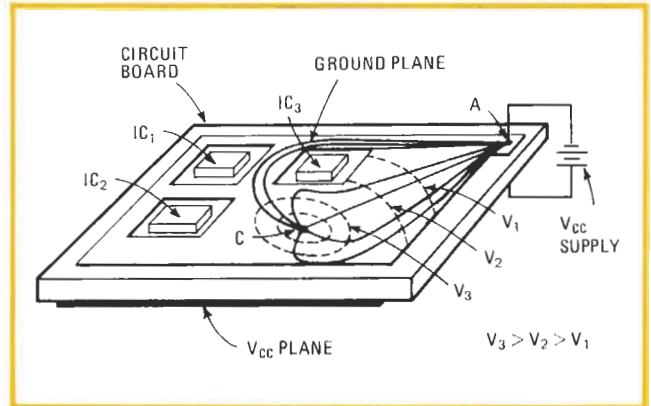


DVM locates short circuit on wired circuit board

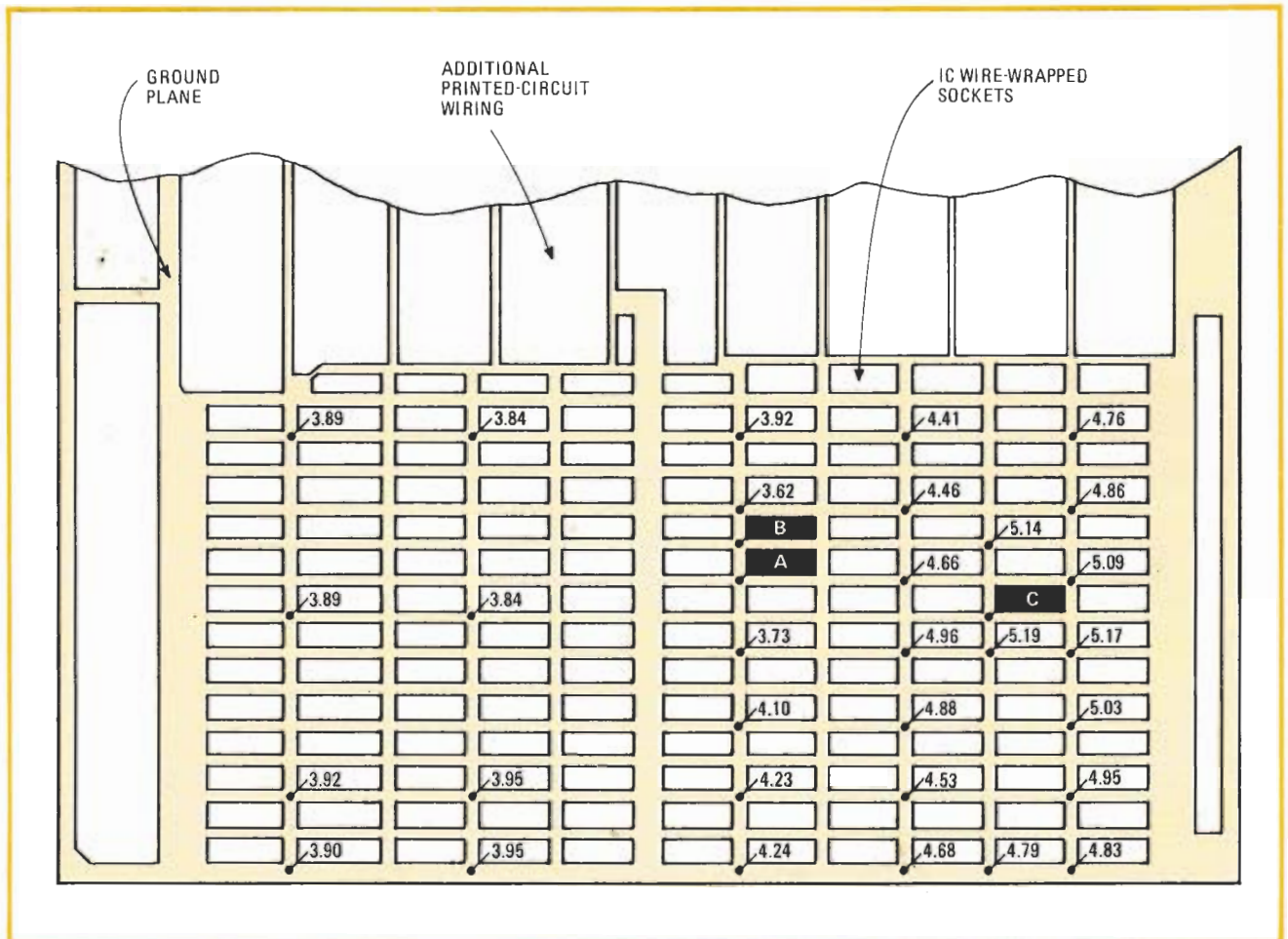
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A microvoltmeter or digital voltmeter can be a great time saver in finding a short circuit on a circuit board that is wired with a large number of integrated circuits and bypass capacitors. The situation arises when the engineer sets his bench power supply to the proper V_{CC} voltage, plugs in the board, and watches the voltmeter drop to zero while the ammeter reads full current at the current-limiter value—the V_{CC} supply is shorted to ground.

If visual inspection does not reveal the short and none



1. Short subject. A short circuit between the power and ground planes at point C causes currents to flow along the ground plane to point A. Since equipotentials have highest values near point C, a probe that measures voltages on the ground plane relative to point A indicates the location of the short.



2. Look here. On this circuit card, signals are carried by 600 wrapped wires above the ground-plane side of the board. A short circuit from an IC pin to the ground plane at point C was located by measuring ground-plane voltages (shown in millivolts) relative to the negative supply connection at point A. The positive side of the supply is connected to the power plane below point B.

of the ICs feels hot to the touch, measurement of the potential between the power-supply ground connection and other points on the ground plane will indicate the location of the short-circuit point in a few minutes.

This technique is effective because a potential difference of several millivolts can exist from one end of the ground plane to the other as current flows through it. If current enters the ground plane at the location of the

short circuit and leaves at the power-supply return, as shown in Fig. 1, the voltage difference is greatest between these two points.

Figure 2 shows the voltages measured at several points on part of a shorted board. The short turned out to have been caused by a 0.5-millimeter ball of solder splatter that was held in place (and out of view) by a bundle of wires. □