



# IPTV Set-Top Embedded Diagnostics Implementation Design Guide

## Overview

### Introduction

The IPTV set-top diagnostics application lets you detect problems with the IPTV set-top. A network connection is not required to use this tool. The diagnostics application has the following capabilities:

- Test all video and audio outputs
- Test the network connection
- Test the hard disk drive and DRAM
- Test the front panel
- Display set-top information stored in the set-top flash memory

### Purpose

The purpose of this document is to show you how to launch the embedded diagnostics for IPTV set-tops running Microsoft middleware and gather information from the diagnostic screens.

### Supported Set-Tops

The embedded diagnostics application is available for the ISB2000, ISB6000, and ISB7000 series set-tops.

### Version

This document supports the embedded diagnostics application version 1.1.

### Audience

This document is written for field technicians and system operators.

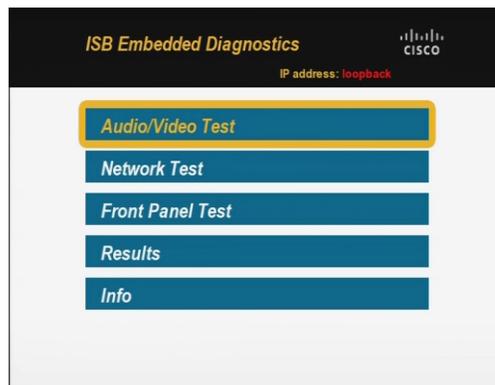
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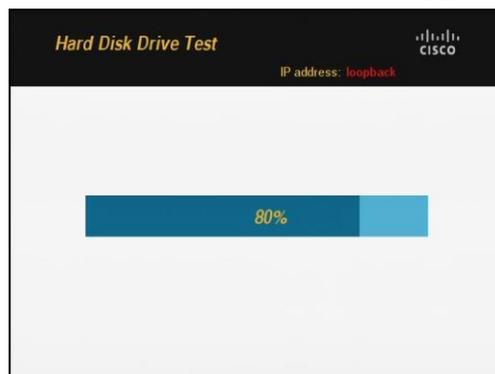
## Launching the Diagnostics

To launch the embedded diagnostics, complete the following steps.

- 1 Hold down the pre-defined keys on the front panel at power up. Because different front panels have a different number of keys, the key sequences are different:
  - For front panels with only a Power button, hold down the **Power** button to launch the diagnostics.
  - For front panels with more than one key, hold down the **Menu+Up** key combination to launch the diagnostics.
- 2 While the embedded diagnostics application is starting, the Power LED will blink rapidly. It may take up to 5 minutes for the diagnostics to launch. See *Factors Affecting How Long it Takes to Launch the Diagnostics*. Depending upon your box type, look for the responses as described here.
  - When the diagnostics application launches on a non-DVR set-top, the diagnostics main menu appears on the TV screen.



- When the diagnostics application launches on a DVR set-top, the progress bar for the hard disk drive test appears on the TV screen.



## Factors Affecting How Long it Takes to Launch the Diagnostics

The following factors affect how long it may take to launch the diagnostics:

- The length of time it takes for the set-top to obtain an IP address from a DHCP server can affect how long it takes to launch the diagnostics. The launcher sends requests for an IP address and waits until either a reply is received or the set-top times out after 45 seconds.

**Note:** If the set-top times out, that means an IP address was not offered. In that case, the diagnostics will still run with a default IP address. You will see loopback on the diagnostics screens in place of the IP address.

- Updates to the embedded diagnostics. If an update is available from the server, the launcher downloads the new code and overwrites the old code.

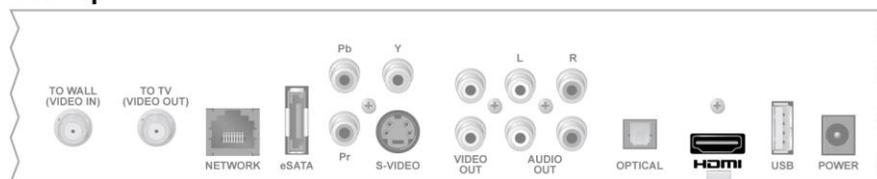
## TV and Set-Top Connections

The diagnostic application displays information on the set-top's video outputs. Make sure that the set-top is connected to a display, the display is on, and the correct video input is selected before running the diagnostic application.

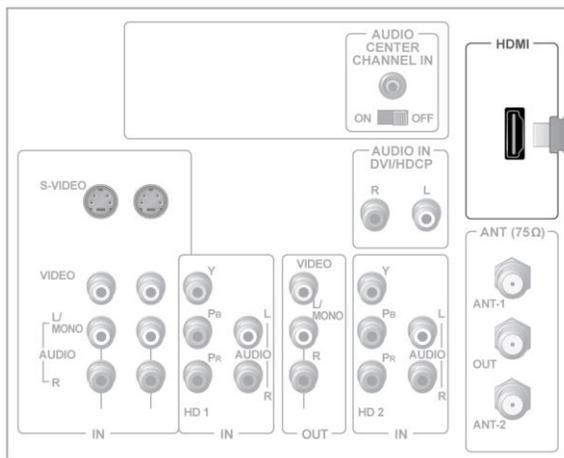
The following diagrams show the connections to an HDTV and SDTV.

### HDTV Connection

#### Set-Top



#### Back of HDTV

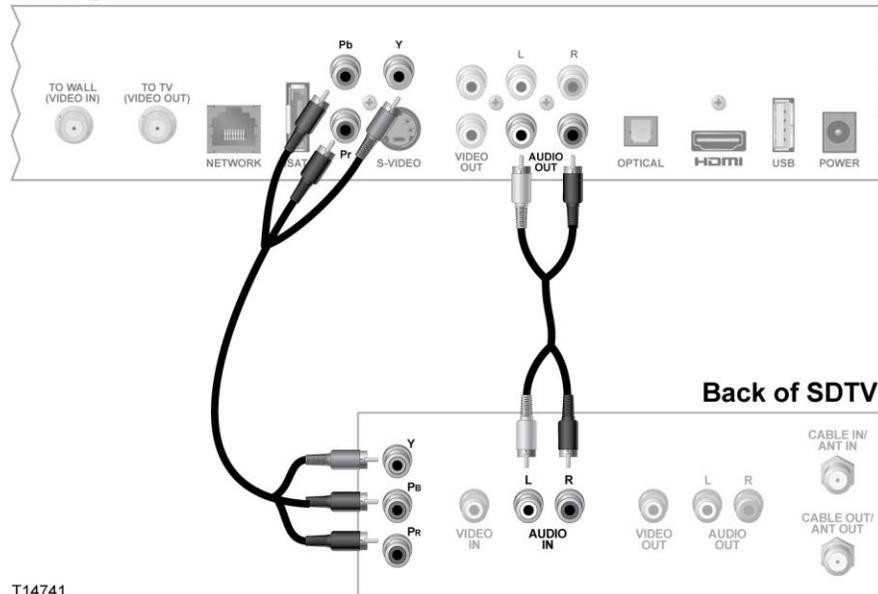


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# TV and Set-Top Connections

## SDTV Connection

### Set-Top



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# Interacting with the Diagnostics

## Input Method

You can use both the front panel and the remote control to interact with the diagnostic application. The only exceptions are launching the diagnostic application and during the front panel button test when only the front panel buttons are active.

## Output Method

If these outputs are available on the set-top, the application supports all the set-top video and audio output connectors listed below. To use the diagnostic application, you do not need to alter any existing connection between the set-top and the video and audio sink.

### Video

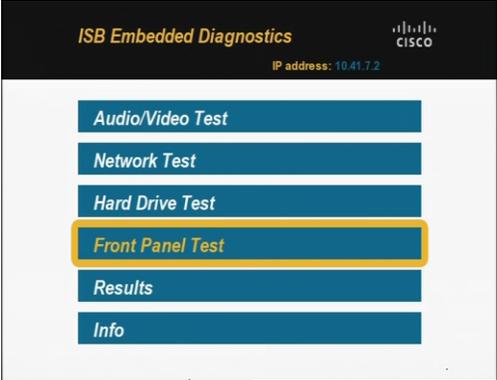
- HDMI™
- Component
- S-Video
- Composite
- SCART
- RF modulator

### Audio

- HDMI
- RCA stereo
- SPDIF optical
- SPDIF electrical
- RF modulator

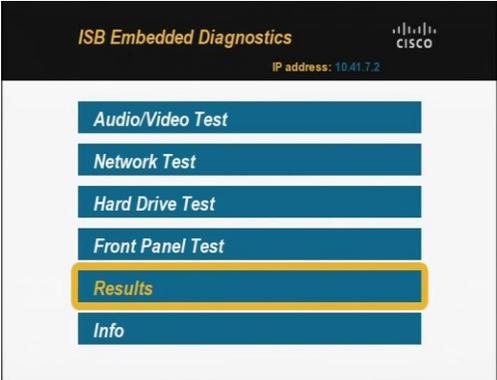
## Navigation

The diagnostic application uses a menu-based user interface. A yellow highlight indicates the currently selected menu item. For example, the Front Panel Test button is highlighted on the Main Menu below.



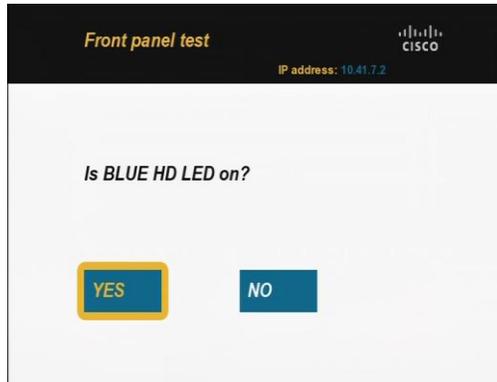
## Scrolling Vertically

Use the Up or Down arrow keys to move in a vertical direction on the screen. For example, use the Up or Down arrow keys to move through the buttons to select **Results** as shown on the screen below.



### Scrolling Horizontally

Use the Left and Right arrow keys to move in a horizontal direction on the screen. For example, use the Left or Right arrow keys to toggle between **Yes** and **No** on the Front Panel Test screen shown below.



### Committing to a Selection

After you highlight a button on the screen, press **OK** on the remote control or the front panel of the set-top to commit to the button you have highlighted on the screen.

## Automatic Tests

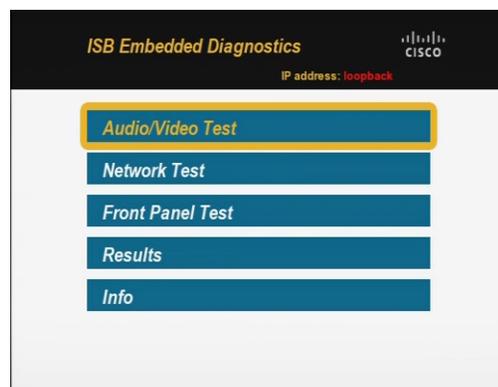
As part of the diagnostic application launch, the set-tops run the following tests automatically. These tests are referred to as "auto test."

- DRAM test
- Hard disk drive test (DVR models only)

### DRAM Test

Before the diagnostic application is first launched, a DRAM test is performed. The DRAM test passed if the diagnostic application launches and displays the Main Menu as shown in this screen.

**Note:** If the set-top is a non-DVR set-top, this is the screen that appears after the diagnostic application launches.

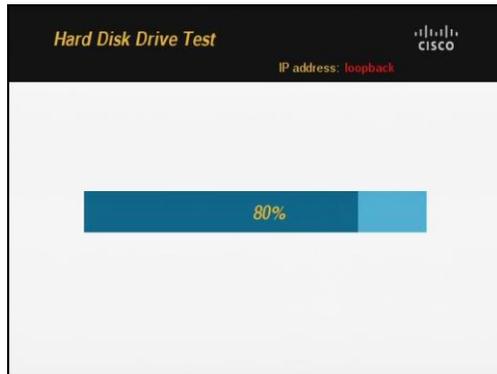


If the DRAM test fails, the video output will be blank, and the green Power LED and the red Record LED will blink rapidly.

### Hard Disk Drive Test

The hard disk drive test is part of the automatic test and is performed only on DVR model set-tops. The hard disk drive test takes several minutes. A progress bar appears to show the progress of the test as shown in the following screen. For more details, refer to *Hard Drive Test (DVR Set-Tops Only)* (on page 19).

**Note:** If the set-top is a DVR set-top, this is the screen that appears after the diagnostic application launches.



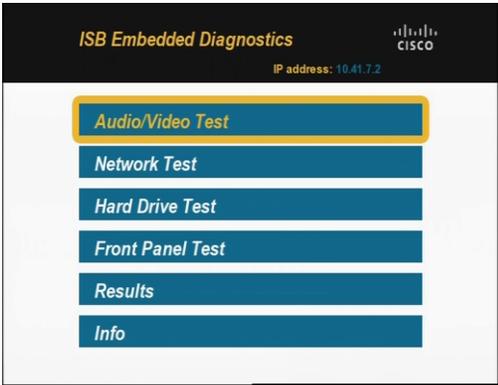
After the auto test, the diagnostics application displays the Main Menu. For more information, see *Diagnostics Main Menu* (on page 12).

# Diagnostics Main Menu

The Diagnostics Main Menu provides access to all diagnostics tests available for your set-top. One Diagnostics Menu is available for DVR set-tops. Another Diagnostics Main Menu is available for non-DVR set-tops. Use the Up and Down arrow keys to find the test you want to run and press the **OK** button to select the test.

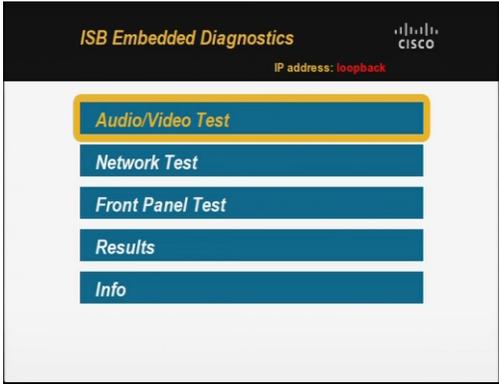
## DVR Diagnostics Main Menu

The following screen shows the Main Menu for a DVR set-top:



## Non-DVR Diagnostics Main Menu

The following screen shows the Main Menu for a non-DVR set-top:



## Audio and Video Test

The Audio/Video test option on the main menu allows you to test the audio and video functionality of the set-top. When you select the Audio/Video test option on the main menu, the set-top outputs an audio tone and a video display simultaneously. You can stop the test at any time by pressing the OK button.

### Audio Test

A monotone audio file is played during the audio/video test. The audio file contains data sampled from the waveform of 440 Hz Sine function.

### Video Test

A colorbar image is displayed during the audio/video test.

For the high-definition video output through HDMI and component connection, the colorbar image appears as follows:

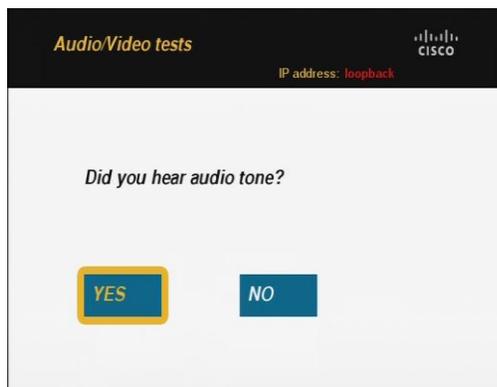
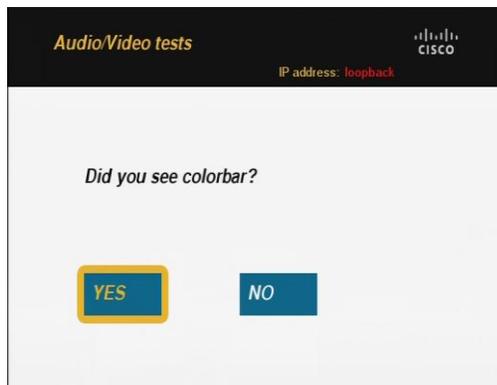


For the standard-definition video output through S-video, composite, and SCART connection, the colorbar image appears as follows:



## Audio and Video Test

After the audio and video tests are complete, the diagnostics application displays a series of screens to ask whether the audio and video is functioning. At each prompt, use the arrow keys to select **Yes** or **No** and press **OK**.



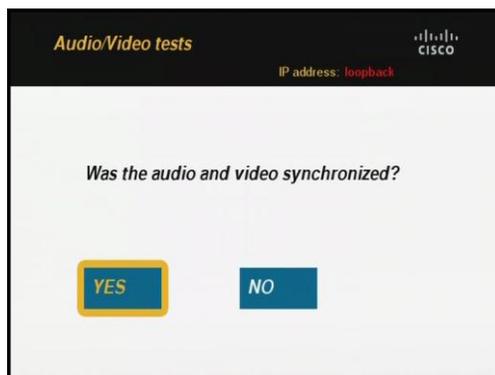
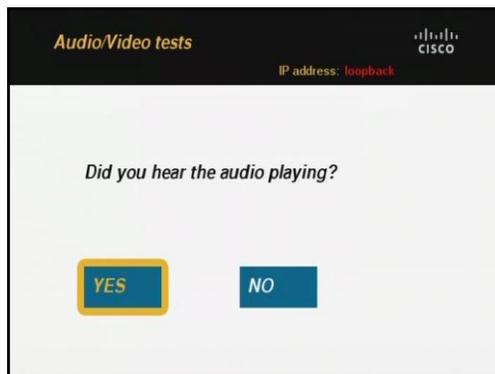
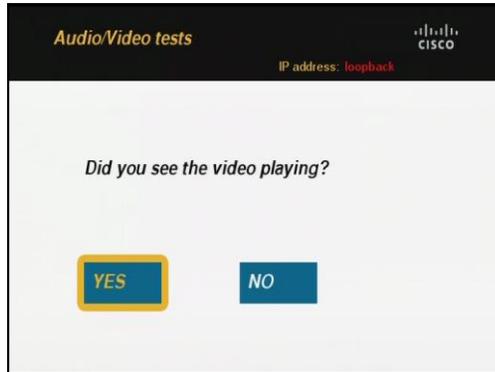
When the application prompts you whether you want to test video with audio, the application responds as follows:

- If you answer yes, a series of screens appear. See *Optional Video Test with Audio* next in this section.

- If you answer no, the Audio/Video tests page opens. See *Audio/Video Tests Results* later in this section.

## Optional Video Test with Audio

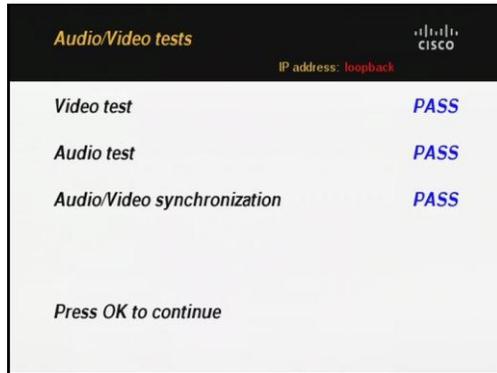
When you select the option to test video with audio, a series of screens appear. At each prompt, use the arrow keys to select **Yes** or **No** and press **OK**.



After you select yes or no, the Audio/Video test page is automatically displayed.

## Audio/Video Tests Results

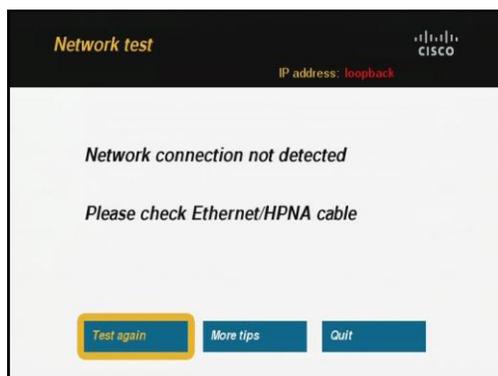
After all of the selected audio and video tests are completed, the diagnostics application displays a summary page of the audio and video test. Press **OK** to exit from the audio/video test summary page and return to the Main Menu.



## Network Test

The Network test option on the Main Menu allows you to test the network connection for the set-top. When you select the Network Test option on the Main Menu and press the **OK** button, the set-top requests an IP address from the DHCP server. The set-top passes the DHCP Test when an IP address is assigned to the set-top. During the DHCP transaction, as an IP address is assigned to the set-top, the set-top becomes aware of the Gateway's IP address. If the set-top is able to ping the Gateway, the set-top passes the Gateway Test.

If the set-top is not assigned an IP address from the DHCP server, suggestions are displayed on the screen and the option to retest the network is offered. The following screen displays the suggestions:



Follow the suggested instructions, select the option to test again, and press **OK**.

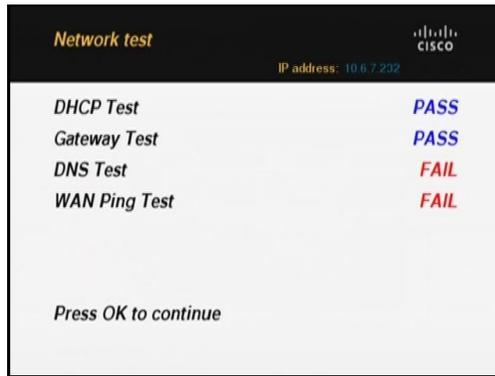
The DNS Test and WAN Ping Test verify that the Mediaroom Discovery Server URL can be pinged by the set-top. The set-top issues the following command:

**# ping -c 10 <name>** where <name> is the fully qualified domain name of the Mediaroom Discovery Server URL.

This name is retrieved from the boot flash of the set-top. A commonly used name is `discovery.iptv.microsoft.com`. During the test, 10 ECHO\_REQUEST packets are sent to the discovery server. The network test uses the ping command's default timeout for the test. The default timeout is the amount of time it takes for a signal to be sent plus the amount of time it takes for an acknowledgment of the signal to be received.

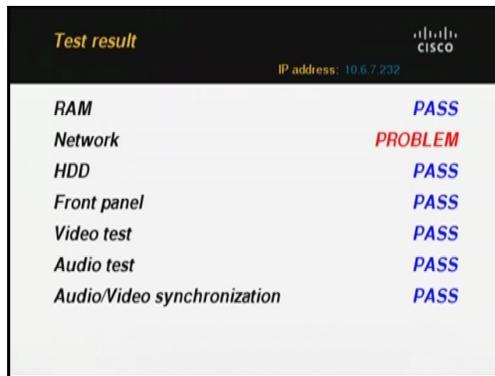
## Network Test

If the DNS Test and WAN Ping Test fail, the following screen is displayed:

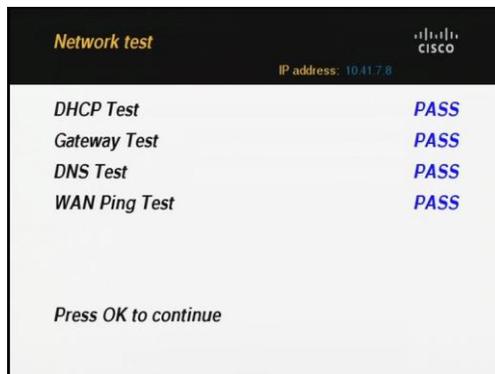


## Network Test Results

The network test fails if any of the individual tests fail. The following screen is displayed for a network test that fails:



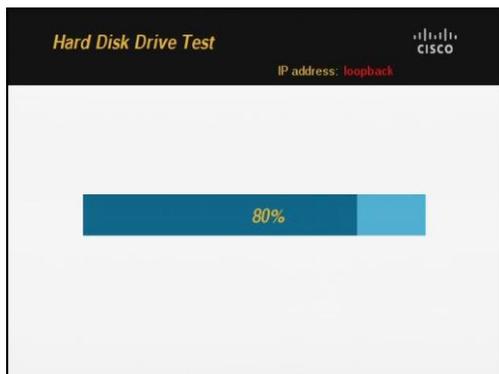
The network test passes if all the individual tests pass. The following screen is displayed for a network test that passes:



## Hard Drive Test (DVR Set-Tops Only)

The Hard Drive Test option on the Main Menu allows you to test the read and write functionality of the hard disk drive on a DVR set-top. You can use this option to re-run the hard drive test that was performed during auto test.

When you select the Hard Drive Test option on the Main Menu and press **OK**, the set-top starts a test of the hard disk drive and displays a progress bar as shown below.



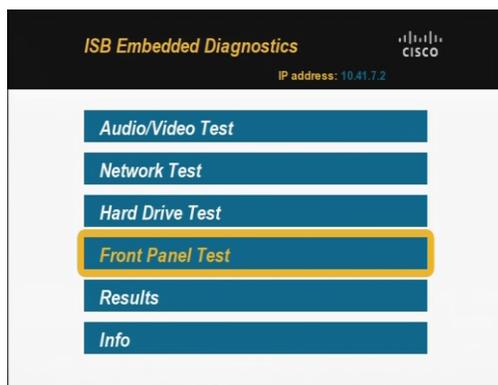
If the hard drive test fails, contact your service center.

The following screen is displayed for a test that passes:



## Front Panel Test

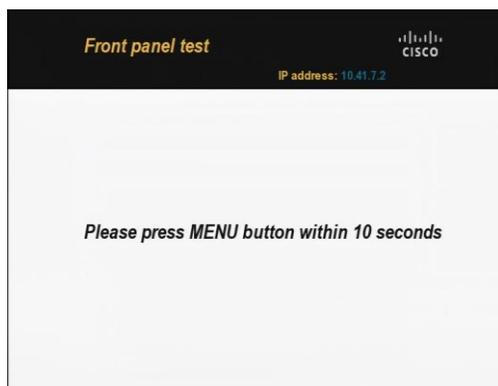
The front panel test enables you to test the buttons and the LEDs on the front panel of the set-top.



When you select the Front Panel Test from the Main Menu, the button and LED tests are launched simultaneously.

### Testing the Front Panel Buttons

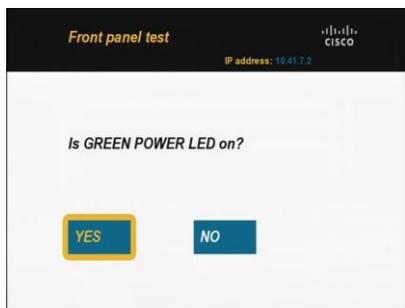
When you launch a front panel test, the application tests the buttons on the front panel of the set-top. The application displays a series of screens to test the front panel buttons in a predefined order. At each prompt, press the button on the front panel to test the button. For example, to test the Menu button, press the Menu button on the front panel of the set-top within 10 seconds of when you are prompted. The following screen is an example of the button test screen:



At the end of the test, a summary screen opens to let you know whether the button keys passed or failed. A button passes if the key press is detected. The button test fails if no button press is detected within 10 seconds, or if you press an incorrect key in response to a prompt.

## Testing the LEDs

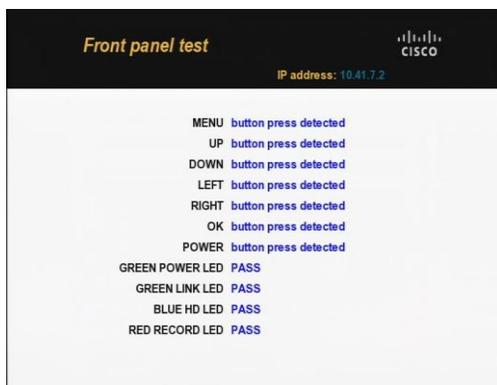
When you launch a front panel test, the application tests the LEDs on the front panel of the set-top. The front panel LEDs turn on one by one and the application displays a series of screens to ask if the LED is on. At each prompt, press the Left and Right arrows to select **Yes** or **No** and press **OK**. For example, to let the application know whether the Green Power LED is working, use the arrow keys to select Yes or No and press OK. The following screen is an example of an LED test screen:



The result of the button and LED tests is stored in DRAM. Only the result of the last test is stored. If you make a mistake, you can correct it by running the test again.

## Front Panel Test Summary Page

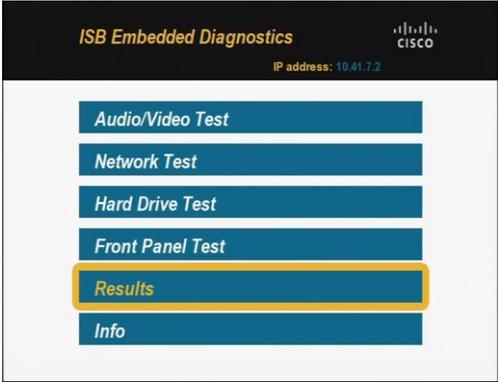
After finishing the front panel test, a summary page opens to show the test results of the buttons and LEDs that were tested. Press **OK** to exit the summary page and return to the Main Menu.



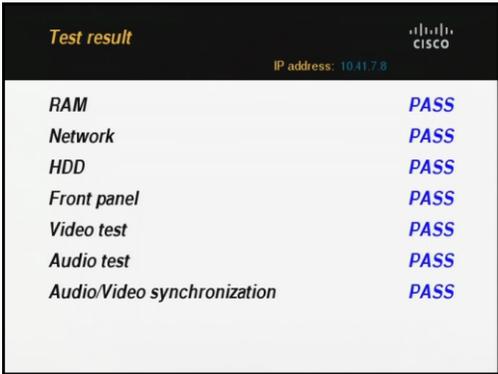
Results

# Results

To get a summary screen of all the diagnostic tests that were performed on the set-top, select **Results** from the Main Menu.

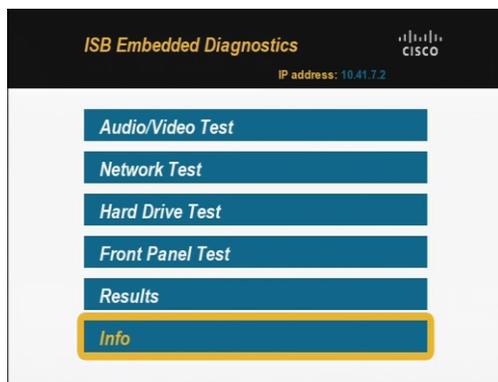


The Test Result screen indicates the status of each test. For any test that fails, follow the on-screen instructions or contact your service center.



## Set-Top Information

To find detailed information about your set-top, select **Info** from the Main Menu.



The Info button on the Main Menu displays a series of screens that provide details about the set-top. Press the **Up** or **Down** buttons to scroll through the screens. The following screen is an example of the set-top information screen:

The screenshot shows the 'Settop Information' screen. At the top, it displays the Cisco logo and the IP address '10.41.7.8'. Below the header, there is a list of system parameters and their values:

Stage 1 bootloader version	2.6.12.0
Stage 2 bootloader version	0.0.75.43
Subnet mask	255.255.255.0
Default gateway	10.41.7.254
DNS Server IP	192.168.114.1
Model ID	ISB7320
HPNA frequency band	12-28Hz
Vendor class id	SAISB7320
HPNA customer select default	0
Default SaDlServer Directory multicast IP address	240.200.0.239
Default SaDlServer Directory UDP port	10240
Default language	English
Default SaBootLogger IP address	0.0.0.0
Default SaBootLogger UDP port	0

For Information

## For Information

### **If You Have Questions**

If you have technical questions, call Cisco Services for assistance. Follow the menu options to speak with a service engineer.





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