Microwave Components, Inc.

Frequently Asked Questions

1. What does a coil do for the RF circuit card?
   A. Air coils are the simplest inductors. These are solenoidal coils that use an air core and can have a single wind of wire to many turns depending upon the range of frequency they are designed for. These inductors have low nominal values of inductance but offer a high-quality factor. As there is no magnetic core, they do not suffer from operating losses due to the hysteresis, eddy current, or distortion common in magnetic cores. Because non-magnetic cores do not easily heat up when the high current flows through the coil, these inductors have a high Q-factor as there is minimal loss of energy by the core in the form of heat. As the frequency of the signal increases, the value of required inductance decreases, making air coil inductors suitable for high-frequency applications. The circuits processing ultra-high frequency usually needs air coils with a single turn.
2. What specifications are engineers looking for when selecting a coil?
   A. In most cases, the Design Engineer has already calculated the value of the inductor required for the specific application. He or she provides the value typically in nH (nano) or µH (micro) Henry. Other parameters which may or may not be known by the design Engineer are:
   i. Wire material – This is usually driven by the bonding method being used by the customer
   ii. Insulated or bare wire
   iii. Spaces between the winds or not - Spaced coils allow for some tuning at installation
   iv. If not spaced winds bonded or not bonded – Bonded coils are mechanically stronger and are easier to handle
   v. Some additional requirements could be height or length restrictions or maximum current required
   Once specifications are agreed upon MCI will build a sample lot of 5 pieces and send to the customer in order to confirm the part performs as required in the next assembly. Lead time for samples is typically 1 week.
3. What / how does an engineer determine when to use multiple coils or additional turns?
   A. The value of the coil depends on the circuit and application. Each application most likely will require a different value or different coil type. MCI manufactures coils with spacing between the turns. This provides the user some flexibility in "tuning" the device. This tuning does not greatly change the inductance of the coil, but it can assist the Engineer in dialing in the circuit.

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Veteran owned, leading manufacturer of miniature air coils for Microelectronics since 1978.

4. Are there limitations how many turns and diameter of coils one can specify? What impact does the tighter the diameter cause? Wire diameter? Number of turns?
   A. The best answer is YES. The total amount of turns will depend upon several factors, including wire type and diameter. MCI manufactures a range of coils that have 1 to 100 turns. MCI products span an inductance range of 1 nH to 1000nH. Wire type, turns, diameter (inner and wire) all impact the inductance of the coil. For example:
   i. The greater the inside coil diameter of the windings, the greater the inductance
   ii. The smaller diameter wire, the greater the inductance
   iii. The greater number of turns in the coil, the greater the inductance
5. Material selection and composition. Can the engineer change the materials of a coil to affect the performance? What is affected and by how much?
   A. Changing the material of the wire (Silver, Gold, Copper, Aluminum, etc.) will impact the inductance. Normally the wire type is chosen for cost and mounting requirements. This is usually determined through discussions with MCI's technical team.
6. Can coils be surface mounted to a PCB?
   A. MCI coils are axial lead and can be used in multiple applications (thru hole, Stripline, microstrip, etc.). MCI coils are primarily surface mounted, but the coils are not conducive to automated pick and place due to their cylindrical shape.
7. How can one tell that a coil is not performing the task intended?
   A. The performance of the circuit will be impacted if the wrong value coil is used.
8. Can coils be re-used?
   A. Coils are passive devices and can be soldered, unsoldered and resoldered. The miniature air coils are very small, and care needs to be used when installing or removing the devices.
9. Selling against packaged coil?
   A. Packaged coils are used for different applications and are very inexpensive. Pennies verses dollars: however, the packaged parts do not have the Q rating necessary to perform in the circuitry in which MCI products are utilized.

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10. How does Microwave Components, Inc. differentiate from competitors?
    A. MCI only produces miniature air coils, while many of our competitors offer a broader portfolio of products. MCI takes pride in manufacturing difficult coils in the quantities our customers require that our competitors typically either cannot or refuse to build. Customers have stated that MCI's lead time, on time delivery and quality, along with the ability to provide small lots of difficult coils, more than compensate for a slightly higher price. MCI is typically the lowest cost solution for our customers miniature air coil requirements.
11. What questions should we be asking potential customers to identify coil opportunities?
    A. Does the customer have a need for RF and Microwave, high Q, low loss inductors?
12. What applications/markets utilize coils?
    A. Typically, the MCI products are used in Defense, Satellite, Radar, Comms, EW and any Hi-Rel applications. MCI has product on several aircraft, missile and satellite programs. In addition, MCI coils are used in ATE (Automatic Test Equipment) Amplifiers and Pre-amplifiers, as well as medical equipment.
13. What is the difference between Microwave Components, Inc. (MCI) and Microwave Components, LLC (MWC)?
    A. MCI manufactures and sells miniature air coils. The private company was founded in 1978 and located in Dracut, MA. MWC is a Boutique Distributor of RF and Microwave products (components, cables, connectors, etc.). MWC is a wholly owned subsidiary of American Distributors, LLC. MCI and MWC are two separate companies, both servicing the RF and Microwave market. MWC is a franchised distributor of MCI coils.