



LOU BURROUGHS

MICROPHONE FACTS

for the operating engineer

from *Electro-Voice*[®]

ELECTRO-VOICE, INC.
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MONITOR SPEAKERS

The Audio Bottleneck

From the time E-V began the manufacture of professional microphones, we have been plagued by the general use of monitor speakers with inadequate response to evaluate microphones. I often find good microphones rejected because the monitor speaker used was of poor quality, but the microphones invariably received the blame.

Many users of audio equipment are particular about the microphone and amplifier equipment they use, often requesting that special curves be run. But what about the monitor speaker? I frequently find the only consideration given the speaker is that it be of a specified size, fit in a given space, or be inexpensive. Many times it is chosen after listening to a few and selecting the one that sounds the most pleasing. Making a choice by listening tests is fine, if the speaker is to be used at home. What the actual measured response happens to be is unimportant. In this instance, the listener's choice of sound is the only consideration.

On the other hand, if the speaker is to be used as a monitor for the evaluation of program material, the response curve is of foremost importance. It must be smooth, must cover a wide range and be distortion free, the equivalent in response of the associated equipment, or the listener will not hear what is actually being reproduced. Here are some things I have found on my travels:

I have been checking the monitor speaker situation for a number of years and I find there are six speakers in common use in about 80% of the studio control rooms I have visited. Curves of these units appear in charts numbered 1 to 6. The other 20% are either using speaker systems they have assembled or are employing nothing more than replacement radio set speakers.

In looking over the six curves I found that none are suitable for monitors. Take number 6, for instance. Where it is used, equalization in the order of 5 to 10 db must be added to the microphone or amplifier to eliminate the large hole in the response. With this added equalization the speaker response now sounds right, but the sound that goes on the tape or on the air is carrying an undesirable haystack in this region.

The user of number 4 will have the opposite effect to overcome. He will be hearing too much in the presence range and will be equalizing downward; as a result, his tape will lack amplitude in this region.

You can imagine what happens when each must use the tape the other has produced! As far as I am personally concerned, the worst part of this situation is that the microphone more often than not receives the blame and is replaced by an inferior unit that happens to have a fault in its response which just happens to compensate for the fault in the speaker. This is the situation in far too many cases. The use of flat-response, wide-range speakers will solve the problem.

Mixed speakers will really foul up an operation. Good or bad, they should at least be all alike. Suppose that a facility had six control rooms, each using a different one of the six speakers I have listed. It would be virtually impossible to produce the same musical program in each of the six studios and have the resulting tapes sound alike, since, in each instance, the audio is being balanced or equalized to a speaker with different response. This is not a hypothetical problem. Mixed speakers are in common use. To correct the situation, flat, wide range monitors are a must.

Here is a problem that has appeared frequently through the years: In this particular incident, the TV engineer involved was asking for a microphone with more range than the one he was using. We, knowing the response of his unit, suggested he try the model 655C since it had well over twice the range.

A few weeks later, I received a letter stating that a 655C had been tested and it had fallen short of the desired response. He said, in listening to it in comparison with his present microphone, that the 655C had less range. We concluded the 655C must have been damaged and asked that it be returned for replacement.

A few days after receipt of his letter, I made a trip taking me through his town, so I stopped in to see about the problem. I brought along the 655C he had returned. Since we had found it to be normal, I knew the trouble had to be at the station.

We proceeded to repeat the test he had made. "A" in chart 7 is the curve of the model 655C we used, and "B" is the curve of the microphone he had used for comparison in the former test. Certainly, as far as curves are concerned, there is no question as to the difference in range.

We repeated the comparison test he had made and the result was as he had written. The 655C just didn't have it on a listening test.

Everything was then checked, from microphone to speaker, and, at this point, I asked what monitor he was using. I found the make and size were unknown. The station had purchased it because several of the personnel liked the sound, and the baffle fit in the space allotted to it. Since it was of an unknown brand we replaced it with a laboratory model of a monitor speaker I had brought along for the purpose. Now, using flat, wide-range amplifiers and monitor, the additional range of the 655C was very apparent.

To complete this case history, a curve was run on their speaker. Refer to curve "C" in chart 7 and you will see why the 655C didn't have a chance. Both microphones had more range than the speaker that was being depended upon as a listening standard and which was controlling the response of this station. Under these conditions, his microphone indicated more range since it had a "haystack" at the top end. In their selection of the speaker they had also been misled. The haystacks at both ends of the curve substituted for the lack of extended range. Your ears simply cannot be depended upon to make the selection of this very vital piece of equipment.

After reading the above, you may be saying to yourself, "I have nothing to worry about - my monitors are tops". Don't be too certain of this. Remember there is better than an 80% chance you are using one or more of these; 20% chance you are using something far worse.

The case of the poor monitor was included to give you an idea of one type of problem I find, among many others. This station needed help and got it. The things that bother us, however, are the number of problems which arise that we never hear about, and our microphones are adjudged poor through no fault of their own.

It is impossible, of course, for me to get to everyone or even a small portion of those involved in audio problems. The best answer I have found is to keep my eyes open, ask questions, and keep continually on the lookout for solutions to problems in my travels around the country. So far I have ferreted out many problems that have resulted in our development of new or improved problem-solving microphones and accessories.

We have always known that supplying the finest in microphones was not enough, that someday we would have to develop a monitor system in their defense. The time finally arrived when we realized something must be done. Increasing blame was being heaped on microphones, traceable to the shortcomings of monitors.

Our speaker engineers, after having been busy on a professional speaker system for about two years, have one which has been developed, field proven, and ready for the job it must do.

We now proudly announce the first two in our line of professional speakers: Sentry I and Sentry II. Refer to attached specification sheet for details.

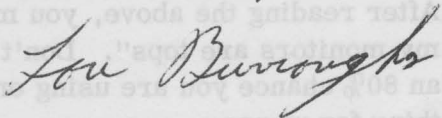
I am sure you will agree the curve of the Sentry system must become the minimum standard for monitor speaker response. Anything short of this will only perpetuate the confusion that now exists in all fields of audio due to the lack of such a standard.

Since these are being offered in the defense of microphones, we are anxious to have you employ them to up-grade your audio. Most of you already have speakers in which you have considerable investment, so, to help the cause along, we are making them available at extremely low prices. Sentry I carries a net price to you of \$139.00 and Sentry II \$149.00.

A very merry Christmas and a happy New Year to all of you.

Cordially yours,

ELECTRO-VOICE, INC.



L. R. Burroughs

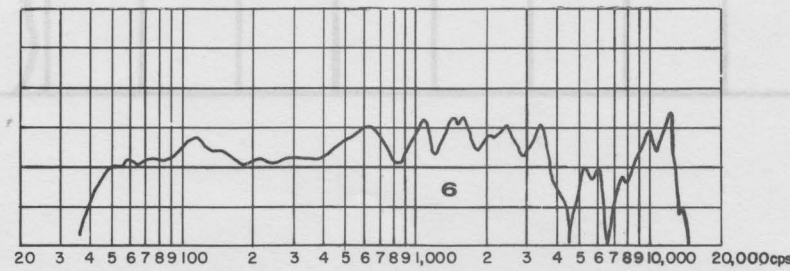
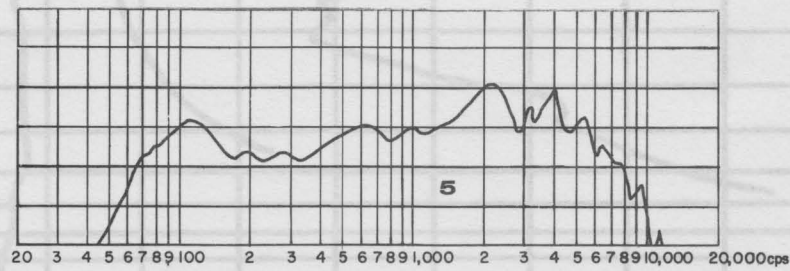
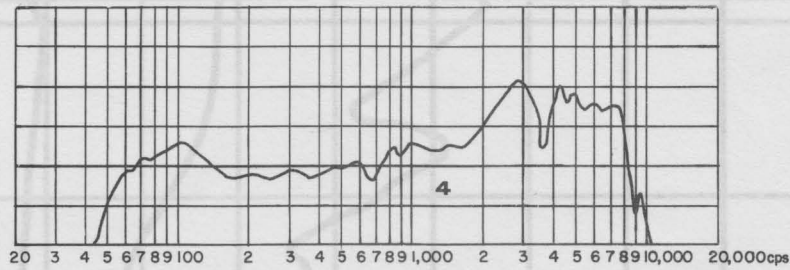
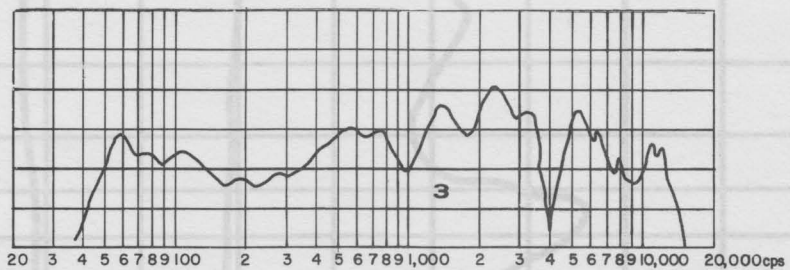
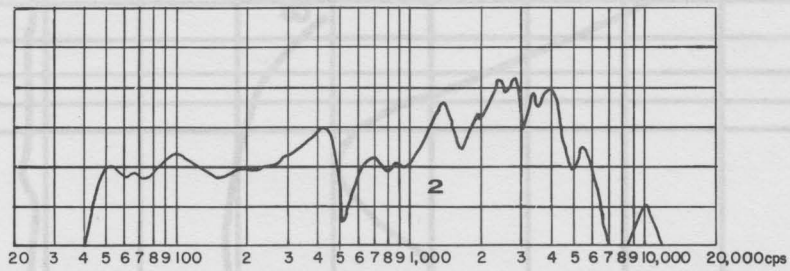
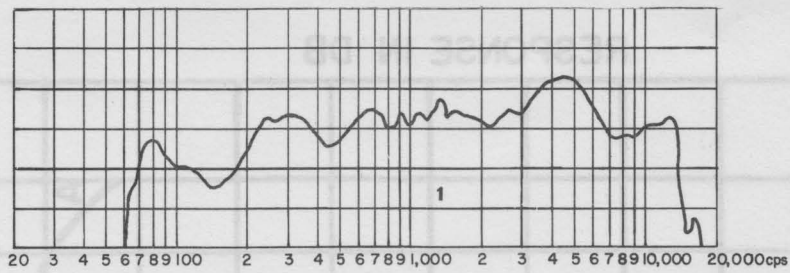
Vice President

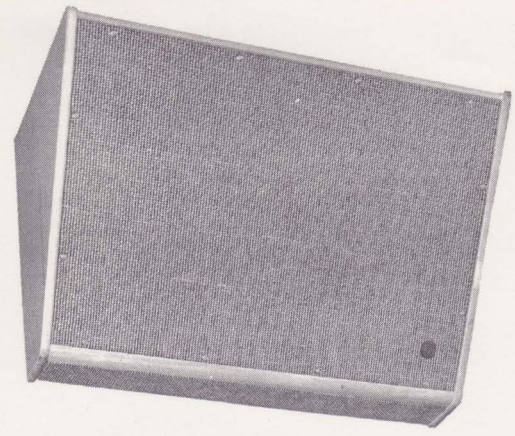
Broadcast and Recording Equipment

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NO.7







SPECIFICATIONS

- Frequency Response: 30-20,000 cps
- EIA Sensitivity Rating: 49 db
- Impedance: 16 - 150 - 600 ohms
- Power Handling Capacity: 20 watts
- Finish: sanded and sealed
- Size: 17" x 37" x 21-3/4"
- Weight: 82 lbs.

INSTALLATION

The Sentry I is designed for wall or ceiling mounting and can be installed in the following manner:

- 1.) Remove 12 Phillips head screws on cabinet front.
- 2.) Carefully remove front panel since all components are attached to this panel.
- 3.) Attach #18 lamp cord, or similar stranded wire, to the desired impedance tap on the crossover mounted on the front panel.
- 4.) Mount empty cabinet on the wall.
- 5.) Drill a small hole in any part of the cabinet for convenient exit of lead wires to amplifier.
- 6.) Place front panel on edge of cabinet and run lead wire through exit hole. Fit front panel back into position and replace washers and 12 screws.

The Sentry I Cabinet has been sanded and sealed, ready to be painted, if desired, to match surrounding decor.

Figure 3 illustrates various wall mounts.

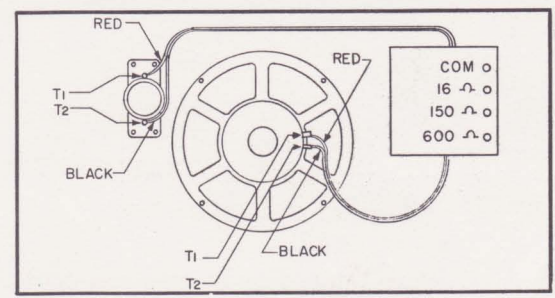


Fig. 1 - Wiring Diagram

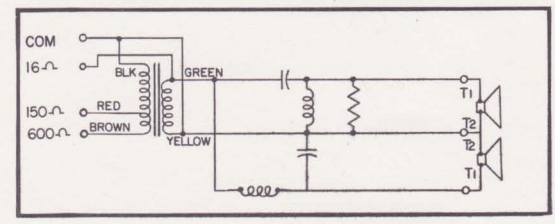


Fig. 2 - Schematic

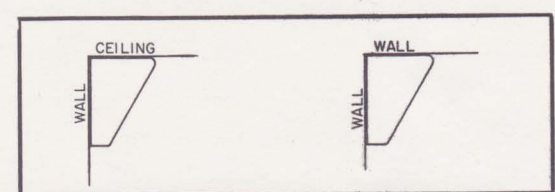


Fig. 3 - Mounting

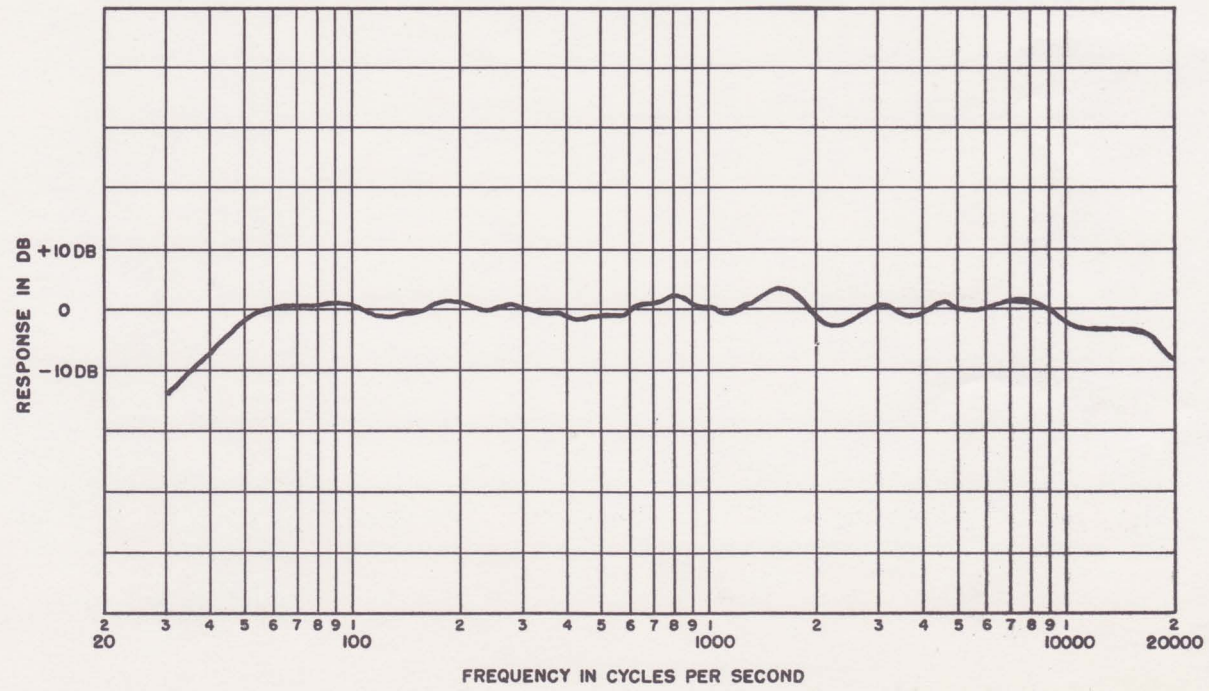
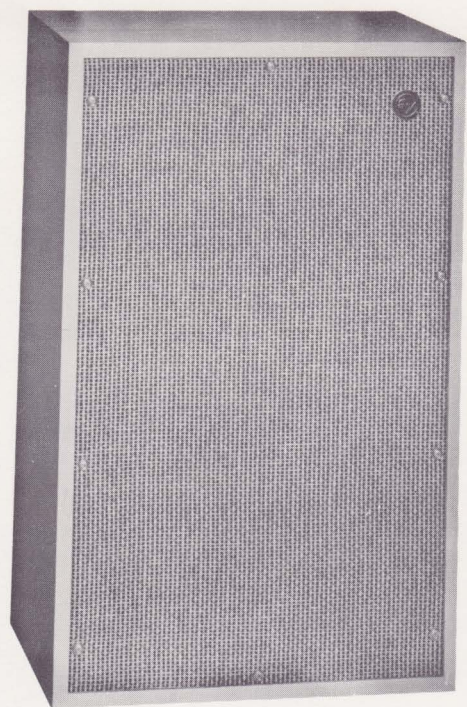


Fig. 4 - Typical Response Curve



SPECIFICATIONS

- Frequency Response: 30-20,000 cps
- EIA Sensitivity Rating: 49 db
- Impedance: 16 - 150 - 600 ohms
- Power Handling Capacity: 20 watts
- Size: 32" x 20" x 13"
- Weight: 68 lbs.

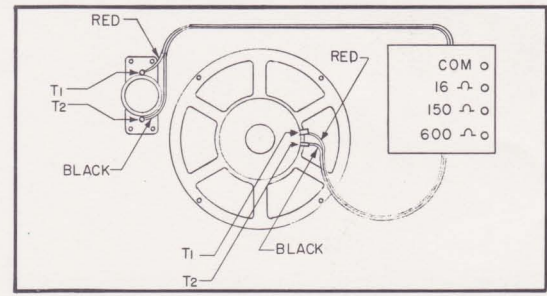


Fig. 1 - Wiring Diagram

The Sentry II was designed for use on the floor. It is furnished ready for use. The cabinet has been sanded and sealed, ready for finishing in the color of your choice.

Impedance connections for 16, 150, and 600 ohms are available. Use #18 lamp cord, or similar stranded wire, for connecting.

Eight metal trunk type corners are enclosed and may be screwed to the cabinet for its protection when it is to be used as a utility speaker. In this way, the cabinet will not come in contact with the floor regardless of the position in which it is used.

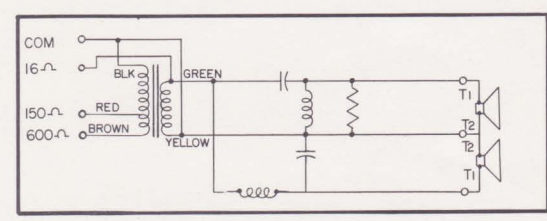


Fig. 2 - Schematic

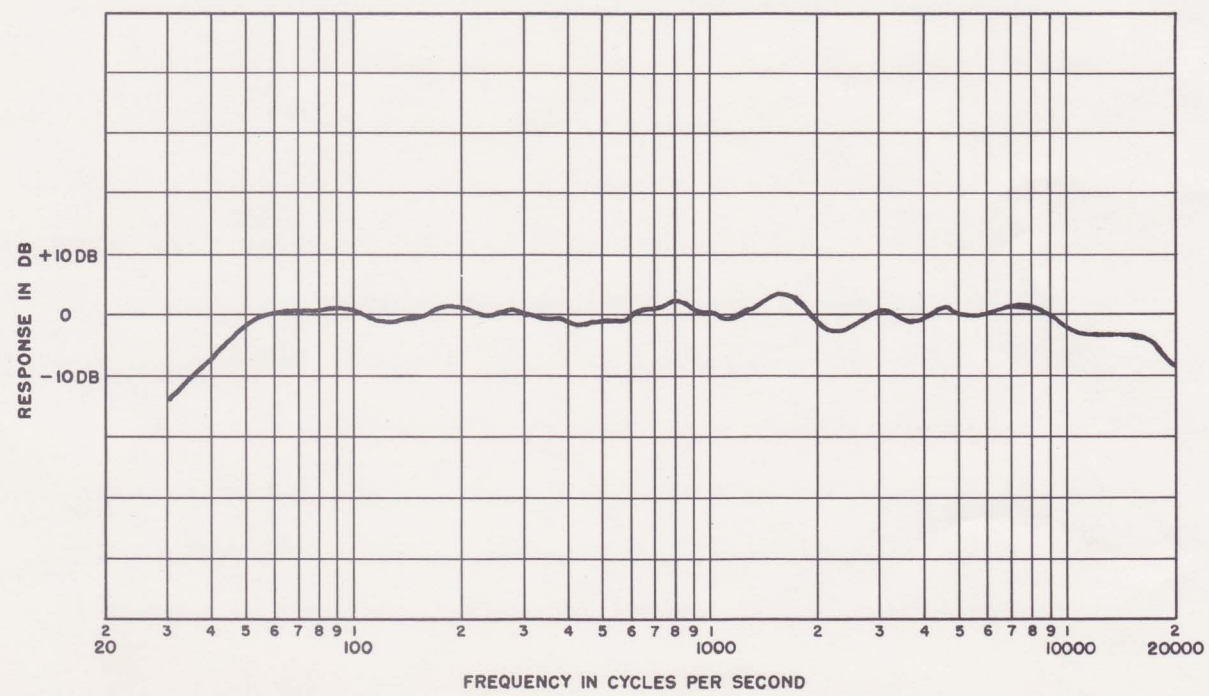


Fig. 3 - Typical Response Curve

ENGINEERING DATA SENTRY II STUDIO MONITOR