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Service Bulletin #12

July 25, 1991

This Bulletin Covers:

The latest information on the Poly-Key Keyboard. Some information is new and some was previously contained in Service Bulletins #9B and #11. Please take the time to read this bulletin so you will be up to date on current developments. **This bulletin completely replaces Service Bulletins #9B AND #11.**

IMPORTANT!

- If the coil board-to-coil board connector is **a 12-pin single-row connector (remove the middle** six keys as described in Section E). hardwire it together (follow **this bulletin). This is for both foam and foamless keyboards.**
- If the coil bard-to-coil board connector is a 20-pin dual-row connector (remove the middle six keys as described in Section E), call ENSONIQ Customer Service for a replacement keyboard assembly.

Tools Needed:

#0 Phillips screwdriver
small flat blade screwdriver
2.5mm hex wrench
jumper wires from ENSONIQ
safety glasses
soldering iron and sol&r
scribe (see Section K)

Contents

A. **History**

Keyboard failures have been caused by two problems. First, when the connector between the two coil boards is intermittent, it may cause a keyboard calibration failure, random notes to be played, or ERROR 144. The fix is to make a reliable connection between the two coil boards (hardwire the two coil boards together). Second, a few failures have been caused by faulty ribbon cables and wire harnesses.

While investigating Keyboard Calibration errors, it was found that a break in the interconnection of the two coil boards can cause a variety of problems. The coil board connectors move in a horizontal plane while the force exerted on the connector by playing is in a vertical direction. If one pin doesn't make contact or loses contact briefly, the keyboard might not calibrate, might freeze up (button presses have no effect), show an ERROR 144, or might start playing random notes. Hardwiring the two boards together forms an absolute connection.

The tin connectors (most commonly used coating/material for connectors) builds up some oxide over time. This oxide is cleared by a wiping action when the pins are moved in their plane (here it would be horizontally). However, the force on the coil board-to-coil board connector is vertical ONLY (no movement horizontally at all) and therefore the oxide would not be cleared off. This oxide buildup could cause one or more pins to lose contact over time.

This problem was masked by the type of flux that we use (Service Bulletin #9B). This flux does leave some residue and we now clean all connectors that hang over the edge of the board (for example the Keypad/Display connector) or hand solder them into the board Cleaning the connectors helped temporarily because the wiping action of separating the coil boards and then reconnecting them broke through the oxide buildup on the connector.

This oxide buildup problem was very difficult to find, because shipping a unit from a customer to the factory could cause the coil board-to-coil board connector to shift enough to break through the. oxide so that the unit would work fine when it reached the factory. Sometimes removing the keyboard from the unit would shift the connector and break through the oxide so that all pins were making contact. Losing contact on just one pin, even briefly, can cause a unit to lock up (freeze) or have a calibration error.

In the investigation of the keyboard failures, it was also found that there were some weaknesses in the design of the KPC board Changes made to the KPC board make the design more robust in terms of heat dissipation and clock generation. However, just updating the KPC only is not sufficient for many keyboards. The main failure on keyboards is caused by the coil board-to-coil board connector. Remember that a KPC board can only be replaced with the whole keyboard assembly as it contains information specific to its particular coil boards and keys in its memory.

Other small things were found and corrected as well but the main cause of failure is the coil board-to-coil board connector breaking contact. Changes were made to the KPC O.S. EPROM to make the keyboard software more reliable, but does not correct the basic problem Changing two resistor values (described in Service Bulletin #9B) helped but does not correct the basic problem, therefore the resistors are no longer included in the KPC EPROM Update Kit

All new units from the factory will have the KPC board changes and the coil boards hardwired together until newly designed coil boards am in production. Any units that come into the factory for repair will also have this done as a routine part of the service.

B. Types of Keyboards

As you may or may not be aware, there are two types of Poly-Key keyboards: ones with foam pads on the under sides of the keys and foamless (ones without the foam pads). We currently manufacture foamless keyboards with coil boards that have reference coils.

Types of WC Versions

Each type of Poly-Key keyboard uses a different KPC O.S. version. The current KPC O.S. versions are shown below.

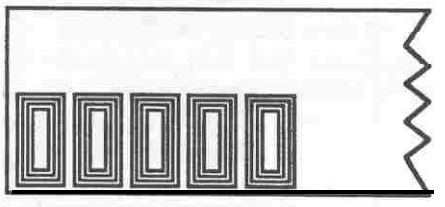
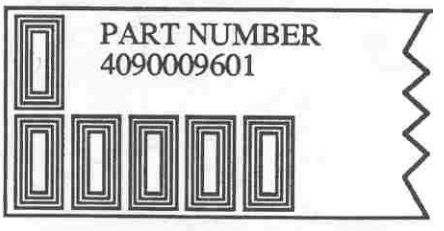
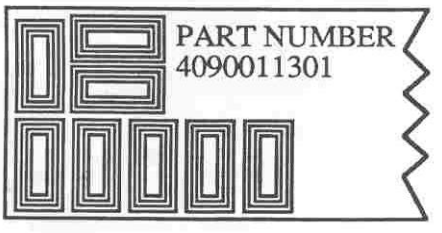
KPC version	Keyboard and Coil Boards
150	white foam pads on the undersides of the keys
203	grey foam pads on the undersides of the **keys**
227	foamless -no reference coil
233	foamless -with reference coil

The KPC O.S. version is typed on the white label on the EPROM (U2) on the KPC board. The KPC board is the small circuit board (3.75': x 4.25") located on the underside of the keyboard assembly. See Section J for information on how to check the KPC O.S.

Types of Coil Boards

There are two types of foamless keyboards: ones with a reference coil(s) (extra coil(s) in a different row than the other coils) and ones without reference coil(s). With the keyboard assembly removed from the unit, the reference coil(s) may be seen on the top edge of the coil board below the lowest key (the left side of the keyboard, see below). If you wish, you may remove the lowest key (see Section E) to get a better view of the coil board

Figure 1

Physical Description	Coil Board-to-Coil Board Connector	Current KPC Version	Comments
	12-pin single-row	227	We used more than one Coil board part number for this version KPC 227. The **only** absolute reference is a foamless keyboard with no reference coil.
	12-pin single-row	233	You may use the part number as a reference if you have dismantled the keyboard.
	20-pin dual-row	233	**Call ENSONIQ for a replacement keyboard.** You may use the part number as a reference if you have dismantled the keyboard.

C. Troubleshooting a Unit with a Poly-Key Keyboard Problem:

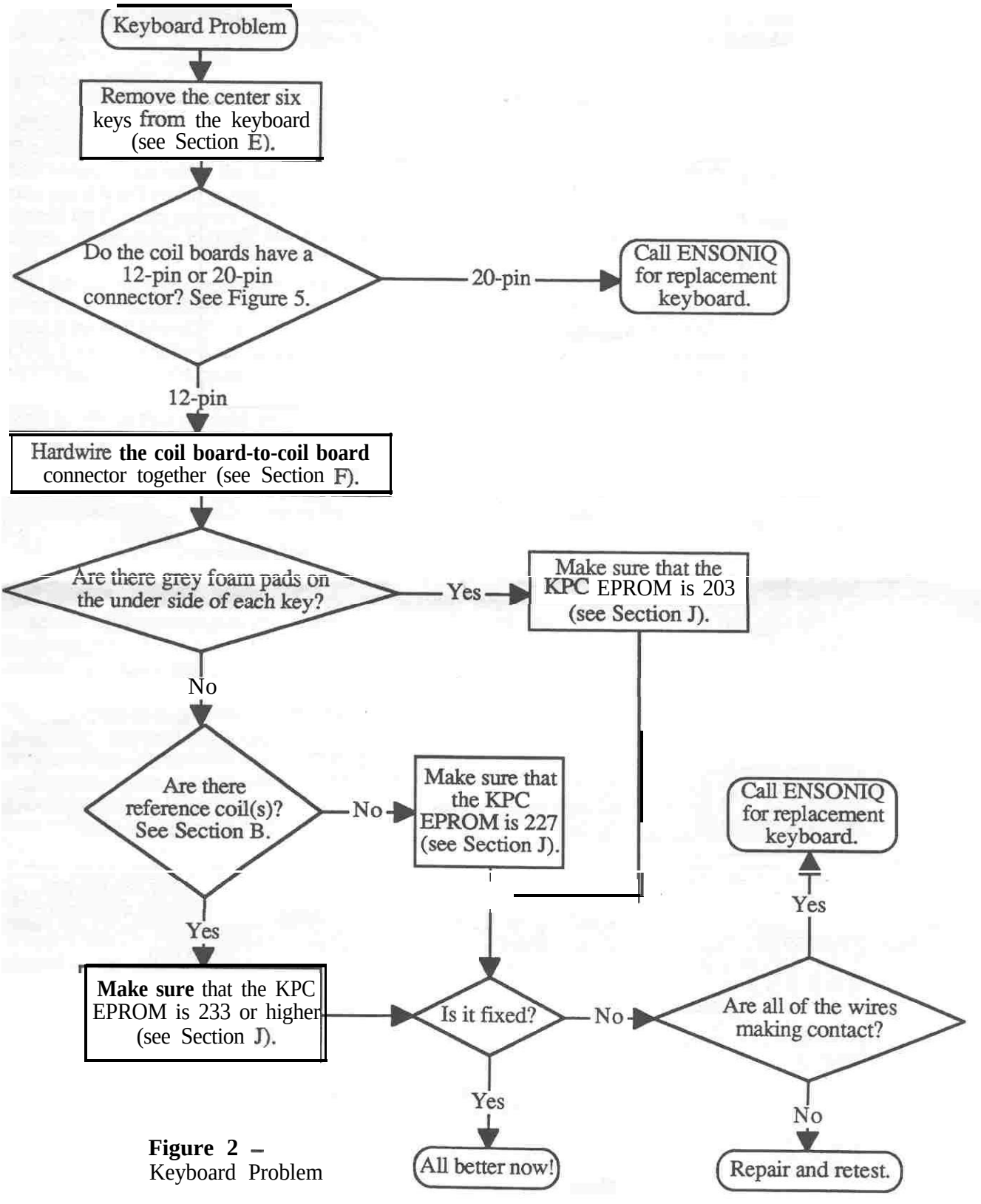


Figure 2 –
Keyboard Problem

D. Removing the Keyboard from the unit

1) Remove all cables connected to the unit, including the Power cable.
2) Using a 2.5mm hex wrench, remove the four (4) screws that fasten the control panel and raise the panel.
3) Place the unit upside down on a soft surface and remove the ten (10) screws that attach the keyboard to the case.

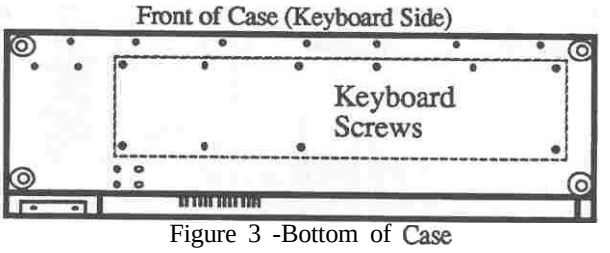


Figure 3 -Bottom of Case

4) Carefully turn the unit tight side up. Raise the control panel and disconnect the 20-pin keyboard ribbon cable from the main board (using a scribe or similar tool, see Section K), paying particular attention to the Polarity.

5) Remove the keyboard from the case by gently lifting up the front of it while pulling it toward the front of the unit. Once the rear of the keyboard has cleared the control panel mounting tabs, the keyboard can be removed from the keyboard cavity.

E. Remove Middle D through G Keys from the center of the keyboard

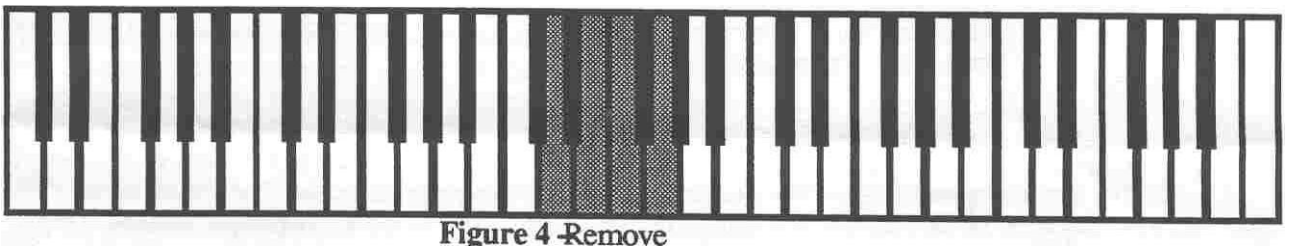


Figure 4 -Remove these six keys

1) Place the keyboard with the keys up on a level surface.
2) **Remove the key springs:**
   a. Insert a small Phillips screwdriver all the way into a key's spring at the tear of the key.
   b. Push down to expand the spring, then move the bottom of the spring away from the keyboard. Be sure to put the springs in a safe place, they have a tendency to roll!
3) **Remove the keys to expose the coil board connectors (white keys first):**
   a. Just below the key number (near the spring hole) on the key there is a rectangular opening.
   b. There is a clip that holds the key in place. Insert **a** small/thin flat blade screwdriver into the opening.

IMPORTANT! These clips do not need much pressure to be released If a clip breaks due to too much pressure, contact ENSONIQ Customer Service for a replacement key.

   c. While lifting up on the back of the key (near the spring hole) push the top of the screwdriver toward the back of the keyboard to release the clip.
   d. Remove the white keys first then the black keys. We suggest keeping the keys in order to make them easier to put back on.

With the middle D through G keys removed from the center of the keyboard:

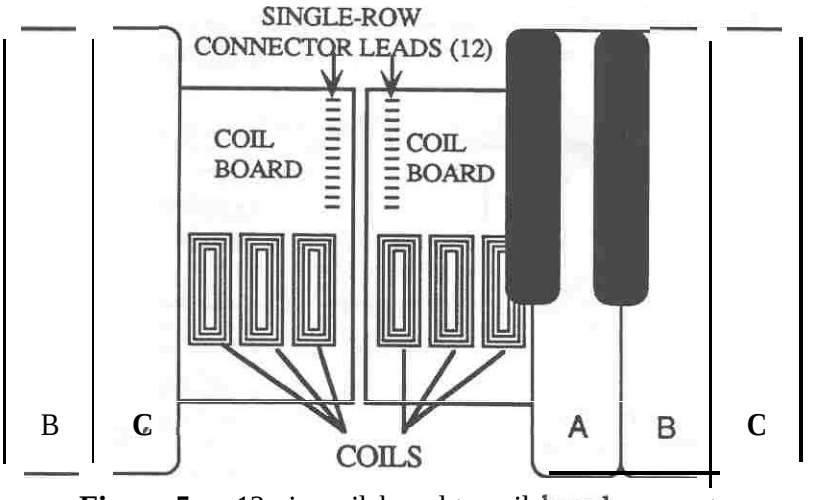


Figure 5 – 12-pin coil board-to-coil board connector

F. Solder the Connector Leads Together

Using the jumper wires provided, hardwire the connector leads together (horizontally).

IMPORTANT! **If there are two rows** of leads on each board, do not solder them together If the connector is a twenty-pin dual-row, contact ENSONIQ Customer Service for a replacement keyboard.

G. Reinstall the Keys

1) Put the black keys on first They go on where there are single keystops.
2) Place the front of the key on first sliding the slot in the front of the key over the keystop on the keyboard frame, then press the back of the key down until the clip catches and holds it in place.
3) Place the white keys back on in order. Make sure that the clip for each key is engaged
4) To reinstall the springs, place the spring into its hole on the key (open side up). Insert the small/thin Phillips screwdriver into the spring and push down and out to expand it. Then move the bottom the spring into the keyboard frame and remove the screwdriver from the spring to lock it in place.

H. Installing the Keyboard into the unit

1) Making note of the proper polarity, connect the keyboard ribbon cable to the main board

IMPORTANT! If ribbon cable is mispinned, fuses F3 and F4 on the power supply will

2) Insert the keyboard rear first into the unit at the front of the keyboard cavity. Gently slide the keyboard toward the rear of the unit, lowering the front of the keyboard as needed to clear the control panel mounting tabs. Lift the keys slightly to be sure that the keyboard cable (and disk drive cable when present) lies flat beneath the keyboard and is not pinched under the keyboard frame.
3) Turn the unit upside down on a soft surface and replace the ten (10) screws that secure the keyboard to the case.
4) Power up, test the unit, and close the control panel.

J. Checking the KPC O.S. Version Number

SD-l, VFX^{SD} and VFX
While holding down Presets, press ***Master***. The display shows ENSONIQ _____ SOFTWARE - ROM V X.XX KPC YYY. X.XX denotes the main operating system and YYY indicates the KPC O.S. version. **See note in Section K for VFXSD keyboard ribbon cable problems.**

EPS-16 PLUS and EPS
Press *Command,* then Env1. The display shows NO COMMANDS ON PAGE. Press the right arrow button until the display shows SOFTWARE INFORMATION. Press Enter.Yes until the display shows KPC VERSION YYY.

K. Keyboard Ribbon Cable Problems

We have found that some units have developed further problems once a keyboard is installed This has been a result of improper handling of the keyboard ribbon cable. We suggest removing the cable connector using the angled end of a scribe (see below).

Figure 6 – Scribe

These can be found in the following catalogs:
- Techno-Tool catalog 38, page 204, part number 400PR144
- Newark catalog 110, page 1024, part number 76-1510

Note for VFX^{SD} Only:
Be sum to route the keyboard ribbon cable around the square 68-pin gate array on the main board. After you insert the keyboard into place, lift the keys slightly and visually check to make sure that the cable is not over the gate array.

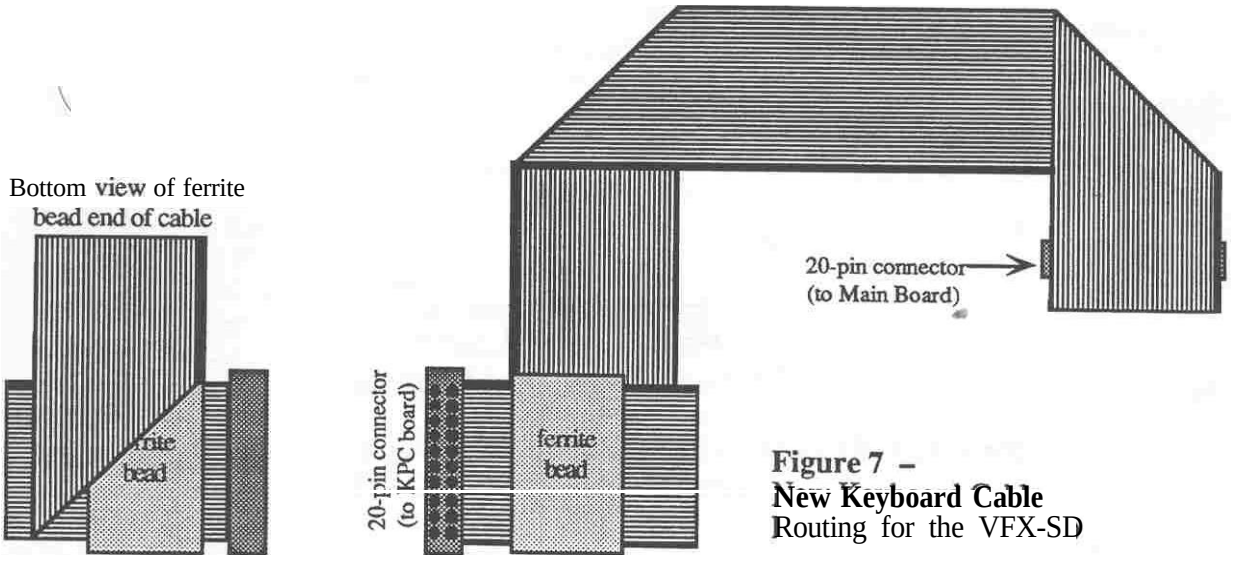


Figure 7 – New Keyboard Cable Routing for the VFX-SD

A misplaced or crimped cable can result in what seems to be **a** keypad/display problem because keypad/display information is passed through the KPC board to the main board. You may call ENSONIQ Customer Service for a new cable with these folds.