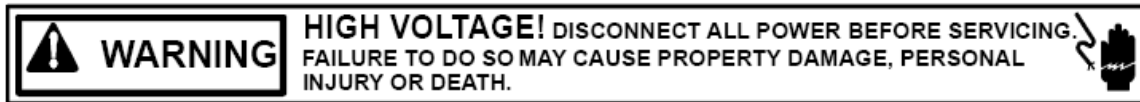# Yamaha DX7 DX-MAX(3)+ Expansion Install

1: Introduction

The DX7 DX-MAX(3)+ a powerful option board that provides increased memory and greater control of the DX7.

While the installation is fairly simple, it still requires patience and general electronics knowledge. We accept no responsibility for the work you perform on your DX7. Read over the following installation description and if you feel you are not capable of the work required, turn the project over to a qualified technician

Precautions!

WARNING — **HIGH VOLTAGE!** DISCONNECT ALL POWER BEFORE SERVICING. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

High Voltage Safety Warning

Unplug the audio cable. Turn the DX7 power switch OFF and unplug it from the wall. Disconnect any other connected cables 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:

- o Avoid carpets in cool, dry areas.
- o Dissipate static electricity before handling any system components by touching a grounded metal object.
- o If possible, use anti-static devices, such as wrist straps and floor mats.
- o Take care when installing the board. 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.
- o If disconnecting a cable, always pull on the cable connector, not on the cable itself.

Tools Required

- o Standard Philips screwdriver.
- o Standard flat-head screwdriver (small).

Condition of DX7

While the DX7 DX-MAX(3)+ 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 the DX7 DX-MAX(3)+.

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.
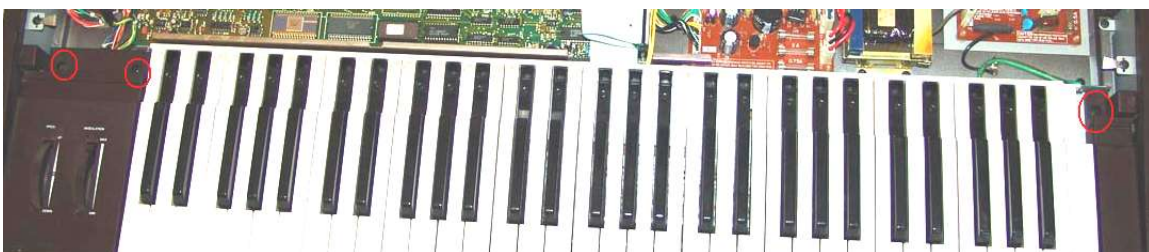

(Re)Move the Keybed & Remove the Keyboard Rail

It can be difficult to see the delicate pins when installing the DX-MAX(3)+ board. By moving the keybed (the chassis with the keys) and removing the silver keyboard rail, you will have better sight lines and freedom of movement when installing the DX-MAX(3)+ 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).
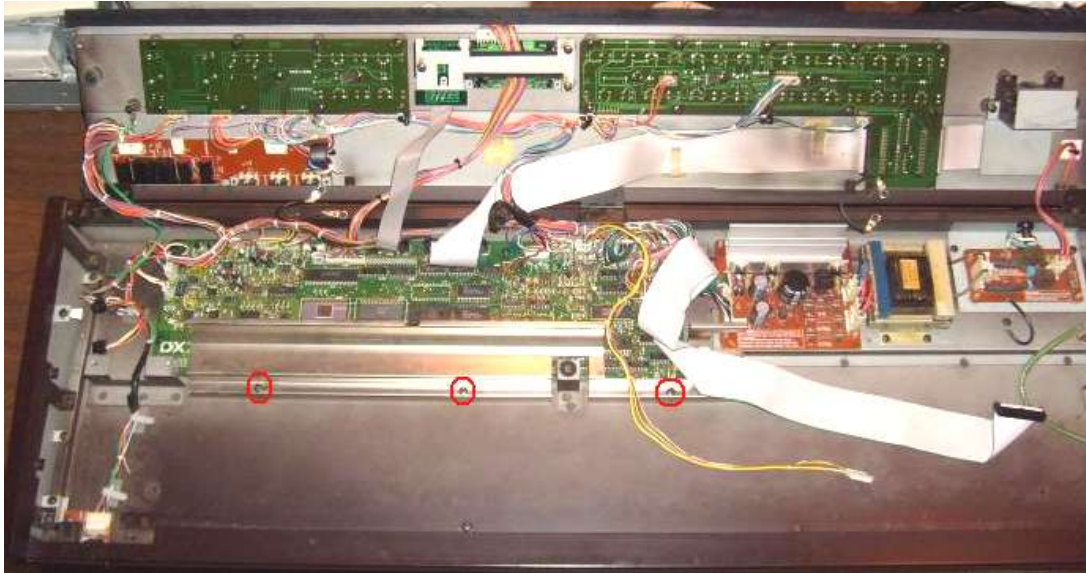
You now have excellent access to the DX7 main board. If you do remove the keybed you may find it easier to remove the small yellow cable and large flat grayish cable at the main-board-end rather than from the keybed. You will also need to unclip two small cables on the left end (mod wheel and pitch bend). There may also be wire tires and/or cable fasteners to deal with.
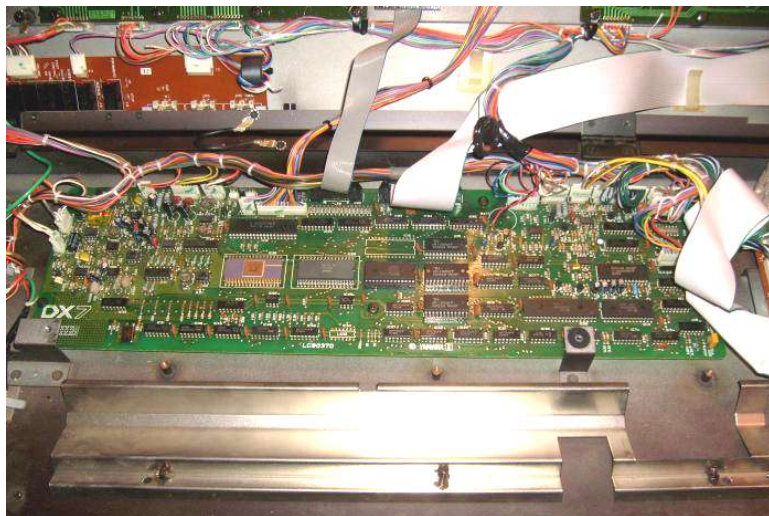

Remove the EPROM and SRAM ICs

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 (or similar) 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 DX-MAX(3)+.

The photo above shows the 3 chips removed.

After removing the chips, also **remove the screw shown at the center of these photos near IC23**.

Install the DX-MAX(3)+ Printed Circuit Board

Hand tighten the supplied nylon standoff into the screw position near IC23. Tighten it well by hand, but there is generally no need to use a tool. Do not over tighten or strip the threads.

Remove the DX7 DX-MAX(3)+ 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 two strips of 8 pins that are more spread out. The photos on the next page show an older board but the important installation elements are the same.

Place the DX-MAX(3)+ board gently on the DX7 main board so that the 28 pins that form a DIP package align with the vacated IC14 spot. The 8 pins along the edge should align with IC20. Do not press the board in place yet. You can use a small mirror to check the pin alignment.
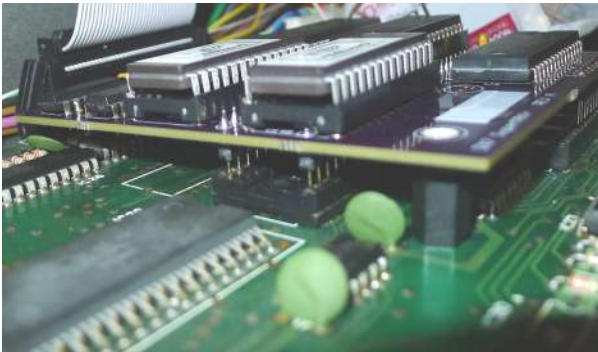
Once you are happy that all the pins are aligning with the desired locations, firmly and evenly press the DX7 DX-MAX(3)+ board in place. Make a visual check to see that the board is flush with the sockets.
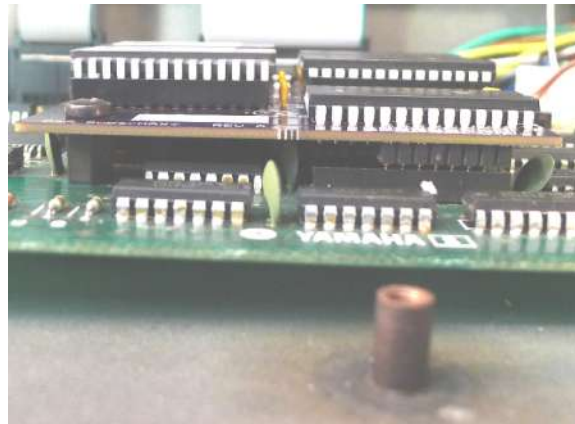
Using a screwdriver, carefully tighten the original main board screw through the DX-MAX(3)+ board into the nylon standoff. **Again do not force it or over tighten as this can not only strip the standoff, but it can cause the DX-MAX(3)+ board to change position. It should be tight enough so that it cannot work lose**. Double check the pins.

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 keybed ground strap wire don't forget to screw it back in.

Test

Plug the AC cable in and turn it on. After a few moments, you should get a greeting message like:

```
*  Welcome to  *
*  DX-MAX(3)+  *
```

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

```
MAXsys/MTG v2.00
MIDI Out Vel=+0
```

Press the green **INTERNAL** button twice.

NOTE: The bottom line shows the setting of the board mounted **velocity switch**. It will say "Vel=+0" (normal) or "Vel=+3" (offset applied). The units 0 and 3 are DX7 internal values and have no particular weighting such as MIDI units or dB or anything else. It was chosen so that a typical player can achieve a MIDI Out note-on velocity of 127 using reasonable force.

Initialization

Since technically the battery has been removed, you may find some of the standard DX7 function settings have been scrambled. Follow the steps below to put the DX7 into a known good state before loading your patches back in.

1. Press **MEMORY PROTECT / INTERNAL** then **OFF**.

   Internal memory protect is now off.

2. Press **FUNCTION** and then button **13** or button **12** repeatedly until you see `FUNCTION CONTROL 3.Voice…` . Press **NO** to set this value to `Voice Only`.

   There is now one global set of function parameters for the DX7 (later you will see how to change this so that each patch can have its own function parameters).

3. Press button **13** or **12** again until you see `FUNCTION CONTROL 4.Init Func?` Press **YES** twice to set the function parameters to the default state.

4. Press button **13** or **12** again until you see `FUNCTION CONTROL 2.Volume=` and make sure this level is turned up to **7** using the **DATA ENTRY** slider or **YES** button.

Check/set the standard DX7 Function settings versus your preferences (Portamento Time often gets altered for example). You should be able to load some patches now, but it is still possible that some setting prevents the sound from being heard.

The patch data memory will certainly be garbled. Use the standard DX7 panel operations to load the current data bank with your patches. The **"Yamaha DX-MAX(3)+ Expansion User Guide"** will explain how to select memory banks as well as how to use the other features of this expansion.

Other recommended DX-MAX(3)+ settings (see the User Guide):
1.Memory Bank=1, 5.MIDI Out=1, 6.Low Key=C-2, 7.High Key=G8, 8.Voice Stack=16x1, 9.Detunes: set all 6 detunes to 0.0. MIDI In channel is found on Function button 8.

Enjoy your updated DX7!
See the MTG web site for more great vintage synth and drum machine goodies.