

Equipment Profiles

This Month:

- Fisher Model 500-TX Stereo FM/AM Receiver
- Ampex Model 1461 Stereo Tape Recorder
- Empire Model 999VE Stereo Cartridge
- Shure Model 548 Microphone

Fisher Model 500-TX Stereo FM/AM Receiver

MANUFACTURER'S SPECIFICATIONS:

FM Tuner Section. IHF usable Sensitivity: 1.7 μ V. S/N: 65 dB. Capture Ratio: 1.5 dB. Selectivity (Alternate Channel): 70 dB. Image Rejection: 65 dB. Spurious Rejection: 100 dB. Stereo FM Separation: 38 dB @ 400 Hz. **AM Tuner Section.** Sensitivity: 10 μ V. Selectivity: 80 dB. **Amplifier Section.** IHF Power @ 8 ohms: 190 watts \pm 1 dB. RMS Power Output: 65 watts/channel @ 8 ohms. Power Bandwidth: 8 Hz to 35,000 Hz. THD: 0.5% at rated output. IM: 0.8% at rated output. Frequency Response (Aux): 20 to 25,000 Hz \pm 1.5 dB. S/N: Phono: 60 dB. Tone Control Range: Bass: \pm 12 dB @ 50 Hz; Treble: \pm 12 dB @ 10 kHz. **General.** Dimensions: 16 $\frac{7}{8}$ in. W x 4 $\frac{13}{16}$ in. H x 14 $\frac{1}{2}$ in. D. Price: \$449.95.

The flexibility normally associated with Fisher products has been expanded in completely new directions in this "top-of-the-line" receiver. In addition to an ample quantity of controls, this new receiver features *four* ways in which to tune in desired FM stations.

First, of course, there is the usual fly-wheel/dial-scale combination similar to that found in most receivers (and a lot smoother acting than some). The upper right portion of the gold colored dress panel, beyond the massive tuning knob, has six combination controls, as can be seen in Fig. 1. Each of the central four of these consists of a tiny push button, surrounded by a concentric multi-turn rotatable knob. Each of these rotating knobs, in turn, controls a miniature tuning-dial pointer running vertically above the knob. Thus, four most-listened-to stations can be presented by means of these controls. The left-most of the buttons is depressed for manual tuning, whereas its concentric outer knob turns on or defeats the built-in AFC circuits. The right-most of the six little controls, when depressed, introduces two more methods of tuning, which Fisher has dubbed "AutoScan"TM. Directly below the six controls mentioned are two dark-colored buttons (on the lower right section of the panel). Depressing the left button will cause this remarkable circuit to start scanning the FM

broadcast spectrum in a "downward" (in frequency) direction until the next station is tuned in. If the button is depressed just momentarily, the circuits will "lock on" to the next listenable station. If the button is held in, scanning will continue until the low end of the dial is reached. The right-most of these two buttons does exactly the same thing, but scanning is then the direction of the higher frequencies, until 108 MHz is reached.

While the scanning principle itself is not new (better automobile radios have had similar features for years), the remarkable thing about this system is that there are *no* moving parts! Nothing moves except the pointer on a dual-purpose tuning meter, the upper half of which is calibrated in MHz. In manual tuning (or even in pre-selected push-button tuning) this same meter is used as a signal-strength indicator for accuracy of center-channel tuning. In the case of the AutoScan circuit, the unit is designed to stop at the precise center-of-channel point. Therefore, the meter can be used to indicate frequency rather than signal strength. Clever dual illumination (alternatively) of the upper and lower halves of the meter scale clearly tells the user which function the meter is performing at any instant.

Because the front-end of this receiver is "voltage tuned" (there is no variable capacitor in the normal sense of the word) for FM operation, the tuning schemes already described are further augmented by an accessory "remote control" hand-held device which simply duplicates the "up-scale" and "down-scale" buttons of the AutoScan feature. Supplied with twelve feet of cable, the optional remote control (Model RK-30, \$9.95) enables the user to change stations from his chair without approaching the receiver itself.

The lower half of the front panel is fairly conventional, featuring, starting at left, a stereo headphone jack, four-position rotary selector switch (Aux, AM, FM, and Phono); a speaker switch (off, remote, main, main plus center channel, and all); a mode switch for mono, stereo, or tape monitor; dual concentric bass and treble controls (each channel may be controlled separately or, with the familiar clutch control arrangement, each dual knob can be rotated as one if desired) and finally, a volume control which, in its counter-clockwise position turns off power to the unit. Six additional miniature push-buttons located at the lower right complete the panel layout. The two used for AutoScan tuning have already been described. The others are of the push-

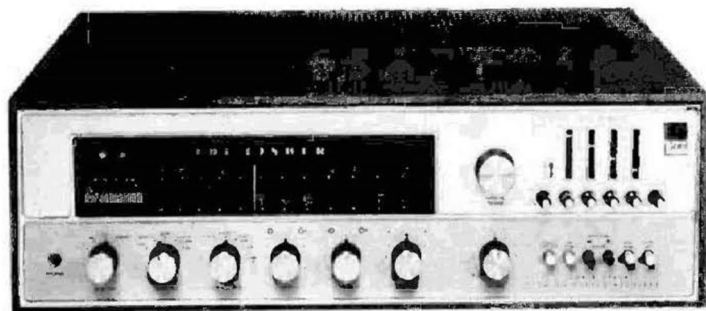


Fig. 1—Fisher Model 500-TX Stereo FM/AM receiver with optional remote-control tuning.

Equipment Profiles (continued)

to-make, push-to-release type. They control loudness-contour, a low-frequency filter, a high-frequency (scratch) filter, and the muting circuits are engaged, a light above the tuning meter indicates this fact. It is located right alongside Fisher's familiar "Stereo Beacon" light which denotes the reception of an FM stereo program. For all that this front panel contains, it is amazingly "uncluttered" in appearance and is totally tasteful, esthetically. We rather wish, though, that Fisher had added yet another button, so that the power on-off function could have been divorced from the volume control.

Examination of the rear panel (shown in Fig. 2) discloses a pair of convenience power outlets, a line fuse, terminal strips for main and remote loudspeaker connections, as well as a strip for direct connection of a "center channel" or remote-mono speaker, FM and AM antenna terminal strips and the usual input, tape output, and monitor jacks. A slide switch next to the phono input jacks selects gain settings for high- and low-level magnetic cartridges (2.5 mV or 10 mV for full output). A very handy addition is the presence of a pair of "jumper" cables, connected from packs labelled "Reverb in" to those labelled "Reverb out." Intended for insertion of Fisher's reverb unit *between* preamplifier and power amplifier sections, it's nice to be able to interpose other equipment (such as frequency filters, presence controls, and the like) of one's own choosing without having to "tear into" the wiring of the

actual receiver. A multi-pin socket on the rear panel enables connection of the RK-30 AutoScan Remote Tuning Control mentioned earlier.

A hefty AM ferrite antenna swings away from the metal rear of the receiver as soon as the unit is unpacked, since many users forget to "pivot" this rod antenna away from the surface of the chassis to ensure best AM reception. Our only criticism of the rear layout (and it is one which we've mentioned before with respect to other Fisher products) is the continued use of closely spaced, non-barrier terminal strips for speaker connection points. Admittedly, everyone cautions about avoiding shorts between speaker leads when hooking them up, but not every user will use spade lugs under terminal strips. Most will still twist the strands of wire together and do the best they can to shove them under the heads of the screws, often leaving a stray strand or two sticking out just enough to reach the terminal of opposite polarity.

Performance

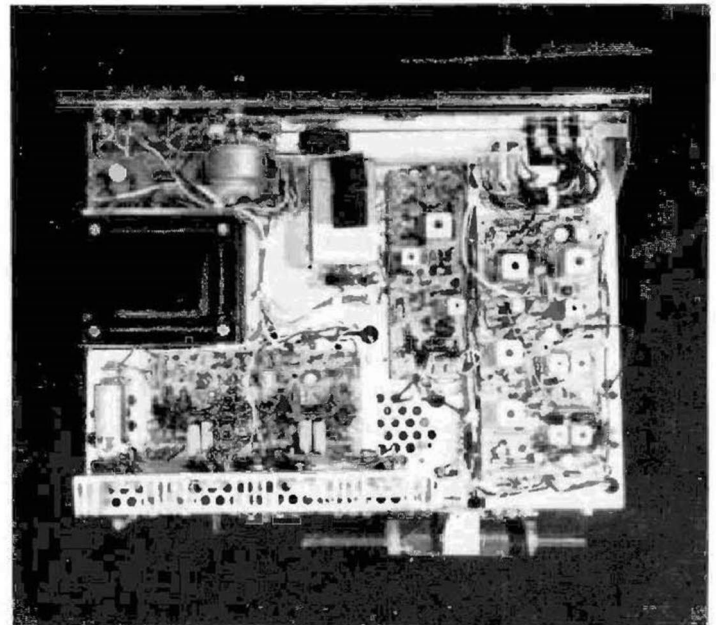
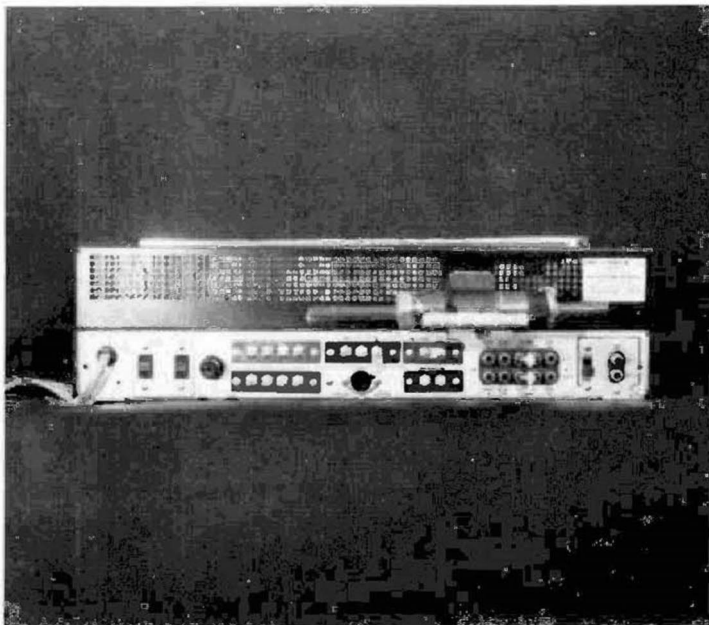
The Fisher 500-TX is very easy to get used to. Naturally, we concentrated on FM, because of the many tuning innovations. Station lock-in is flawless. That is, when the auto-scan stops on a station it stops on the exact "center" of that channel. Because this tuner is of a wide-band design, this is difficult to prove when listening to an actual station (had the "scan" stopped a bit off center, we would not have been able to detect it audibly except in the case

of very weak stations which do not cause full limiting). Accordingly, we put our own "station" on the air, in the form of a signal generator, being swept ± 300 kHz at a carrier frequency of 97 MHz and a signal strength of $100 \mu\text{V}$. The photograph in Fig. 4 shows the detector "S" curve obtained using the AutoScan and letting it "home in" on our signal. Note that it locked in on precise center of the curve. This test, by the way, is far more severe than would be encountered in normal station selection because of the extremes of modulation we employed.

As noted, then, AutoScan is probably more accurate in tuning to center of desired channel than can be accomplished manually, but our particular unit did exhibit one little quirk. Because we have so many stations on the band in our area, so closely spaced together (we logged 43 on this unit, 15 of them in stereo), our AutoScan had a tendency to race ahead of itself just a bit. That is, when we took our finger off the "scan" button (either the down-scale or the up-scale one), instead of stopping on the very next station up or down the line, the circuit would often skip over the next station and settle in on the next one after that. No amount of "quick-finger" releasing seemed to alter this situation. It should be noted, however, that this occurred only when we let the AutoScan change frequency over a wide range. If we tapped the button just to go from one station to the next, everything worked fine. In other words, as a random scanner (when you just want to go from

Fig. 2—Rear-panel layout of Fisher 500-TX receiver, and a topside view of chassis with cover removed. We counted (via schematic)

55 active solid-state devices, excluding diodes and rectifiers, of which two are multi-circuit ICs.



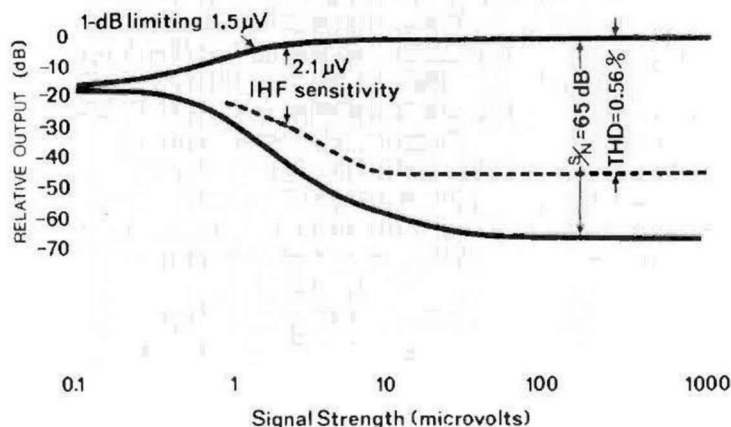


Fig. 3—Stereo FM characteristics of the Fisher Stereo FM/AM 500-TX receiver.

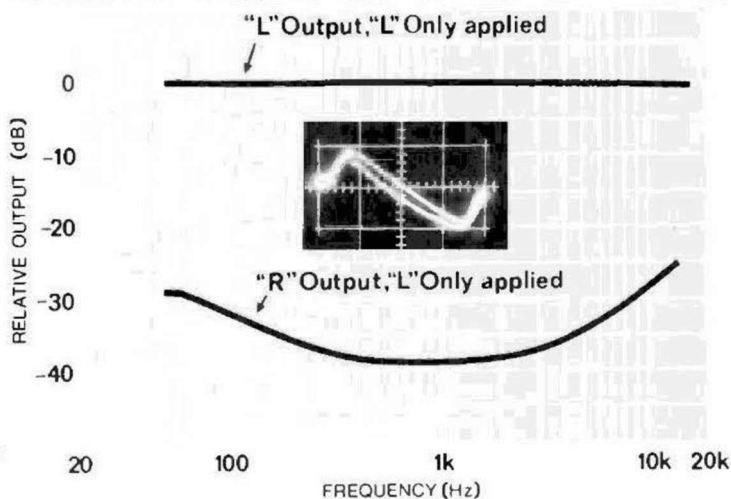
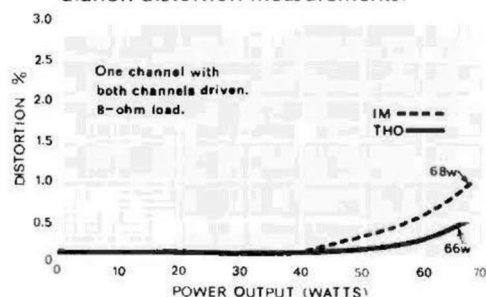


Fig. 4—FM separation measurements. The photo shows the "S" curve observed at the output of the tuner section.

Fig. 5—Harmonic distortion and intermodulation distortion measurements.

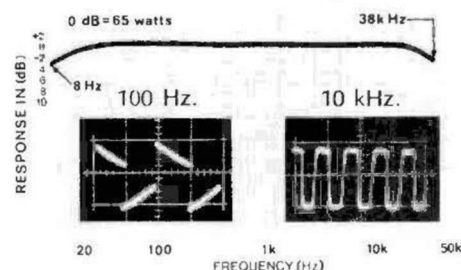


station to station to see what's on) it is truly a wonderful thing to have, but to get from 106.5 MHz down to 93.5 MHz in a hurry, you'd be better off using the manual flywheel tuning or setting up the desired frequencies on any of the four "pre-select" buttons.

FM sensitivity measurements edged up close to the spec's $1.7 \mu\text{V}$ IHF sensitivity figure, hitting $2.1 \mu\text{V}$ at 98 MHz, as shown in Fig. 3. Usable sensitivity was everything we could have desired and limiting took place at a remarkable $1.5 \mu\text{V}$. Ultimate signal-to-noise ratio was 65 dB, as claimed. Stereo FM performance was excellent (see separation curves of Fig. 4). And the muting action was positive, introducing no audible distortion in the case of marginally acceptable stations, or any others for that matter. Muting was overcome by signals of as low as $5 \mu\text{V}$.

We can confirm the power output specification, as given in terms of r.m.s., as actually exceeding the 65 watts per channel claimed, as shown in Fig. 5. Rated distortion (0.5%) is achieved at 66 watts, while IM reaches 1% at 68 watts. Power bandwidth extended from 8 to 38,000 Hz, based upon 65 watts

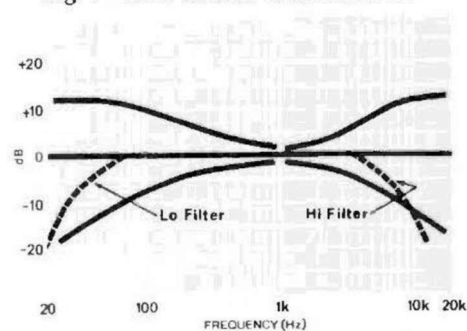
Fig. 6—Power bandwidth illustrates frequency range at half power. Also pictured is square-wave response.



per channel, as shown in Fig. 6. Tone control range was adequate and quite symmetrical (See Fig. 7). The low and high-frequency filters are also plotted in Fig. 7 and are of the 12 dB/octave type, making them useful and meaningful.

Since we spent a great amount of time experimenting with the FM tuning features of this receiver, we felt we had to devote some listening time to the 500-TX in amplifier-only terms. We "lived" with this unit for purposes of recorded music reproduction for nearly two weeks, subjecting it to every conceivable type of recorded material—from synthesized electronic music to baroque. Always, we sensed that here was an amplifier section with great power reserve that could handle just about anything we fed to it at very loud levels in large listening rooms. We decided, too, that this kind of power rating is just begging for remote speakers, so we operated a pair or these in another room (out of earshot) to see if "halving" the power availability to the "main" pair would in any way impair the dynamic response available. It did not!

Fig. 7—Tone-control characteristics



Finally, we decided to add a "center channel" speaker in the main listening area. Unfortunately, since there is no separate level control for this center channel output, we found the center-channel fill destroyed some of the stereo illusion. Of course, a local "pad" could be added to a center speaker used in this way. As a remote mono speaker, though, the center channel connection is useful as it is, since it enables you to have stereo in two locations and, if you desire, a mono equivalent in a third location.

The Fisher 500-TX is a top-grade receiver whose performance might easily challenge that of even some of the better separate tuners and amplifiers in Fisher's own line or in competing ones. It's obviously slanted towards FM, but all the wonderful tuning convenience features cannot obscure the fact that it's a powerhouse of an amplifier that is capable of excellent transient response (see square-wave photos of Fig. 6, particularly the lack of "rounding" in the 10-kHz presentation), and truly "big," "clean" sound.

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