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tech tips

Answers To Common Questions On Performance Testing Stereo TVs With The ST65 And ST66

This Tech Tip covers the most commonly asked questions about using the ST65 and ST66 Stereo TV Analyzers to performance test stereo TVs. By learning the answers to these questions, you'll be prepared to service stereo TVs more efficiently with your Stereo TV Analyzer.

How Can I Tell If A Stereo TV Is Working Properly?

To know exactly how well a stereo TV is working and to be able to tell your customer, you'll want to check the receiver with a series of industry standard tests designed to test for proper stereo and SAP performance. These tests are called performance tests.

When Should I Performance Test Stereo TVs?

There are four major times when it's important for you to know whether your customer's stereo receiver is operating to peak performance:

1. On a service call, to prove to yourself and to your customer whether or not there is a problem.

2. Before you begin a stereo repair in the shop, to fully define the problem.

3. After a stereo circuit repair, to be sure of a complete repair and reduce callbacks.

4. After any non-stereo repair on a stereo TV, to insure top stereo performance and customer satisfaction and to generate extra service profits.

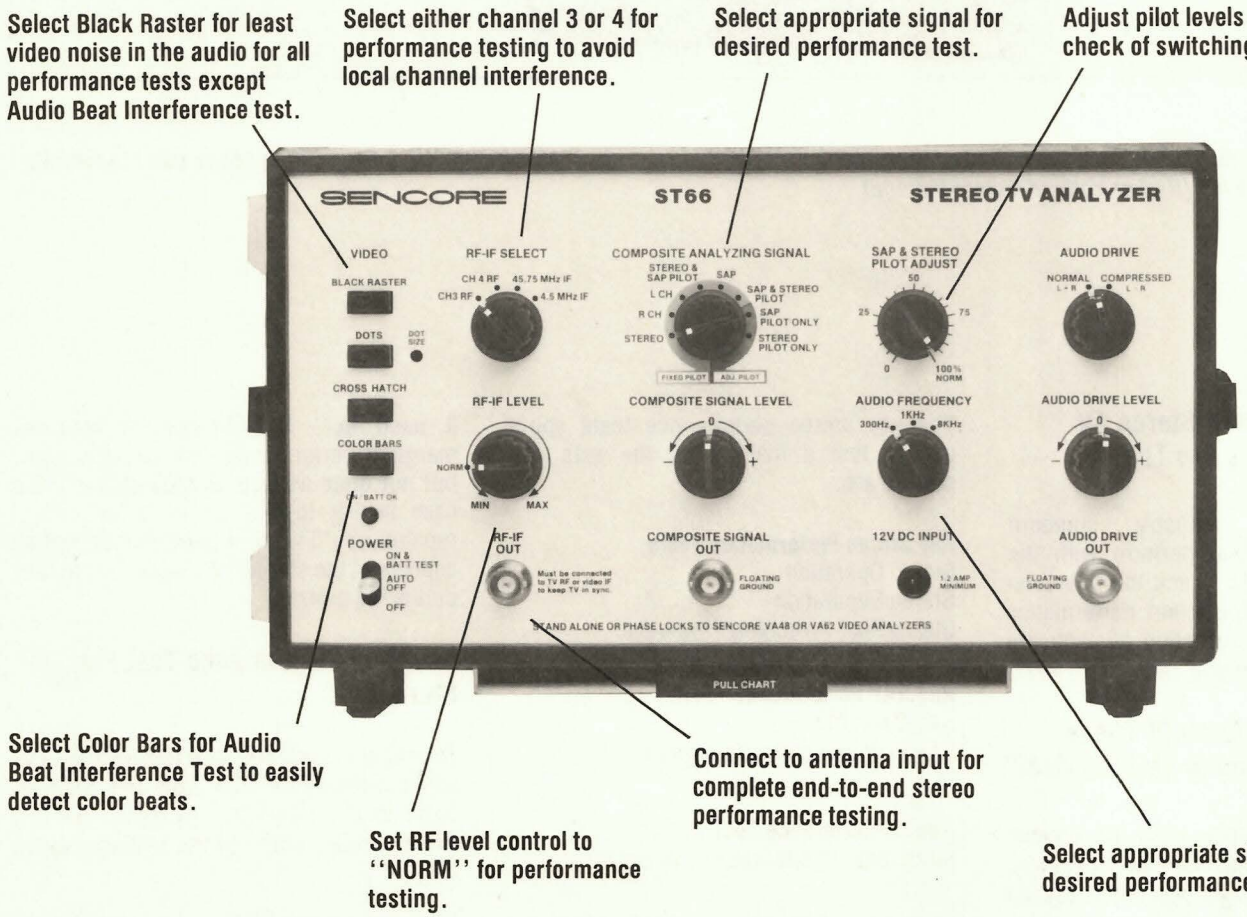

Fig. 1: These are the controls you use for performance testing stereo TVs.

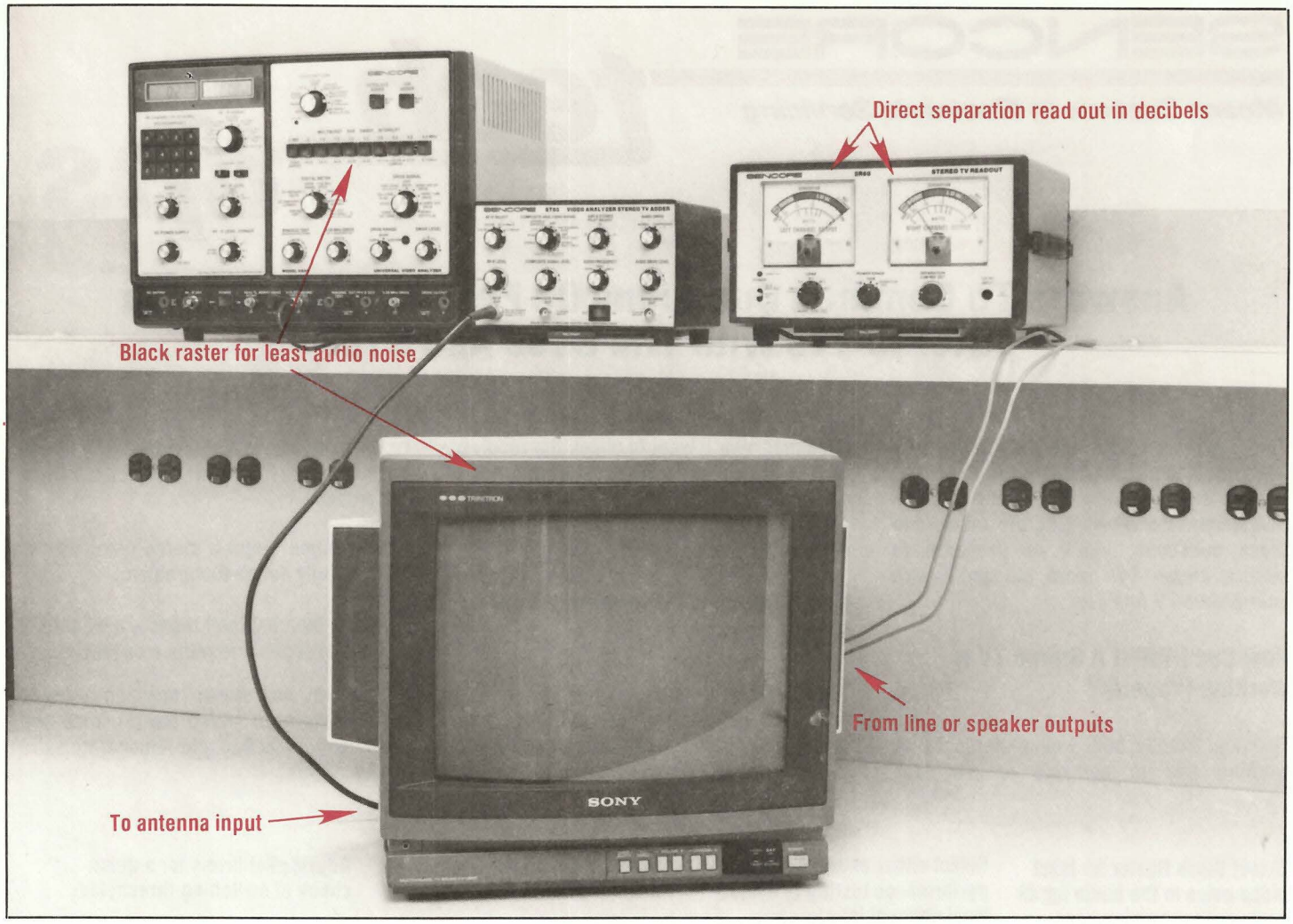

Fig. 2: Use a stereo readout or stereo monitor to obtain a direct readout of separation in decibels, or when using a scope use the formula: Separation (dB) = 20 log (Higher Voltage/Lower Voltage).

How Many Standard Stereo TV Performance Tests Are There?

There are ten industry standard performance tests you perform with the ST65 or ST66 to fully check the operation of any stereo TV. These ten performance tests and a brief description of each are outlined at the end of this Tech Tip.

Should I Perform Each Of These Tests On Every Stereo TV I Service?

A few key performance tests are usually sufficient to indicate normal operation, as long as you have no other reason to suspect improper or marginal performance.

The key stereo performance tests you'll use to test a majority of the sets you service are:

Key Stereo Performance Tests
Stereo Operation
Stereo Separation
Stereo Pilot Switching Threshold

Key SAP Performance Tests
SAP Operation
SAP Pilot Switching Threshold

Audio Interference Test
Audio Beat Interference in Video

However, when your customer tells you that his stereo ''doesn't sound as good as it used to,'' for instance, it indicates marginal performance; the circuits work, but not quite as well as they should. In a case similar to this, or for other critical repairs, you'll want to performance test all aspects of the stereo TV's operation to fully define the problem.

How Do I Performance Test For Stereo?

To prepare to performance test a stereo TV, connect the RF-IF OUT from the ST65 or ST66 to the TV's antenna input. Set the RF-IF LEVEL control to the NORM position (Figure 1).

When using the ST66, select the BLACK RASTER video pattern. When using the

VOLTAGE RATIO	dB EQUIVALENT
1.0:1	0.00
1.5:1	3.52
2.0:1	6.02
2.5:1	7.96
3.0:1	9.54
3.5:1	10.88
4.0:1	12.04
5.0:1	13.98
6.0:1	15.56
8.0:1	18.06
10.0:1	20.00
15.0:1	23.52
20.0:1	26.02
30.0:1	30.88
50.0:1	33.98
75.0:1	37.50
100.0:1	40.00
150.0:1	43.52
200.0:1	46.02

Fig. 3: Use this chart to convert output voltage ratios to decibels of separation.

ST65 with the VA62, select MULTIBURST BAR SWEEP and remove all the bars with the BAR SWEEP INTERRUPT buttons for a black raster. *This is the industry recommended pattern to use for least video noise in the audio during audio testing.*

Monitor the output of both TV audio channels (either line or speaker outputs) with a stereo readout, stereo monitor, or a dual trace scope. *Be sure you plug the TV into an isolated AC power supply, such as the PR57, before you connect your scope grounds to the speaker connections.*

Test Stereo Operation

To test for normal stereo operation, select the STEREO position on the COMPOSITE ANALYZING SIGNAL control and set the AUDIO FREQUENCY control to the 300 Hz position.

The stereo indicator lamp on the TV should light, both audio channels should produce a clean 300 Hz audio output, and there should be equal output from both channels (either line or speaker outputs) with the balance control set close to its center position.

Select the 8 KHz position on the AUDIO FREQUENCY control. The output signal should drop to approximately 25% of the level at 300 Hz (−11.74 dB on a stereo readout or stereo monitor) if the receiver deemphasis circuit is working properly.

Test Stereo Separation

To test for stereo separation, switch to single channel modulation (either L CH or R CH on the COMPOSITE ANALYZING SIGNAL control).

First, check low frequency separation by selecting the 300 Hz position on the AUDIO FREQUENCY control. Monitor the output voltage of both the right and left channels (either line or speaker) with a stereo readout or stereo monitor for a direct readout of separation in decibels.

For separation in dB when you're using an oscilloscope, read the peak-to-peak signal level from each channel and calculate the separation in decibels, using the formula in Figure 2. Or, divide the higher voltage reading by the lower reading to get the ratio between the two and consult the chart in Figure 3 to obtain the separation in decibels.

Repeat the test with signal on the other channel. At least 18 dB (or the manufacturer's separation spec, when available) for both the R CH and L CH test indicates good low frequency separation.

Repeat the test for high frequency separation by selecting the 8 KHz position on the AUDIO FREQUENCY control. Again, at least 18 dB (or the manufacturer's separation spec, when available) for both the R CH and L CH test indicates good high frequency separation.

Test Stereo Pilot Switching Threshold

To test for proper stereo switching threshold, select STEREO PILOT ONLY on the COMPOSITE ANALYZING SIGNAL control and turn the SAP & STEREO PILOT ADJUST control down until the stereo indicator on the TV just goes out. The switch-off point should be at 50% of normal pilot level or lower.

Now, turn the SAP & STEREO PILOT ADJUST control up until the stereo indicator just comes back on. The switch-on point should be at 50% of normal pilot level or higher.

How Do I Performance Test For SAP?

Test SAP Operation

To test for normal SAP operation, turn the COMPOSITE ANALYZING SIGNAL control to the SAP position. Select the 1 KHz position on the AUDIO FREQUENCY control.

The SAP indicator lamp on the TV should light, both audio channels should produce a clean 1 kHz audio output, and there should be equal output from both channels.

Test SAP Pilot Switching Threshold

To test for proper SAP switching threshold, select SAP PILOT ONLY on the COMPOSITE ANALYZING SIGNAL control and turn the SAP & STEREO PILOT ADJUST control down until the SAP indicator on the TV just goes out. The switch-off point should be at 50% of normal pilot level or lower.

Now, turn the SAP & STEREO PILOT ADJUST control up until the SAP indicator just comes back on. The switch-on point should be at 50% of normal pilot level or higher.

How Do I Performance Test For Interference?

Test Audio Beat Interference In Video

To test for audio beat interference, select COLOR BARS on the ST66 or either COLOR BARS or CHROMA BAR SWEEP if you are using the ST65 with the VA62. Select each of the composite audio modulation components by switching through each position on the COMPOSITE ANALYZING SIGNAL control.

Watch the picture for signs of audio beat interference. *Be sure to use a color pattern so you'll detect any 900 kHz color beats.*

Complete details on other performance tests are available in the MTS Simplified Guide. Call your Area Sales Engineer at ***1-800-843-3338*** *to obtain a complimentary copy.*

Ten Standard Stereo TV Performance Tests

1. Stereo Operation:

This test checks the ability of the stereo circuits to switch on, light the stereo indicator, and produce a normal output from both channels.

2. Stereo Separation:

This test checks the ability of the receiver to reproduce a single channel input at the proper channel output without allowing any of the signal to leak to the other channel output.

With low stereo separation, your customer will hear very little of the "stereo effect"; all audio will tend to sound like mono. Better stereo separation gives your customer more pleasing stereo sound.

3. Stereo Signal-To-Noise Ratio:

This test determines how much internal noise is being generated in the receiver stereo circuits, from the antenna to the speakers.

4. Stereo Pilot Switching Threshold:

This test checks that the stereo circuits switch on only when a stereo signal is actually present and that they switch off when no stereo signal is received. If the stereo circuits are incorrectly switched on when there is no stereo signal present, your customer will tell you he has very noisy audio.

5. SAP To Stereo Crosstalk:

This test determines whether there is signal leaking (crosstalk) from the SAP circuits to the stereo circuits. This crosstalk causes your customer to hear SAP audio during quiet moments of stereo operation.

6. SAP Operation:

This test checks the ability of the SAP circuits to switch on, light the SAP indicator, and produce a normal output from both channels.

7. SAP Signal-To-Noise Ratio:

This test determines how much internal noise is being generated in the receiver SAP circuits, from the antenna input to the speakers.

8. SAP Pilot Switching Threshold:

This test checks that the SAP circuits switch on only when a SAP signal is actually present and that they switch off when no SAP signal is received.

9. Stereo To SAP Crosstalk:

This test determines whether there is signal leaking from the stereo circuits to the SAP circuits. This crosstalk causes your customer to hear stereo audio during quiet moments of SAP operation.

10. Audio Beat Interference In Video:

This test checks whether the traps in the IF or video circuits are defective or improperly adjusted, or whether the IF filter is defective, allowing parts of the composite audio signal to cause interference in the video.

For More Information

Call WATS Free 1-800-843-3338.
In Canada Call -
WATS Free 1-800-851-8866.
In SD Call Collect (605) 339-0100.

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