

# TO MAKE THE MOST OF THIS TUNER

## FM ANTENNA

The greatest advantage of FM broadcasting is that playback sound is superior to that of AM. However, because of the inherent characteristics of FM broadcast frequencies (VHF band), even when a high quality tuner is used, incorrect selection of antenna and its feeder cable may easily impair the advantage of FM. The FM antenna system must be set up taking into account the electric field strength, multi-path problems, noise sources, tuner location and so forth.

## SELECTION OF FM ANTENNA

### [ Field Strength ]

When receiving FM broadcasts from distant stations, it is necessary to use a highly sensitive tuner to improve S/N ratio. However, if the FM antenna was inadequately selected, a user cannot take the advantage of such high sensitive tuner. For instance, a comparison of the following tuner/antenna combination was made:

- (1) a tuner having IHF sensitivity of  $1.7\mu\text{V}$  plus a simple single feeder antenna (a type of whip antenna).
- (2) a tuner having IHF sensitivity of  $2.5\mu\text{V}$  plus an exclusive 3-element FM antenna.

Results showed that the latter combination gave better reception. This is because such a simple single feeder antenna has a negative gain while an exclusive FM antenna has a positive gain. The gain factors of such exclusive FM antenna are, 3-4dB with 2 elements, 4-5dB, 3 elements, 5-7dB 5 elements and 6-8dB, 7 elements.

As the antenna gain is increased in proportion to the number of antenna elements, selection of optimum FM antenna can be determined by consideration of field strength of FM wave where the tuner is installed. Needless to say, your audio shop will gladly assist you for optimum selection of the antenna.

In summary, where far from broadcast stations, high gain antennas are needed. If field strength is

sufficiently strong, good reception is possible with the di-pole antenna (T-type) provided.

### [ Multipath Measures ]

The terms multi-path refers to the multiple paths of FM radio waves reflected by mountains, buildings, etc. that are received by an antenna besides the waves arriving directly from broadcast stations. This phenomenon is inevitable because of the inherent nature of VHF (very high frequency) transmission waves. In the case of a television receiver, presence of multipath is visibly recognized by so-called "ghost" phenomenon and everyone is aware of the importance of proper setting of TV antenna. However in the case of FM reception, multipath problems may only be perceived as deteriorated playback of stereo sound. Very frequently, such deterioration is attributed to the program source. Correction of multipath problems can sometimes be made by use of an FM tuner having excellent limiter characteristics, but normally there would be no other measures than to provide an optimum FM receiving condition by selection of antenna, location, direction, height, etc. An effective way to filter harmful multipath waves coming from all conceivable directions by reflection, and to catch the direct wave only, is a use of directional FM antenna as explained in the "Field Strength" of this manual.

Since such antennas not only possesses gain but also directivity when it is directed to broadcast stations, it filters out waves coming from other directions. The directivity sharply increases as the number of antenna element increases. When sharp cut-off of multipath waves is desired, use of an antenna having more elements is necessary. The standard di-pole antenna (T-type) has such directivity as may be described by the numeral "8". This means when multipath waves come from the opposite direction of broadcast stations it is subjected to multipath influence. To the horizontal direc-

tion (parallel to antenna leads), since gain is lowered, multipath waves coming from that direction can be filtered. With this knowledge, the di-pole antenna may be very useful.

The whip antenna which is provided for portable transistor radios has no directivity. This means where multipath is present, it is completely subjected to its influence.

Measures against multipath trouble must be taken after verifying the cause of multipaths occurrence by which optimum measures can be known - - - use of directional antenna such as exclusive FM antenna, standard di-pole antenna, etc. and also its correct placement and setting up. If multipath problems are present at a place close to broadcast stations (sufficient field strength), it is suggested that you procure a 2 element compact FM antenna at an audio shop. This antenna has little or no gain but has very good directivity and is optimum for reducing multipath measures at a location having strong field strength. When using a standard di-pole antenna (provided as accessory), it is also recommended to set it outdoors in order to avoid possible influence of metallic accessories such as curtain rods, etc., not to speak of steel used in ferro-concrete structure.

## About ACCUTOUCH System

The ACCUTOUCH System will not operate for weak-wave stations below the pre-fixed muting level, since it is operated by the control signal from the C.L.L. Circuitry and the Muting Circuitry.

Therefore, when such station whose electric field is fluctuating around the muting level is tuned in with the ACCUTOUCH & C.L.L. Release Switch turned on, the ACCUTOUCH System starts or ceases to function in accordance with the fluctuation of electric field. In this case it is advisable to turn the muting level adjuster counter-clockwise.