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News Room Audio

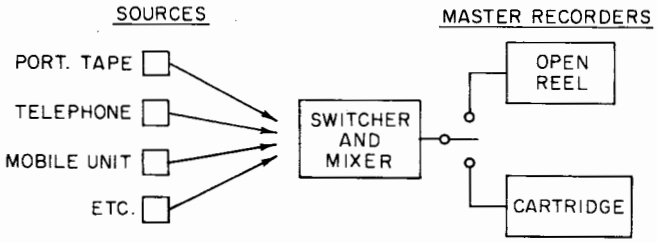

Fig. 1. When a variety of sources must be channeled to one or more master recorders, some type of switching and mixing unit is needed.

• Many electronic means are used for gathering and editing the news presented by radio stations. Most of the effort ends up on audio tape for air presentation over the station's regular facilities. The news room is actually a specialized, but major, recording facility of the station. Although the bulk of news programming is talk in nature, the technical quality of the finished product should be comparable to that offered by the station's other facilities.

BASIC PROBLEMS

When a variety of sources must be channeled into a master recorder, some means of switching and mixing is desirable. A standard console can be used for the purpose, or (as is often the case), the station can design its own arrangement. Whatever method is used, impedance matching of the various equipment units, and signal levels throughout the system must be considered.

The input/output impedances of each unit are some of the basic design parameters which allow various units to electrically interface. Impedances

should be matched properly so the most efficient transfer of the signal from one unit to another can be accomplished. When units are connected together without consideration for impedance matching, then a serious mismatch can occur, affecting both signal levels and audio frequency response.

Signal amplitudes are important both from an operational as well as a technical standpoint. In operation, if the levels are at great variance with each other, the operator will have a difficult time editing and recording master tapes. If levels are too high, amplifiers may be overloaded and distortion results. When levels are too low, then there is the chance of cross-talk, noise, and interference problems.

HEADROOM

Signal levels and distortion often go hand in glove together. One way that distortion can occur is through lack of *headroom* in the equipment design. True signal peaks are not indicated on the vu meter; they can be 8 to 10 dB higher than the indicated peaks. Headroom is that region above the indicated signal peaks and the point the amplifier goes into distortion.

You can check out the headroom in the equipment or system with a sine wave audio signal and a distortion analyzer. Feed the tone into the input of the system and adjust controls for normal operating levels. Measure distortion at the output of the system. Without changing any of the adjustments, increase the output of the signal generator by 10 dB and again measure distortion. If there is no change in the measured distortion, then there is adequate headroom in the equipment. But if the distortion increases significantly, headroom is lacking. In this case, set normal operating levels *downward* to a new value for normal operating levels. This should be at least 10 dB below the point where the amplifier or system goes into distortion. One word of caution: either pad the vu meter or disconnect it during the high level test to prevent damage.

PADS AND TRANSFORMERS

Match impedances and control signal levels throughout the system by use of resistor pads or transformers. Precision pads may be purchased, but home made pads are usually adequate. The resistor values for the pads may be calculated from formulas found in many technical books or, oftentimes, equipment manufacturer catalogs will provide tables of resistor values for

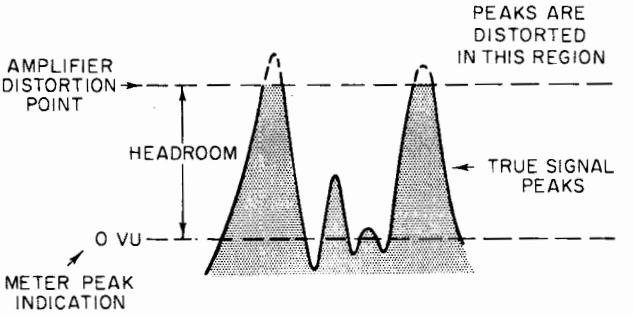

Figure 2. Headroom is the space above the signal peaks, as indicated on the vu meter and the point the amplifier begins to distort.

building pads. These are calculated values and may not always match up with standard stock resistor values. So, select stock values close to the required values. This will affect the end results by a few dB, but otherwise they will be satisfactory.

Transformers can be used for isolation, matching, or bridging. Good quality audio transformers are somewhat expensive, so you may desire to stick with resistors to do the job. But remember that resistors always create a loss when placed in the circuit, so the equipment should have enough reserve capacity to make up for this loss. When isolation is a definite need, it's best to use a transformer.

HEAD ALIGNMENT

Recorder heads, especially those on the master recorders, should be kept in proper alignment. Use a standard NAB alignment tape for the playback alignment first. Then align the recorder with audio tones from a signal generator using a good tape to record the results. It is not enough to obtain good results on the master machine alone. Take the tape you just recorded with tones to one of the control room machines and play it back. The results produced should be very similar to

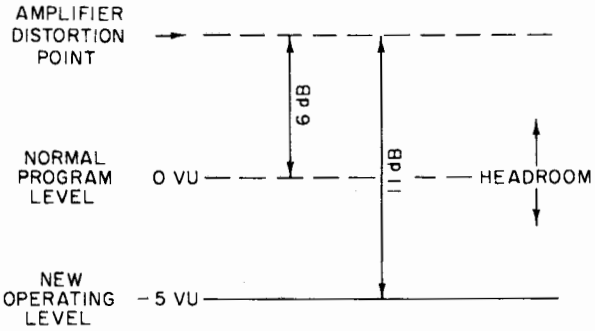

Figure 3. If the amplifier or system does not have adequate headroom at the prescribed normal program levels, then set a new operating level at least 10 dB below the amplifier distortion point.

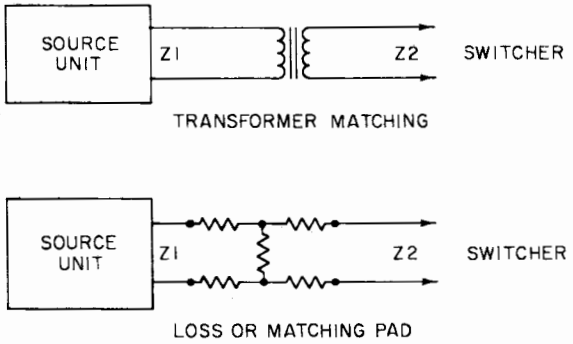

Figure 4. Impedances should be matched and signal levels controlled with either pads or transformers.

those obtained on the master machine by itself. If there is a great variance, go back and realign the master machine again. Make sure the playback equalizer in the master machine is not overcompensating for poor head alignment. Unless the recordings are compatible, the quality will suffer when the control room machines play the recorded product on the air.

CLEANING

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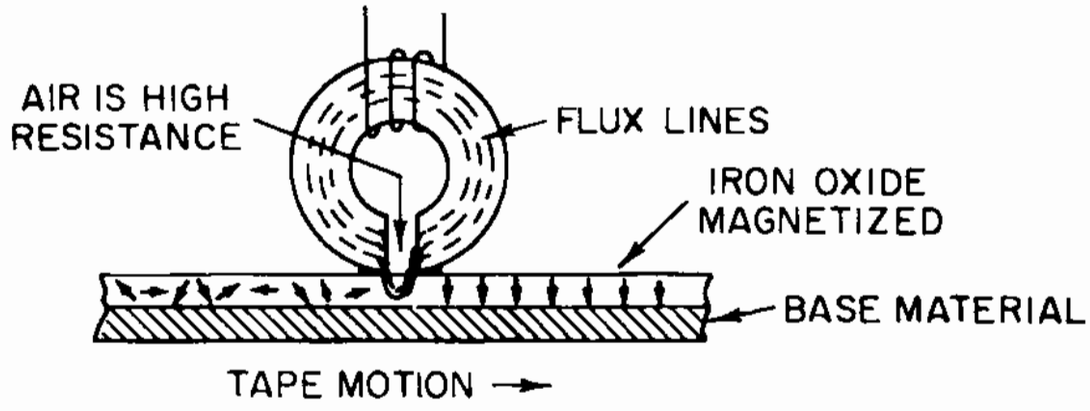
CLEANING

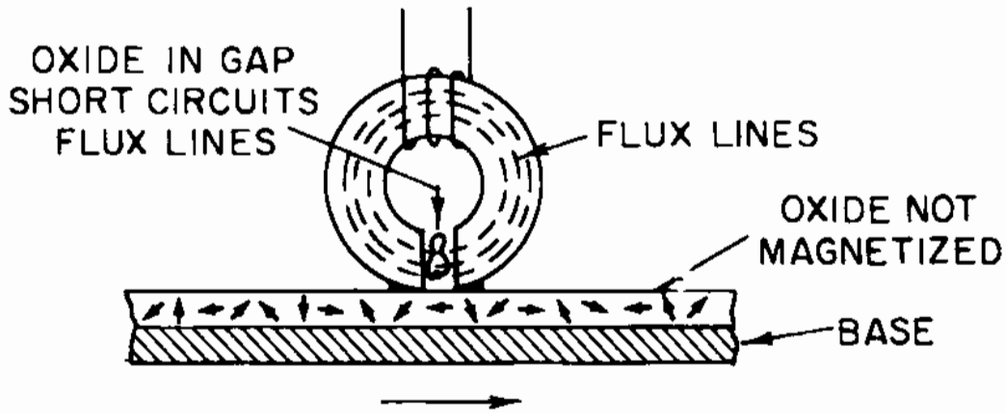
All the news tape machines, especially the master recorders, should be cleaned on a regular basis. Clean the heads, pinch rollers, drive shaft and guides. A main problem can be caused by oxide from the tape that builds up on the head, forming ridges that prevent the tape from making tight contact with the face of the head. It is not possible to get a good recording unless there is a tight head-to-tape contact. The results will be low signal levels and poor audio frequency response.

Another problem can be iron oxide from the tape, clogging the gap between the pole pieces of the head. This will produce a magnetic short circuit to the flux lines of the head, making an easy deflected path for the flux instead of it going through the coating on the tape. (The gap is air or other non-magnetic insulation which has a high resistance to the flux lines. As the tape passes against the face of the head in tight contact, the iron oxide on the tape creates a low resistance path so the flux lines flow into the tape and thus magnetize the iron particles—the desired result of the recording.)

Also, oxide coating can harden on the head, guides and other spots where there is friction with the tape, producing a very abrasive surface that will scratch and wear out the tape quickly. If small sections of loose tape wrap around the pinch roller or capstan drive shaft, this will increase their diameters and change the tape speed.



(A)



(B)

Figure 5. (A) The air gap has a high resistance to magnetic flux lines of the head and forces them through the easier path in the tape's iron oxide. (B) When oxide clogs the gap, the flux lines are short-circuited and few, if any, enter the tape.

Regular cleaning of all the machines will do much to maintain the technical quality of the end product.

TAPE

All audio tape is not alike even though it may visually appear the same. Various *types* of tape (not necessarily brands) have other differences besides thickness of the base material. The iron oxide coating differs. This is where the action is—at the iron oxide coating. The recorder should be optimized by adjusting the bias for the highest output and frequency response on a particular type of tape. If possible, the news room should standardize on one type. If there must be several types in use regularly, a compromise is necessary. Find a compromise setting of the bias and equalizers that will produce similar, but satisfactory results on all the types of tape in use. Remember that this is a compromise and therefore less than optimum, but it is better than having optimized results on one type and much less than optimum on all the other types. However, your best bet is to standardize on one type of tape.

BULK ERASING

Cartridges must be bulk erased, but it is often also advantageous to bulk erase small open reel tapes that will be taken out on portable recorders.

These machines are half-track and there may be occasions when an important story is brought back to the station with no time to dub it over on the master machine. The tape can be played directly on the control room machines (assuming it was run at the correct speed). Since most control room machines are full track, the half-track tape you are using must have the other track blank.

When bulk erasing tape, move the tape out of the eraser field before turning the eraser off. That strong collapsing field can severely magnetize the tape, creating a clicking or popping in the background of new recordings on that tape, something difficult to erase.

BATTERIES

Portable recorders will operate on batteries, usually the rechargeable type. It is important that the batteries be kept at full charge so the recorder is ready to use. If the batteries are down and the recorder taken out on assignment, an important interview may be lost because the batteries went dead. If they're not quite dead, just low enough so that the machine runs at a slow speed, when the tape is played back on a machine that is up to full speed, the results will be "Donald Duck" sounds. If the tape is open reel, it is sometimes possible to save the recording, provided that there is a machine which has a variable speed arrangement, such as a variable cue speed. Play the tape and adjust the speed control until the voice sounds natural. Once you can achieve this, then dub the results onto another tape, rather than rely on this arrangement. The best practice, of course, is a regular check on the batteries and the chargers.

TELCO RECORDING

Many interviews are done over the regular telephone, and the interview recorded. To get the best recording, connect directly to the telephone line for that phone number. But use 0.1 μFd capacitors in each side of the line for d.c. isolation and an audio transformer for a.c. isolation to prevent hum. Voice levels at the news room and the far end of the line will almost always have a wide difference. Use of a *gated* agc amplifier in the lineup will improve the recordings considerably to equalize the voice levels.

SUMMARY

The news room is a specialized, but important recording center of the station. Good technical quality requires attention to the impedances and signal levels in the mixing arrangement, and then a regular cleaning and maintenance program of the equipment. ■