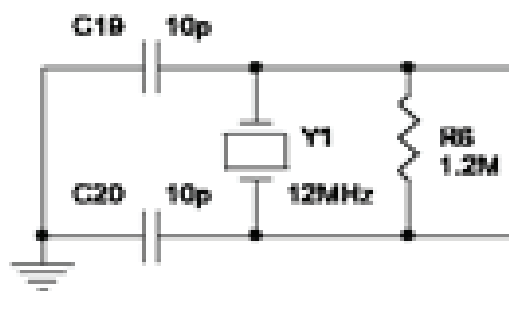




# Electronic Failure of USB pen drive

The first things to check for with a possible electronic failure of a USB pen drive are the USB connector and the soldering on the PCB. Make sure there's no damage to the connector and the components are soldered properly on board. To diagnose a pen drive which hasn't got any response when connected to the computer, you need to look at three things:

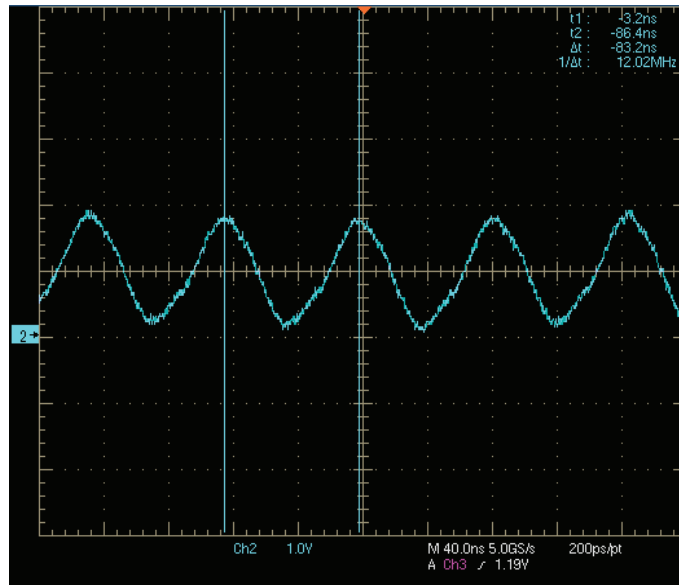
1. Power supply. There are two power supplies. One is to the main controller and the other one is to the flash memory chip. Generally speaking, if there's no power, the fuse or the 3.3V voltage regulator is damaged. For a 3.3V voltage regulator, there're 3 pins on it which are +5V input, GND and +3.3V output.
2. Clock signal. The clock signal generated by the crystal circuit is the essential condition for the microcontroller to work correctly. The flash memory communicates with the microcontroller at a certain frequency. USB pen drives use 12MHz clock signal. The clock signal comes from the crystal oscillating circuit. It is a very simple circuit as show in the figure below.



Before we test the crystal, we need to make sure the capacitors and the resistors are not blown. (Refer to the 'General Procedure for the Diagnosis of Electronic Components on HDD PCB' document) The only way to diagnose the crystal is use analogue 'scope. Under a working state, any one of the pins on the crystal will have a 12MHz sinusoidal waveform as show in the figure below.



# Electronic Failure of USB pen drive



In the case of the scope showing a stable voltage (oscillating amplitude), it indicates the crystal is damaged. Generally, the crystal can be very easily damaged due to a drop or physical vibration. The only thing to do is to replace the damaged crystal. Most USB pen drive with size larger than 1G use a cylinder shape crystal while some small size USB pen drives use a surface mounted crystal.

3. Microcontroller. If the two conditions above are good, the only other failure should come from the microcontroller. Currently, there's not suitable equipment to replace this kind of chip.

## 4. Conventional USB Pen Drive Schematic

