I just remembered having saved information on a hidden test routine that is built into the stock DX7. There was an extremely detailed article in Keyboard Magazine's 03/84 issue by Eddy Reynolds describing each of the 11 tests available. Tests #1-5 are hardware oriented (switches, keys, wheels, aftertouch, displays), #6-9 are for internal/cart memory, #10 checks the OS software, and #11 gives automatic audio. There is a lot of detailed procedural info written in the article. I will paraphrase it all as accurately as possible and quote his exact wording wherever appropriate.

\*\*\* To enter the test routine, push and hold the Function switch. While keeping it depressed, push the green #16 voice switch and keep it down. While holding these two switches, push the green #32 voice switch and then release all three. At this time the display should read "TEST MODE ENTRY - ARE YOU SURE?". Push the +1/yes switch and the program will advance to the first test:

Addition [ For DX7 II: While holding down [EDIT], press [16], hold it and then press [32]. ]

Test#1 -- Outputs a 440 Hz sine wave at -10dB. Checks circuit failures following the envelopes and operators. The volume control and pedal Volume control should work smoothly.

[ Press the +1/yes switch again to advance to next test, and so on ]

Test#2 -- All LED and LCD segments will flash on and off to check all elements of the displays.

Test#3 -- Checks all front panel switches. At beginning of test, LED show "1". Press the green #1 voice switch. If switch and it's circuits are okay, the LED changes to "2". Check voice switch #2. Continue thru all green voice switches. If a switch is bad (or if you press out of order), it says "ERROR SEE LED". Press that # again and if still bad, then switch or circuit is bad. Unfortunately, you can't continue with the rest of test #3 until that switch is fixed. Anyway if all works, when you reach switch #32, continue to switch #33 which is the orange Store switch, and so on thru the two rows of control switches.

Test#4 -- Reads "TEST 4 KBD". Checks all key contacts and associated circuitry. As you play one note at a time from the lowest to highest key, the LED and LCD will display the key number and note name to be struck next. Like Test#3, it will stop if a bad key is found. Reads "KBD ERROR".

Test#5 -- An analog/digital conversion test for all the analog controls and controllers. These are the data entry slider, pitch wheel, modulation wheel, aftertouch sensor, modulation foot controller, and breath controller. Can check each of these in any order desired. As soon as one is moved, the LCD displays name of what you moved and the LED will begin showing numbers relating to the position of the control. All range from 1 or 2 up to 99. Pitch wheel center position reads 50. For example, pressing a key hard into the keybed, the LCD should display AFTERTOUCH and the LED should display response up to 99.

Test#6 -- (ROM cartridge test) - Skip this test since it required a special technicians test cart that never became available.

Test#7 -- RAM cartridge write test. Supposedly doesn't erase data. Must have a RAM cart inserted with the memory protect switch off before you move up to this test from Test#6. Will start test automatically when you increment up to this test. If Ram cart okay, will read "WRITE OKAY".

Test#8 -- RAM Cart Read/Write Test. THIS WILL ERASE ALL DATA IN THE CART!!! Test doesn't begin automatically. RAM cart inserted with memory protect switch off. Reads "TEST 8 CRT RW" and bottom line is blank. To initiate, press the green #1 voice switch. Bottom line should read "JUST CHECK". If everything okay, it takes about a minute to completely load and read the cartridge.. The LCD will then read "EEPROM OK". Remember this wipes out all cart data but only if you push the green #1 voice switch. You can cycle thru to Test#9 without affecting the cartridge.

Test#9 -- An internal/cartridge RAM test. THIS WILL ERASE ALL INTERNAL VOICES. Test#9 is complicated because it can be done in three different ways for different purposes.

\* Method 1 - Run test with no RAM cartridge inserted. Like previous test, press green#1 voice switch to start test. The LCD will read "WRITE ERROR" for a fraction of a second, showing that the cart wasn't inserted, and then "RAM OK" for a second , then followed by "COMPLETED". If anything wrong with the internal Ram, display reads "RAM ERROR" and lists the IC number of the defective Ram. Again, this test wipes all voices from the internal Ram.

\* Method 2 - Run test with Ram cart inserted with memory protect switch off. Yamaha intended test#9 to be run this way. After pressing green voice switch#1, LCD reads "UNDERWRITING" for about a half a minute, then "RAM OK" for a fraction of a second, then "COMPLETED". Anything wrong displays "WRITE ERROR" of "RAM ERROR". The interesting thing about performing the test this way is whatever voices that were previously in internal Ram get loaded into the cartridge. I guess the technician could then easily reload the voices back as the customer originally had them.

\* Method 3 - Run test with RAM cart inserted but with memory protect ON. Here the voices contained in the cartridge will be loaded into internal Ram. Eddy Reynolds says this method has helped him solve some odd cartridge problems but can't guarantee. Ram carts have writable internal ID numbers that can be used like a security code to limit user access to only someone who knows and can enter that specific cart's code. A cart that displays "READ PROTECTED" when you try to call up its voices has somehow locked you out and needs that code. Running the previous Test#8 will initialize the cart, setting a standard open access ID number. So use Test#8 to fix a locked cart, but remember you lose all the voices. Eddy says that Test#9 done with Method 2 (cart mem protected) is the way to capture those cart voices before doing an ID initialization. First do Test#9 with Method 3, which does the test but loads all the cart voices into internal memory when done. Then check to make sure they are there in the internal memory. Then go back and run Test#8 with the memory protect OFF to fix the cart's ID problem. Now transfer your original voices back from internal memory into your fixed cart.

Test#10 -- Test the DX7's internal ROM which contains all the software for operation of the instrument. Test starts automatically as soon as Test#10 is selected. All ROM data are added and compared to previously computed data. If the two sums are the same, LCD reads "SUM CHECK OK".

Test#11 -- An automatic audio keying test. Plays a repeating chromatic scale from lowest key to highest key. This could be helpful when tracing an audio signal or intermittent problem.

[ Press +1/YES switch to exit last test and also exit the entire test routine program. The DX7 goes back to normal operation ]

\*\*\* This completes the diagnostic routine as described by Eddy Reynolds in the 03/84 Keyboard Magazine article. Hope my posting this helps you all \*\*\*

Good Luck, Greg