

Build a recording studio in your garage

Got your own rock group? Like the sound of the local high-school band? Aunt Maude sing real pretty? Record them! In your own home sound studio. Here's how one guy turned his garage into a pro studio. You can do it too.

by Roy Goshorn

This year's edition of my local high school band was an exception. Listening to the final concert of the year I was impressed with the instrumental harmony and the selection of music on the program. If someone only had thought to make a tape recording of the performance, I would have enjoyed hearing it again.

Since the days of Thomas Edison, the audio recording has been one way to preserve the lifelike sounds that are so important to us. Millions of recordings, be they discs or magnetic tapes, are sold each year worldwide. Yet that total is only a fraction of the potential that could be sold to specialized groups.

A high school band or chorus is such a specialized group. So are church choirs, barbershop quartets, rock bands, and polka orchestras. There are thousands of groups with regional followings and, therefore, a potential profit to a recording company.

But how could you get a major company to record a performance and sell records of it? The answer is you couldn't. Even with the right connections major record companies wouldn't be interested. The price they would have to charge for the finished product would be high.

Major firms don't take on small jobs that sell only a few dozen or a few hundred records or cassettes. Their profit comes from volume sales. For this reason alone, fine local groups can't afford a contract with a major recording studio. But there is an answer.

Many smaller musical organizations



Garber adjusts one of two tape recorders in the control room of his Bellwood, PA, recording company. A custom designed sound mixing console he built is in the foreground. The large vertical equipment rack, right, contains equipment for mass duplicating cassettes. A large bookcase along the control room rear wall serves as a storage vault for several hundred master tapes and discs recorded in the studio over the years.

are turning to semi-professional home recording studios. Home recording is really a misnomer because much of the so-called home recording equipment available today is very professional.

One man's studio

Small recording studios are springing up all over the country, catering to small volume work. These studios have a modest investment in gear that is readily available. They turn out professional-sounding *master tapes* in mono or stereo. Some even have gone into the mass tape cassette duplication sideline. Because of the number of cassette player-recorders on the market, some studios find it easier to mass duplicate cassettes rather than go through the complicated process of

having discs pressed by a record laboratory.

A word of warning, however, Duplication of cassettes containing copywritten or licensed music or programs is *illegal*. This means it is unlawful to duplicate a pre-recorded tape or disc even for home use. Federal authorities during the past year have sought out and closed down several basement illegal tape dubbing operations. Make sure that you have *written* permission from the group or its manager before you do any recording with the intent to produce copies for sale.

Asbury Recording Company of Bellwood, PA, is an example of a tiny professional firm that caters to the small recording market. It's owned and oper-



Garber checks a microphone volume level for proper setting during a recording session. The row of switches above the mixing controls operate equalizers which are used to enhance or diminish certain frequency ranges during a recording session or in making a copy or dub taping. A professional Crown stereo tape recorder is at Garbers right.

ated by Earl Garber, an electronics instructor and broadcast engineer. Garber, through his broadcast experience, saw a potential for recordings and custom designed his studio to cater to it.

Although the operation is strictly afterhours fun for Garber, it keeps him busy recording high school band and choral concerts. And he's branched into religious, country-western, polka, and organ music. Garber even is experimenting with production of a television show. *Asbury* also is involved in making radio commercials for stations or advertising agencies who do not have facilities for involved production.

Garber now uses Ampex and Crown professional tape recorders and microphones in his studio but he actually began operation with a home-type recorder. Today he has the only cassette mass duplication facility between Pittsburgh and Philadelphia.

How to start your own

The average hi-fi enthusiast probably has a recorder, suitable for semi-professional work, as part of his playback equipment. For serious recordings, however, a *reel-to-reel* machine should be used, although many cassette recorders may work nearly as well. Reel-to-reel machines are more flexible and easier to operate, maintain, and transport to different locations. Forget about using cheap battery-powered cassette or *toy* reel-to-reel recorders. They have limited capabilities and don't give good results.

There are many variations in quality among recorders. So, before purchasing one outright or thinking seriously about using the one you may have as a part of your hi-fi setup, you need to know how to judge a good quality tape recording.

One quick and easy test of the quality of any tape recorder is to listen for *wow* or *flutter*. These are the warbling sound distortion caused by non-uniform speed of the recorder. Try making a recording of a piano solo. *Wow* and *flutter* distortion, if there is any, will show up quickly.

What's a good recorder?

Another quick check of a recorder's capabilities is to record a small instrumental or choral group. Listen very closely. See if each instrument or voice retains its characteristic. The high notes should be clear and sharp. The low and mid-range notes should not interfere with each other. There should never be a *hiss* or a background noise of any kind in the recording that you make.

The recorder also should be able to cope with wide volume ranges from very loud *crescendos* to soft *pianissimo* passages in music. Cheaper recorders have poor dynamic ranges.

If your equipment passes these simple tests, your chances of obtaining exacting reproduction are good.

Examples of semi-professional tape recorders used by smaller studios are the Crown 700 and 800 series, the Sony Superscope model 850, and the Pioneer 1011 machines. Other brands may do just as well. But a word of warning before you accept any recording contracts. Be sure you thoroughly check out

your machine with a critical ear. Imperfections showing up on the completed tape can't easily be removed, if at all.

The choice of tape is another important consideration that is sometimes overlooked. There are hundreds of types of magnetic tape on the market. Not all of it is suitable for your particular recorder no matter how much it costs. The most expensive isn't necessarily the best choice. Above all, don't record on the cheapest you can get your hands on. Many bargain-price tapes are really no bargain. They could cause serious damage to the recording heads in your machine. Cheaper tapes lack the ability to capture portions of information that your recorder delivers to the recording head. Bargain price tapes simply aren't capable of storing the total information.

For additional details on tapes and the proper selection of them, see *Modern Electronics*, May 1978, page 44.

Microphones are important

Also important is the choice of microphones. Here, the cheapest is not necessarily inferior to higher-priced products. Most recorders come with microphones that are balanced for that particular machine, although some budget-priced recorders do have poor quality mikes. Again, some quick and positive tests should be made.

Make a recording of something musical, preferably a piano where a wide



Asbury Recording Company owner Earl Garber sits in the center of his custom designed and built sound mixing console in the control room. Crown stereo tape recorders are located at his right and left. A large window looks directly into the studio from the control room affording Garber a direct view of the recording artist or orchestra. The slightly tilted glass pane in the window provides protection from sound reverberation.



Asbury Recording Company owner Earl Garber uses a stop watch to accurately time a segment from a master tape playing on one of two stereo recorders in the control room. Exact timing is essential so a selection will fit on a disc or tape cassette. The master mixing and control panel is at Garbers left.

range of pitches can be recorded. Listen very carefully to the recording with particular emphasis to any distortion and frequency response. The tape should not sound as if some passages are overwhelming or muted. The recording's high notes should be as clear as the bass notes. All in-between audio frequencies should be detected or felt to be there.

The microphone also should be able to avoid pickup of reverberations or echos, although this can be eliminated somewhat by mic placement. A microphone with directional capabilities is best.

Some brands of microphones in use at amateur and professional studios are Sure model 546 Unidyne, the Electro-Voice model 666, and an old standard, the RCA 44 BX.

Sound mixers

If you choose another microphone, be sure it will *match* your particular recorder. A microphone not only has to be distortion free and have a smooth level frequency response, it also has to have the correct impedance and output level for the recorder's input. Professional help is recommended when purchasing microphones or matching them to a recorder. Remember, too, that there are many microphones not suitable for recording. For example, public address mics are strictly for voice reproduction.

Most studios use several microphones during a recording. Through trial and error during a rehearsal you find the best location.

Some home tape recorders are not capable of directly accepting two or more microphones. Solve this problem by using a *mixer*, a device which accepts several microphone inputs while feeding a combination of any or all to a tape recorder's single input. Most mixers have volume controls so that audio

levels from each mic can be adjusted. The volume control on the tape recorder can then be used as a *master* control.

Several types of mic mixers are available commercially at hi-fi outlets. The Lafayette 2-channel stereo microphone/phone mixer, catalogue number 80 C 83057, is a good choice.

To house all of your recording equipment you'll need a properly prepared studio. It doesn't have to be an elaborate construction project, but you'll need a place to make recordings. It can be as simple as a living room or as in the case of *Asbury Recording Company*, a specially prepared building.

Studio in garage

Asbury owner Garber converted his two-car garage into a combination studio and control room. Extra sound proofing was added to the cement block walls. The ceiling was carpeted along with the floors. A control room, which houses recorders and a complex audio mixing panel he built himself, was added to one end of the structure. There's ample room to store tapes, records, and equipment. The control room is about one third the size of the studio with enough room to work comfortably.

In making your choice of location the main thing to remember is that you are dealing entirely with *sound*. Any sound that you don't want in the final recording should be eliminated *before* it enters the microphones.

Sound that originates outside the studio must not leak through the walls, flooring, duct work, or ceiling. At the same time sounds that are to be recorded should not leak outside the studio and be lost.

Remember high school physics? When sounds strike a smooth surface they reflect and reverberate throughout a room. Unless reverberation or *echo* is desired during a recording session, you'll have to take steps to eliminate it.

There are cheap and easy methods to deaden a room. Heavy drapes hung on the walls, and thick rugs on the floors make excellent sound absorbers. Some home recording studios and several radio stations that have extensive recording facilities use ordinary fiber egg cartons tacked to studio walls by the hundreds to act as baffles. In some cases, the egg cartons work as good or better than sound proofing tiles or cork blocks.

If your proposed studio has windows they must be heavily sound proofed to eliminate reverberation, outside noises, and traffic vibration. If you are planning a window between the studio and control room, be sure to construct it so the glass pane is tilted slightly to deflect any sound waves caught by the pane toward the carpeted floor or sound proofed ceiling.

Another tip in sound proofing is to construct *gobo boards* or sound absorbing

room dividers that can be stationed in a problem area of the room. Gobo boards also are used to isolate a vocalist from an orchestra or a particular instrument from the band itself to enhance or diminish its quality or volume.

A good studio sound comes mainly by trial and error. Different studio arrangements are needed for different types of recording, so final plans shouldn't be fixed or so complicated that a major reconstruction project is necessary when changing from one session to another.

Many times, by the nature of the event itself, recordings will have to be made *on location* or outside the controlled environment of the studio. In such cases the recording engineer is at the mercy of the location itself. The event may be outdoors or in a large auditorium where conditions cannot be fully controlled. In these circumstances, the simpler the set up the better because you probably can't improve the acoustics beyond whatever is already there. It is possible the environment might even add to the recording.

Away from home

Take the case of an outdoor band concert. If audience noise, clapping, and traffic sounds were part of the event and are picked up by the mics, it adds to the *live* effect of the recordings. Microphone placement for *remote* or on location recordings is super critical to eliminate as much background noise as possible. Again it's a trial and error task best done during a rehearsal.

Don't be afraid to tackle a remote recording. Many amateur and professional recording companies have had spectacular results from on location recording sessions. Unless you have a very large studio, a high school band isn't exactly the easiest thing to cram into a living room.



Garber stands beside his custom designed cassette duplication equipment to check the volume level for proper range. Asbury Records can duplicate cassettes at the rate of six at a time. The large bookcase stores master tape recordings.

Now that you have assembled equipment and outfitted a studio, where do you find groups to record? It's mainly a matter of being able to make contacts with groups or organizations interested in owning a recording of their work. Remember, the name of the game is to record a group or performance that will have the greatest potential to sell records.

We already mentioned the local high school band and chorus. You might approach the director for a start. He just might be interested in a recording of a special performance. Perhaps your social club has a musical group or an annual variety show or entertainment that would be good for recording.

Other potentials are a popular rock group; ethnic music has a large following in certain parts of the country; church choirs or organ recitals are another possibility; and don't overlook the Saturday night country-western group that packs them in at the local hoe-down.

Smaller studios do well recording those small groups with a large local following. Should you be lucky enough to discover talent of interest to a major recording studio, you can negotiate to sell the rights to your master tape recording.

Once the final or *master* tape of the recording session is completed, you will have to come up with some sort of timing sequence. Each long playing record usually has a maximum playing time of 12 to



Closeup view of Asbury Recording Company master control and sound mixing console in the foreground. Eight separate microphone inputs can be feed to two professional stereo tape recorders either individually or combined. A Crown stereo professional tape recorder sits to the left of the master console. The microphone near the top of the control panel is used for control room-studio talk back communications.

15 minutes per side. Cassette tapes are a bit different because of their construction permitting continuous lengths of recording surface. Normal playing time is one hour, although there are 90-minute and 120-minute cassettes available. The 60-minute tape is the most popular.

In order to have a recording fit the finished product, carefully time each individual number of the master tape. Then, in conjunction with the group or its director, decide which numbers will best fit the time available. Use a stop watch.

Another decision facing you is the total number of discs and or cassette tapes that will be needed. This is tricky. Again, it is best to work closely with the group and its director. He should be able to give you some rule of thumb as to how much interest would be generated by the public in record demand. Remember, however, record pressing and tape duplicating firms work on volume amounts. The larger the order, the cheaper the cost per unit to you. An order for, say, 200 discs or cassettes would be cheaper per unit than an order for, say, 50 or 100 units.

There are numerous pressing and duplicating firms worldwide. For a negotiated price they will transform your master into finished products that are playable on any home recorder. Selecting one is a matter of price, availa-

bility, and extra services that your particular need might require.

Most, through the use of sophisticated electronic equipment, are able to correct slight errors or imperfections in the master tape you send them. Through this equipment it is possible to add or subtract high or low frequencies to enhance the overall response of the finished product. Labs also are able to add *presence* or *echo* to make a recording sound alive. Some firms also are able to make monaural recordings sound like stereo. Ask about those additional services, but remember there probably will be an additional charge. Shop around and see which firm gives you the best price and the fastest service.

Many pressing firms also offer an extra-charge service to design an album cover and special disc labels. If you have the budget, it's a nice touch to the finished product. But someone who is handy with a camera or a paint brush can do just as well. By combining talents you can design your own cover, have a local printer duplicate it, and then paste them on the blank sleeves that cover the discs or cassettes when shipped from the manufacturer.

As you become familiar with recording techniques, it may be possible to rent your facilities or equipment to advertising agencies and radio stations who produce their own commercials. Many times because of budget and space limi-



Asbury Records' studio features heavily carpeted flooring and semi curved walls (left) to inhibit sound reverberation. The glass pane in the studio-to-control room window is tilted slightly for additional protection from reverb. Microphones are attached to booms to insure exact positioning during recording sessions. The dual multi-coned speakers on either side of the control room window are used for playback of recordings. A row of microphone connectors seen between the two boom mics lead directly to the control room mixing console on the other side of the wall. Album covers serve as decoration around the control room window.

Where to get dupes

Now that you have your master tape recording, here's where to get information concerning the transfer of your recording to discs or cassettes. Note that some firms are interested in small quantity jobs, while others only take orders for large volume duplication.

Discs and cassettes (Small volume duplication)

Asbury Recording Company, Bellwood, PA 16617.

Earl E. Garber, Owner and Manager
Asbury Lane, Altoona, PA 16601

facilities: studio or on location mono or stereo recording. Cassette duplication, tape mastering, tv audio and film/video production, commercial recording, tape mastering and correcting services, album cover custom design and printing services.

Recorded Publications Company, Camden, NJ

1558 Pierce Avenue, Camden, NJ 08105

facilities: disc pressing and tape mastering-correcting services. Caters especially to the nonprofessional or educational institutions. Album cover services.

Allentown Record Company, Allentown PA

10th and Walnut Streets, Allentown, PA 18102

Harvey Solomon, Manager

facilities: complete tape to disc transfer, tape mastering and correcting services, small and large volume disc pressing, album cover design and printing services.

Southern American Record Company, Nashville, TN

207 Dembeurn Street, Nashville, TN 37023

John Ivanits, President

facilities: complete disc duplicating services, large and small volume, tape mastering and correcting services, album cover design and printing.

Discs only (large volume)

Capitol Records Inc., Scranton, PA

facilities: high volume disc pressing, and tape cassette dubbing.

RCA Recording Company, Camden, NJ

facilities: high volume disc and tape cassette duplication. Full tape mastering and correcting services, album design and printing facilities. Full studio recording facilities.

tations these organizations find it easier to use someone else's facilities.

The recording of *production* radio commercials takes skill and usually means working with *talent* or hired professionals. Recordings usually are of short duration, one minute maximum to 10 seconds minimum. Professionally done radio commercials include sound effects, music, and theatrical acting.

The actual recording sessions, although long in total time spent in the studio, consist of many *takes* or recordings of the same commercial. Timing must be exact and if the commercial involves complicated production techniques, it may take numerous recordings of the same thing to get just one that is exactly right. For this reason, most studio and equipment rental is charged by the hour or day plus costs.

Another possibility for work is the recording of material for distribution to blind persons. Talking-book records have been around for some time. Check with your local handicapped agency to see if they have a need for such a service.

The possibilities are actually limitless in the recording world once you have the proper equipment and a studio. Don't be fooled into thinking you can compete with well-established major recording companies. But, for the technically-inclined, there is plenty of recording work right in your own hometown to keep you busy. ☐

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