If the MULTIPATH meter reads less than the SIGNAL STRENGTH meter reading by one unit or more, or if the multipath reading varies in rhythm with the SIGNAL STRENGTH meter reading, then you are receiving multipath signals.

The scan speed can be adjusted from SLOW to FAST by the CHANNEL SCAN SPEED slide control.

To position the antenna, tune to a fairly weak station and rotate the antenna until the signal is strongest as shown by the reading on the SIGNAL STRENGTH meter.

The frequencies selected appear on a DIGITAL READOUT, which incorporates long-life cold cathode indicators, replacing the conventional dial and pointer. This readout displays frequencies selected by one of four scanning modes: Manual scanning, automatic scanning, automatic stereo scanning, and card programing.

Stereo stations will be indicated by the STEREO and STATION lights going on. Monophonic stations will be indicated by the STATION light only going on.

Most frequently used cards may be kept in a special CARD STORAGE slot located beneath the CARD READER slot on the front panel. To use these cards, simply insert the desired card into the CARD READER slot. The words CARD PROGRAM will light up and the frequency will be displayed on the digital readout.

AUTOMATIC STATION SCANNING — Push the STATION button on the SCAN MODE SELECTOR. The tuner automatically will start scanning from the top of the FM band, 107.9 MHz, and will continue scanning down until it reaches a station, either monophonic or stereo. To select the next lower frequency station, momentarily depress and release the SCAN button to initiate scanning action.

AUTOMATIC STEREO STATION SCANNING — Push the STEREO button on the SCAN MODE SELECTOR. The tuner will now stop only on stereo signals. Scanning to the next lower frequency stereo station again is actuated by momentarily depressing and releasing the SCAN button.

REAR PANEL VIEW

H. H. SCOTT 433 DIGITAL FM STEREO TUNER

The ANTENNA BALUN switch should be positioned in either the 750 or 300Ω position, depending on whether or not 75 ohm coaxial cable or 300 ohm twin lead or shielded cable is used.

The ANTENNA switch should be set as follows:
- 750Ω position: Use 750Ω antenna when using 750Ω coaxial cable.
- 300Ω position: Use 300Ω antenna when using 300Ω twin lead or shielded cable.

ACCESSORY OUTLET — The AC outlet on the back of the tuner may be used for connecting an amplifier, a tape recorder, etc.

POWER CORD — Insert the power cord plug into the receptacle entitled PWR CORD on the back of the tuner. Always disconnect this power cord before removing the fuse for examination or replacement.

FUSE — Use only a 0.3 amp, 250 volt sti-bio fuse. This is a nominal fuse voltage rating, not a power line voltage for operating the tuner. Disconnect the power cord before removing the fuse.

TEST JACK — The rear of the panel has a TEST JACK output which makes accessible various voltages at specific test points. This is for use by qualified service personnel only, using proper test equipment.

MULTIPATH OSCILLOSCOPE OUTPUT — These outputs are for connecting the vertical and horizontal amplifiers of an oscilloscope in order to orient the antenna for minimum multipath interference.

TUNER OUTPUTS — These outputs are for connecting equipment such as amplifiers, tape recorders, etc. These outputs are in parallel with the front panel TAPE OUT jack which provides convenient temporary tape recorder connection.

FM ANTENNA — An FM dipole antenna is supplied with your tuner. In some strong signal areas your antenna should be more than adequate to satisfactorily receive most available FM stations. The dipole antenna should be connected to the two 300Ω terminals on the strip marked FM ANTENNA on the back panel.

FOUR-CHANNEL MULTIPLEX DECODER OUTPUT — The output jack provides access to the detector output for use with a multiplex decoder, if and when the FCC approves a true 4-channel broadcasting system.

OUTPUT LEVEL — The OUTPUT LEVEL Adjustments should be set so that audible volume from loudspeakers or earphones has the same average output level with FM as with phono operation.
INSTALLATION AND OPERATING INSTRUCTIONS FOR THE 
STEREOMASTER 433 DIGITAL FM STEREO TUNER

INTRODUCTION

We are proud of this exciting new Stereomaster 433 Digital FM Stereo Tuner and its many contributions to performance, accuracy and convenience of FM reception. We welcome you as an owner and we urge you to review this manual carefully. Your enjoyment will be enhanced, both by understanding the features, advantages, and operating modes of a radically different FM Tuner, and by correctly installing and operating it so that it may perform to the full limits of its potential.

Your new 433 frequency synthesizer digital tuner ranks with Scott's many major technological innovations, and like them, doubtless will be emulated in time. Being first, whether as a manufacturer or as an owner, is far more rewarding than is merely following. But wherever men dare, risk and create to explore and push back frontiers of knowledge, whenever present limits of "state of the art" performance are exceeded, problems can occur. However, exacting the design, assembly, testing, quality control, shipping, and for that matter, operation, perfection can only be approached, at least by human beings. We therefore encourage you to register for the free two year parts and labor warranty as outlined on page 20 in order to avail yourself of the manufacturer's continuing interest in your satisfaction and enjoyment of this tuner.
UNPACKING

Please unpack your tuner very carefully. We recommend that you save the packing materials and shipping box for protection both if you should have occasion to move to another location or in the unlikely event that it should be necessary to return your tuner either to the factory, or to an authorized factory warranty station, for service.

INSTALLATION, REAR PANEL CONNECTIONS

POWER CORD – Insert the power cord plug into the receptacle entitled PWR CORD on the back of the tuner. Always disconnect this power cord before removing the fuse for examination or replacement. This tuner operates on AC 110–120 volt, 50–60 Hz current only (except if export models are made, which will have 250V capability as well).

ACCESSORY OUTLET – The AC outlet on the back of the tuner may be used for connecting an amplifier, a tape recorder, etc. Only AC 110 to 120 volt, 50–60 Hz equipment drawing not more than 250 watts should be connected here. This outlet is not switched from the front panel so associated equipment must be turned on or off independently.

OUTPUT LEVEL – The OUTPUT LEVEL Adjustments should be set so that audible volume from loudspeakers or earphones has the same average output level with FM as with phono operation. Adequate adjustment range is provided, but is limited so that output levels cannot be reduced to inaudibility.

FOUR-CHANNEL MULTIPLEX DECODER OUTPUT – The output jack provides access to the detector output for use with a multiplex decoder, if and when the FCC approves a true 4-channel broadcasting system.

MULTIPATH OSCILLOSCOPE OUTPUT – These outputs are for connecting the vertical and horizontal amplifiers of an oscilloscope in order to orient the antenna for minimum multipath interference. See page 14 for further information.

TUNER OUTPUTS – Three sets of output jacks are provided for connections to equipment such as amplifiers, tape recorders, etc. These outputs are in parallel with the front panel TAPE OUT jack which provides convenient temporary tape recorder connection.

FM ANTENNA – An FM dipole antenna is supplied with your tuner. In strong signal areas this should be more than adequate to satisfactorily receive most available FM stations. The dipole antenna should be connected to the two 300 Ω terminals on the strip marked FM ANTENNA on the back panel. The dipole should then be opened to full “T” configuration with the top bar of the “T” horizontal, and positioned to give the highest readings on the SIGNAL STRENGTH meter on the front panel. To position the antenna, tune to a fairly weak station and rotate the antenna until the signal is strongest as shown by the reading on the SIGNAL STRENGTH meter. Sometimes rotating the antenna will give multiple maximum readings when the FM signals come from various points of the compass. Usually, a compromise position can be found which works best for most of the stations desired.

Generally the higher the dipole can be placed, the stronger the signals are likely to be. If you wish to place the dipole further away than its present lead length permits, additional 300 ohm twin lead cable should be procured from your dealer for connection between antenna and antenna terminals.

The ANTENNA BALUN switch should be positioned in either the 75Ω or 300Ω position, depending on whether 75 ohm coaxial cable or 300 ohm twin lead or shielded cable is used.

For reception of weak and fading signals, or where noise and multipath interference are problems, an external antenna may be necessary. Please refer to pages 11 and 13 for information on antenna selection, connection and orientation.
OPERATING INSTRUCTIONS

Now that you’ve carefully selected, located, oriented and connected a suitable antenna for your particular location, let’s discuss how you operate your new Stereomaster 433 Digital FM Stereo Tuner. First notice that there are no knobs to turn. Lots of buttons to push, but no dial, no pointer, no strings connecting the pointer to the rotary tuning knob . . . no rotary knobs at all. Instead, depressing a SCAN bar causes a discrete series of scanning steps to occur, from exact center of one station to exact center of the next lower frequency station. This produces drift-free 100% accurate digital tuning with crystal controlled accuracy on every one of 100 FM channels available on the North American Continent. The frequencies selected appear on a digital readout, which incorporates long-life cold cathode indicators, replacing the conventional dial and pointer. This readout displays frequencies selected by one of four scanning modes: Manual scanning, automatic scanning, automatic stereo scanning, and card programming.

POWER — This switch will be depressed to the “ON” position in order to turn the tuner on and of course must be pushed again to the “OFF” position to turn the tuner off.

MANUAL STATION SCANNING — Push the CHANNEL button on the SCAN MODE SELECTOR. Then push in and hold the SCAN bar until the desired frequency is reached. Be sure to release the SCAN bar in time, because if you pass the desired frequency, you must sweep through the entire FM band in order to reach it again. The tuner scans in one direction only, from the highest frequency, 107.9 MHz, through to the lowest, 88.1 MHz, and then repeats the scanning cycle. The scan speed can be adjusted from SLOW to FAST by the CHANNEL SCAN SPEED slide control. At faster speeds you can sweep through the entire FM band in several seconds, so you may reach a specific channel rapidly by adjusting CHANNEL SCAN SPEED to FAST, depressing the SCAN bar and holding it in until you reach frequencies just above that desired. Then release the SCAN bar, adjust CHANNEL SCAN SPEED to SLOW and with great skill and savoir faire again hold in the SCAN bar until the desired frequency is reached. With a little practice you’ll find that you readily achieve desired frequencies without over-shooting, even at relatively rapid scanning speeds. The manual scanning mode is useful when the desired station frequency is known and if you’re “browsing” through the FM band for program material worth listening to.

Stereo stations will be indicated by the STEREO and STATION lights going on. Monophonic stations will be indicated by the STATION light only going on.

AUTOMATIC STATION SCANNING — Push the STATION button on the SCAN MODE SELECTOR. The tuner automatically will start scanning from the top of the FM band, 107.9 MHz, and will continue scanning down until it reaches a station, either monophonic or stereo. To select the next lower frequency station, momentarily depress and release the SCAN bar to initiate scanning action. Again, stereo stations will be indicated by the STEREO and STATION lights lighting up, while monophonic stations will be indicated by just the STATION light going on.

AUTOMATIC STEREO STATION SCANNING — Push the STEREO button on the SCAN MODE SELECTOR. The tuner will now stop only on stereo signals. Scanning to the next lower frequency stereo station again is actuated by momentarily depressing and releasing the SCAN bar. As the tuner stops at a station, the STEREO and STATION lights will light up and the exact frequency will be shown in the digital readout.

CARD PROGRAMMING — This unique feature offers instant tuning to any desired FM station frequency with programmed cards. A complete set of 100 cards is supplied, one for each available frequency in the FM band. Determine station frequencies within your listening area, select the corresponding cards, and write in FM station
call letters in the space provided on each card. Most frequently used cards may be kept in a special CARD STORAGE slot located beneath the CARD READER slot on the front panel. To use these cards, firmly insert the desired card into the CARD READER slot. The words CARD PROGRAM will light up and the frequency will be displayed on the digital readout. Stereo stations will be indicated by both STEREO and STATION lights, monophonic stations by just the STATION light. Inserting a card will override all other control settings. When a card is removed, the tuner circuit automatically reverts to previous mode of operation and cycles to the highest frequency 107.9, ready for either another card or for manual scanning down through the FM band.

To determine which station frequencies are in use and listenable in your area, we suggest that you insert one card after another in the CARD READER slot, until you have gone through the entire deck. Do not discard cards which you will not be using. You may need them if you move to another location. Local newspapers will give FM station call letters for each station frequency in your area.

Several unprogrammed cards are supplied in case you should lose or accidentally destroy a card. Fig. 1 gives diagrams for coding of each frequency. Locate the diagram for the frequency of the lost or destroyed card, and using a sharp knife cut along the lines provided, removing the tabs indicated in white on the diagram.

If it becomes necessary to obtain a replacement set of programmed and extra cards, please write to Customer Relations Department, H. H. Scott, Inc., 111 Powder Mill Road, Maynard, Mass. 01754. It is not practical to replace individual cards, but an entire set of cards can be obtained for ten dollars.

TAPE OUT — This jack is in parallel with rear panel TUNER OUTPUT jacks, and provides front accessibility for convenient temporary tape recorder connection. If you are tape recording, lock in the tuner station, either with the appropriate station card inserted, or by depressing the CHANNEL button. Otherwise, noise, multipath interference, fading, or station momentarily turning off the stereo pilot carrier frequency for test purposes could cause the tuner to cycle automatically to the next lower frequency station, thereby interfering with continuity of tape recording.

MUTING — When the SCAN button is depressed, muting action is automatically initiated before actual scanning begins, and muting continues for the duration of that scanning cycle. If the MUTING button is in the OFF position, and the tuner is scanning manually, you may get a frequency where there is no station. Then rushing FM
noise will be heard. This also applies with very weak or marginal signals. If tuning to marginal and noisy signals is to be avoided, depress the MUTING button to the ON position and the tuner automatically will mute these marginal or noisy signals.

If for some reason you wish to receive marginal signals, the MUTING button of course should be in the OFF position. With MUTING in the OFF position, under some circumstances it may be possible to tune to a marginal or not-in-use channel adjacent to a strong local station, and hear a distorted noisy image of the signal from the strong station.

MODE – In the STEREO position of the MODE button, scanning action in either CHANNEL or STATION positions of the SCAN MODE SELECTOR permits both monophonic and stereo signals to be received. The MONO position is desirable if a desired station is marginal for acceptable stereo quality, but may be listenable in the monophonic mode. Also, if multipath interference causes the tuner to switch back and forth between mono and stereo when it is inconvenient to reorient the antenna and minimize such multipath interference, more reliable and listenable signals can be obtained by depressing the MODE button to the MONO position. In the STEREO position, unless the stereo signal is of sufficient quality, the tuner automatically will initiate scanning action to the next lower frequency in either the STEREO or STATION positions of the SCAN MODE SELECTOR.

SCAN MODE SELECTOR – The three buttons of the SCAN MODE SELECTOR are CHANNEL, STEREO, and STATION. These are interlocked so that only one may be depressed at a time. Automatic scanning is possible only if (1) no card is in the card reader, (2) the SCAN bar is depressed, or (3) if a marginal signal should fade to unlistenable levels. In that case the tuner would cycle automatically to the next lower frequency. To avoid such automatic cycling under conditions of marginal or fading, but desired signals, the CHANNEL button should be pushed in order to prevent the tuner from scanning.

FILTER – This is a noise filter which in normal listening conditions will be in the OUT position. Under circumstances where high frequency noise such as record surface noise, when worn records are being broadcast, or sub-channel filter noise, interferes with operation, particularly under conditions of desired but marginal signals, this FILTER in the IN position will reduce high frequency response and separation in order to make the signal more listenable.

TUNER FUNCTION CHECK – To check that tuner functions are operating normally, you can cause the tuner to cycle indefinitely, with no ill effects on its circuitry. Push in the STEREO button of the SCAN MODE SELECTOR bank and the MODE button to MONO position. The tuner then will scan for stereo, but since the MODE button makes possible only selection of mono stations, the tuner will scan continuously, recycling through the FM band. To stop continuous scanning, release the MODE button to the STEREO position. Noise muting may be initiated by pushing the MUTING button to ON.

EXTERNAL ANTENNA SELECTION

The computer industry has a term GIGO, which stands for “garbage in, garbage out”. Your new tuner has great sensitivity, but to achieve its full potential it must have adequate signal input. In weak signal areas and where multipath reception occurs, this input is a function of an adequate antenna, properly placed, oriented, and connected to the tuner.

Remember that FM transmission involves very high frequencies which are directional. FM signals normally will not bend, either around the curvature of the Earth or around mountains or buildings. Line of sight transmission involves a range to the horizon, so the average limit of useable FM transmission is about 30 miles. This can be increased by raising the height of the transmitting antenna or the receiving antenna, or both. Mountains or buildings in the path of signals may block or reflect them and cause multipath signals to be received as described on page 13. Received signals become more marginal in distant or fringe area, in valleys or areas where signals are blocked by mountains, in noisy areas subject to FM interference such as locations near busy highways, and in city areas where large buildings block or reflect signals. More sensitive and directional external antennas may be needed to receive marginal signals under such conditions.
For adequate reception of stereo multiplex, a good external antenna is almost mandatory in marginal signal areas, whether for distance, interference or multipath reasons. Many fine Yagi or log periodic FM antennas are available commercially to provide strong signals and minimize interference, thereby enhancing the range and performance of your tuner. A typical antenna is shown in Fig. 2.

![Typical FM Antenna](image)

**Figure 2**

In high-noise areas such as those adjacent to heavy highway traffic, a Yagi or log periodic antenna should be located as far as possible from the source of disturbance, but preferably not much more than 50 feet from the tuner. In this case, 300 ohm shielded cable should be used and the shield should be connected to the GND connection on the FM ANTENNA terminal strip. 75 ohm coaxial cable may also be used and this should be connected to the 75 Ω FM ANTENNA input jack. Solder a standard automobile antenna plug to the coaxial cable after stripping the insulation to expose the ground shielding and the insulated center wire.

Since Yagi or other antennas mentioned are extremely directional, the antenna should be oriented for best reception of desired stations as indicated by highest SIGNAL STRENGTH meter readings. In areas where signals are received from diverse directions, an antenna rotator may be desirable.

There is more to selecting and installing a good antenna than most people realize. Properly installing the lead-in cable is almost as important as properly installing the antenna. A good antenna system is one of the best investments that you can make if you are to achieve best performance from your new 433 tuner. The high sensitivity and selectivity of your tuner, together with an adequate antenna, allow you to receive more and more distant FM stations, either monophonically in stereo.

**MULTIPATH RECEPTION**

MULTIPATH INTERFERENCE — After adjusting your system for maximum signal strength, you should adjust your antenna for minimum multipath reception. Basically, multipath interference is similar to a TV "ghost". The FM signals are reflected from a mountain or large man-made structure, as shown in Fig. 3. This causes reflected signals to reach your antenna a fraction of a second later than the signals received directly from the transmitter. This effect, if severe, may cause distortion and unbalanced stereo sound.

![Multipath Reception Diagram](image)

**Figure 3**

If the MULTIPATH meter reads less than the SIGNAL STRENGTH meter reading by one unit or more, or if the multipath reading varies in rhythm with the SIGNAL STRENGTH meter reading, then you are receiving multipath signals. This situation can be corrected by re-orienting your antenna and possibly by re-routing your lead-in cable for minimum difference and synchronization. If the MULTIPATH meter reading remains fairly constant, then your antenna is set properly.
MULTIPATH OSCILLOSCOPE OUTPUT — Greater precision in antenna orientation and lead-in cable routing for minimum multipath can be obtained with an oscilloscope. Two jacks marked VERT. and HORIZ. are provided on the back of the panel under the heading MULTIPATH OSCILLOSCOPE OUTPUT. These jacks deliver error voltages caused by various degrees of multipath signals, and these error signals can be displayed visually on the vertical and horizontal plates of an oscilloscope simultaneously.

The output voltages of these two jacks are between 50 and 100 millivolts depending upon the degree of modulation (loudness) of the FM station, and on normal component tolerances of the tuner.

The oscilloscope used should have a full-scale sensitivity of 50 mv and a frequency response of about 5 to 250,000 Hz. Should your scope lack sufficient sensitivity, a 5–250,000 Hz preamplifier may be required to provide sufficient gain.

Connections to the oscilloscope should be made with shielded audio cable. Once the oscilloscope has been connected, tune to an FM station, and observe the pattern.

Fig. 4 shows the most common patterns you may find on your oscilloscope. With practice you will be able to tell at a glance what sort of FM signal is being received.

Depending upon internal scope phasing, the pattern may be right side up or up side down. The width of the bowl is proportional to the loudness (modulation) of the station. A weak station will be a broad fuzzy line. Scope patterns with ridges and zig-zags indicate multipath reception. The steeper these ridges, the worse the multipath. When multipath reception is indicated, the antenna should be rotated or moved, and/or the lead-in cable routing should be rotated or moved, and/or the lead-in cable routing should be changed to obtain the bowl-shaped pattern.

TV ANTENNA USE — Many apartment buildings provide TV antenna service from roof-top antennas which feed a distribution system to TV-antenna wall-receptacles. You can use a 75 ohm plug to connect your tuner to this receptacle. First, however, ask your landlord whether the receptacle is of 50 or 75 ohm impedance. If 50 ohm service is provided, use an external transformer to accommodate 50 ohm antenna leads. If 75 ohm, run a 75 ohm coaxial cable to the TV wall-receptacle, install a standard automobile antenna jack at the other end of the cable, and connect it to the tuner 75 Ω FM ANTENNA input. Another caution is that some master antenna systems filter out the FM portion of the band, thereby making FM reception worse than with the simple dipole antenna provided. In that case a suitable separate antenna must be installed.
If a standard home TV antenna is to be used for both TV and your tuner, a double-pole, double-throw switch or a TV quick-clip should be used so that the TV antenna can be switched either to the TV set or to the tuner, as shown in Figures 5 and 6. Such switching is recommended if maximum signal strength of the received signal, either TV or tuner, is desired. If such switching is not provided, the impedance of the set not in use is likely to detune the input and thereby degrade reception from the set in use.

![TV Quick Clip Diagram](image)

Digital readout is provided by decoding binary information which determines the desired ratio of the programmable divider. This readout is always exactly accurate and indicates in all modes of operation. Automatic stepping operation is initiated by a sequential code generator which is disabled during card programming. A block diagram is shown in Figure 8. Thirty-three integrated circuits, 56 transistors, and 37 diodes are incorporated, as are two 6-pole lumped LC filters in the IF circuits. These give considerably better selectivity than do crystal filters. Outputs are filtered for beat-free tape recording, thereby eliminating possible whistle. Continuous monitoring of multipath conditions is provided, as is completely noise-free four-way muting.

**DESCRIPTION**

Your new H. H. Scott Stereomaster 433 Digital FM Stereo Tuner incorporates innovations which advance the frontiers of present state-of-the-art circuitry. The 433 will tune to any one of the 100 channels available in the FM band from 107.9 through 88.1 MHz. It is impossible to tune to anything but the exact center of each channel. Tuning itself is not continuous as in a conventional manual tuner, but occurs in discrete steps from channel to channel. This tuning system is made possible by a phase-lock loop, a digital programmable divider, a varactor tuned RF section, and an error correction system using a quartz crystal as a reference standard. The end result is digital tuning with crystal controlled accuracy for every frequency in order to eliminate drift entirely.
Interstation noise is entirely eliminated in all operating modes. Phase muting is provided so that the tuner will initiate muting if not tuned to a proper frequency. Mono stations are muted entirely during stereo scanning action. Other muting is provided if the signal fails or becomes marginal. SCAN bar muting is provided so that muting action is initiated automatically before a scanning cycle begins, and is maintained until the next station is tuned in.

Every circuit feature and performance specifications of this tuner has been designed to equal or exceed limits of present state-of-the-art FM reception in quality, reliability, convenience, and user enjoyment. We wish you many years of trouble-free performance and pride in ownership of this new contribution to FM reception from the laboratories of H. H. Scott, Inc.

**433 STEREOMASTER DIGITAL FM STEREO TUNER SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHF Sensitivity</td>
<td>1.9 μV</td>
</tr>
<tr>
<td>Sensitivity (within 3 dB of full quieting)</td>
<td>6 μV</td>
</tr>
<tr>
<td>Signal to Noise Ratio</td>
<td>67 dB</td>
</tr>
<tr>
<td>Ref. 100% Modulation</td>
<td></td>
</tr>
<tr>
<td>Cross Modulation Rejection</td>
<td>90 dB</td>
</tr>
<tr>
<td>Harmonic Distortion (MONO)</td>
<td>0.25%</td>
</tr>
<tr>
<td>Drift (warm up)</td>
<td>600 Hz (0.0006%)</td>
</tr>
<tr>
<td>Drift (24 hrs. @ 25°C)</td>
<td>150 Hz (0.00015%)</td>
</tr>
<tr>
<td>Capture Ratio</td>
<td>1.8 dB</td>
</tr>
<tr>
<td>Selectivity (alternate channel)</td>
<td>75 dB</td>
</tr>
<tr>
<td>Spurious Rejection</td>
<td>100 dB</td>
</tr>
<tr>
<td>Image Rejection</td>
<td>75 dB</td>
</tr>
<tr>
<td>Audio Hum (ref. 100% mod)</td>
<td>70 dB</td>
</tr>
<tr>
<td>Muting</td>
<td>70 dB</td>
</tr>
<tr>
<td>Stereo Separation</td>
<td>40 dB</td>
</tr>
<tr>
<td>Phase Lock acquisition time</td>
<td>5 m sec</td>
</tr>
<tr>
<td>(adjacent channel)</td>
<td></td>
</tr>
<tr>
<td>Phase Lock acquisition time</td>
<td>40 m sec. (worst case)</td>
</tr>
<tr>
<td>(card program)</td>
<td></td>
</tr>
<tr>
<td>Automatic Scan Speed</td>
<td>3 ch/sec.</td>
</tr>
<tr>
<td>Manual FAST SCAN</td>
<td>20 ch/sec.</td>
</tr>
<tr>
<td>Manual SLOW SCAN</td>
<td>1 ch/sec.</td>
</tr>
</tbody>
</table>

**CAUTIONS, WARRANTY REGISTRATION AND SERVICE**

**POWER** — This unit should be connected only to 110–120 volt, 50–60 Hz AC power.

**FUSE** — Use only a 0.3 amp, 250 volt slo-hlo fuse. This is a nominal fuse voltage rating, not a power line voltage for operating the tuner. Disconnect the power cord before removing the fuse.

**POOR FM RECEPTION** — Check that the ANTENNA BALUN switch is in the proper position. Check all external antenna connections and check for the existence of multipath interference and distortion as outlined on page 13. Sometimes distortion (usually a hissy “s” sound when the announcer speaks, or audible breakup of the music) occurs even with adequate signal strength and normal noise suppression. The trouble then is likely to be multipath distortion caused when FM signals reflect off buildings, mountains, of other objects causing additional signals to arrive at your antenna at different intervals. The result will be distortion, and the best solution is a well-oriented outdoor antenna. We stress this because adequate signal strength (no background noise, hiss, etc.) does not mean that you necessarily are getting best reception, even when located in a metropolitan area near the FM station. Actually, metropolitan locations increase the likelihood of multipath distortion because stronger signals reflect off nearby buildings and elevated structures with more intensity than do weaker signals transmitted from distant locations.

**TEST JACK** — The rear of the panel has a TEST JACK outlet which makes accessible various voltages at specific test points. This is for use by qualified service personnel only, using proper test equipment.

**CAUTION** — Your tuner is factory aligned. Do not attempt alignment without proper equipment and knowledge. To prevent electrical shock — do not remove covers. There are no user serviceable parts inside. Please refer servicing to qualified service personnel only.

**WARRANTY REGISTRATION** — We, like you, take pride in this new tuner and we stand ready to assist you in any reasonable and practical manner. Should you have questions regarding installation, operation, performance, or service, don’t hesitate to write our Customer Relations Dept. We remind you that you must register to validate your warranty, using the card accompanying the tuner, if you are to receive the protection of the two-year parts and labor warranty described on page 20.
SCOTT AUDIO COMPONENT, LOUDSPEAKER
SYSTEM, AND STEREO MUSIC SYSTEM
WARRANTY

All H. H. Scott professional quality tuners, amplifiers, receivers, compact stereo music systems, and loudspeaker systems are warranted against defects in material and workmanship for two years from the date of sale to the consumer. The unit must be delivered to and picked up from either an authorized Scott warranty service station or the Customer Service Department, H. H. Scott, Inc., 117 Powdermill Road, Maynard, Massachusetts 01754.

This warranty covers repair and/or replacement of any part found by the manufacturer, or his agent, to be defective, including any associated labor cost.

The above warranty does not apply to (1) accessory parts explicitly covered by the field warranty of an original manufacturer; (2) units subjected to accidental damage or misuse in violation of instructions; (3) normal wear and tear; (4) units repaired or altered by other than authorized service agencies; and (5) units with removed or defaced serial number.