



## DIAGNOSTIC ROUTINES FOR THE YAMAHA DX9

**L**AST MONTH WE WENT through the built-in test program in the Yamaha DX7. I had intended to cover both the DX7 and the DX9 in one column, but there was too much material for the available space. So after a month's wait, we can now look at the DX9.

To enter the test routine on the DX9, push the function switch and while keeping it depressed, push the green #10 voice switch and keep it down. While keeping both of these depressed, push the green #20 voice switch and then release all three. At this time the LCD display will say "TEST MODE ENTRY — ARE YOU SURE?" Push the +1/yes switch and the program will advance to the first test. The LCD will now read "TEST LEVEL 1 — ADJ VR5." As on the DX7, this test is for circuits following the envelope generators and operators. "ADJ VR5" refers to an internal adjustment for output level. This adjustment ("VR3" in the DX7) should never need to be made unless a component is changed in the output circuitry. The 440Hz sine wave output during this test is fairly accurate, and with the volume slider all the way up the output level should be about -10dBm.

Pressing the +1/yes switch again will advance the program to test 2. In test 2, all LED and LCD display segments flash on and off at one-second intervals so that each segment can be visually checked. The segments flash so that we can see not only that they go on, but also that they go off when they are supposed to.

Pressing the +1/yes switch again will advance the program to test 3. Test 3 checks all the switches on the front panel. At the beginning of this test, the LCD will say "TEST 3 SW — PUSH #1." Press the green #1 voice switch. If the switch and its associated circuitry is okay, the LED will display "1" and the LCD will say "PUSH #2." Press the #2 voice switch, and if it is okay, the LED will change to "2" and the LCD will read "PUSH #3." Continue through all the voice switches, then the store, function, edit/compare, and memory select switches. In each case the LED will tell you what switch to press next. If there is a problem or a switch is pressed out of order, the LCD will show "ERR!" and the switch that should be pressed. If a switch is bad, you will not be able to continue through test 3. The LCD will stay on "ERR!" and will display the number of the bad switch. After you press the memory select switch, the LCD will instruct you to push sustain and then portamento. You will need footswitches plugged into the sustain and the portamento jacks for this. The +1/yes and -1/no switches are the only two left at this point. Obviously, the +1/yes switch works or we wouldn't have progressed to this point of the test program. The -1/no switch is used to back up in the test routine to a previous test, so press

it at this time. If it is okay, you will be back in test 2 with the flashing displays. Press it again and you will be back at test 1.

To enter test 4, press the +1/yes until the LCD readout says "TEST 4 KBD." As you play one note at a time from the lowest to the highest key, the LED will display the key number of the note just played. If there is a problem or a note is played out of order, the LCD will show "ERR!" and the name of the note that should be played. Just as with the switch test, if a key contact or its associated circuitry is bad, the LCD will lock on the bad note, and you will not be able to continue through the test.

Test 5 tests the analog-to-digital conversion process for the pitch-bend and modulation wheels, data entry slider, and breath controller. These controls can be checked in any order desired. As soon as one is moved slightly, the LCD will display the name of what you have moved and the LED will begin showing appropriate numbers relating to the position of the control. All of these controllers should range from 1 or 2 to 99. The center position of the pitch wheel should be 50.

Up to this point the test program is basically the same as the DX7. With test 6, however, it changes. Instead of RAM cartridge tests, we go into several tests for the cassette interface. When you enter test 6, the LCD will say "TEST 6 CASSETTE — PUSH #1 BUTTON." To perform this test you will need to set up a cassette recorder and hook it up to the cassette in and out terminals on the back of the instrument. Put the cassette recorder in record mode, then push the #1 voice switch. The LCD should say "OK!" This test checks the output and input circuitry of the DX9 and also the cables and cassette operation. When you push the #1 button, the instrument puts out a short tone burst at its cassette-out jack and looks for it coming back at its input jack. If you get "ERR!" on this test, make sure that the recorder is plugged in, in record mode, and with the record level set properly.

Test 7 checks the cassette remote jack. When the #1 button is pushed, you should hear a relay click inside the instrument and the LCD will say "ON." When the remote is on, the remote jack is shorted, allowing a cassette recorder equipped with a remote jack to run.

Test 8 is an internal RAM test. Pushing the #1 button initiates this test, which checks the two internal RAM ICs. If one is bad, the LCD will display "ERROR RAM 1" or "ERROR RAM 2." Before initiating this test by pushing the #1 button, be sure you don't have any voices in the instrument that you don't want to lose. This test could erase them.

Test 9 is an internal ROM test. The internal ROM contains all the software for operation of

the instrument. As soon as test 9 is selected, the test is automatically started. All data in ROM is added and compared to previously computed data. If the two agree, the LCD will display "OK!" If there is a problem in this area, it will respond with "ERROR."

Test 10 checks the envelope generator/operator portions of the circuitry. There are three different tests in test 10. The first checks envelope function. To initiate the first test, push the #1 button. The LCD will read "ENVELOPE" and you will hear an A-440 pulsing at about one-second intervals with a soft attack and decay. Pressing the #1 button again will change the LCD to read "MODULATION." You should now hear the same pulsing of modulation. Hit #1 again and you will now hear feedback being added in each pulse. The LCD, of course, will say "FEEDBACK." Subsequent pressing of the #1 button will continue cycling the instrument through these three tests.

Test 11 is an automatic audio keying test. This is a general-purpose test in which the instrument automatically plays a chromatic scale from the lowest to the highest key over and over again. This is the last test, and when +1/yes is hit, the instrument will either exit the test program and go into normal operation or will go back to test 1. If it goes back to test 1, simply turn the instrument off and then back on, and it will come up in normal mode. This same power off/power on operation can also be used to exit the test program at any time. At some point in time this test program may be changed slightly, but I doubt it.

In working with the DX9, I've noticed something that may be of some help when using the cassette interface with the remote jack. If you select save, verify, load, or load single, the LCD will display this word followed by a question mark. After pressing the +1/yes switch, the LCD will say "READY?" At this point, pressing the #10 voice switch will turn the remote jack on. Pressing again will turn it off. This is especially convenient when saving to tape. After recording the voices on tape, the LCD will say "VERIFY TAPE — READY?" Now instead of unplugging the remote jack on the tape recorder to rewind the tape, simply press the #10 voice switch, rewind, press #10 again, press play on the recorder, and hit #1/yes to start the recorder and the verification process. The only problems I've encountered with the cassette interface have been with record and playback levels incorrectly set and tape with a high percentage of dropout. Once again, as I mentioned in a previous column, I highly recommend computer cassette data tape. It is available in most computer stores and Radio Shack stores, and it has proven to be very dependable. ■

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