

Yamaha DX7 4X EXPansion Installation

1: Introduction

The DX7-4X-EXP a powerful option board that provides increased memory and greater control of the DX7.

THIS INSTALLATION WILL REQUIRE SOLDERING EXPERTISE AND ELECTRONIC KNOWLEDGE. THE INSTALLATION SHOULD BE REFERRED TO A QUALIFIED TECHNICIAN.

The soldering work entails direct wire connection to IC's already installed on a PCB. The backup battery voltage is still live. This is a volatile Lithium battery. We accept no responsibility for the work you perform on your DX7, your safety or material losses.

Precautions!



High Voltage Safety Warning

Unplug the audio cable. Turn the DX7 power switch OFF and disconnect the AC power cable before opening the DX7.

ESD Precautions and Proper Handling Procedures

You should observe standard static-safe handling behavior when working with sensitive electronic equipment such as synthesizers:

- Avoid carpets in cool, dry areas.
- Dissipate static electricity before handling any system components by touching a grounded metal object.
- If possible, use anti-static devices, such as wrist straps and floor mats.
- Take care when installing the board. A damaged pin can render the board unusable.
- Prevent damage to the connectors by aligning connector pins before you apply pressure. A damaged pin can render the board unusable and can cause damage to system components at power-on.
- If disconnecting a cable, always pull on the cable connector, not on the cable itself.

Tools Required

- Standard Philips screwdriver.
- Standard flat-head screwdriver (small).
- Standard soldering iron and solder. Because most soldering irons are grounded-tip, you must unplug all cables from the DX7.

Condition of DX7

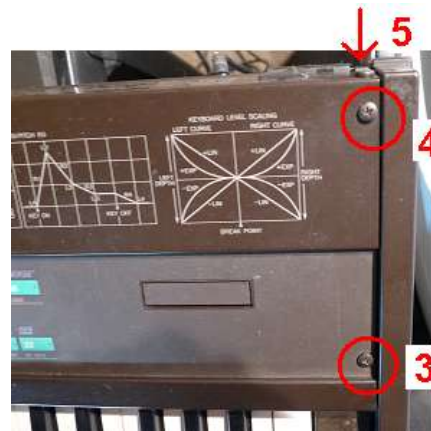
While the DX7-4X-EXP will replace the functionality of damaged or missing EPROM and/or SRAM chips, it will not correct other problems your vintage synthesizer may have. It is recommended that the synth be in otherwise good condition before beginning the installation. For instance, the battery voltage should be checked and the battery replaced/repaired by a tech if necessary. Sockets for the EPROM and SRAM chips should be in good working order and not be dirty, oxidized, rusted or otherwise compromised. If repair is required, do it before installing DX7-4X-EXP.

2: Installation

🔑 **Back up your patches if they are important to you!**

Open the DX7

Using a Philips head screwdriver, **remove the 5 screws from the front panel**. Two are located on the left front. Two are located on the right front. A final one is located on the right rear. Set the screws aside, noting that the rear panel one is the shortest.



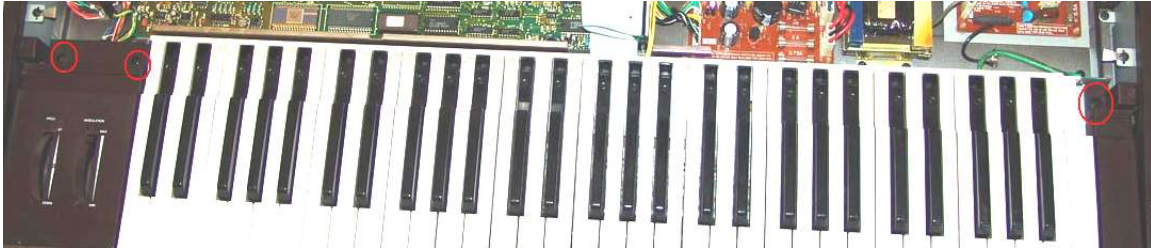
(Re)Move the Keyboard & Remove the Keyboard Rail

Some of the solder connections are very close to the silver colored metal keyboard rail. By moving the keyboard (the chassis with the keys) and removing the silver keyboard rail, you will have better sight lines and freedom of movement when installing the DX7-4X-EXP board.

Remove the 4 large external screws from the underside of the keyboard along the front edge. The photo below shows the inside front edge of the empty case bottom and illustrates the location of the 4 screws. You will, of course, be unscrewing from the DX7 underside.

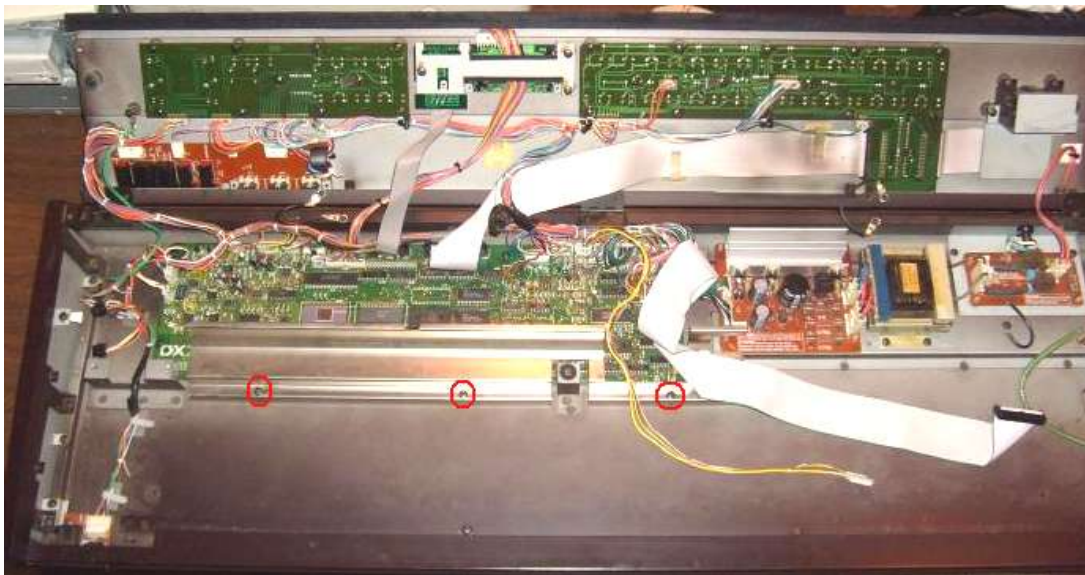


Loosen the 3 internal screws at the extreme right and left ends that hold the keybed in place. It is not necessary to extract them from the holes they reside in.

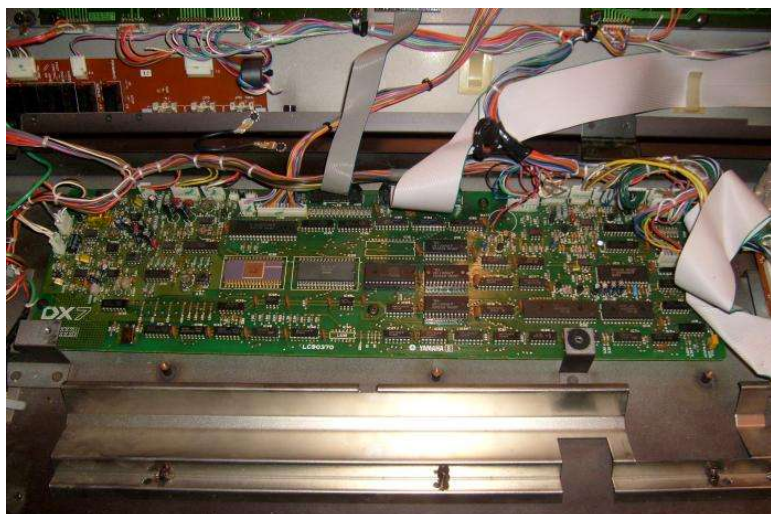


Carefully lift the keybed slightly up and out (toward yourself) an inch or so.. You don't need to move it much. You will probably need to free up one or more cables to accomplish it. Or if you prefer, disconnect the cables and completely remove the keybed.

This will give you access to the 3 screws holding the silver keyboard rail in place. **Remove those three screws and set aside the silver keyboard rail.** (Shown here with keybed removed).



You now have excellent access to the DX7 main board. If you do remove the keybed you may find it easier to remove the small yellow cable and large flat grayish cable at the main-board-end rather than from the keybed. You will also need to unclip two small cables on the left end (mod wheel and pitch bend). There may also be wire tires and/or cable fasteners to deal with.



Remove the EPROM and SRAM ICs

The next step is to **remove the EPROM and two SRAM ICs**.

The EPROM is found in location IC14 and the two M5M5118P SRAM chips are located at IC21 and IC20.

Remove them by prying slowly at each end of the chip back-and-forth with a small flat-head screwdriver. Avoid touching any of the metal pins with the screwdriver.

Place them safely aside on anti-static foam. You can use the reverse side of the foam shipped with the DX7-4X-EXP.



The photo above shows the 3 chips removed.

Install the DX7-4X-EXP Wiring

FOLLOW THE INSTALLATION STEPS EXACTLY. Do NOT install the circuit board at this time!

Carefully unplug the 3-conductor cable from the DX7-4X-EXP board and set the board aside. The 3 wires that make up this cable need to be soldered onto chips that are already present on the DX7 main board. (Do not mistake the wire colors for power and ground. They are not.)

The cable is about twice the length you need for the standard installation. Some alternate solder points are provided if you want to be creative. You don't have to shorten the wires but it is recommended that you cut the length down by half then strip and tin the leads.



PCB shown reverse angle.

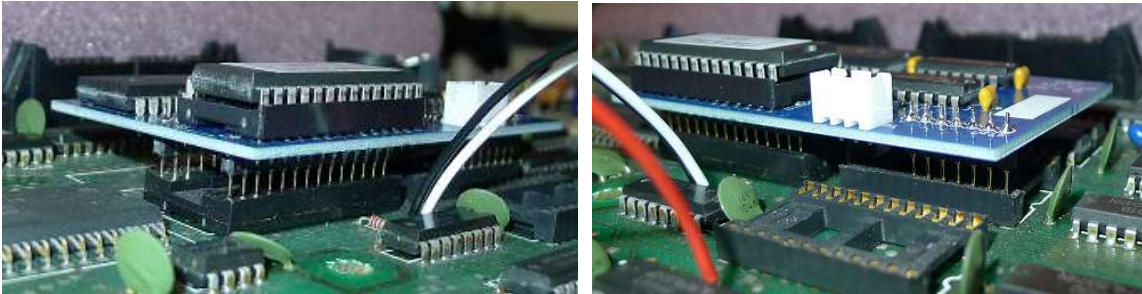
- CE20* : The RED wire should be soldered onto IC22 pin 3.
- A15 : The WHITE wire should be soldered onto IC23 pin 4.
[Alternate A15 points: IC63 pin 4 -or- IC34 pin 5.]
- A14 : The BLACK wire should be soldered onto IC23 pin 5.
[Alternate A14 points: IC63 pin 3 -or- IC34 pin4.]

Install the DX7-4X-EXP Printed Circuit Board

Remove the DX7-4X-EXP board from the anti-static foam. Inspect the bottom of the board to make sure none of the pins have been damaged. You should see one collection of 28 pins (2 parallel strips of 14 pins), and a strip of 7 pins.

Do NOT connect the cable to the board yet.

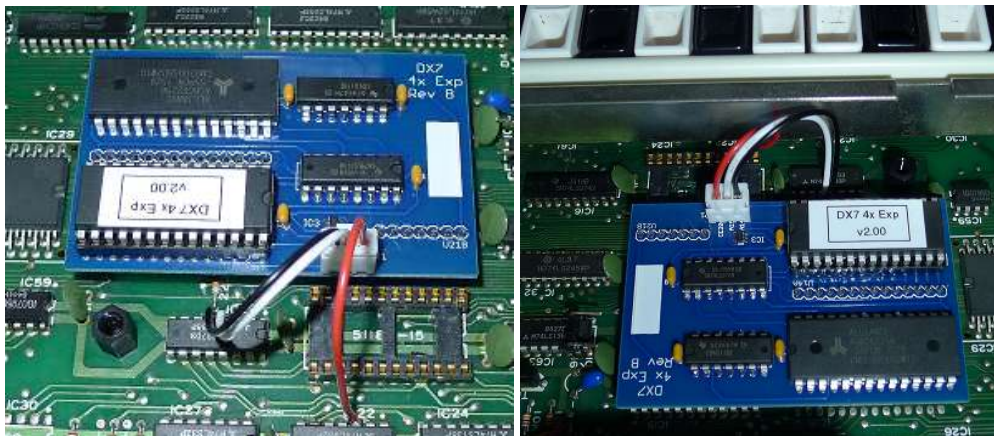
Place the DX7-4X-EXP board gently on the DX7 main board so that the 28 pins that form a DIP package align with the vacated IC14 spot. The 7 pins along the edge should align with IC21. Do not press the board in place yet. You can use a small mirror to check the pin alignment.



Once you are happy that all the pins are aligning with the desired locations, firmly and evenly press the DX7-4X-EXP board in place. Make a visual check to see that the board is flush with the sockets.



Carefully plug the 3-conductor cable back on the expander (it only goes in one way). Hold the board in place while doing so by pressing down on the EPROM area (the chip with the white label).



From keyboard playing side

Reverse angle with keybed and rail back in.

Reassembly

Remove all tools from the DX7. Carefully reassemble the DX7 in the reverse order, taking care to replace the correct screws in the various locations. If you disconnected the green keyed ground strap wire don't forget to screw it back in. Do not snag, tug or otherwise interfere with the wires you have soldered on.

Test

Plug the AC cable in and turn it on. You should get a greeting message like:

```
* Welcome to *  
* DX7 4x Exp *
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Troubleshooting: If you don't see this after a couple of seconds, you have probably soldered the wires onto the wrong spots or the solder connections are poor. All of the expansions have been tested in a real DX7 prior to shipping. Recommend removing whole expansion and start over.

You can do a quick version check of the board by pressing and holding the front Function button and also pressing and holding buttons 16 and 32. You should see something like the following:

```
DX7 4x Exp v2.11  
Test Entry ?
```

Press INTERNAL twice to return to the main screen (or press NO or power the DX7 off).

Since technically the battery has been removed, you may find **some of the standard DX7 Function settings have been scrambled** (Eg. Portamento Time usually). Check/set the standard DX7 Function settings versus your preferences.

You will need to set the initial DX7-4X-EXP parameters on FUNCTION 13 (or 12) and then load up to 4 banks of 32 patches (what Yamaha calls Voices). Each bank must be activated by a patch selection (which will **initially be garbled data**) **then** the data can be loaded via cartridge or MIDI.

Consult the online "Yamaha DX7 4x Expansion User Guide" for more information on using your upgraded DX7.

For your convenience, the recommended default settings for FUNCTION 13 are shown here:

- Midi Trns Ch= 1
- Vel OFFSET= 0
- 2nd CH VOICE=1
- LOCAL ON
- SPLIT OFF

Enjoy your updated DX7!

See the MTG web site for more great vintage synth and drum machine goodies.