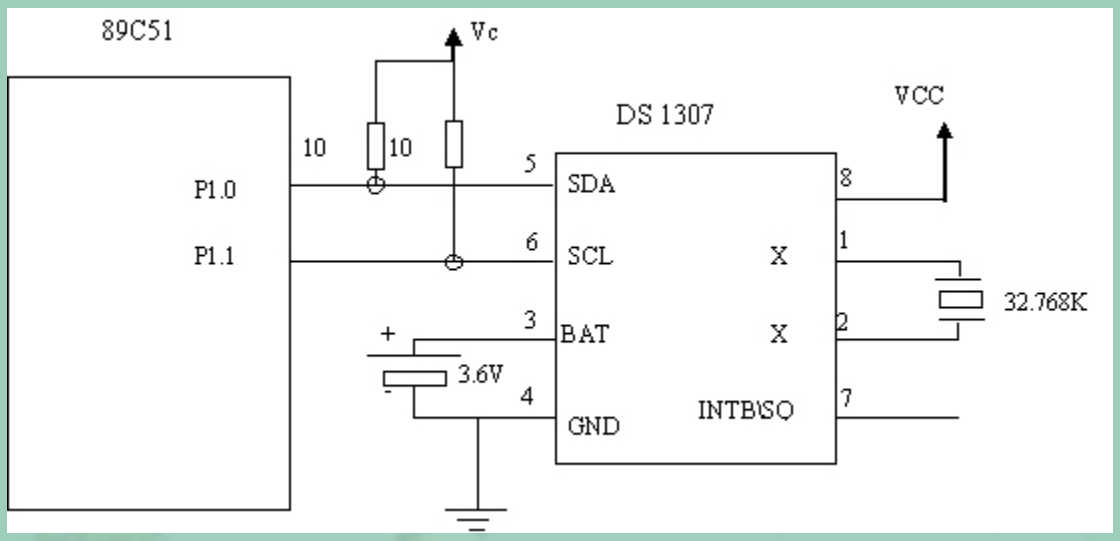
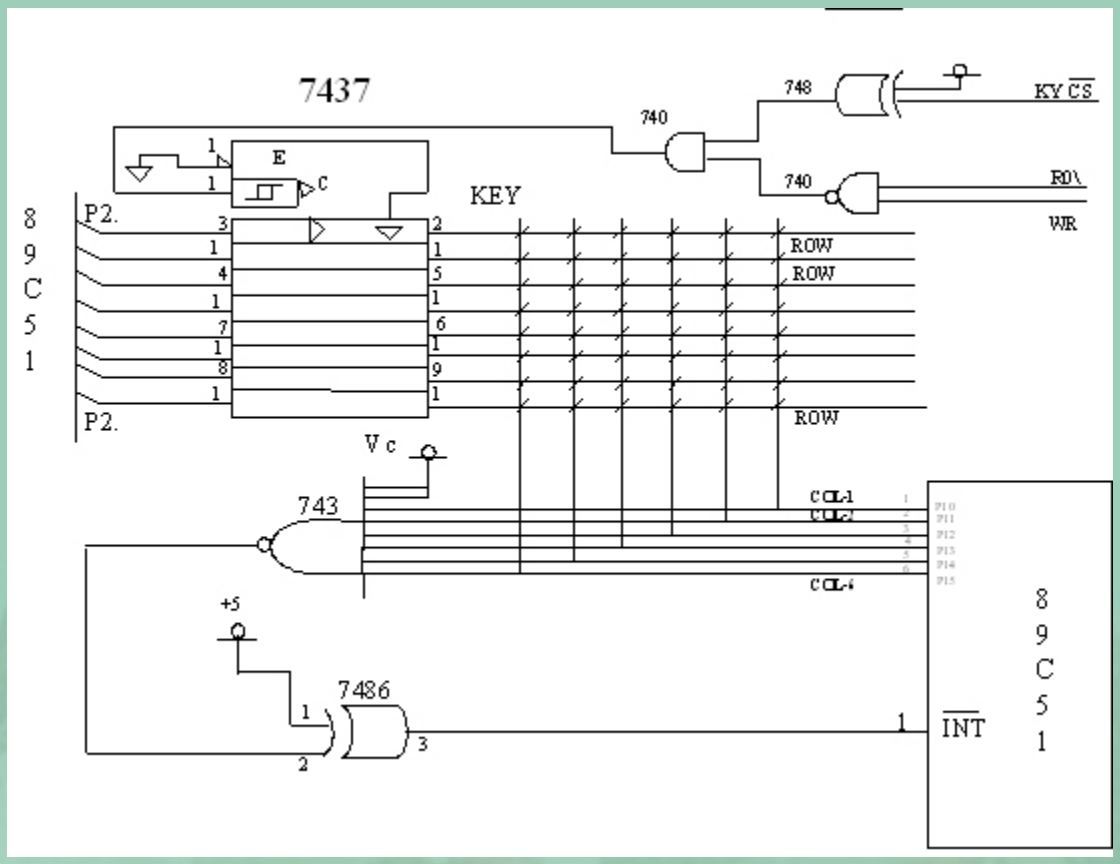
- Knows about the interfacing with keyboards
- Knows about the interfacing with LED’s.
- Knows about the interfacing with LCD’s
- Knows about the interfacing with ADC, DAC etc.
- Knows about external program and data memory interface.

RTC Interface



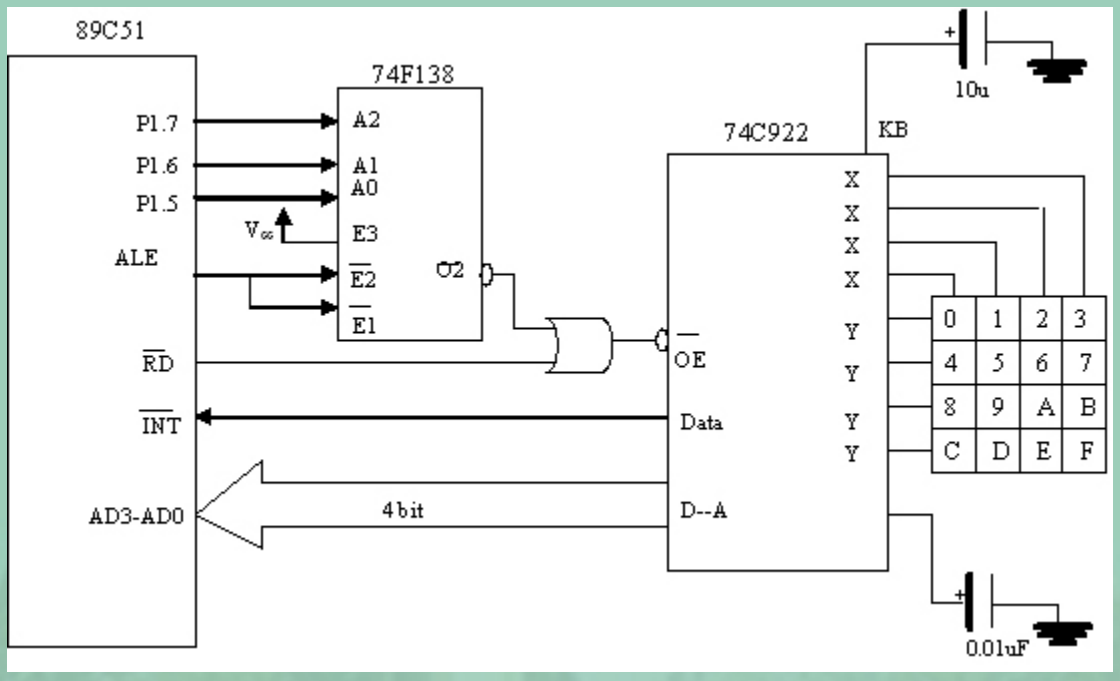
- DS 1307 is a real time clock chip
- Maintains real time clock once powered up Year, Month, Day , Time in hours, Minutes and seconds can be written into or read out serially
- Has 56 bytes of data space to save or retrieve data of importance like settings
- Consumes very low power2or 3 uw @ 32.768KHz 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



- 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

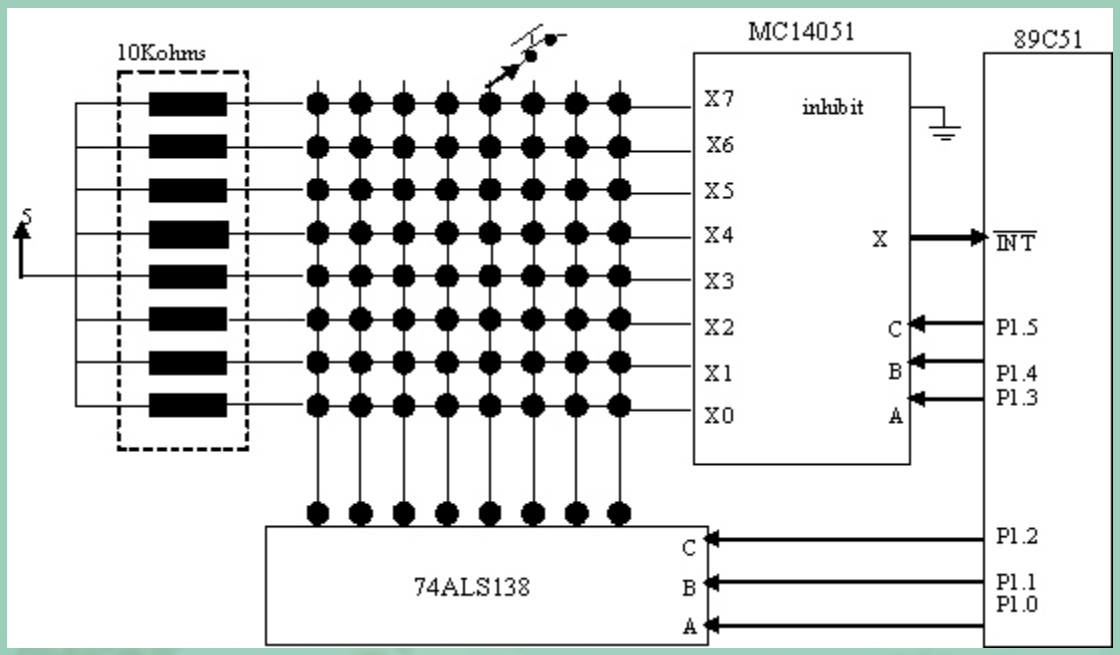
Keyboard Interface -2



Keyboard Interface-2

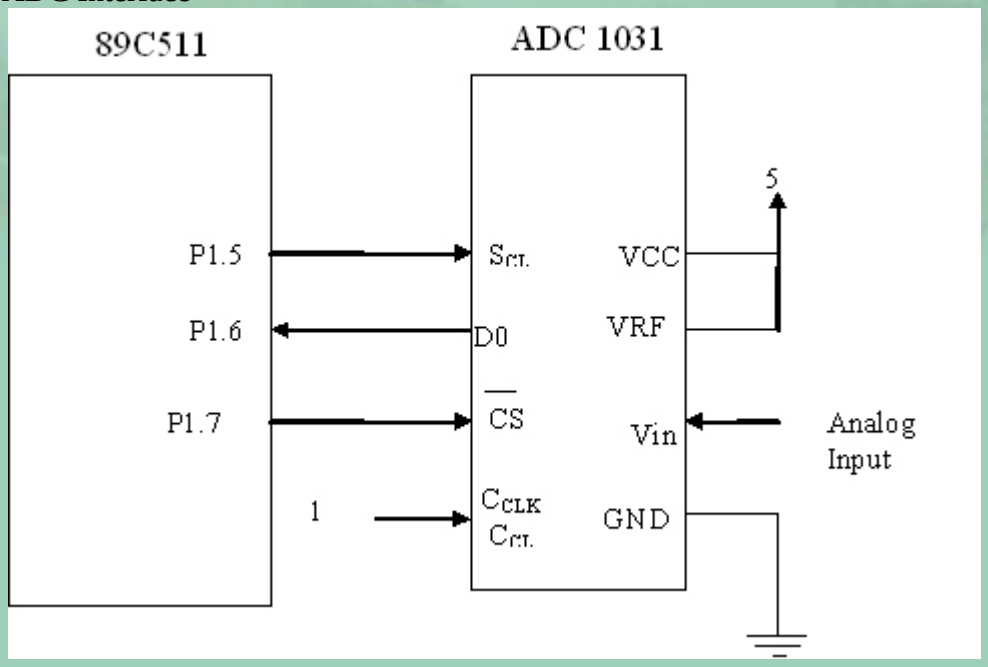
- 74C922 is a 16 key encoder that performs keypad scanning and de-bouncing
- When key is pressed it outputs a 4 bit code
- When interfaced to micro-controller, it reads the code through its port pins
- Has key De-bouncing and key mask features
- It has a data available output that interrupts the micro-controller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

Keyboard Interface-3



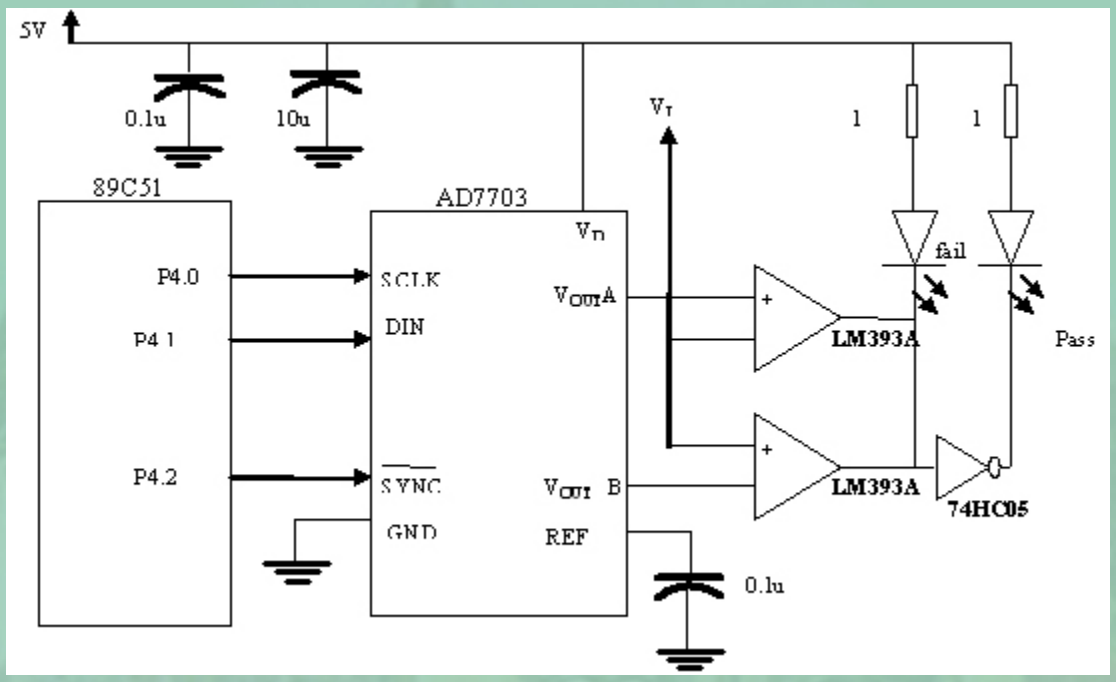
- The circuit interfaces 64 keys
- It consists of 14051 a 8:1 multiplexer and 74138 a 3:8 decoder
- When a key is pressed 89C51 is interrupted
- The 3 bit input of multiplexer and 3 bit input of the decoder gives the key code
- which is read in the interrupt routine

Serial ADC Interface



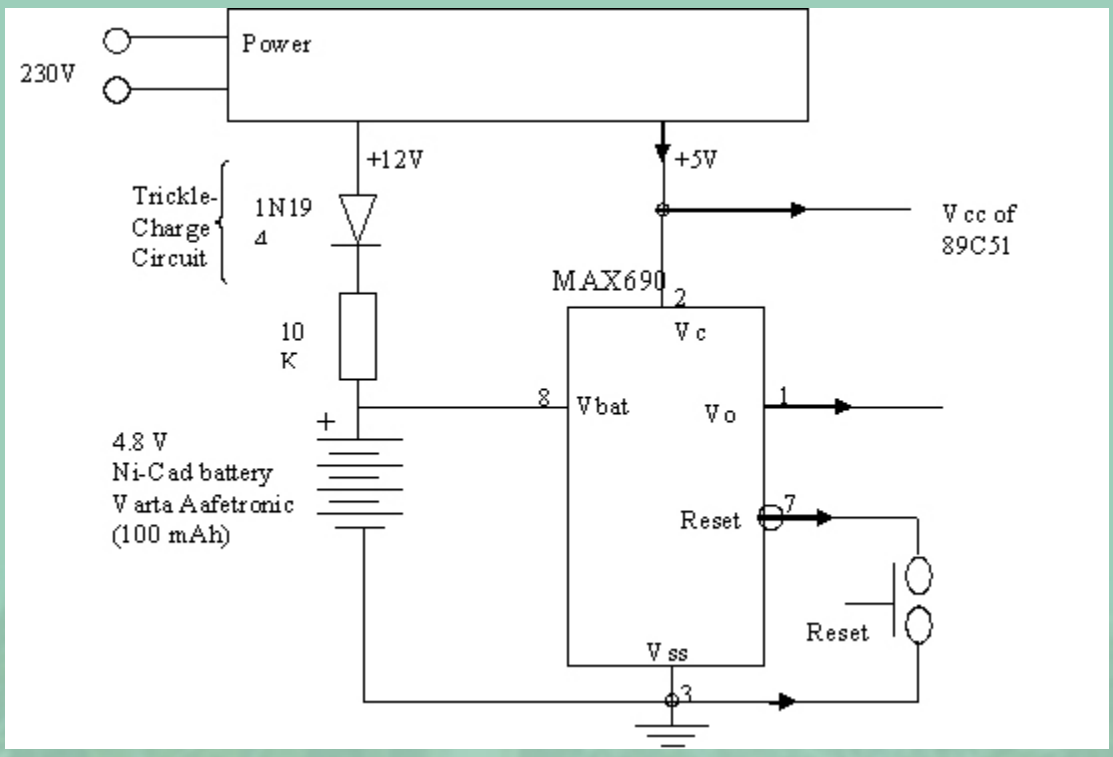
- ADC1031 from National semiconductor is a 10 bit ADC
- with Serial interface
- Conversion time is 13.7 us @ 3MHz.
- Conversion starts as soon as CS is enabled
- External clock 1MHz is connected to CCLK

Serial DAC Interface



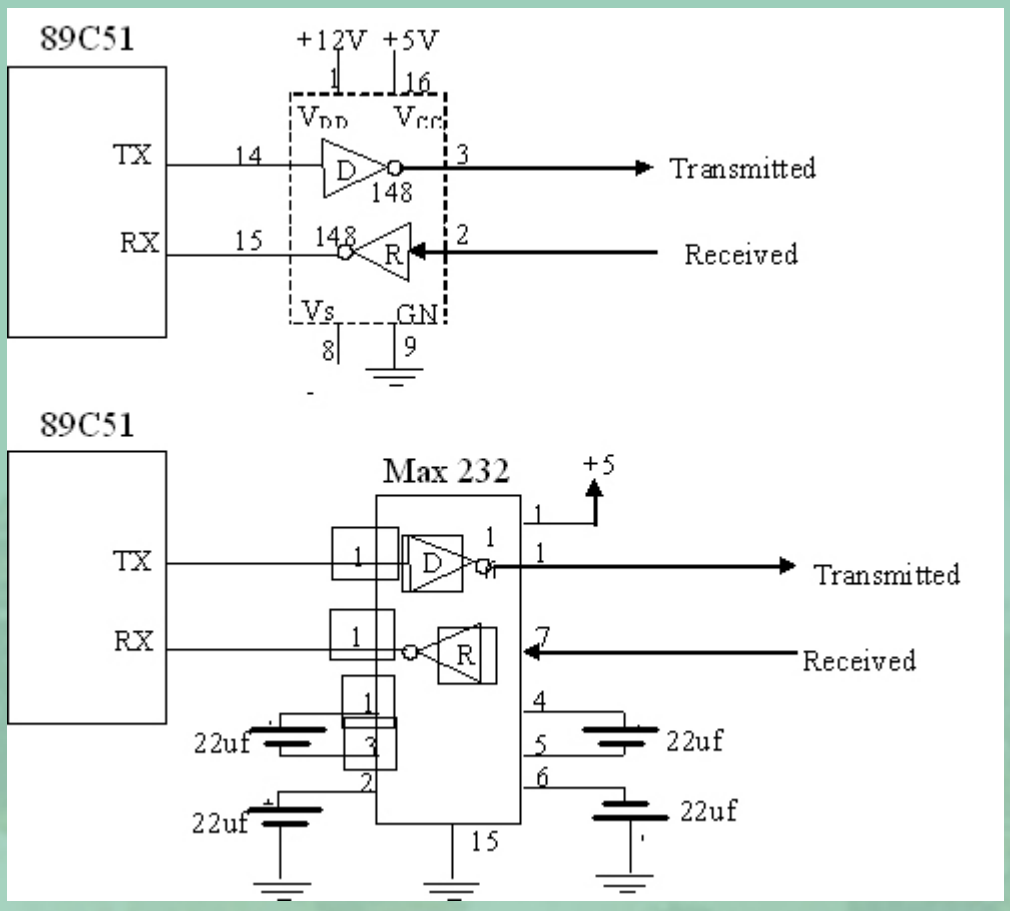
- AD7303 is dual channel 8 bit DAC
- Has 16 bit input registers, 8 bit for data and 8 bit for control
- Out put voltage = (2*Vref*N) / 255.
- Interface is shown to realize window detector
- If the data is between upper limit and lower limit pass LED glows else fail LED glows

Battery Backup



- 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
- VOUT is connected to the Vcc of any memory chip which requires battery back up

Serial Interface

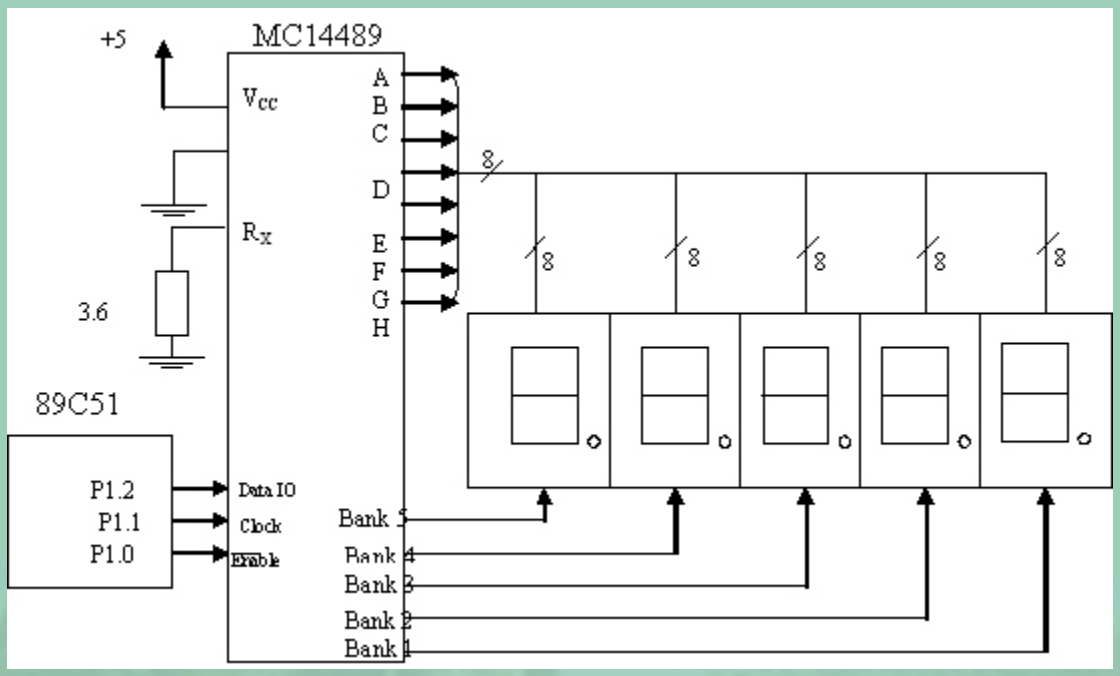


- RS 232 interface can be realised with 1488 (transmitter) and 1489 (receiver) level translator Ics
- These ICs require +\- 12V supplies
- Max 232 IC require only 5V and four external capacitors

LCD Interface

- LCD 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



- 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 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

1. In 8051 an external interrupt 1 vector address is of _____ and causes of interrupt if ____.
   a) 000BH, a high to low transition on pin INT1
   b) 001BH, a low to high transition on pin INT1
   c) 0013H, a high to low transition on pin INT1
   d) 0023H, a low to high transition on pin INT1

2. Serial port vector address is of _____. And causes an interrupt when _____.
   a) 0013H, either TI or RI flag is set
   b) 0023H, either TI or RI flag is reset
   c) 0013H, either TI or RI flag is reset
   d) 0023H, either TI or RI flag is set

3. In serial communication modes, mode 1 the Baud rate =
   a) BR=2^{SMOD}/32 * (Timer 0 over flow rate)
   b) BR=2^{SMOD}/16 * (Timer 1 over flow rate)
   c) BR=2^{SMOD}/16 * (Timer 0 over flow rate)
   d) BR=2^{SMOD}/32 * (Timer 1 over flow rate)

4. In modes 2 and 3, if _____ bit of SCON bit is set will causes enable multiprocessor communication and is of ____ bit address.
   a) SM1, 9EH b) TB8, 9CH c) SM2, 9DH d) SM0, 9FH

5. Interfacing LCD with 89C51 _____ data lines are used along with the _____ signals.
   a) 6, RS, RW b) 5, RW, EN c) 8, RS, EN, RW d) 9, RS, EN, RW

6. Resolution of ADC is defined as
   a) 1/ (2N – 1) b) 2^N-1 c) 1/ (2^N-1) d) 2N-1

7. In microcontroller and LCD interface which line will instruct the LCD that microcontroller is sending data?
   a) DB0 b) RW c) EN d) RS

8. Which bit of TMOD will exactly configure timer / counter as a timer or counter.

   i) TMOD.6 of C/T for timer 1 ii) TMOD.6 of C/T for timer 0
   iii) TMOD.2 of C/T for timer 0 iv) TMOD.2 of C/T for timer 1
   a) i, ii b) ii, iv c) i, iii d) iii, iv

Key:

7.1 C	7.2 D	7.3 D	7.4 C	7.5 C	7.6 C
7.7 C	7.8 C