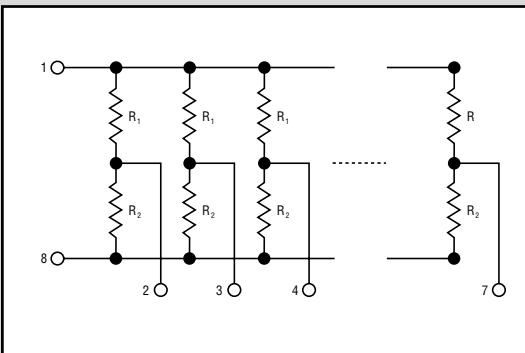


MEASURING NETWORKS WITH LOOPS

There are many kinds of circuits where a certain resistor in a network may be bridged by a loop of other resistors. Some examples from the linear circuit world are bridges and attenuator pads. It is not always desirable or possible to break the loop in a resistor network where pins may be very limited.

A good example of a very common digital network containing circuit loops is the dual terminator network shown in the drawing below. In this network there is a series-parallel circuit that interferes with the accurate measurement of any single resistor.



In a network with loops, the initial adjustment to tolerance and subsequent test and inspection steps may be accomplished accurately by the use of a guarded ohmmeter or guarded precision bridge. The guard electronically removes the parallel paths or loops by applying a voltage to the loop network in such a manner that the loop current is essentially zero.

In the example above, the resistor at the far left labeled R2 may be accurately measured by connecting the ohmmeter or bridge from pin 8 to pin 2 and connecting the guard to pin 1. The guard will drive pin 1 so that the voltage across R1 is

essentially zero and no loop current flows through R2, the resistor being measured. Using this method each resistor in the network may be precisely measured.

The guard method will work as long as the guarded ohmmeter or bridge can supply the necessary current to drive the loop network. As a practical matter, large ratios of a single resistor to the parallel network will reduce accuracy. Another situation that should be avoided is the use of resistors small enough that the resistance of the cermet conductors on the substrate will interfere with accuracy. When tight temperature tracking or tight TCR is required in resistors of 500 ohms or less, it is recommended that you contact the factory for applications assistance.

