

j) General use of EQs for Feedback Control.

The procedure of equalizing a sound system to eliminate feedback is usually referred to as **ringing-out**, because the objective is to reduce the system response at the most sensitive frequencies which "ring". The objective of ringing-out a system is (believe it or not) to get as many frequencies as possible to ring at the same time as the system goes past its gain-before-feedback limit. When a system rings at many frequencies simultaneously, it is an indication that no one or two frequencies stand out well above the others in the system's total response.

A way of approaching the setup of a system which is feedback-prone is to ring out the system first, then adjust the tonal quality and volume level to taste. This approach would be especially appropriate for a monitor system, where the speakers are usually pointed more-or-less directly at the microphone positions—and would also be useful wherever else high output levels or high gain is required. (Ideally, this procedure should be done with a limiter in the system, which should be set with a relatively low threshold so that no damage occurs to any component in the system. Limiters are described in Ch. 8.)

One approach to "ringing out" the system—to be done with no audience present:

- (1) With the EQ sliders set in their flat position, gradually raise the system gain until it begins to slightly ring at one frequency.
- (2) Find the slider closest to the frequency of the ring, and gradually reduce the slider level just far enough for the ringing to stop. (If finding the appropriate slider is difficult, arrange several opportunities to try the exercise described in section "i" of this chapter. A good live-engineer should ordinarily be able to find the nearest slider on a 1/3-octave EQ on the first or second try.)
- (3) Increase the overall level of the system further, until one or more additional frequencies ring.
- (4) Gradually reduce the sliders at those frequencies until the ringing stops.
- (5) Repeat the procedure until the system rings simultaneously at as many frequencies as is reasonably possible.
- (6) If necessary, adjust the tonal quality until it is reasonably satisfactory to the ears.
- (7) If new rings have been created, reduce the gain, or repeat steps 2 through 6 until a reasonable combination of feedback control and acceptable sound have been achieved. This may require a compromise, so a judgement call is in order at this point as to which is more important—maximum possible gain, or pleasant sound (oftentimes, "flat" is not considered the most pleasant by those making the decisions).
- (8) Finally, and perhaps most importantly, back the system off a bit from the point where ringing begins (i.e., reduce the gain). How much the system should be backed off depends on the sound quality requirements and also on the environment. Generally, the more the reverberation in the room is a problem—especially in a small reverberant room—the more the gain should be reduced below the point of feedback. In a reverberant room, where clarity is commonly hard to achieve, the optimum reduction might be as much as 6 dB or-more below the point where ringing occurs. In a very "dry" room, as little as 3 dB might be more than adequate. (See also Fig. 6.8.)

Note: If the mics will be used close-up by the talker or performer, the mics normally need to be double-checked with a person standing with mouth next-to or touching the front of each of the mics. This is due to reflection and resonance involving the up-close user, which can add to feedback potential.