

by Richard L. Kaye

Learning How to Broadcast Four-Channel Sound

What it takes to bring "concert-hall" realism into your living room

NO DOUBT you are familiar with "concert-hall realism," but have you considered what the implications of this cliché phrase might be when you are dealing with a hall whose dimensions are 75 feet wide, 125 feet long, 65 feet high, and whose concert-giving inhabitants number over one hundred talented musicians? The "realism," of course, is being brought into your 12- by 20-foot (likely) listening room by two loudspeaker systems, possibly by four, and in some places by only one. It might be easier to invite the players of the Boston Symphony (the orchestra with which I work) into your home. You might have some trouble finding room for the eleven cellos, nine basses, two harps, and percussion instruments—not to mention the strings and woodwinds—but the players are personable, good company, and pose no electronic problems when they are present in the flesh.

However, there are some mind-boggling problems when you try to bring their music-making by means of radio broadcasting into a home that has two speaker systems, while simultaneously satisfying the acoustical needs of a neighbor on one side who is using a single speaker, or the audio pioneer down the street who is listening quadratically over four speakers.

Compounding this diversity is the simple fact that no two radio stations broadcast in precisely the same manner. The concerts of the Boston Symphony Orchestra are presented on FM stations, stereo FM stations, AM/FM combinations, and in at least one instance by two FM stations combining on quadracasts. Further, while five stations broadcast the programs live as they actually take place, about one hundred more stations use taped versions.

In the Boston area, the concerts of the Boston

The author is manager of the Boston Symphony Transcription Trust and general manager of WCRB, Boston, Mass.

Symphony and Boston Pops orchestras are broadcast both live and by tape delay. Every Saturday during the Symphony and Pops seasons, WCRB-FM and WGBH-FM join forces to present live concerts in four channels—WCRB in front, WGBH in the rear. Occasionally, on Tuesday evenings, both stations synchronize their kilowatts with WGBH-TV to present the *ne plus ultra* of simulcasting: TV with four-channel audio. To do so takes three transmitters and four inches of tape width on two very precisely synchronized machines at WGBH, plus a video tape recorder and a sixteen-channel Ampex MM-1000. WGBH-FM also transmits BSO concerts on Tuesday evenings and Friday afternoons in ordinary two-channel stereo; WCRB-FM adds Friday evening BSO concerts and Sunday afternoon Pops concerts by delayed broadcast from tapes, and is currently presenting these in CBS SQ encoding for four-channel reception.

These broadcasts are produced for the Boston Symphony Transcription Trust, and programs of the Trust are also presented on nearly one hundred more stations in the U.S. and Canada, as well as on the Voice of America. The combination of live and delayed broadcasts, in four and two channels, leads us to produce a wide variety of audio formats. Here is a listing of what is now being done and for whom:

1. Four-channel (discrete), live—for WCRB-FM and WGBH-FM.
2. Four-channel tape—four tracks on ½-inch low-noise tape—for delayed broadcasts on WCRB-FM and WGBH-FM when the orchestra is out of town.
3. Four-channel Sansui QS matrix—two tracks on ¼-inch tape—for WFMT, Chicago; WCLV, Cleveland; KKHI, San Francisco; WQRS, Detroit; WLWL, Minneapolis; WFMK, East Lansing; WSND, Notre Dame, Indiana.
4. Four-channel CBS SQ matrix—two tracks on