



New equipment now makes finer sounds available for motoring listeners

cited will still exist in a car, and the car owner with a good set will benefit from them.

Anyone who considers seriously an FM radio for his car should be aware of two major limitations. One is that FM transmission is "line of sight" and the ground wave of such a broadcast station does not cover as great a distance as standard AM radio. The true FM range may extend only 50 to 75 miles from the strongest stations, except perhaps under unusual circumstances. The second limitation is the fact that many sections of the United States have few FM stations, or possibly none at all. Generally, FM broadcasting is concentrated in large metropolitan areas.

There are three kinds of equipment that will bring FM radio broadcasts into a car. They are:

FM CONVERTERS—These are FM tuners that attach to the existing AM radio in a car. There is an AM-FM switch which, when in the AM position, allows operation of the AM radio in the normal manner. In the FM position, the switch brings in the converter which receives and amplifies the FM broadcast, converts it to an AM signal and then feeds it to the antenna cable to the AM radio set. The tuning for stations then is on the AM dial just as any ordinary AM reception. The chief drawback to this system is the quality limitations of the AM unit involved. Such converter units usually are installed under the dash in a convenient location near the AM radio. The converter is the lowest in cost of the FM auto radio systems available at the present time and so it is the most economical way to obtain some of the advantages of FM broadcasting.

FM RADIO—This is the unit independent of the AM radio that may or may not be in the car. It has its own speaker system, power transistors, and/or tubes. It receives and amplifies FM signals directly and without reference to any AM set. It can share the antenna with an AM radio, if there is one, with no adverse effect on reception. Mounting location usually is under the dash, when the car is equipped with an AM radio. If it is the only radio in the car, there is a special mounting face plate so that it can replace the AM set, although the common practice is to use the FM in addition to AM. Highest quality at moderate cost is the advantage of the FM-only set, prices range from about \$75 to \$125. The unit may be removed if and when the car is sold, without difficulty and without leaving a gap in the dash.

FM-AM RADIO—A combination set that accomplishes both FM and AM reception in a single unit. This unit may be engineered in two compact packages, the speaker and the power pack. Installation in most cars is without undue difficulty. Cost, naturally, is the highest of the three systems and, when the car is sold, the FM-AM radio generally has to go with it, since removal leaves the conspicuous hole in the dash. Prices range from about \$140 to as high as \$600, depending upon make of car, number and quality of speakers, and special extra equipment.

Those are the three classifications of FM systems. There is, of course, the difference between a good set of quality and an inferior one. A good set, for example, will accept broadcasts from weak or distant stations and produce them with reasonable strength and constant volume. A set of poorer quality, on the other hand, may need strong broadcast signals just to produce average FM qualities. Considerations such as these are particularly important when listening in fringe areas when reception is critical.

Better sets will have treble and bass controls, or at least

a variable-position control for treble-bass of the type found in costlier AM radios. Sets of higher quality generally have five circuits, and in a few instances as many as six, including: two tuned RF stages, one IF stage, one discriminator stage (de-modulated) and one limiter stage.

Sensitivity ratings for a high-quality set may range from 1.5 micro volts at 20 db quieting for the *best* reception, to three to five micro volts at 20 db quieting for *good* reception. The sensitivity rating indicates the ability of the set to receive without background noise.

Before purchasing any FM car radio, the buyer should know the electrical ground of his car—whether it is negative or positive. Some converters and FM-only sets will work only on negative-ground cars of 12-volt electrical systems. And there is no easy way to change the grounding system of a car. Most U.S. cars of 1955 or later have no problem. It is chiefly imported cars that face an uncertain situation, since some of them have positive-ground systems.

There are several makes of FM auto radios available that will operate off either grounding systems, and off either six- or 12-volts. The German Becker and Blaupunkt and the U.S.-made Debut are three that are adaptable.

Beyond the radio itself, there are some accessories related to FM units. Extra rear-seat speakers of exceptional size and quality are available at prices ranging from \$8 to \$80. Special FM aerials, strictly an option, go from \$8.50 to \$20. Spark plug suppressors and/or resistor spark plugs are offered to further reduce ignition interference. Some shops sell complete static-elimination kits from \$25 to \$100.

That's the FM car radio picture at the moment. The cheapest known way of bringing FM broadcasting into a car runs about \$75, the average installation will be close to \$100 to \$150. As usual, there are reports of individuals who have gone as far as \$1,000 and more! How much you spend depends upon how much you enjoy listening. But FM is worth the extra cost. •

RADIOS have been one of the most common items of optional equipment on cars for many years. Radical changes involving them have been relatively few and infrequent. Now, however, it appears a new and major development is in the making—the mass introduction of FM car radios.

The FM radio for a car is not really new. It has been available, but in a limited way, for quite some time. Most car owners probably never considered FM when ordering the installation of a radio. The choice was made from the AM selection and that was that.

On the other hand, FM radio has been booming in popularity in the home in recent years. There are a number of reasons for this and most of them apply equally well to car FM, although there are some limiting factors involved. Yet, to indulge in a little speculation, it probably is safe to say that a vast number of car owners will want the benefits of FM, providing they can be obtained at a reasonable price.

Right now several of the major domestic radio manufacturers are preparing, or seriously considering, FM car radios. These firms, in addition to those overseas already involved, may make FM available on a far greater scale in the next few years.

For the person unfamiliar with FM radio a single demonstration usually is enough to interest him immediately. Usually his initial discovery is the fewer commercials heard over an FM station. Fifteen to 30 minutes of uninterrupted music is not uncommon. The current practice among FM station announcers is for far less talk, even when introducing selections.

FM programming also tends toward "better" music: the smoothly popular mood music, all types of jazz, semi-classical, even the real long-hair stuff, if that's the listener's choice. Anyone who enjoys music generally will find a wide selection to suit his individual taste.

Background noise and interfering static is vastly reduced. Nearby electrical installations and high-tension wires are far less troublesome. Fadeout when passing beneath steel structures, such as bridges, is less. Volume is more constant and there isn't

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such a tendency for the station tuned in to "drift" and require readjustment. Static-free reception during electrical storms also is possible.

It must be stressed, however, that FM radio alone, whether in a car or a home, is not Hi-Fi without other conditions being met. Hi-Fi stipulates definite qualities in the receiving set, plus proper enclosures to assure superior reproduction. It is on this latter point that FM car radio runs into some of its limitations. Some of these may be resolved to a degree in the new sets as yet unseen and unheard.

Obviously, the physical factors that limit AM radio in a car will also restrict FM, such as enclosure arrangements and speaker size and location. But the other advantages of FM radio already

A complete list of all FM sets of domestic manufacture and imported is virtually impossible. Some only are sold regionally, others are in the preparation stage and information pertaining to them is unofficial. Anyone interested can check his local retail stores or, if necessary, write to the manufacturer for further information. The following is a partial guide:

MOTOROLA—America's first transistor-powered FM-only car radio is priced at \$125. Negative ground for 12-volt systems. Installs under the dash. Receives 50 to 15,000 cycles, 15 watts power, uses three transistors and seven tubes. Address of manufacturer: 4545 West August Boulevard, Chicago 51, Illinois (Dept. ML).

GONSET—A converter tuner system that adapts existing AM radio for FM reception. Price \$100. Installed under dash, easily transferred from car to car. Negative ground, 12-volt system. Address: 801 Main Street, Burbank, California (Dept. ML).

BECKER—Complete FM-AM radio set. Prices from \$140 to \$300. Made in Germany, this set can be used with six- or 12-volts, negative or positive ground. Features remote control or push-button selection of stations. Sensitivity rated at 1.5 micro volts at 20 db quieting. Distributor address: 709 Hoover Street, Los Angeles 5, California (Dept. ML).

BLAUPUNKT—Another complete FM-AM unit made in Germany, priced from \$140 to \$300, and adaptable to six- or 12-volts and positive or negative ground. Sensitivity rating 1.5 micro volts for 20 db quieting. Distributor address: 225 Seventh Street, San Francisco 5, California (Dept. ML).

ERIC—An FM Converter tuner, priced at \$80. Sensitivity rating 1.5 micro volts at 20 db quieting. Operates off negative ground, 12 volts. Address: 1823 Colorado Boulevard, Santa Monica, California (Dept. ML).

GRANCO—Expected to announce an FM unit soon. Details unknown. Address: 36-07 20th Avenue, Long Island 5, New York.

RAE-MAR—Will announce FM converter tuner, selling for about \$80. Negative ground, 12 volts. 1917 N. Hoyt, South El Monte, California (Dept. ML).

DEBUT—Complete FM-only unit, priced at \$80. Operates off negative or positive ground, six or 12 volts. Address: 15818 Whittier Boulevard, Whittier, California (Dept. ML).

ZENITH—Said to be preparing an FM unit, but information is unconfirmed. Address: 6001 Dickens Avenue, Chicago 39, Illinois (Dept. ML).

NORELCO—Planning an FM unit but no data on production or availability. Address: 100 East 42nd Street, New York 17, New York (Dept. ML).