

NX-877 plus

PIC16F877 Microcontroller Experiment Board

Copyright 2004-2005 by Innovative Experiment Co.,Ltd.

Feature

- | Support PIC16F87x (PIC16F877A on-board). It comes with 8KWords Program memory, 20MHz clock and provides 33 I/O port
- | Support HS oscillator modes
- | Select mode RUN/PROGRAM with one switch
- | Connect to PX-127 for download program via ISP
- | RS-232 serial port interface circuit
- | 3-digit multiplexed LED display
- | 32-Bit LED monitor
- | LCD connector
- | 1Hz- 1kHz pulse generator
- | 4 of 0-5V Voltage source for A/D experiment
- | 1-Wire/iButton interface via RJ-11 Blue-dot receptor
- | Matrix switch 4x3

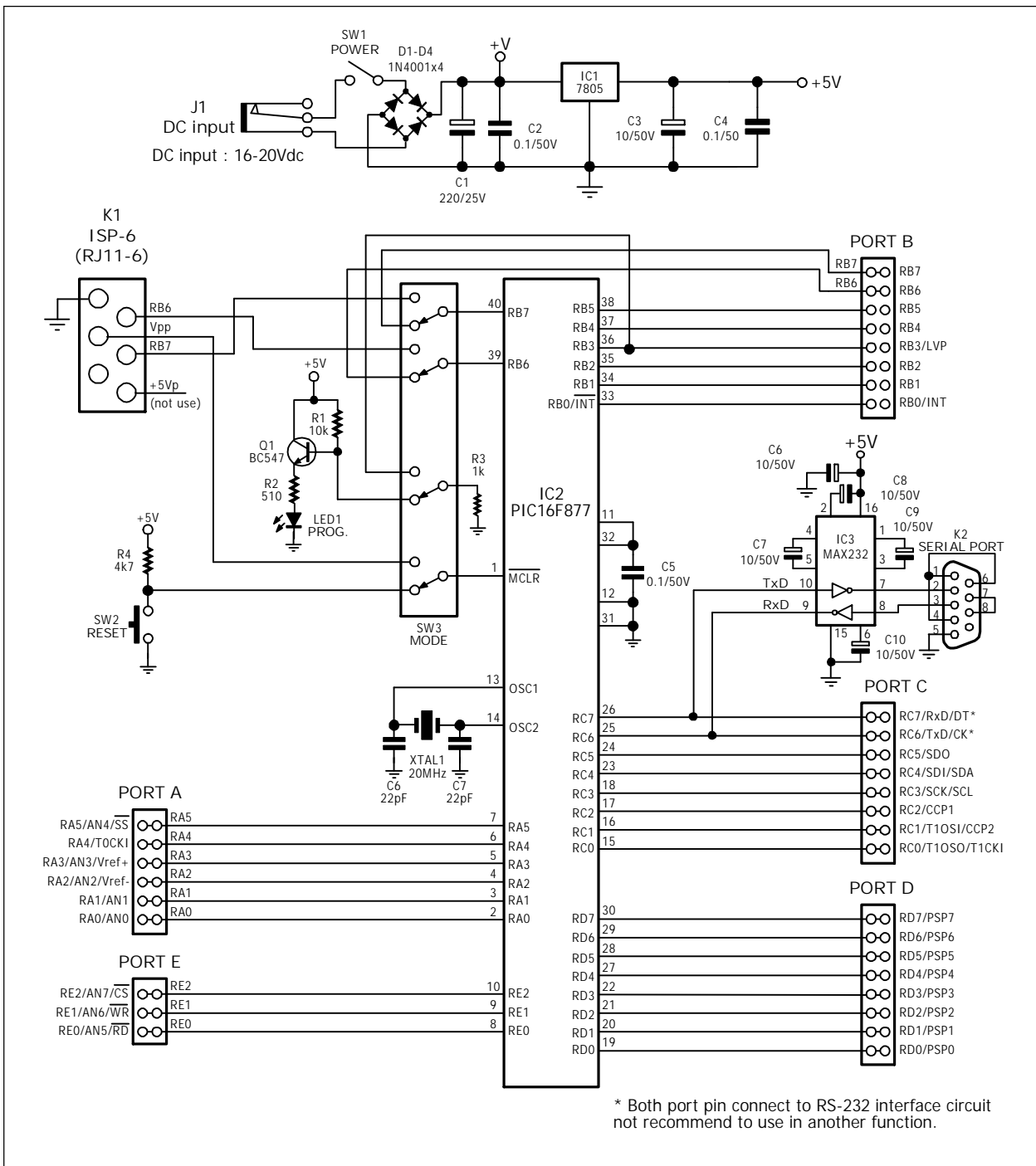
Packing List

- | Experiment board
- | Documentation
- | PX-127 USB Flash PIC microcontroller In-System Programmer with USB cable and software in CD-ROM
- | 12Vdc Adaptor
- | 16x2 LCD module with cable
- | RS-232 serial port cable
- | Wire jumper box set

NX-877 plus Schematic Description

Microcontroller section

The heart of this section is PIC16F877A microcontroller. It is programmed via In-System Programming (ISP) by PX-127 programmer board (included in this package) and can select operation mode (Run/Program) by a MODE switch



Experiment board provide 5 port groups, Port A (RA0-RA5), Port B (RB0-RB7), Port C (RC0-RC7), Port D (RD0-RD7 and Port E (RE0-RE2). However in 28-pin microcontroller cannot use Port D and E connector

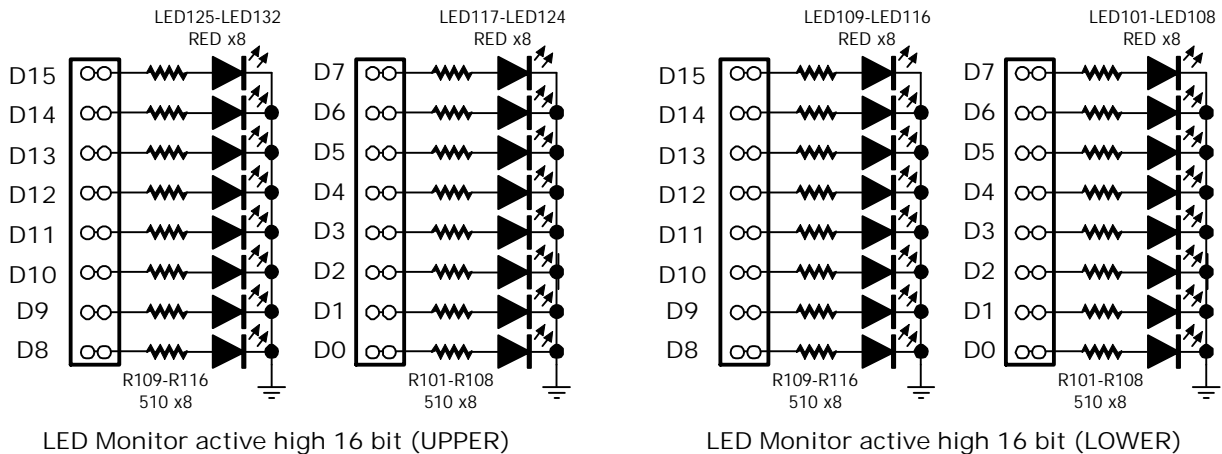
Oscillator mode for microcontroller is HS mode, fixed frequency at 20MHz

On the experiment board provide +5V for supply the experiment circuit and all circuit on the experiment board.

Addition RS-232 serial port interface to microcontroller, This experiment board connect RC6/TxD and RC7/RxD pin to MAX232 circuit for interface serial port. Experimenter can interface RS-232 serial port very easy nit construct external circuit.

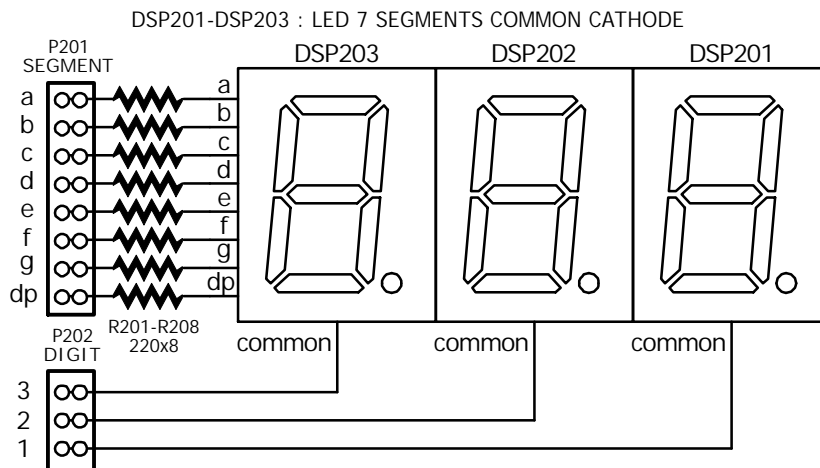
LED monitor

On experiment bord provides 32-bit of active high LED monitors . Each channel connectd current-limit resistor for protect LED current through.



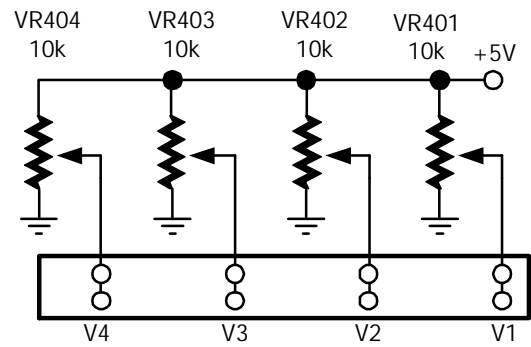
7-segment LED display

This board provides 3-digit of 7-segment common cathode LEDs. All LED connect in multiplex and connect current-limit resistor in each segment.



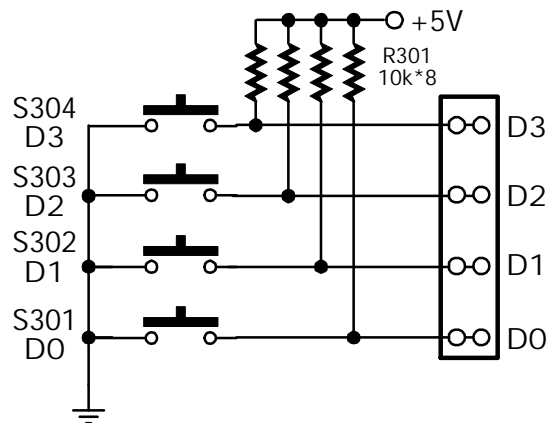
0 to +5V Reference Voltage Source

For support analog experiment, NX-877 plus experiment board provides 4 channels of 0 to 5V analog voltage source to supply analog voltage for ADC circuit.



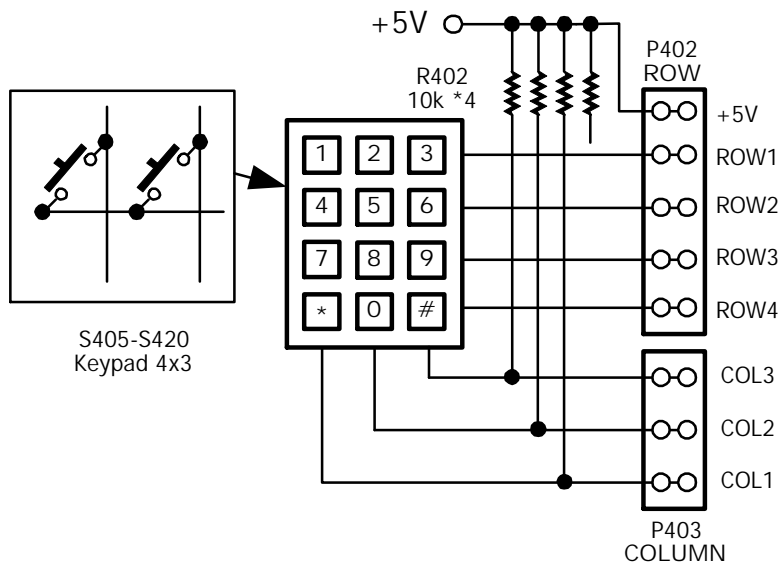
Switch input

Switch is the type of input device for microcontroller experiment. Four normally-open pushbuttons are made available via connectors. The buttons are wired in an active-low configuration, with a pull-up resistor.



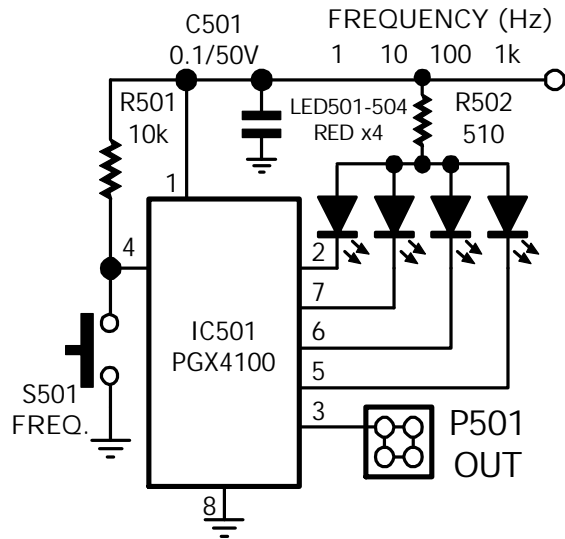
4x3 Matrix Switch or Keypad

This circuit consists of 12 push-button switches connected in a matrix configuration. It is defined as 4 rows and 3 columns. The pull-up resistors are connected at the column lines. The switch positions are defined in a telephone keypad format, including numbers 0 to 9, *, and #.



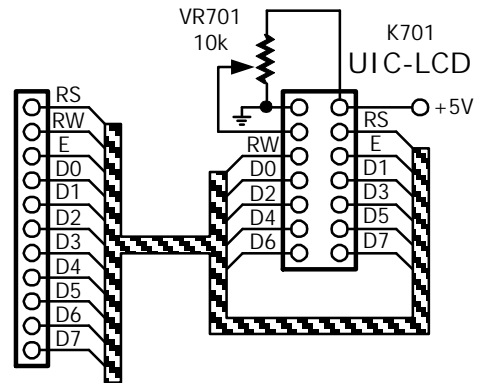
Pulse Generator

The NX-877 plus experiment board's pulse generator provides a selectable square-wave output of 1 Hz, 10 Hz, 100 Hz, and 1 kHz. Frequency selection is by the push-button near the pulse generator output (an LED indicates current frequency). Be sure that the output of the pulse generator is connected to an input pin only, as this output is driven both high and low.



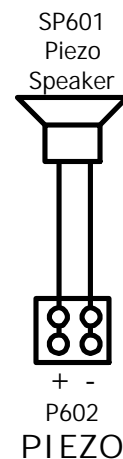
LCD module connector

At this connector can connect with 16-character 2-lines LCD module that bundle in experiment board set. It prepare variable resistor for LCD's contrast adjustment.



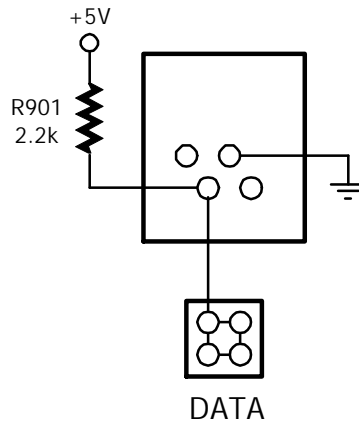
Piezo speaker

Sounding device on this experiment board is Piezo speaker. It may connect with 1 to 470mF electrolytic capacitor for amplify sound level. The piezospeaker has resonance frequency at 2 to 3 kHz. If the resonance frequency apply to the piezo speaker, it lounds maimum.



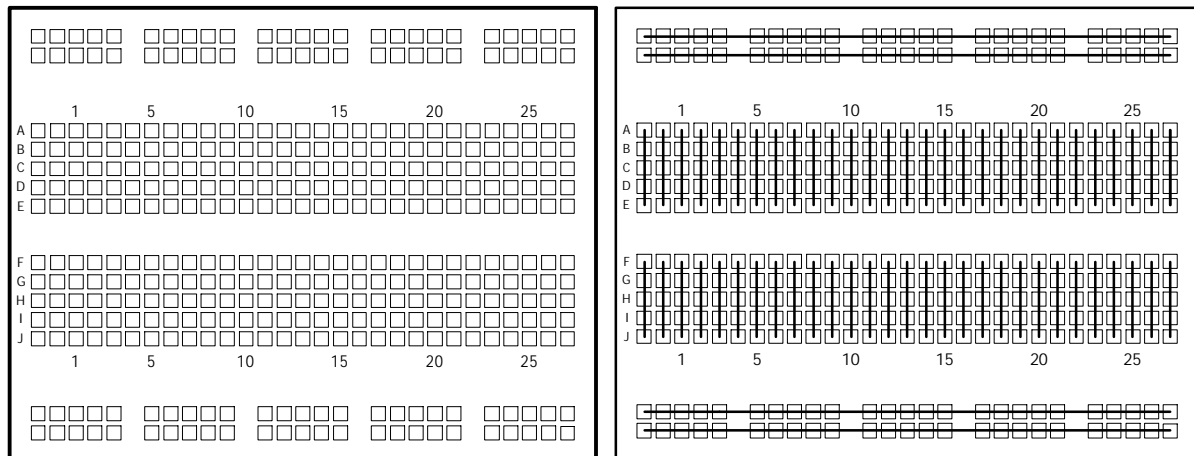
1-Wire/iButton interface RJ-11 Connector

The RJ-11 connector is configured for Maxim/Dallas 1-Wire or iButton I/O. This experiment board bundle DS1402 iButton socket cable. Experimenter can plug to this jack for interface iButton device (DS1990A and Ds9093F included this package).



Preparing the Solderless Breadboard

Most experiments will involve components placed in the solderless breadboard. The breadboard on this experiment board size is 2.5x7 Inches and provides 800 point-contacts. Detail of breadboard shows in the figure below (the figure is example, size, number of row, point contacts may be change).



Using experiment board

Preparation

Before using, user must prepare some tool and software following :

1. Personal computer which install Window 95/98/ME/2000/XP, text editor program, MPLAB, MPASM and MicroPro software

MPLAB and MPASM are licenced by Microchip Technology , for more information please contact at <http://www.microchip.com> (included in CD-ROM when order NX-877 plus board)

MicroPro is licenced by DIY Electronic (included in CD-ROM when order NX-877 plus board)

Computer must has at least one USB port for connect with PX-127 Programmer.

2. Write program, set beginning address at 0x0000 and save file in .ASM

3. Assembler .ASM file by MPASM with selected INHX8M type. So it will be HEX file

4. Prepare DC adpator 16-20V 500mA.

Procedure

(1) Constuct the curcuit on breadboard on NX-877 plus board.

(2) Connect PX-127 with USB port. Wait for READY LED on PX-127 lights.

(3) Open MicroPro software.

(4) Connect NX-877 plus boar with PX-127 by ISP-6 cable at ISP jack.

(5) Supply voltage to NX-877 plus board.

(6) Press MODE switch for changing to PROGRAM mode, red LED is bright.

(7) Select PIC16F877 or PIC16F877A microcontroller depend on the chip that install on experiment board.

(8) Open HEX file.

(9) Erase and blank check data in microcontroller.

(10) Program data into microcontroller

(11) Verify programming

(12) After programming completed, press MODE switch to RUN mode. Microcontroller will run your program.

