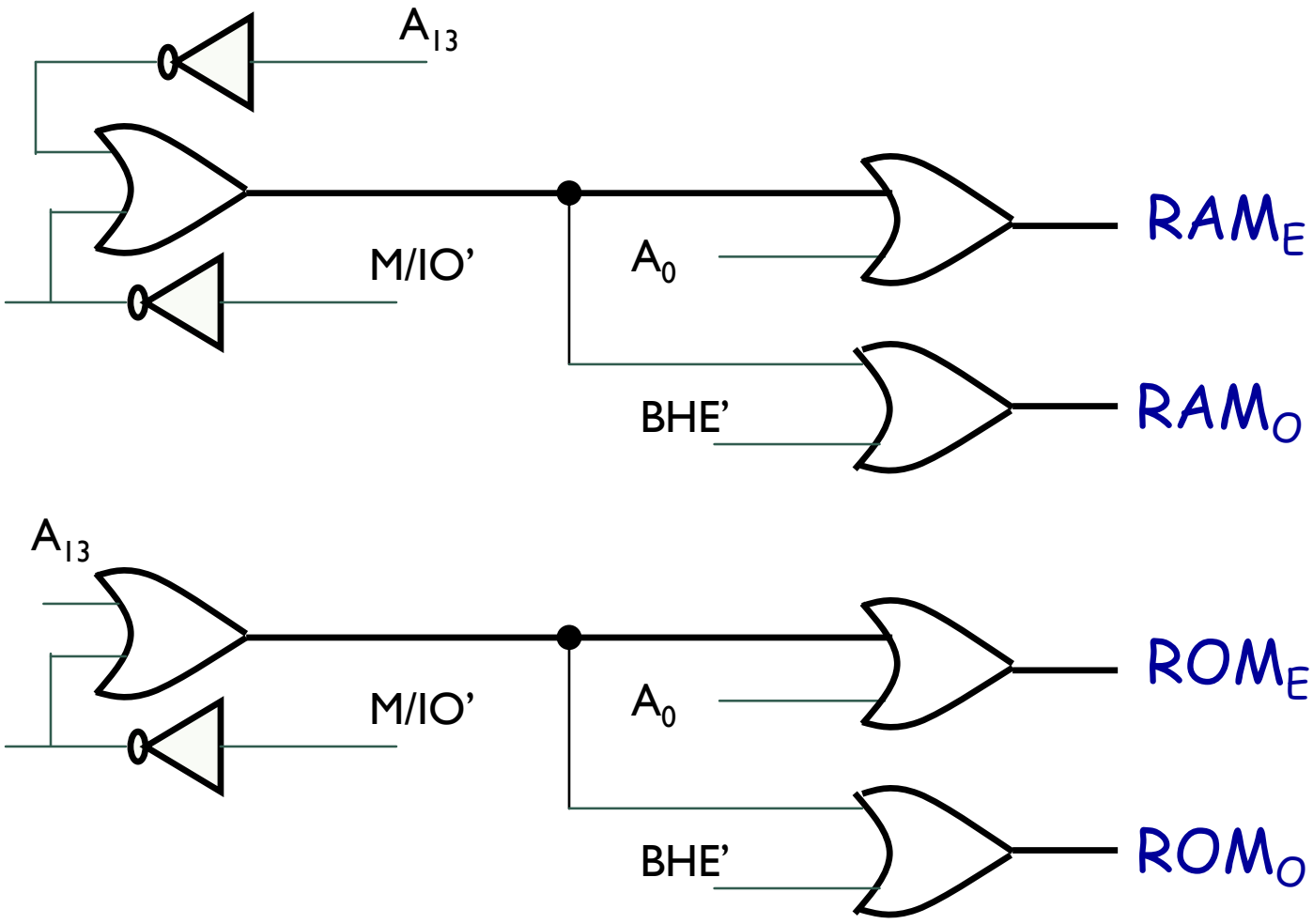
INTERFACE 8255, 8254 & 8259

- Fixed addressing
- Address
- 00 - 06_H -8255
- 08_H - $0E_H$ – 8254
- 10_H – 12_H - 8259
- Incremental Addressing

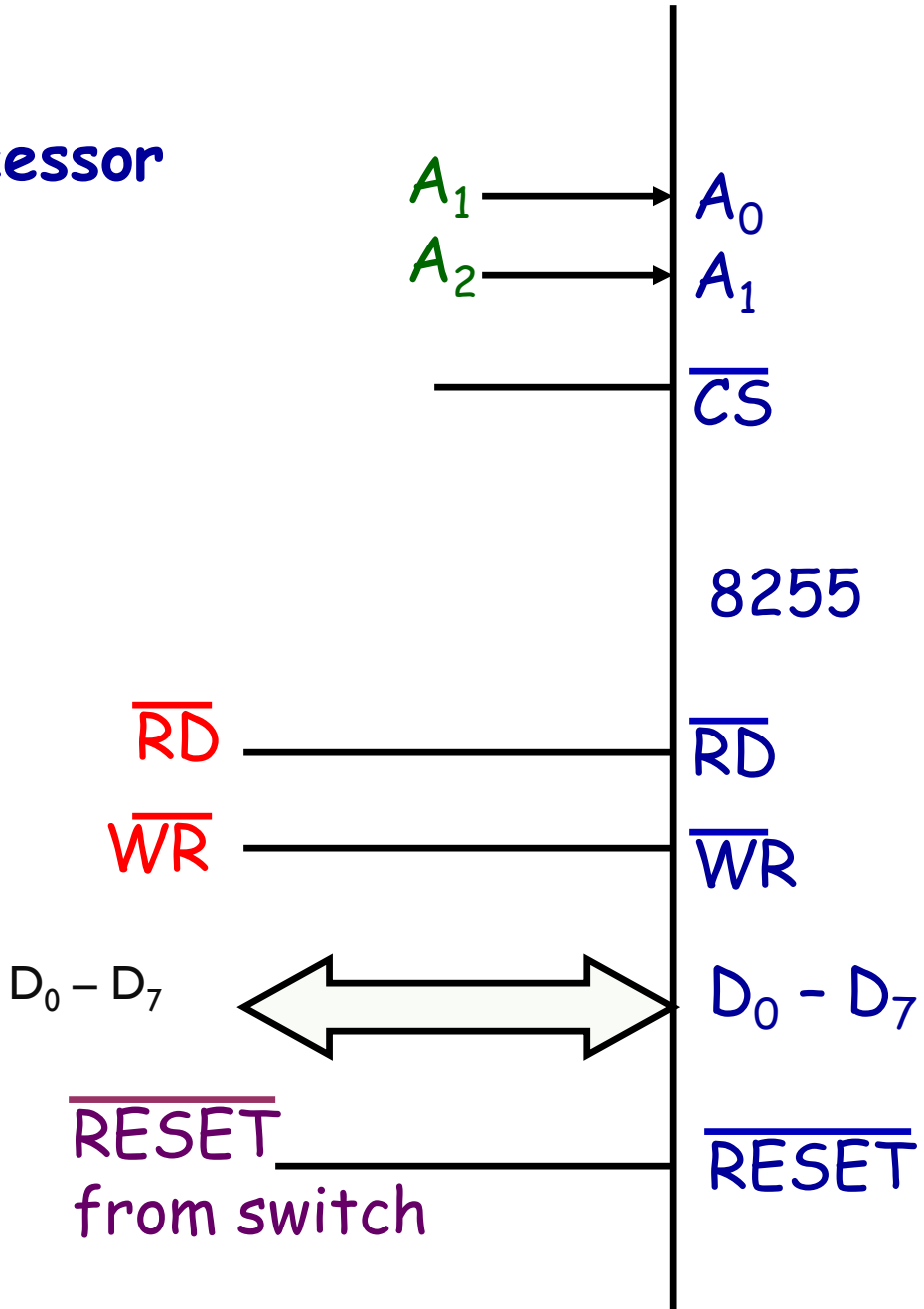

A5
A4
A3
I2
I1
I0
O0
O1
O2
LS138
8255
8254
8259
M/IO'
G2B
G2A
G1
A0
GND

INTERFACE MEMORY

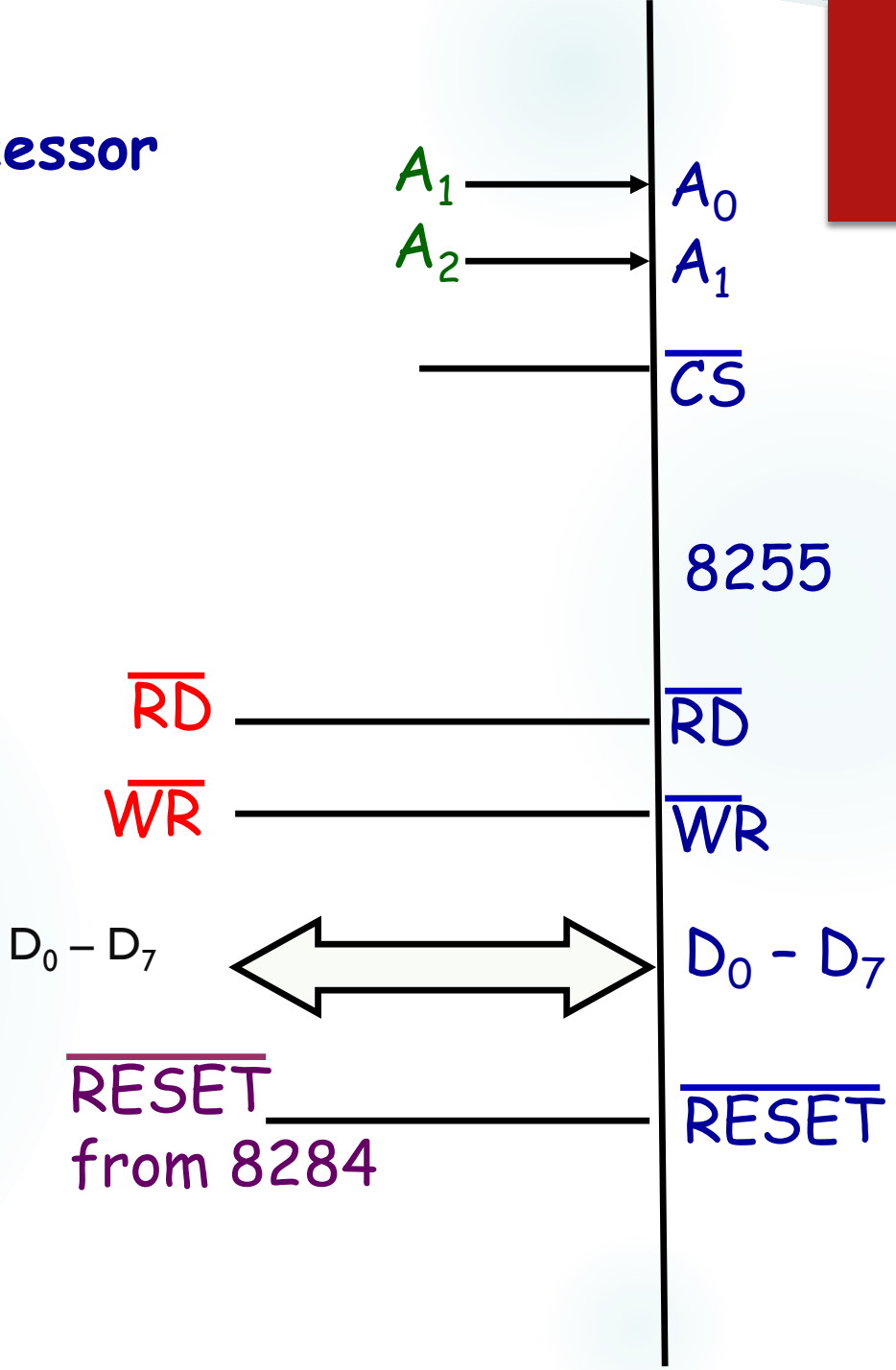
- RAM – minimum 2k chip- 4k
- ROM – in proteus 7 is minimum 4k chip – 8k
- ROM1 00000_H - $01FFF_H$
  - This is ok as proteus allows you to set reset address I have set it to 0000:0400(CS:IP)
  - This the area after IVT
- RAM 02000_H – $02FFF_H$

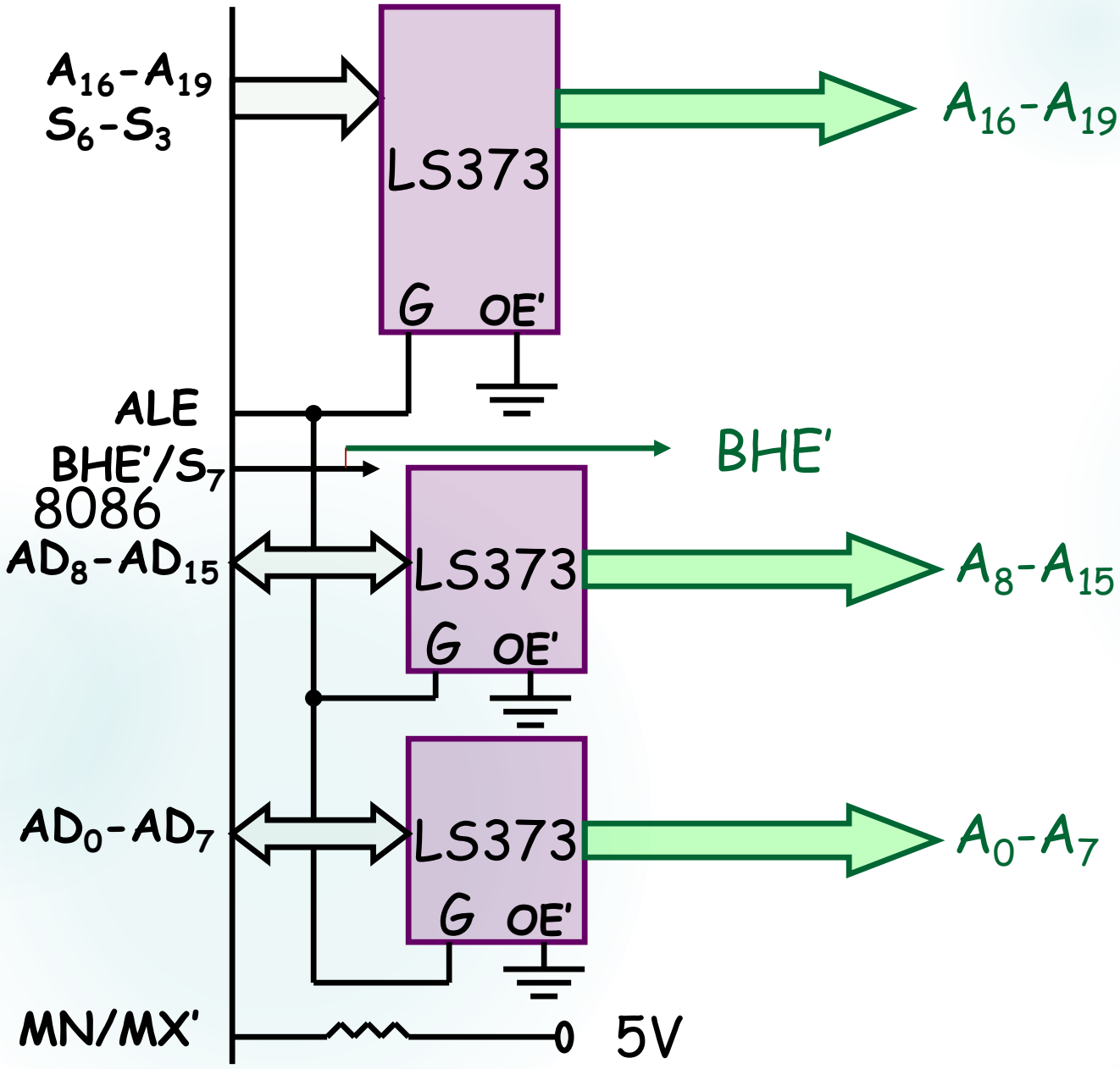

A13
M/IO'
A0
RAME
BHE'
RAMO
A13
M/IO'
A0
ROME
BHE'
ROMO

Interface to the processor

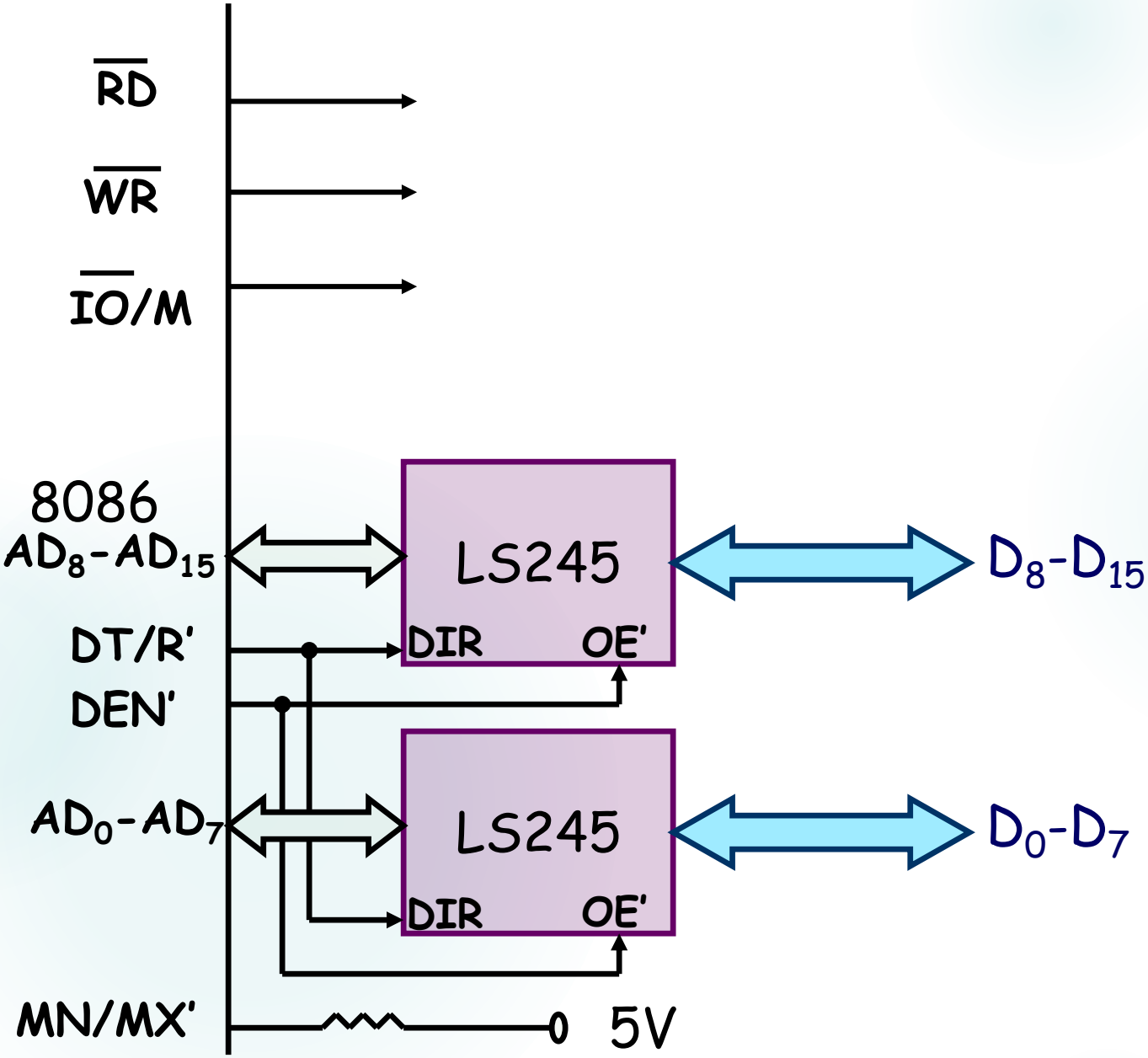


Interface to the processor

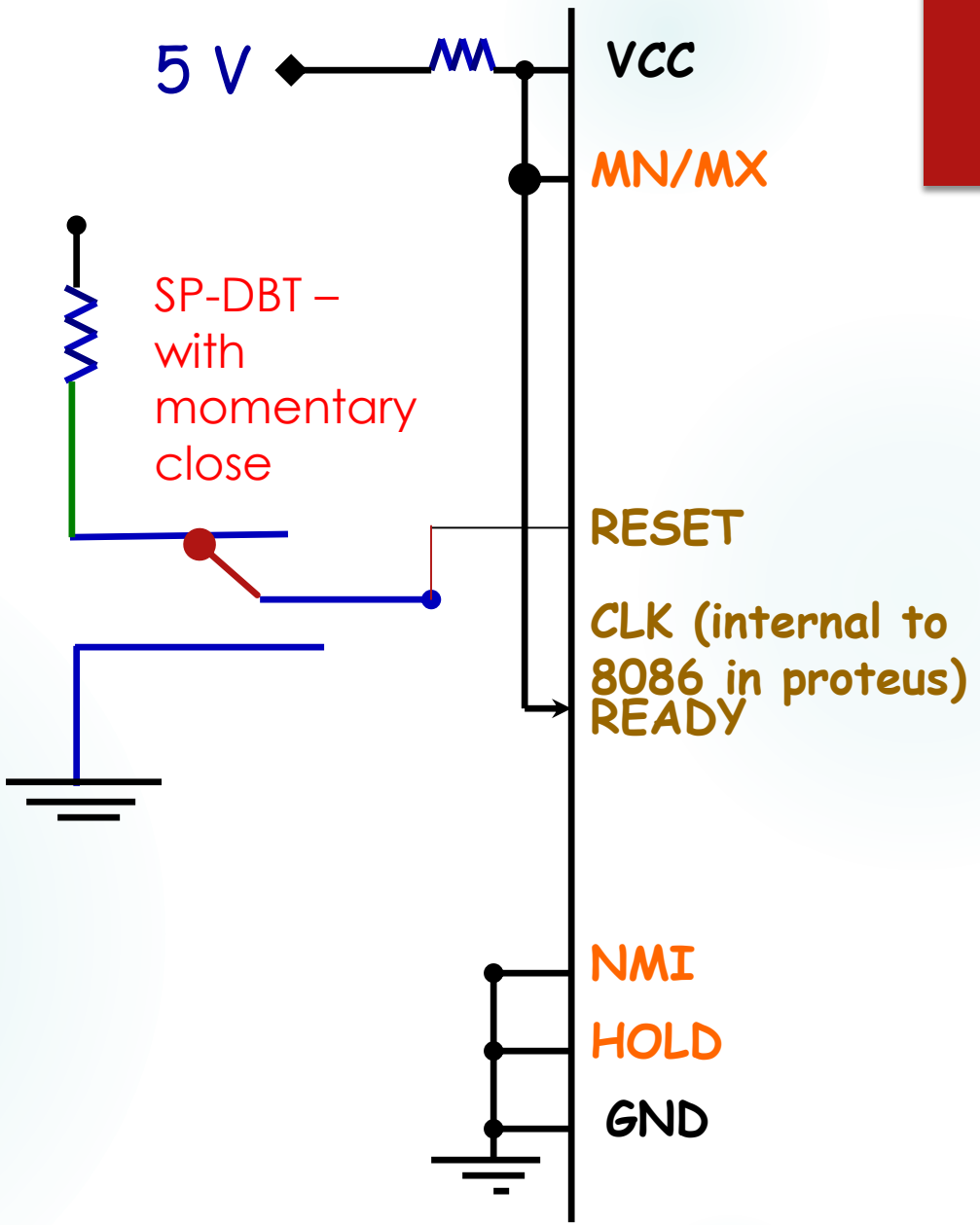




System Bus of 8086 (Address)

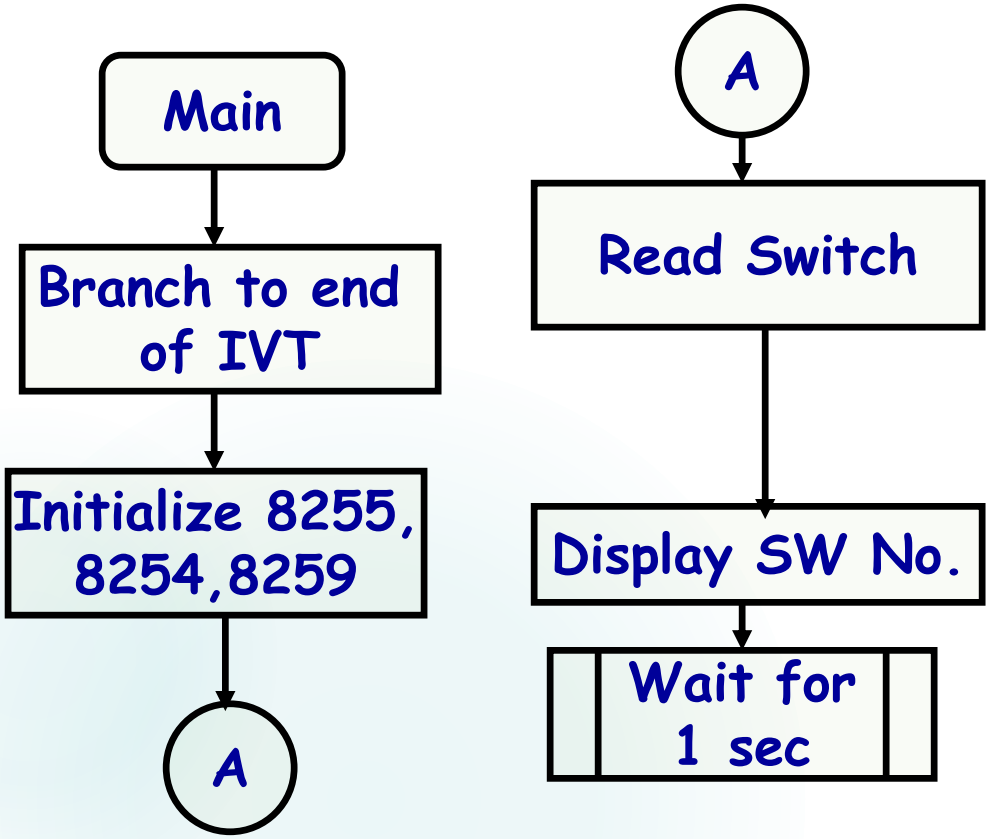


System Bus of 8086(Data + Control)

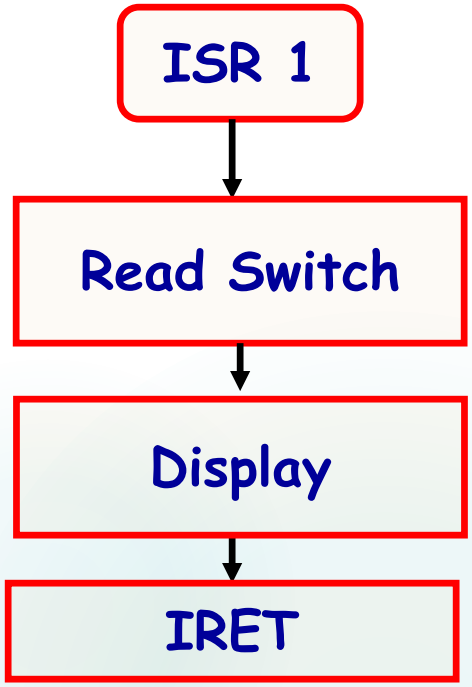

5 V
VCC
MN/MX
SP-DBT –
with
momentary
close
RESET
CLK (internal to
8086 in proteus)
READY
NMI
HOLD
GND

8086 Inputs

Software


Main
Branch to end of IVT
Initialize 8255, 8254,8259
A
A
Read Switch
Display SW No.
Wait for 1 sec

Software - ISR



Program

- Use EMU 8086 for assembling – as it creates the reqd binary file to load to 8086 ROM