

To Trim Or Not To Trim, An Engineering Question?

Design engineers are often told not to use variable components. Yet, Voltronics trimmer capacitors may still be the best solution for new designs. Here is why.

What is most important today? Performance, reliability, and cost.

You can't buy fixed components, assemble them and achieve frequency tolerance of 0.1%, or 0.01%.

Tight tolerance fixed parts are too expensive. Stray capacitances and components' drift cause errors.

Changing fixed capacitors is not only costly but can destroy the substrate board.

Laser trimming is a one-time process, which can't adjust for frequency drift during burn-in or during aging and temperature cycling.

One solution is to try a small inexpensive trimmer set to a specific value at the factory and tune it when and if required. As an example, if you need a 6.4 pF fixed capacitor, we can provide an AIM8 set within 1 % of that value. It will be as stable as any fixed capacitor, but you can adjust it at any time if the circuit requires. This saves all the time of initial tuning and yet has all the advantage of a variable capacitor.

The argument that trimmers aren't mechanically reliable is no longer valid, if it ever was. Long term data shows that trimmer capacitors are as stable as fixed components. Our new solid dielectric trimmers won't change or short out in moisture, dust, shock, vibration or space environments.

For 36 years, Voltronics variable capacitors have been designed into many crystal oscillators and filters used throughout the communication, instrument and aerospace industries. And our new designs are ever more reliable and inexpensive.

Because Voltronics is an engineering driven company we:

1. Offer new products, which meet today's need for high reliability, small size, cost effectiveness and high frequency capability. See our A1-A4 styles described here.
2. Design new trimmers to meet your needs either by modifying present designs or designing a brand new part.
3. Make unusual special products to meet very specific needs. Some of these are shown here to stimulate your thinking about what we can do for you.

Voltronics latest A1-A4 line offers small multi-turn trimmers with a patented solid dielectric for high frequency applications. There is no chance of shorting or changing value under time or stress. They have high Q's and are inexpensive. Each can be set exactly to a fixed value at our factory and yet can be finely turned in the field as other components drift.

The four standard sizes are:

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| A1 | 0.4" long x .155" dia. in 4, 8 or 12pF maximum capacitance. |
| A2 | 0.225" long x 0.094" dia. with a 0.3 to 1.2pF tuning range |
| A3 | 0.5" long x 0.3" dia. with a 1 to 10pF tuning range (to replace popular air piston types) |
| A4 | 0.15" to .325" long x 0.16" dia. in 2, 3, or 5 pF maximum capacitance. |

All of these can be surface or PC mount. This product line was developed for the low cost, wireless communications and instruments markets. High voltage versions are rated 500 to 1500 WVDC. They all can be non-magnetic for MRI or NMR applications.

Voltronics also offers larger styles with 10, 16, 23, 30, 40 and 55 pF maximum capacitance values. These parts are 0.3" dia x 0.5" or 1.0" long and are available in many different mounting styles. Non-magnetic and high voltage versions are also available.

The Voltronics popular J line of half turn ceramic chip trimmers are available in three very small sizes. They include 8 values from 0.4-1.0pF to 8-40pF and can be used over 3 GHz. They are very stable, well within $\pm 1\%$ after 1000 hours of applied voltage aging. The "J" series is the most stable of any type ceramic half-turn trimmer proven with large volume field experience by hundreds of users. Millions of parts are in stock with immediate delivery in most cases. Quantities of 50,000 to 100,000 and higher can be delivered within 30 days.

Voltronics engineers design new standards and special trimmers, often without NRE charges.

Example:

1. A customer saved expense and assembly time when we added a special hex bushing to a 10pF trimmer. This eliminated two small nuts and allowed immediate assembly without adjusting the smaller nuts. To increase reliability the capacitor used solid dielectric instead of air in the same size body. See V3600.
2. We designed high frequency split stator trimmer with two capacitors of 1.5 and 2pF in a 0.53" long sapphire NMR non-magnetic trimmer. SNMKZ3S.
3. For thumb wheel side tuning the V2592 rated 40 pF max and 3000 volts solved a difficult accessibility problem for the customer.

Many options include very high RF voltage ratings, non-magnetic materials, cryogenic trimmers which work to 4° K, dual DRO tuners, and untold others.

Voltronics engineers will offer you the best standard product for your application or design a special part for you. Since our catalog represents a small portion of available trimmers; if you don't see what you need, contact our applications engineers and we'll design your ideal trimmer!