

NMB Standard USB Keyboard Circuit Description

The keyboard is simply consisted of two major blocks, one is electronic printed circuit board, the keyboard membrane 18x8 key matrix switches, and the cable cordset.

A. Electronic Printed Circuit Board

The keyboard is using Novatek NT6881USB Micro-Controller Unit, The Micro-Controller is supplied by an internal 6MHz Ceramic resonator and wire bonding directly to printed circuit board as COB (Chip On Board).

The CPU perform key scanning on 18x8 matrix, the 18 column outputs are open drain and the firmware will keep continue to have a running "0" pattern to scan the columns, the 8 rows input have an internal pull-up resistor about 20K Ohms, the firmware will detect the 8 rows input every time when the firmware change the running "0" pattern for column in order to make sure any key press or key release in the membrane switch..

If a key press or key release is detected, the firmware will de-bounce the events to make sure it is firmly pressed or released, then converge the key location to the USB Low-speed protocols with USB HID Keyboard usage codes and transfer the usage-codes through differential I/Os "D+" and "D-" pins. Note that the USB low speed signal will transmit and receive signals at the speed of 1.5 Megabits/second

The MCU also directly driving 3 LED indicators for Num, , Caps, and Scroll Lock.

The Keyboard and MCU is supplied by DC voltage, at 4.4Vdc to 5.25Vdc and total Currents consumption with all LEDs are ON is no more than 100 milli-amperes. The sleep mode currents is no more than 500 micro-amperes.

Since the MCU is very well design for EMC and there are only two capacitors are used for EMC purposes, they are 10uF electrolytic capacitor and 0.1uF ceramic capacitor

B. Membrane Key Matrix

The membrane key matrix is consisted of three sheets of plastic mylar sheet , the Top and Bottom sheet is the Row and Column Mylar sheet, respectively, which is printed by conducted paints with respect to the key-matrix, the middle sheet is called "Spacer" mylar which does not have any paint to separate the top and bottom sheets but with a hole on the key position to allow the contact between the Row and Column sheet when the key is pressed..

The resistance of a key when it is pressed start from the connector is about 50 Ohms to 500 Ohms depending of the length the traces of such switch location.

C. USB Full Speed Cord set

A USB Full Speed Cord Set construction is consisted of 4 signals wires +5V, Gnd, D+, D- with jacket and one drain bare wires. All wires are 28 AWG. All 4 wires are twisted about 180 degrees per inch. These 4 wires are enclosed and shielded by braided shield wires with the bare drain wire touch to the braided-shield internally. The Cable Cord set length is 1.5 meters, one side tied to the USB Type "A" male connector with the drain-wire solder to the metal chassis and the other side is tied to the right angle connector that is directly soldered to the PCBA.