Logitech® LTAS2 USB / PS/2 Combo 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 MC68HC(9)08JB8 Micro-Controller Unit, The Micro-Controller is supplied by an external 6 MHz Resonator with resistor R1=1M, with the divided by 2 circuitry.

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 Scan-codes and transfer the scan-codes to "Clock (D+)" and "Data (D-)" I/O pins in IBM® PS/2 signal protocol.

The MCU also directly driving 4 LED indicators for Num, Caps , Scroll and F Lock.

The Keyboard and MCU is supplied by DC voltage, at 5VDC +/- 5% and total currents consumption with all LEDs are ON is no more than 60mA.

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 Cord set

A USB Cord Set construction is consisted of 4 signals wares +5V, Gnd, +Data and -Data with jacket and one drain bare wires. Each construction of wire are as below.

1) +5V, Gnd : 24 AWG-No twist
2) +Data and –Data : 28 AWG , twist 1 pair
3) Drain bare wires : 26 AWG

These 4 wires are enclosed and shielded by the Al Mylar /Al sheet with the bare drain wire touch to the Aluminum mylar sheet internally. The Cable Cord set length is 1.5 meters, one side tied to the USB 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.

D. Adapter for PS2

This adapter is used for transformation from USB to PS2. The principle of function is equivalent for USB mode.