

# FW DIAGNOSTICS

For **IntelliVision<sup>®</sup>**  
Game System Hardware



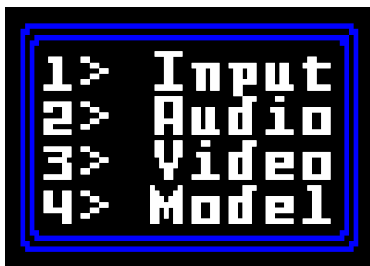
# FW HARDWARE DIAGNOSTICS

Testing hardware is easier with diagnostic software.

**Freewheeling Diagnostics** is designed to help you troubleshoot problems with your Intellivision console and peripherals, make adjustments, or just confirm that everything is working correctly.

## MAIN MENU

At the title screen, *Freewheeling Diagnostics* will indicate whether it detects an ECS and/or Intellivoice connected to the Intellivision. It then customizes the diagnostics menus and individual tests accordingly.



**Choose the type of diagnostic to run** by pressing **1**, **2**, **3**, or **4** on a controller keypad.

## INDIVIDUAL TEST SELECTION

Use the Disc to choose a test. Then press **ENTER** or any Action Button on a controller to run the test.

You can also load the music synthesizer test directly from the Input Diagnostics menu by pressing the far right white key, or run the ECS keyboard test by pressing the **SHIFT** key.

**To Exit A Test** – Pressing **CLEAR** will usually return you to the main menu. However, if you are running a controller diagnostic, you must reset your Intellivision console to exit the test.



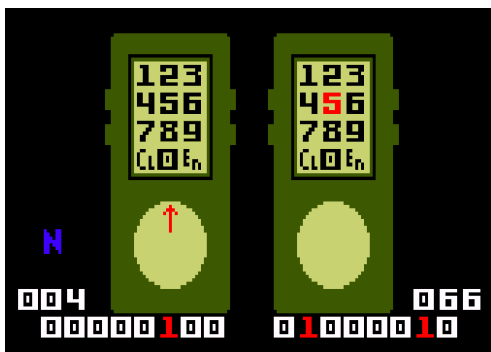
# INPUT DEVICE DIAGNOSTICS

These utilities allow you to test the Intellivision controllers, ECS Keyboard, and Music Synthesizer.

## HAND CONTROLLER TEST

This diagnostic allows you to test all 16 positions on the controller disc, the 12 keypad buttons, and all four Action Buttons. (Note that the top two Action Buttons are wired together in hardware.)

Two controllers are displayed on the screen. These represent controllers 1 and 2 on the base Intellivision unit, as well as controllers 3 and 4 if you have an ECS connected and two additional



controllers plugged in to the ECS ports. (Note: Testing controllers 1 & 3 or 2 & 4 together may result in unusual behavior.)

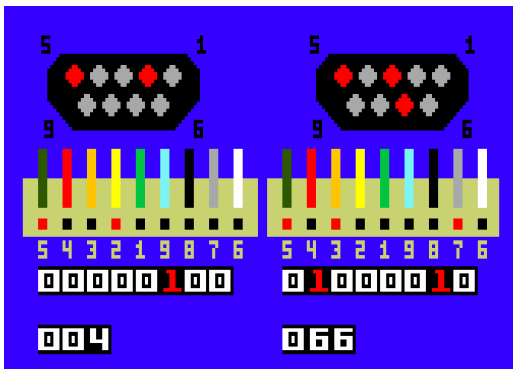
**Press the Disc or any button** to light up the corresponding area on the screen in red. The numbers displayed are the decimal and binary values generated from the input and are normally useful only to Intellivision programmers.

Note that certain disc/button/keypad combinations are not distinguishable. This is a hardware limitation of the Intellivision controllers.

## CONTROLLER PLUG TEST

This option tests the pins/wires coming from the controllers for both an Intellivision II (top plug view) and original Intellivision Master Component (bottom pin connector view).

Two plugs/pins are displayed on the screen. These represent controllers 1 and 2 on the base Intellivision unit, as well as controllers 3 and 4 if you have an ECS connected and



two additional controllers plugged in. The plugs are shown as if you are looking at the end of the plug on the controller cable (you'll need to invert the diagram to diagnose an issue with a controller port on your Intellivision or ECS).

**Press the Disc or any button** to light up the corresponding pins on the screen in red. The numbers displayed are the decimal and binary values generated from the input and are normally useful only to Intellivision programmers.

Note that certain disc/button/keypad combinations are not distinguishable. This is a hardware limitation of the Intellivision controllers. Also note that the plug test cannot be used with a Music Synthesizer or ECS Keyboard. The Intellivision reads the input from these devices differently, and so it's not possible to read the pins directly from them. Use Hand Controllers to test the ports on an ECS.

## ECS KEYBOARD TEST

This test lets you check each key on the ECS Keyboard. Pressing a key will generate a click sound, as well as display the key you pressed in a scrolling buffer at the bottom of the screen.

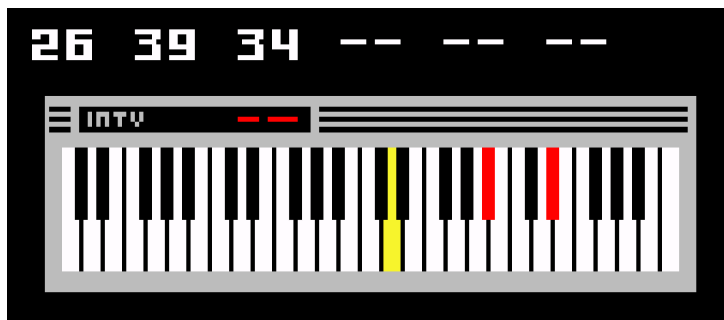
You can clear this buffer by pressing **ENTER** on any Hand Controller.



## MUSIC SYNTHESIZER TEST

This will test each of the black and white keys on the Music Synthesizer. Each key will generate a unique tone, so the test can be used as a basic synthesizer player as well.

The Intellivision and ECS together can generate up to six sounds at a time, so the key numbers are displayed as well (starting with key 0 as the far left white key, and key 48 as the far right white key). If multiple keys are pressed at once, key numbers are displayed in the order that you press them.



# AUDIO DIAGNOSTICS

These utilities allow you to test your Intellivision audio output, Intellivoice output, and ECS volume and make adjustments.

## BASIC SOUND TEST

With this test, you can individually check the Intellivision's three audio channels (1, 2, and 3), as well as the ECS's three additional audio channels (4, 5, and 6). Toggle each one on and off using the controller keypad.

Pressing the Disc up or down changes volume, left or right changes



octave. Additionally, each component's noise channel can be tested in the same way, as long as at least one audio channel is enabled. **Press 9 to play a song** via the console audio channels. *Song volume and octave are not variable.*

## INTELLIVOICE TEST AND CALIBRATION

With this test you can use the short and long voice checks to verify that your Intellivoice module is operating properly.

**Toggle sound or music together with voice** and adjust the Intellivoice level with the module's volume knob.

## ECS VOLUME CALIBRATION

This option helps you set the ECS volume so it matches your Intellivision console. **Press 1 or 2 to select short or long tones**, which will play alternately from your console and ECS module. Then use the module's volume knob to adjust the ECS volume until its sound matches the console.

# VIDEO DIAGNOSTICS

This utility allows you to test your Intellivision video output and monitor settings to make adjustments.

## VIDEO TEST

The video test generates 10 different types of color bars and test patterns.

**Press left or right on the Disc** to navigate through the screens, or press 0-9 to jump directly to a particular test pattern. Change the border color by pressing a top Action Button. Pressing the bottom left and right Action Buttons independently changes colors on patterns 8, 9, and 0.



## MODEL DETECTION

This reports the type of video system present, either NTSC or PAL/SECAM, as well as the model of your console (INTV1, Sears SVA, INTV2, or Tutorvision).



## MOTHERBOARD ANALYSIS

**Press 0** to analyze the console's main PCB to determine its exact configuration of executive program (EXEC), graphics read-only memory (GROM), standard television interface chip (STIC), system memory (RAM), and graphics random access memory (GRAM).

EXEC will be INTV1, Sears SVA, INTV2, or Tutorvision. GROM and STIC can be either standard or Tutorvision. RAM and GRAM are either standard or extended.

# **DIAGNOSTICS**

## **CREDITS**

Produced by Gary Magnan

Programming by Gary Magnan

Hardware by Joe Zbiciak

Box, Overlays, and Manual by Mark Thompson

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Special Thanks: Phil Boland, Oliver Puschatzki, Hank Thompson, Benjamin Stirling, Jonathan Hershberger, and Óscar Toledo Gutiérrez

Musical Inspiration: Jennie & The Lapkin Kids

Programmed in IntyBASIC: [nanochess.org/intybasic.html](http://nanochess.org/intybasic.html)



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