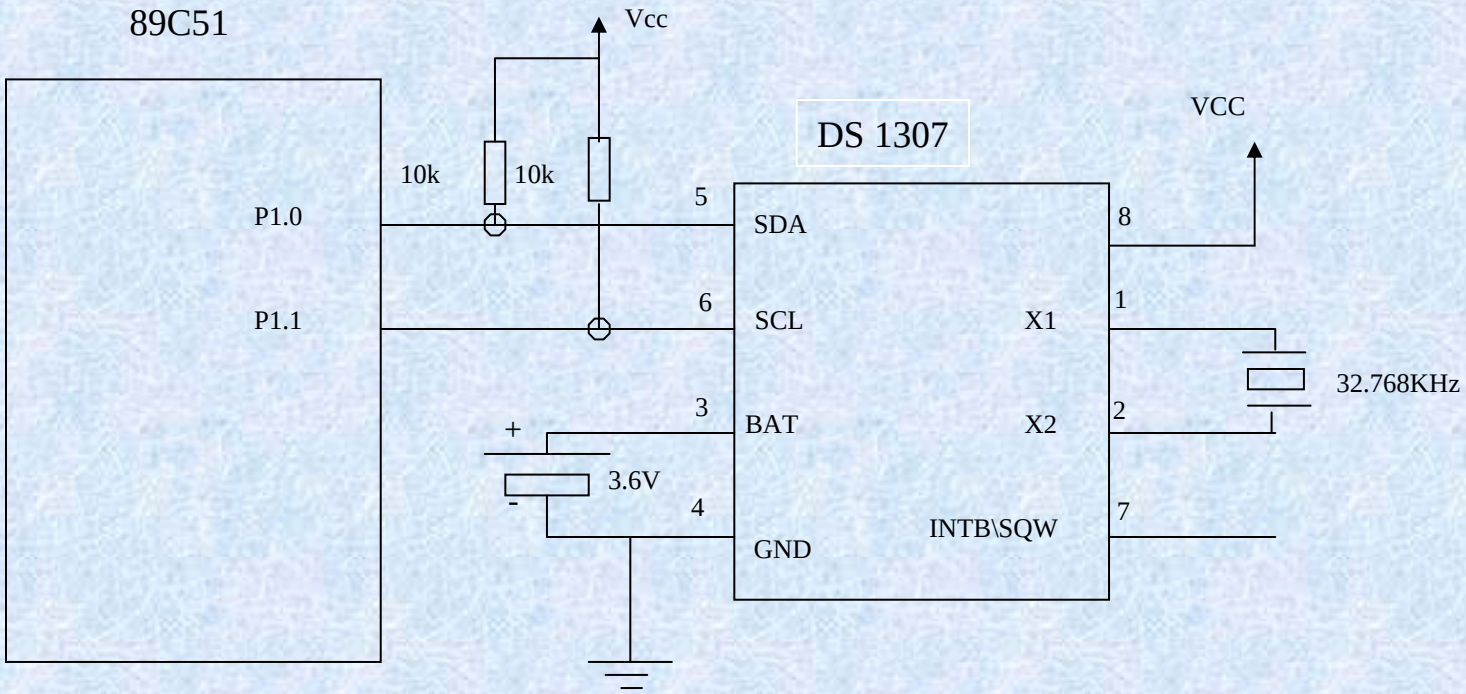
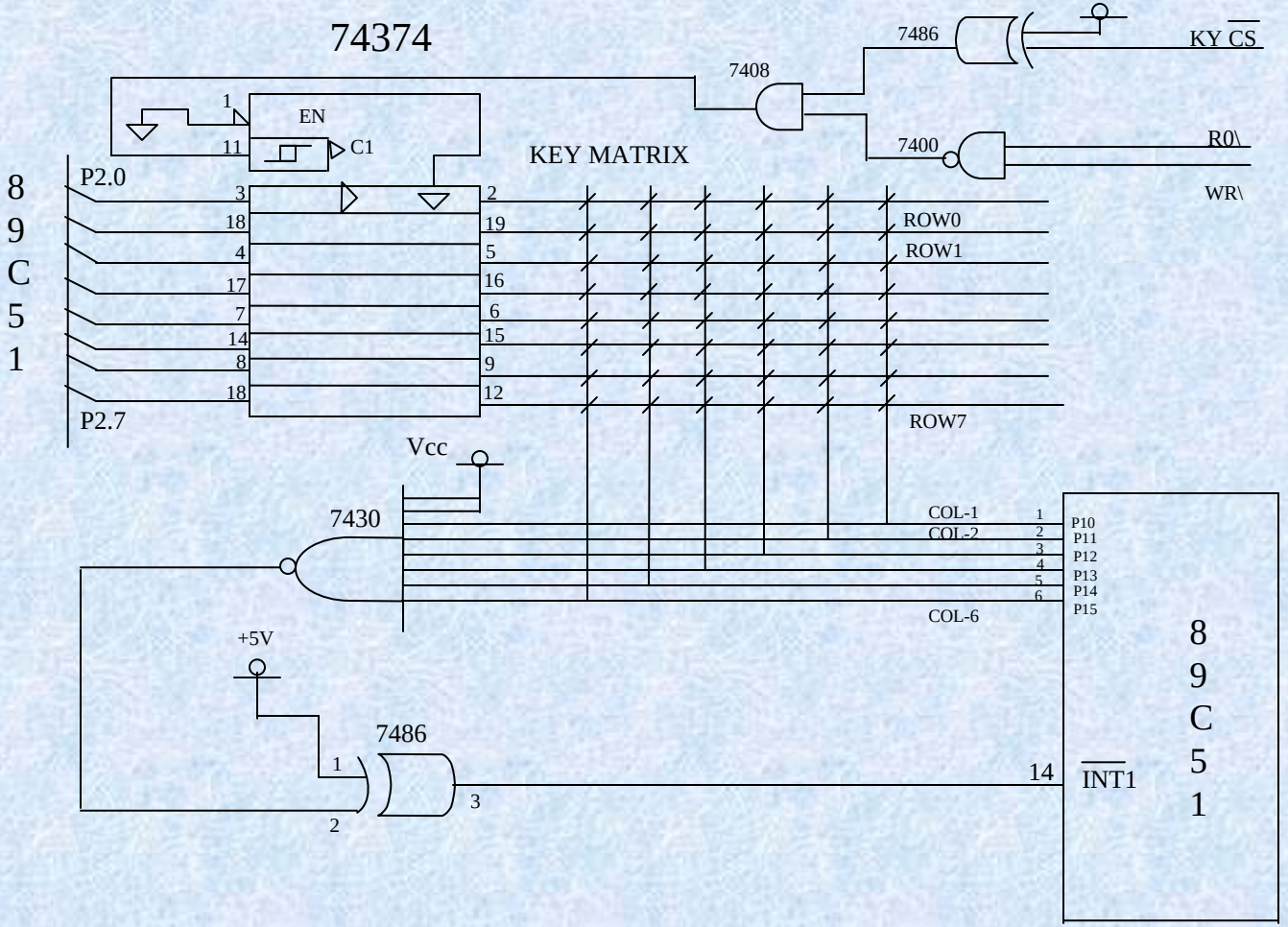
RTC Interface



RTC Interface contd….

- DS 1307 is a real time clock chip
- Maintains real time clock once powered up Year, Month, Day , Time in hours, Minutes and seconds can be written into or read out serially
- Has 56 bytes of data space to save or retrieve data of importance like settings
- Consumes very low power2or 3 uw @ 32.768KHz with a backup battery of 2.5 to 3.6V
- Has SDA, SCL pins to send data and clock respectively
- SDA, SCL are directly interfaced to I/O pins of 89C51

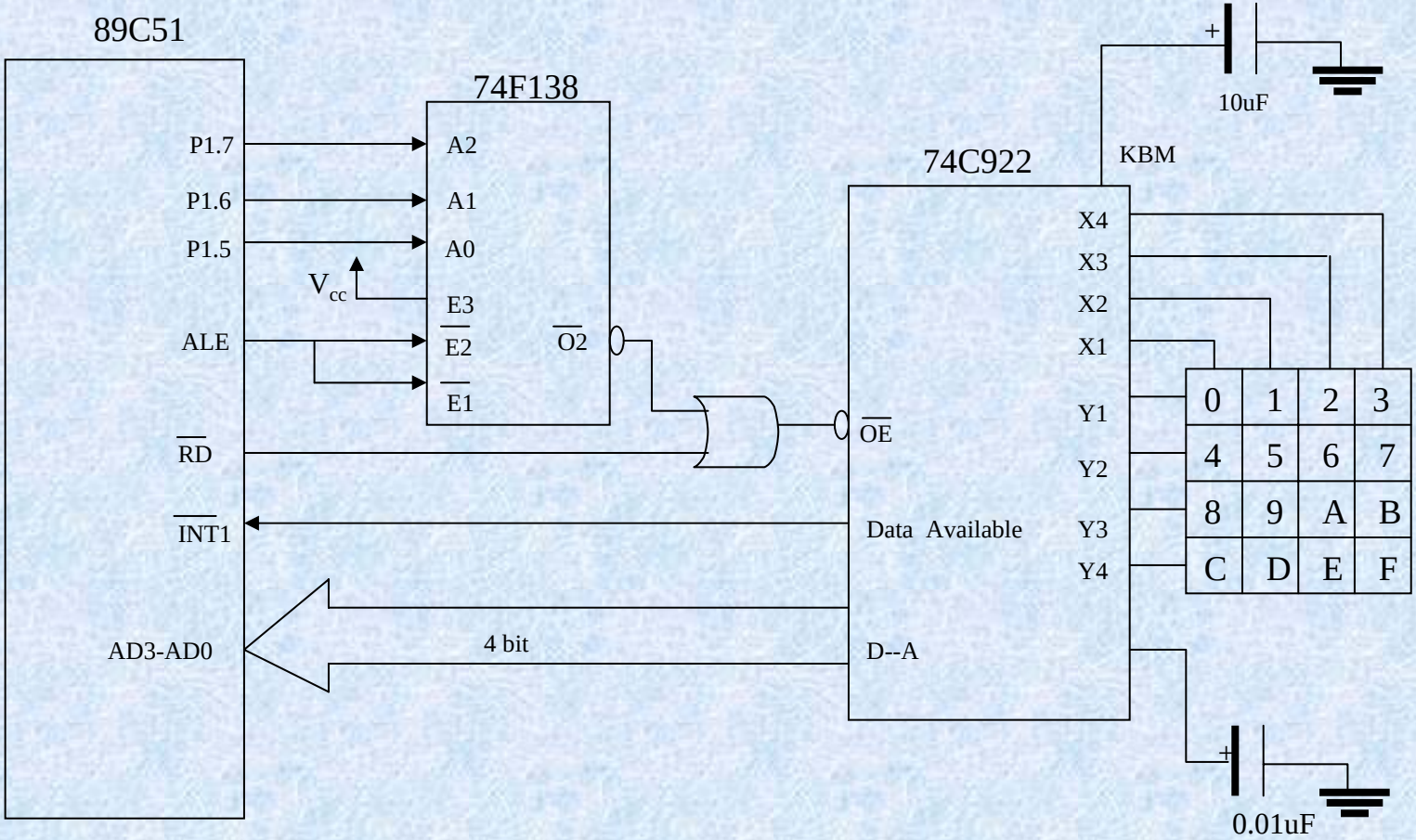
Keyboard Interface-1



Keyboard Interface-1 contd…

- Outputs 8 bit row code (0FEH, 0FDH etc.,) on port0
- Interrupts micro-controller when a key is pressed
- Interrupt software to find which column and key is pressed

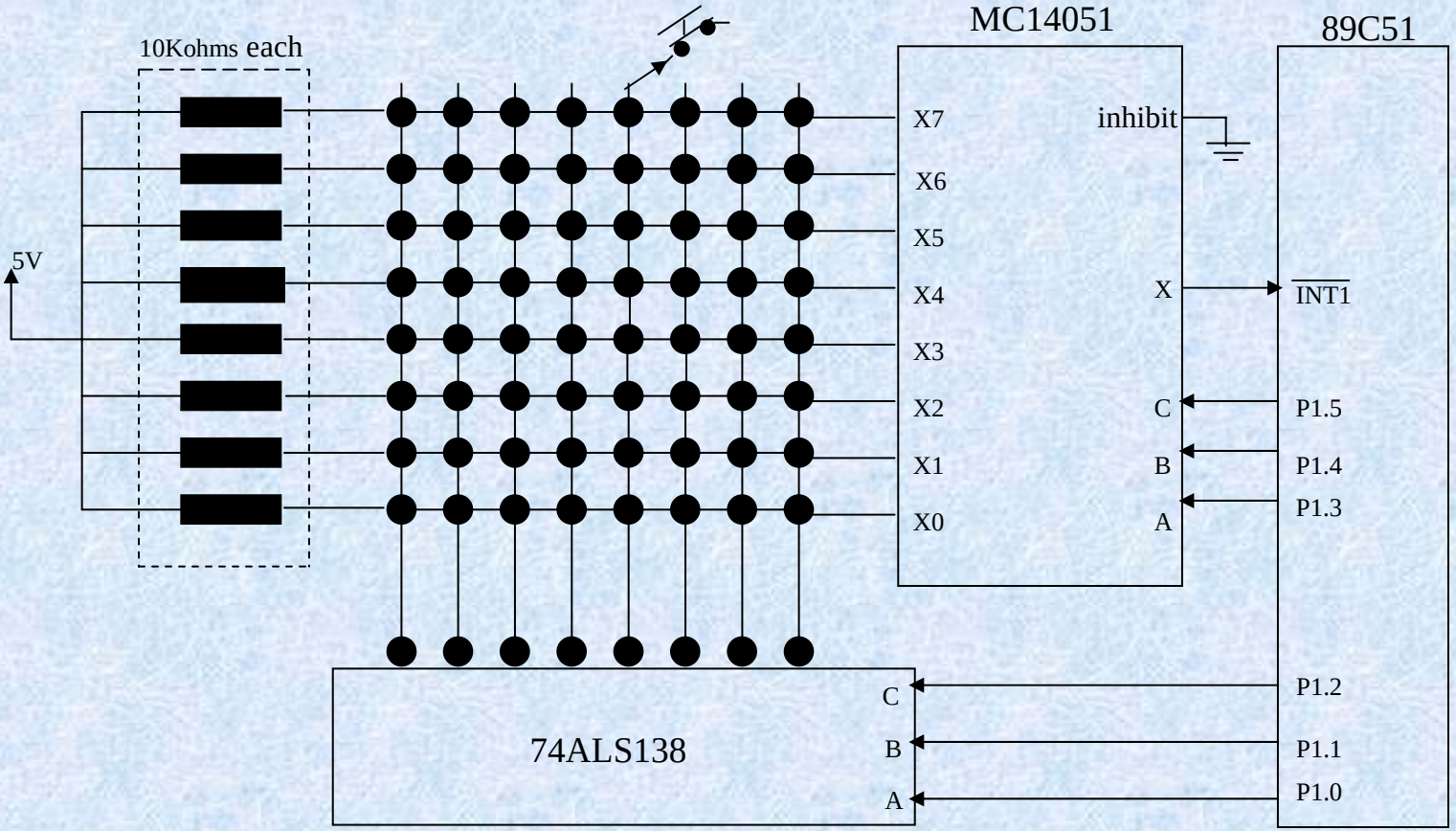
Keyboard Interface -2



Keyboard Interface-2 contd…

- 74C922 is a 16 key encoder that performs keypad scanning and de-bouncing
- When key is pressed it outputs a 4 bit code
- When interfaced to micro-controller, it reads the code through its port pins
- Has key De-bouncing and key mask features
- It has a data available output that interrupts the micro-controller
- Interrupt software to find the key pressed

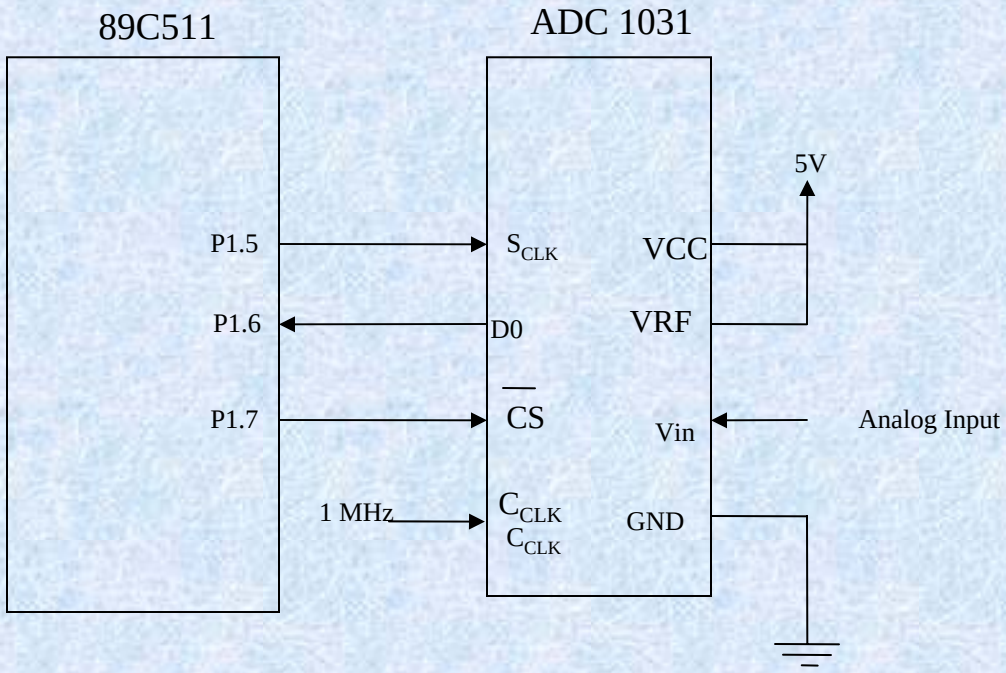
Keyboard Interface-3



Keyboard Interface-3 contd…

- The circuit interfaces 64 keys
- It consists of 14051 a 8:1 multiplexer and 74138 a 3:8 decoder
- When a key is pressed 89C51 is interrupted
- The 3 bit input of multiplexer and 3 bit input of the decoder gives the key code
- which is read in the interrupt routine

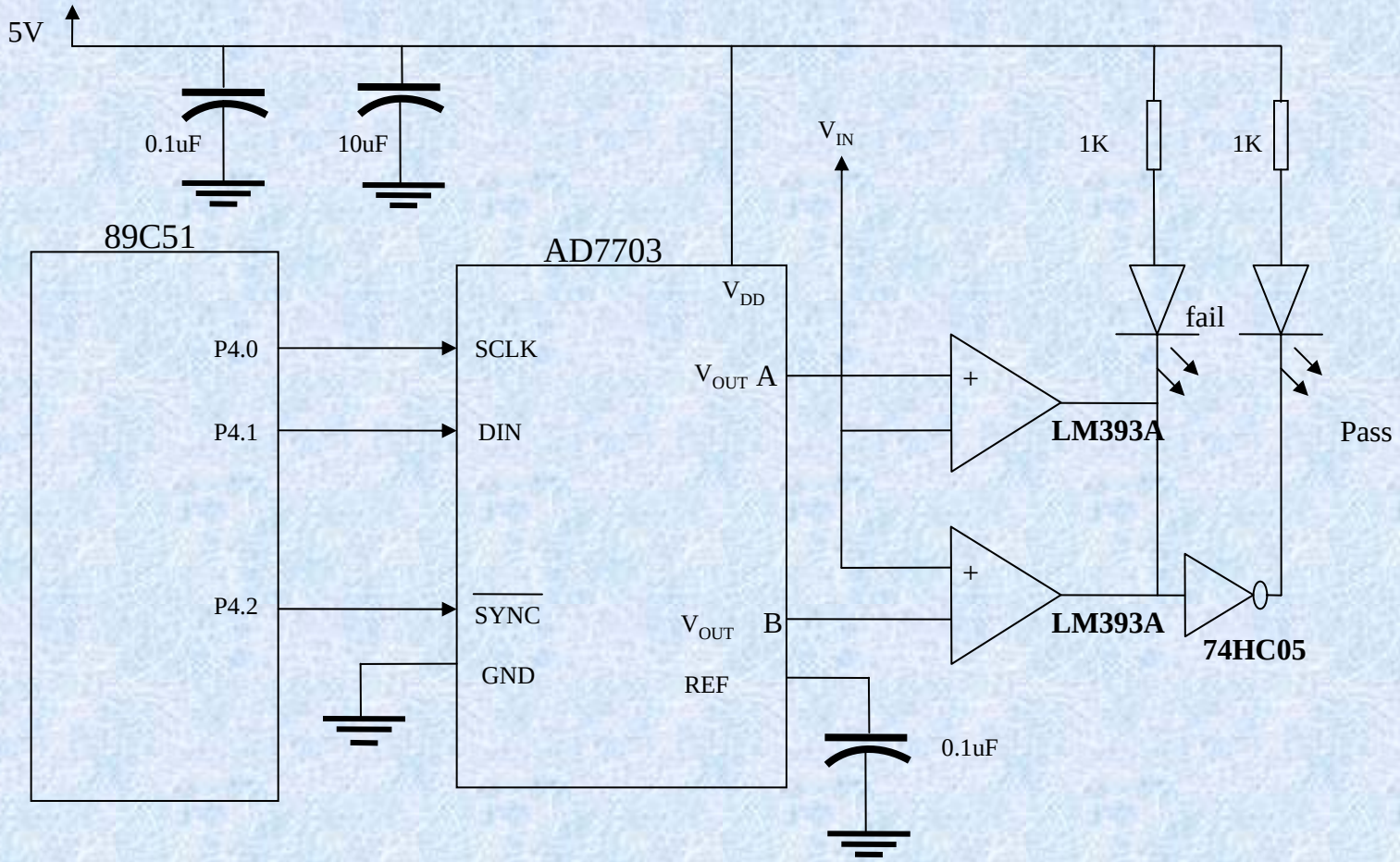
Serial ADC Interface



Serial ADC Interface contd…

- ADC1031 from National semiconductor is a 10 bit ADC
- with Serial interface
- Conversion time is 13.7 us @ 3MHz.
- Conversion starts as soon as $\overline{CS}$ is enabled
- External clock 1MHz is connected to C_{CLK}

Serial DAC Interface



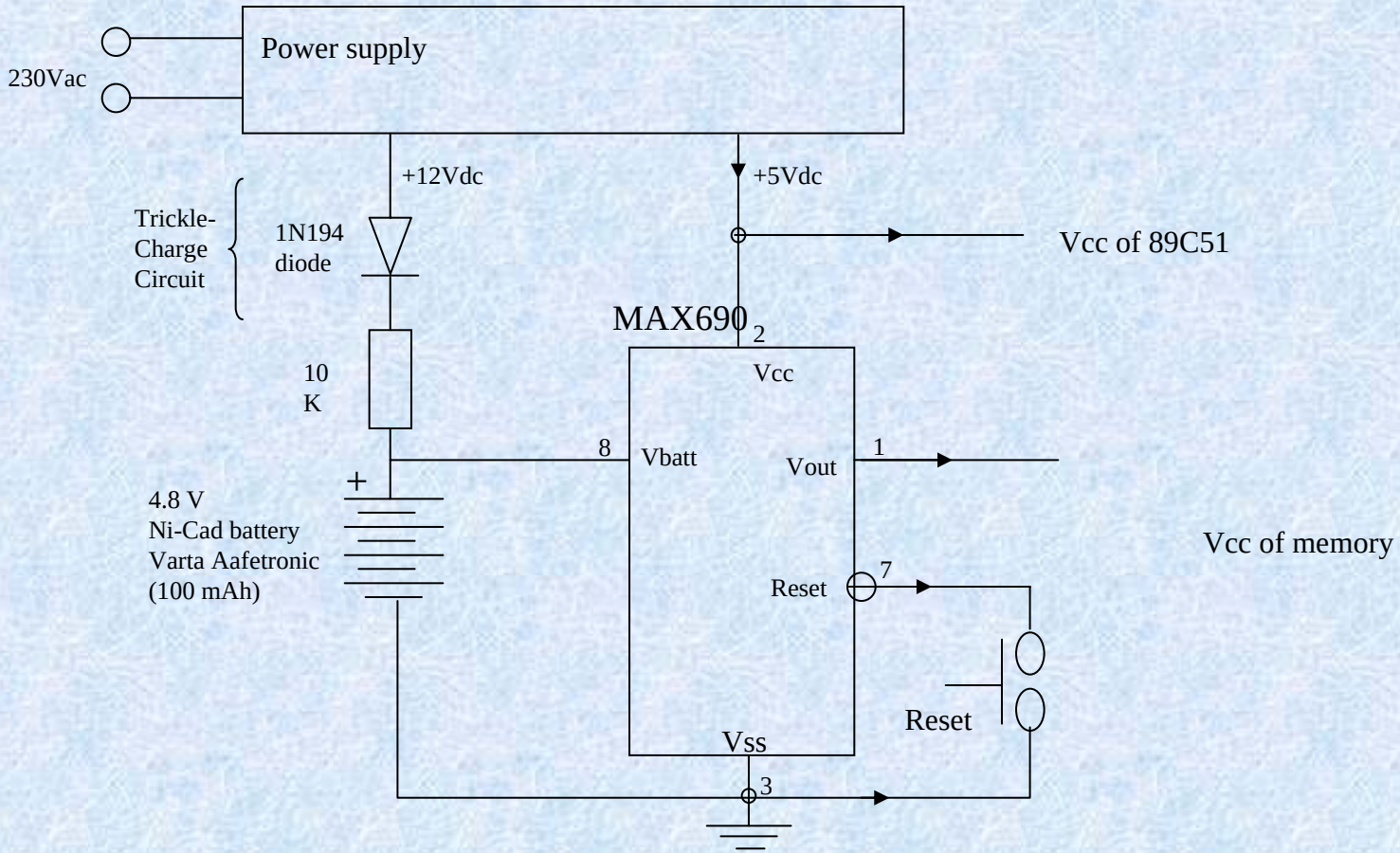
Serial DAC Interface contd…

- AD7303 is dual channel 8 bit DAC
- Has 16 bit input registers, 8 bit for data and 8 bit for control
- Out put voltage = $\frac{2 \times V_{ref} \times N}{255}$

Interface is shown to realize window detector

- If the data is between upper limit and lower limit pass LED glows else fail LED glows

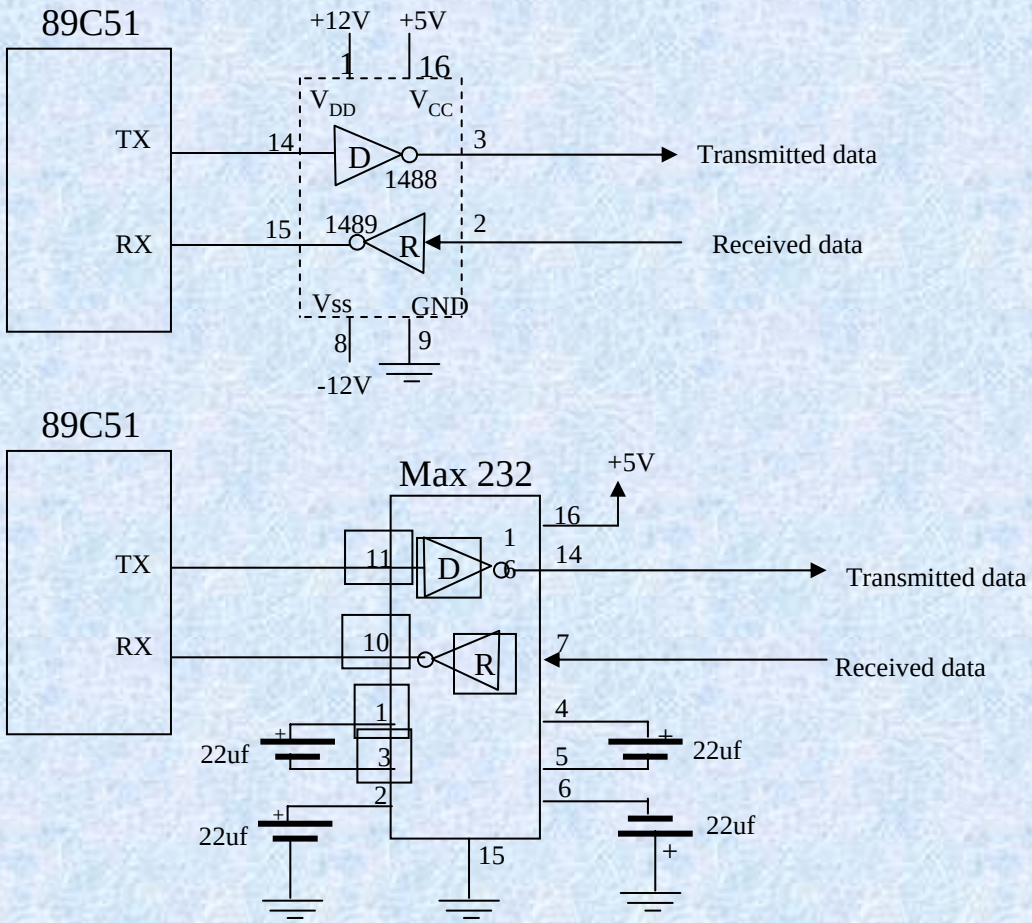
Battery Backup



Battery Backup

- Max 690 is a battery switchover/reset generator chip
- It provides a voltage thresh hold mechanism for bringing the chip out of reset at startup and for returning it to reset at power down
- The reset out is connected to the reset pin of 89C51 through an inverter
- V_{OUT} is connected to the Vcc of any memory chip which requires battery back up

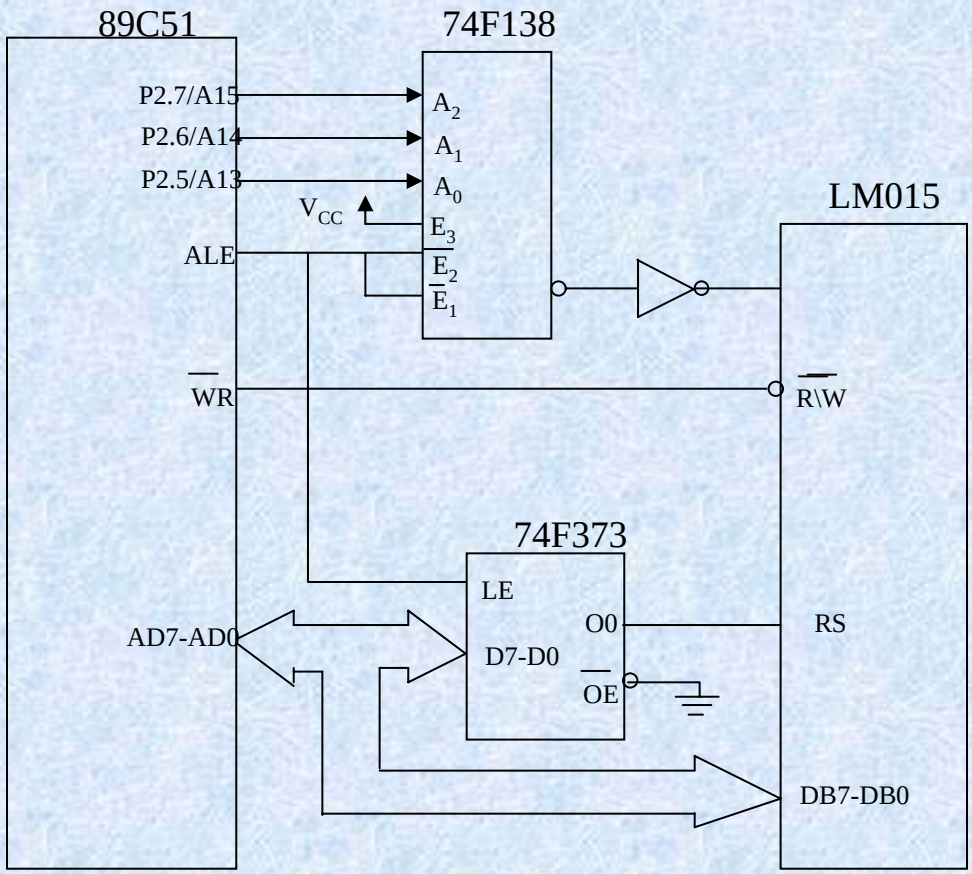
Serial Interface



Serial Interface

- RS 232 interface can be realised with 1488 (transmitter) and 1489 (receiver) level translator Ics
- These ICs require +\- 12V supplies
- Max 232 IC require only 5V and four external capacitors

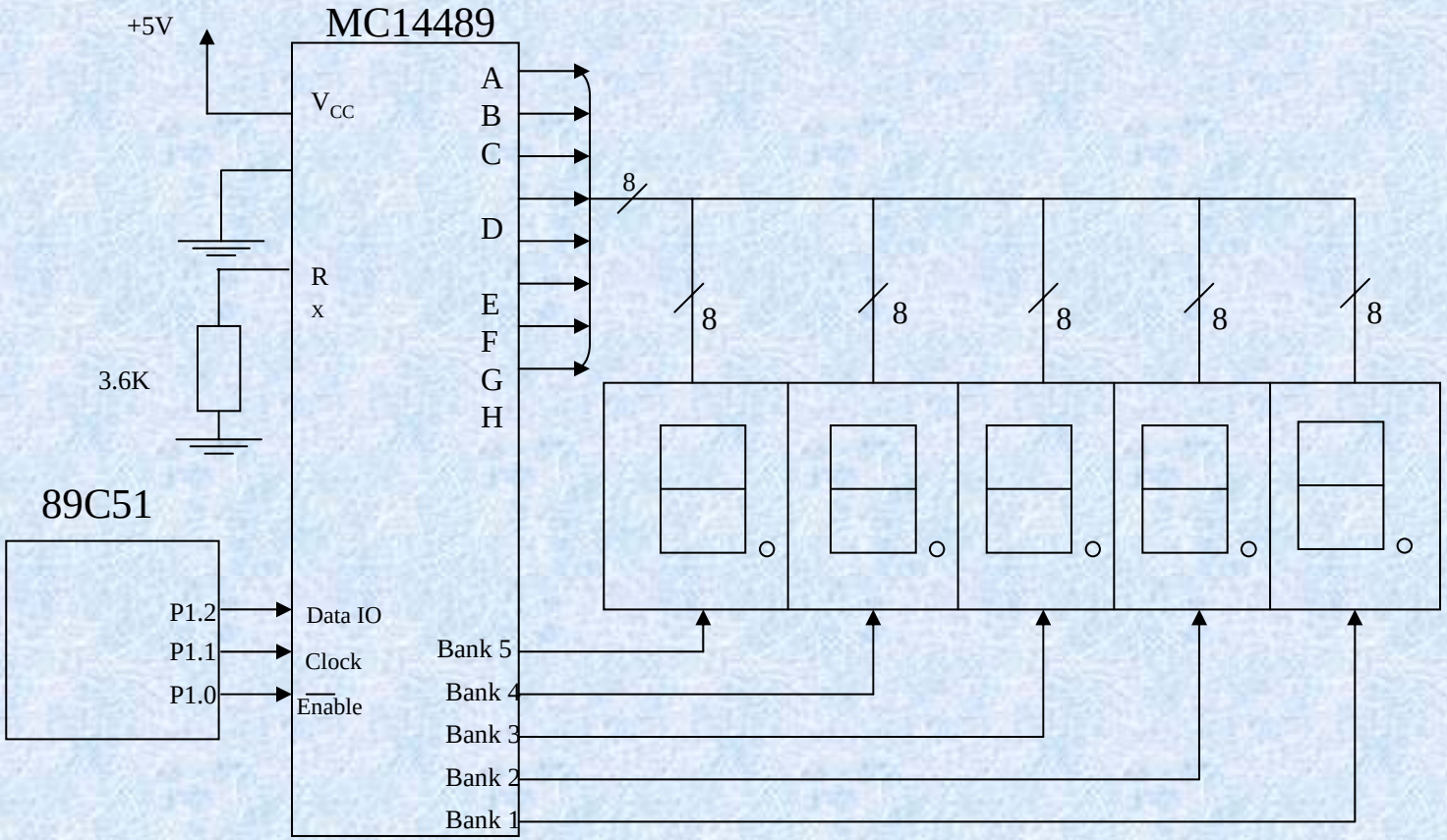
LCD Interface



LCD Interface

- LCD module LM015 displays one line of 16 characters.
- LM015 is initialized with some command words through its control register
- The data to be displayed is written into its data register in ASCII format
- RS pin distinguishes the control and data registers when E is logic high

LED Interface-1



LED Interface-1

- MC14489 is a multi character LED driver
- With out additional ICs 89C51 can be interfaced to drive five 7 Segment LED displays.
- 24 bit data is serially transmitted to the the driver by the 89C51 to display five digits with decimal point option
- MC14489s can be cascaded for more number of displays
- The brightness is controlled by the external resister 3.6K