



APP NOTE: Using the KFL1-4 over a wide temperature range

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APPLICABILITY: If your KFL1-4 (or K1-4) kit was shipped after December 13th, 2001, you already have the more temperature-stable trimmer capacitors described below. The new trimmers have a blue body; the old trimmers were white.

BACKGROUND

The K1 four-band module (KFL1-4) uses very high-Q band-pass filters. These "tight" filters provide excellent rejection of out-of-band signals and ensure good transmit spectral purity.

The down side to very high-Q filters is that wide variations in operating temperature may cause the filters to become slightly de-tuned. This is very unlikely to affect receiver performance. However, maximum transmit power output might be reduced. The exact low or high temperatures at which some power degradation might be noted will vary from one KFL1-4 module to the next, because the temperature coefficients of the trimmer capacitors vary.

This application note describes two ways to improve the operating temperature range of the four-band module.

METHOD #1

The simplest way to increase the operating temperature range is to decrease the Q of the band-pass filters slightly. This can be done by increasing the size of the small coupling caps in each filter. We have carefully tested this modification, and found that it had no adverse effect on transmit or receive performance. These changes alone should allow operation at significantly higher and lower temperatures, and will also provide somewhat flatter power output across a given band.

Here are our recommended values:

C9 = 2 or 2.2 pF

C10 = 4.7 or 5 pF

CJ = 2.7, 3.0, or 3.3 pF

CK = 4.7 or 5 pF

You can either replace the existing capacitors or add small capacitors in parallel on the bottom of the board (this is much easier). If you wish to make these changes but don't have one or more of the required capacitors, Elecraft will send them to you free of charge. Send your request to support@elecraft.com.



METHOD #2

APPLICABILITY: If your KFL1-4 (or K1-4) kit was shipped after December 13th, 2001, you already have the more temperature-stable trimmer capacitors described below. The new trimmers have a blue body; the old trimmers were white.

If you anticipate operating in wider temperature extremes, you may need to replace the original trimmer capacitors on the KFL1-4 board with a more temperature-stable type. The original trimmers were 8-50 pF, Elecraft p/n E540000. The replacement type is 1-40 pF, Elecraft p/n E540002. This difference in maximum capacitance will not affect KFL1-4 module alignment.

We will supply you with a full set (16) of the new trimmers at low cost (\$15 plus shipping). Call Elecraft to order, use our parts order form or or send e-mail to sales@elecraft.com.

Note: these temperature-stable trimmers are *not* required for other circuits in the K1 (or the K2), since these circuits operate at lower Q than the K1's band-pass filters.

Before you attempt to install new trimmers, you'll need to *completely* remove all solder from the mounting holes using solder wick or a vacuum de-soldering tool. Otherwise, you won't be able to seat the new trimmers. Straightening the bends in the new trimmers' leads may also be helpful. If all else fails, push very gently downwards on the trimmers while heating the pad from the back side of the board, but be careful not to use excessive heat, which could melt the plastic bodies. After installing the new trimmers, re-align the module per the KFL1-4 manual.