

## **HYTRAK TROUBLE SHOOTING**

### **A frequently asked question**

I am dealing with a partial short on the VCC circuit, it is shorted somewhere along the VCC distribution circuit on the PC Board.

It is more likely a component short instead of PCB internal short because it is not a complete short therefore it is not measured to be zero ohm, but some resistance shows up on the DMM.

Can the Hytrak be used to trace partial short instead of complete short on the circuit?

If yes, please give me a rough idea how it can trace a partial short until and find the precise spot where the short is located.

This is a very familiar request and the answer is as follows:-

The Hytrak can be used to find shorts which are not necessarily zero ohms.

Is it a Hytrak 100 D or a model 100 L that is being used ?

The reason for this question is that on the Model 100 D the full scale max reading is 199.9 ohms and on the 100 L the full scale max is 19.99 ohms.

I mention this because if the " partial " short is greater than say 200 ohms, ( or 20 ohms on 100 L), then you cannot read the resistance directly since it is too high to see directly on the display. However the partial short is probably less than these values.

Let's assume that it is a model 100 D that is being used and that the "partial short" is less than 200 ohms.

As a case in point I had a similar fault on a memory board here where all the IC s in the memory array were commoned on the 0 and 5 v Vcc lines.

It was a large memory array and a situation which sounds very like what the enquirer is describing.

So I measured the resistance across the Grnd and VCC pin of each chip on the memory board and made a pencil note in an array table form of the resistance at each chip.

It very soon became apparent where the lowest ohms reading was. I therefore removed that chip.

However the short resistance was still there !

On the memory board that I was working on the power was distributed by small vertical bus lines running across the board. It turned out that the fault was in this bus line at a place directly where it had connected to the chip which I removed.

So we had physically found the fault which was a low resistance short but initially we had incorrectly made the assumption that the short was in the chip.

I relate the above since it sounds like a very similar situation to what the customer wants to be able to do with the Hytrak.

During the above procedure - I was of course moving down the ranges on the Hytrak to make it more sensitive. I did not have to rely on the audio guidance at all.

From memory the partial short was several milliohms.  
The reason that you can do this using the Hytrak is due to its resolving power in resolving 100 micro ohm increments on the most sensitive range of the Model 100 D.

If you try to do this with a DMM it cannot resolve the small increments needed to "see" the short or partial short..

It may be necessary in a difficult to isolate situation, to may cut a track. Fortunately I was able to find the fault without doing that.

The decision to cut a track in fault finding comes down to the economics of the situation. How valuable are the finished boards ?

The memory board I was working on was very valuable and hence worth spending time on to convert what was useless in its faulty form into valuable stock.

I did the above procedure on the customer's site and once I had shown them how to do it , they were then able to convert a pile of similar boards which had been gathering dust on the corner of their very very expensive PCB ATE bench into valuable stock.

The Hytrak had effectively paid for itself on the first board that I cured !