

Elecraft K2 Keying Modification Instructions

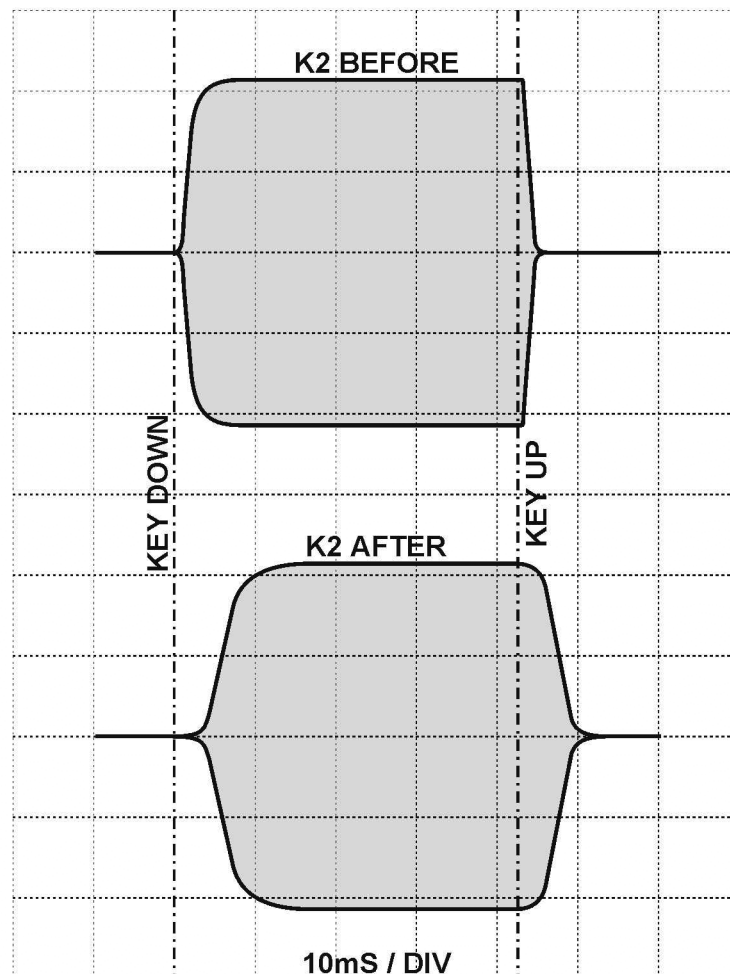
Rev. A, Feb. 3, 2004

Introduction

The modifications described here significantly reduce the K2's CW keying bandwidth, while not making the keying too soft. This change is recommended for all K2s, but is especially important for stations operating at high power, which are more likely to interfere with nearby stations. **NOTE:** You must update your K2 firmware to revision 2.04P or later when you make these changes (see next page).

Technical Details

Recent analysis has shown that the keying bandwidth of many transceivers is excessive. A consensus has emerged that a sigmoidal (S-shaped) envelope, rather than a classic R-C exponential envelope, is ideal. The K2 can be modified accordingly. As shown below, the new keying waveform has longer rise and fall times, and the abrupt falling edge is eliminated.



Most of the changes are in the key shaping circuitry (U10A, Control board). The R-C shaping network is reconfigured as a two-pole low-pass filter. In addition, a capacitor is added from the VPWR line (U8 pin 2) to ground to reduce the slew rate of the power-control DAC signal. Finally, a high-performance PIN diode replaces the original D36 on the RF board to prevent control signal leak-through during keying.

Parts Inventory

All parts to be changed or added are on the Control board except D36, which is on the RF board.

Ref.	Description	Qty.	Part No.
C31, C46	Capacitor, .01 μ F monolithic ("103")	2	E530009
C45	Capacitor, 22 μ F electrolytic	1	E530012
RF-D36	PIN diode, 5082-3081, glass body	1	E560014
R22	Resistor, 82 k, 1/4 watt, 5% (gray-red-orange)	1	E500119
R21	Resistor, 270 k, 1/4 watt, 5% (red-violet-yellow)	1	E500101
Misc.	Hookup wire, #24, green (used for insulation only)	4 inches	E760008

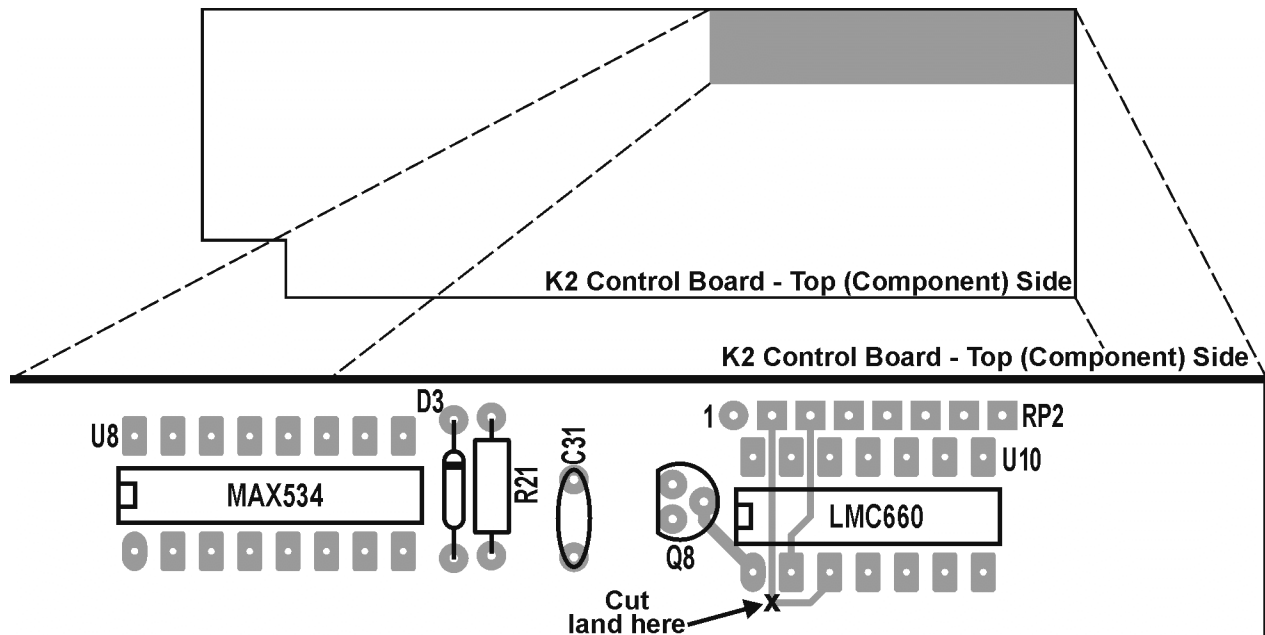
Preparation for Modifications

1. Check your firmware revision by holding any switch while turning power on. The number displayed on the left side of the LCD is the main microcontroller firmware revision (U6 on the Control board) while the number displayed on the right side of the LCD is the I/O controller (IOC) firmware revision (U1 on the RF board).
2. If the main microcontroller firmware revision is earlier than 2.04H, you'll need to replace it now. If your IOC firmware is older than version 1.09, you will need to replace the I/O controller at the same time. Complete all of the instructions supplied with the K2 Rev. 2 Firmware Upgrade.
3. Turn the K2 off and remove the top cover or KPA100 module.
4. **To protect static-sensitive components, put on a wrist strap or touch a grounded surface.**
5. Remove the Control board (first remove the KAF2 or KDSP2 if applicable).

Changes required to the K2 Control Board

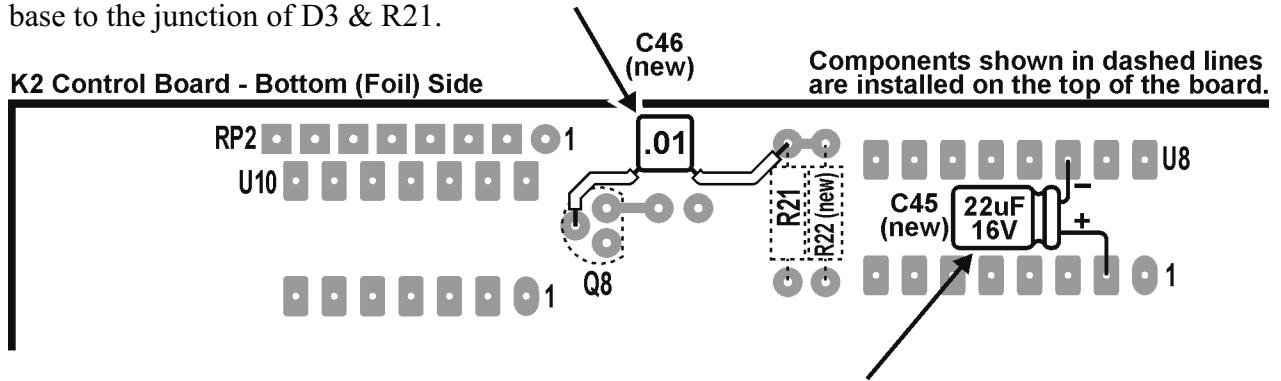
WARNING

Components on Control Board can be damaged by Electrostatic Discharge (ESD)! Be sure to take precautions to protect against ESD by using a grounded wrist strap or by touching a grounded object periodically while working with the Control Board.



- On the *top* (component) side of the Control board, CAREFULLY cut the PC board land running from RP2 pin 2 to U10 pin 3. This land runs under U10, around U10 pin 2, to pin 3. Cut it at the point indicated in the illustration, above.
- Use an ohmmeter between RP2 pin 2 and U10 pin 3 to confirm that the connection between these two pins has been completely broken. Resistance should be greater than 1k ohms.
- Remove D3 and replace with an 82k (Gry-Red-Org) 1/4w resistor. See illustration, above. Note that the new *resistor* at D3 will now be designated as R22.
- Remove R21 and replace with a 270k (Red-Vio-Yel) 1/4w resistor. See illustration, above.
- Remove C31 and replace with a .01 μ F ("103") monolithic capacitor. See illustration, above.
- Locate the 4" (10 cm) piece of green insulated wire that was provided with the modification parts kit. Strip 1/4" (6.4 mm) of insulation from one end of the wire and then remove and discard the wire from the remaining insulation. RETAIN the green insulation.
- Cut two 1/4" (6.4 mm) lengths of the green insulation and slip them over the leads of the remaining uninstalled .01 μ f ("103") monolithic capacitor (C46).

- On the **bottom** (foil) side of the Control Board, Install the .01 μF ("103") capacitor (C46) from Q8-base to the junction of D3 & R21.



- On the **bottom** side of the Control Board, install a 22 μF 16VDC electrolytic capacitor (C45) from U8 pin 2 (+ lead) to U8 pin 14 (- lead).

This completes all changes required to the K2 Control Board

Changes required to the bottom side of the K2 RF Board.

- Remove the K2's bottom cover. Locate D36 which is on the bottom side of the RF board, 2-3/4" (7cm) in from the left edge and 2" (5cm) up from the bottom edge of the PC board.

Note: In the following step, due to the density of components on the top side of the RF board, you may find it difficult to clip the leads of the new D36 which will be installed from the bottom side of the board in the following step. You may find it easier to pre-trim the diode leads so they are flush with the top side of the RF board when the diode is installed before you actually install the diode.

- Replace D36 with a 5082-3081 PIN diode. Observe the proper polarity when installing this diode (cathode band faces to the right as indicated by the component outline).

This completes the K2 Keying Modification.