# Equipment Profiles



## Marantz Model Nineteen FM Stereophonic Receiver

MANUFACTURER'S SPECIFICATIONS:

FM SECTION: **IHF Sensitivity:** 2.0 μV. **S/N:** 73 dB. **THD:** (Mono and Stereo): 0.15% maximum. **Frequency Response:** 20 to 15 kHz ± 0.5 dB. **Stereo Separation:** 45 dB @ 1 kHz. **38 kHz Supression:** 65 dB. **67 kHz Supression:** 65 dB. **Selectivity:** 50 dB.
AMPLIFIER SECTION: **RMS Power Output:** (both channels driven): 50 watts per channel at 4 or 8 ohms; 30 watts per channel at 16 ohms. **THD:** 0.15% Maximum. **IM:** 0.2% maximum. **Power Bandwidth:** 7 Hz to 40 kHz. **Hum and Noise:** high level, -80 dB; phono, 1 μV. equivalent input (74 dB below a 5-mV. signal input referenced to full output). **Damping Factor:** 80 at 8 ohms. **Frequency Response:** high level, 20 Hz to 20 kHz ± 0.5 dB. **RIAA Equalization on Phono:** + 0.5 dB. **Input Sensitivity:** high level, 100 mV.; Phono, 1 mV.
GENERAL: **Overall Dimensions:** 18¼ in. W. x 6⅛ in. H. x 16 in. D. **Shipping Weight:** 46 lbs. **Suggested Retail Price:** $1000.00 (walnut cabinet optional extra).

In reviewing a $1000.00 receiver, such as the new Marantz Model Nineteen stereophonic receiver, one almost has to take a completely new perspective. *Of course* a receiver such as this meets all of its specifications with plenty of margin. Certainly, the construction, choice of components, chassis layout, and styling leave practically nothing to be desired. The real question, it would seem to us, is, "In what ways does this receiver justify its price tag as compared with, say, the next lower-priced group of receivers?" The answer involves so many extraordinary features (some obvious, some subtle) that a goodly portion of this review will be devoted to them.

To begin with, the front panel is constructed of heavy gold-anodized aluminum into which has been set a long, black, molded bezel, surrounding the tuning dial, horizontal tuning flywheel, and the oscilloscope display and its associated controls. The flywheel tuning control has appeared on Marantz products before, and whether you use your thumb or your forefinger to spin it, it is still just about the smoothest and neatest tuning control extant. The action involved in using this control somehow lends a measure of precision and control of tuner setting not possible with the more conventional "twist and turn" tuning knobs. Moreover, this is obtained without sacrificing speed of getting from one end of the dial to the other—human engineering at its very best. With fewer mechanical linkages involved (the flywheel has the dial string wound directly on its shaft), the "feel" of this tuning mechanism has just got to be smoother than most others—and it is. Other familiar trademarks are the large, matching, metal-turned knobs used for signal-source selection, balance, volume, bass and treble, and speaker selection. The tone control knobs are dual concentric, providing individual bass and treble adjustment of each channel. The speaker selector switch has positions for MAIN, REMOTE, or BOTH sets of speakers, as well as an OFF position for headphone listening. There are 10 push-buttons arranged horizontally across the front panel expanse. All are the push-to-actuate, push-to-release type, and they control such features and functions as the various scope operations, TAPE MONITOR, MONO/STEREO, phono input choice (there are two), high-frequency blend (for noise elimination during noisy stereo broadcasts), low and high frequency filters, and an FM muting on/off switch. At the extreme right of the panel is an ANTENNA ATTENUATOR switch for use in overly strong signal areas. Power is applied to the unit by means of a separate switch located at the right of the panel, above the usual stereophone jack. DUBBING-IN and DUBBING-OUT front panel jacks for use with a tape recorder (without having to get at the back of a custom-installed receiver) are not new, but in this Marantz version, the DUBBING-IN jack has a built-in switch which automatically disconnects the rear panel TAPE INPUT jacks when you insert a standard three-conductor phone plug. Thus, the playback of an extra tape recorder via this front jack is made possible without any interaction, impedance loading, etc. even if another permanently installed tape recorder is connected to the rear TAPE INPUT jacks. The DUBBING-OUT jack, on the other hand, is connected in parallel with the TAPE OUTPUT jacks on the rear panel. Thus, it is possible to record into two tape recorders at once, solving the problem of long-duration programs involving the use of more tape than your reels can hold and avoiding the loss of critical passages during reel changing.

Along the bottom edge of the rear panel of the Model Nineteen are a three-terminal barrier strip for connecting either a 75-ohm or a 300-ohm antenna transmission line, an eight terminal barrier strip for main and remote speaker pair connections, a line fuse, input jacks for PHONO 1, PHONO 2, TAPE, AUX 1, AUX 2, and the TAPE OUTPUT jacks previously referred to. A convenience a.c. outlet, as well as a ground binding-post terminal, are also provided on this panel.

Since the model Nineteen is equipped with a quick-acting output protection circuit, no other fuses (such as speaker-line fuses) are required.

Interior views of the chassis clearly illustrate the well shielded construction of both the r.f. front-end and the i.f. sections of this receiver. The low-level magnetic preamp circuitry is also enclosed in a metal shield.

## Circuitry

The block diagram is reproduced from the well written customer's illustration manual supplied with the Marantz Nineteen and represents the basic circuit blocks of *one channel only*. The r.f. amplifier utilizes a MOSFET dual-gate transistor which is a.g.c. controlled. The i.f. section is modified Butterworth-type filter configuration which requires no alignment and which results in a phase-linear 200 kHz pass band with sharp cut-off slopes. This pass band characteristic provides improved selectivity as well as excellent stereo separation. A multi-stage limiter amplifier feeds the FM detector circuitry from which the composite audio signal is fed to the scope display circuits, as well as to the stereo multiplex circuitry. The latter circuits feature automatic triggering of the stereo indicator light located in the dial calibration area, as well as the stereo demodulator circuits.

Audio signals, routed by the selector switch, are fed through the various control circuits and to the tone-control circuits, which use a continuously variable Baxandall feedback configuration whose response curves closely approximate the Fletcher-Munson loudness contour curves. For this reason, Marantz chose *not* to incorporate a LOUDNESS CONTOUR switch in the Model Nineteen.

Beyond the input of the predriver stages, all succeeding amplifier stages are direct-coupled through to the loudspeakers providing instant recovery from overdrive or short circuit conditions. Upon turning the unit on, the constant current supply for the prediver input stage provides a few seconds of delay before the circuit is activated. In this way, turn-on pops and pulses are effectively eliminated. The output stages themselves are push-pull, complementary-symmetry transistor pairs.

An electronic circuit senses the peak output current and voltage across the output transistors and limits the current to the driver stages to a safe predetermined value. This limiting protects the driver and output stages under overdrive and short circuit conditions and prevents the driver and output transistors from exceeding safe operating conditions. In addition, a relay protection circuit automatically disconnects loudspeakers and headphones in the event of a failure of the output or driver circuits. The presence of any significant amount of d.c. voltage at the output terminals will activate this relay, since normally, the balanced dual power supply would result in negligible d.c. voltage at this point.

**Fig. 1**—Showing the rear panel.

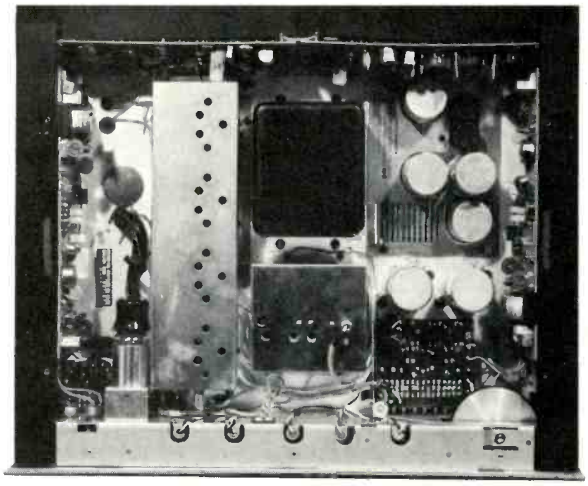

**Fig. 2**—Top view of chassis.

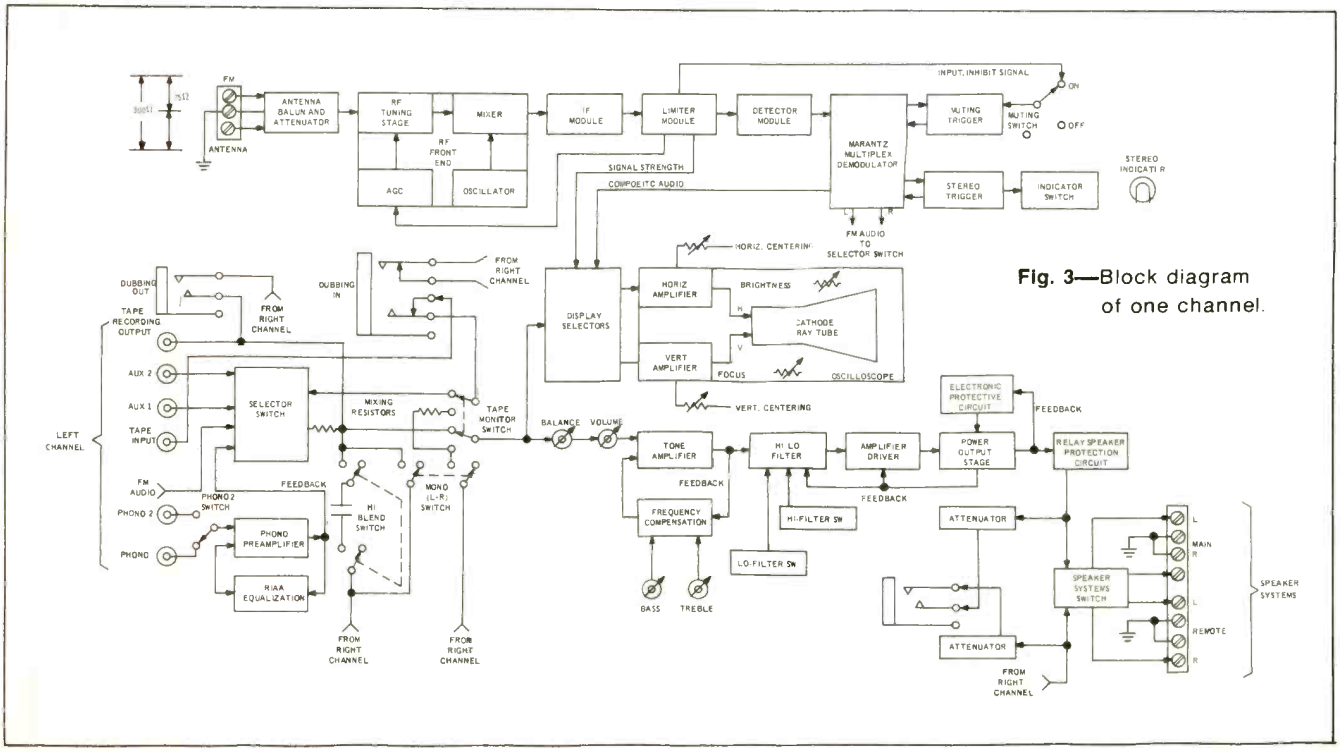


**Fig. 3**—Block diagram of one channel.

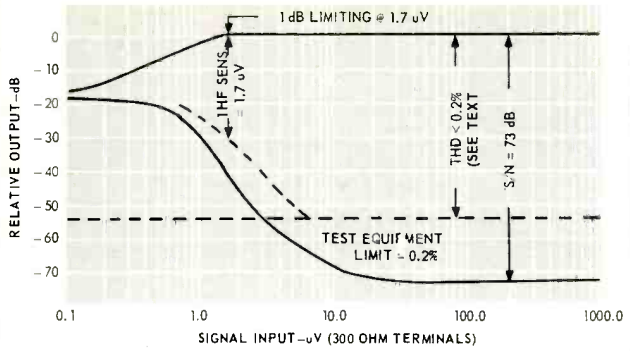


**Fig. 4**—FM characteristics.

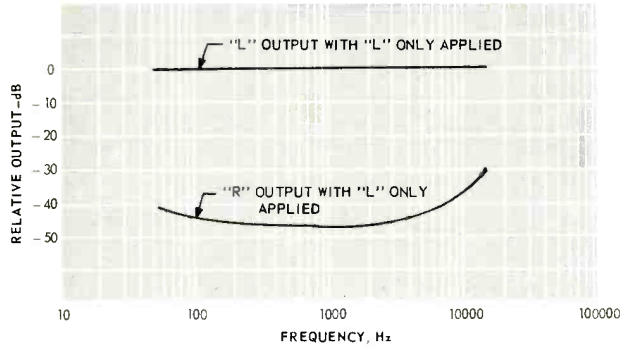


**Fig. 5**—FM separation characteristics.

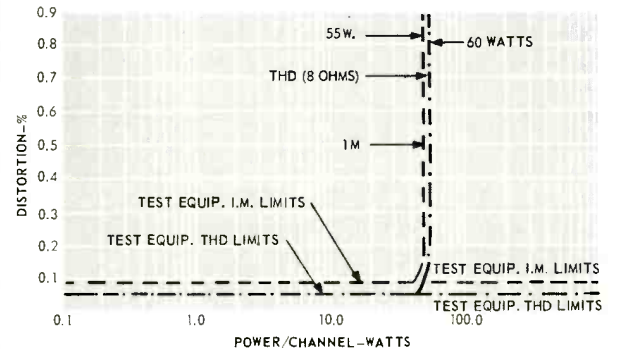


**Fig. 6**—THD and IM distortion.

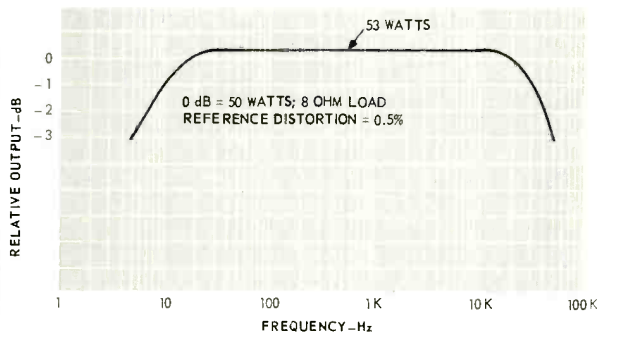


**Fig. 7**—Power bandwidth.

## Test Measurements

Some of the receiver's FM characteristics are shown in Fig. 4. An IHF sensitivity of 1.7 μV. is, of itself, not that remarkable. Other receivers have done as well. What is more important is the fact that at 2 microvolts of signal input, quieting has already reached -50 dB, and at 5 μV. the quieting has reached the incredible value of -63 dB. Incidentally, in typically conservative fashion, Marantz claims only 2 μV. IHF sensitivity and a 55 dB quieting figure for 5 μV. The ultimate signal-to-noise ratio reached a value of 73 dB, exactly as claimed, and it reached this figure at a mere 50 μV. signal input. One dB limiting occurred at 1.7 μV., the same figure as IHF sensitivity. As for THD, we had to express our findings as "less than 0.2%" since that is the known residual distortion of our recently recalibrated FM generator. Marantz claims that maximum THD in either mono or stereo is a maximum of 0.15%—and since we can't prove otherwise, we certainly believe them. Note, too, that the figures are the same for mono or stereo. How many manufacturers even list THD figures for stereo—where it usually tends to be higher because of additional interposed circuitry?

Stereo FM separation is plotted in Fig. 5, and again, the results are superlative. We've seen sets with 45 dB separation capability at 1 kHz—but it's that 30 dB figure at 15 kHz that is so amazing, not to mention the 40 dB of separation available at 50 Hz. Would that some of our local stereo FM stations maintained these parameters in their transmitters!

Thus, if we had to summarize the FM performance advantages of the Marantz Nineteen compared with lower priced competition, these are the areas of perfection we would talk about—good quieting, low distortion in mono and stereo, and unusually fine stereo FM separation. Would you be able to hear the difference? That's a whole discussion in itself, but the success of Marantz products over the years suggests that enough people care enough or hear enough or are convinced that they hear enough to justify the higher price tags.

Audio amplifier measurements were equally impressive. Again, our test equipment could not measure up to the extremely low THD and IM figures exhibited by this receiver at all but overload levels. Thus, as shown in Fig. 6, we must simply say that THD was "below" 0.05% at ALL power levels below about 48 watts per channel, reaching a discernible 0.1% at 52 watts (Marantz claims 0.15% at 50 watts), while IM distortion was "below" 0.08% (our test equipment limits) at all power levels below 45 watts per channel, reaching 0.13% at 50 watts (as opposed to 0.15% claimed by the manufacturer). As the curves indicate, at 60 watts per channel, THD is still under 1% while IM is below 1% even at 55 watts per channel.

Power bandwidth extends from 5 Hz to 50 kHz, considerably greater than the 8 to 40 kHz claimed, but it should be pointed out that our reference was a distortion level of 0.5%, rather than the 0.15% used by Marantz. Over most of this bandwidth, 53 watts of continuous power is available at any frequency from about 27 Hz to 27 kHz at 0.5% distortion or less. In this context, it is interesting and gratifying to note that Marantz did not find it necessary to resort to "music power" or "peak power" or "± 1 dB" power ratings. All they quote is the continuous rms or sine wave power in their published specifications. Evidently, the reasoning is that anyone ready to spend $1000.00 on a quality receiver is sophisticated enough not to be impressed by "inflated" power figures—and in our opinion, they're quite correct!

Tone-control characteristics, as well as low and high frequency filter characteristics, are plotted in Fig. 8, and the latter have a slope of 12 dB, making them quite effective in actual use. With tone controls set to mechanical center, we found perfect correspondence to electrical "flat" or center

with frequency response remaining within ± 0.5 dB from about 12 Hz to 35 kHz. Square wave response at 100 Hz and at 10 kHz are shown in the scope photos of Fig. 9, and there is no evidence of overshoot or ringing at either of these end frequencies.

## Listening Tests

You have undoubtedly surmised by now that we think $1000.00 is not too much to spend on a stereo receiver if you crave the kind of features and performance that can be had with the Marantz Model Nineteen receiver, but the real proof was in its use and in listening to it. Frankly, in our experiments with FM reception, we found two of the controls to be superfluous—the HIGH BLEND control and the ANTENNA ATTENUATOR switch. In other words, all of the stations received (and there were some 57 of which 28 were stereo) were received perfectly without the use of either control. We experienced no overload and the noise level was always far enough in the background so as not to require the use of the HIGH BLEND control which would have reduced separation if used. Of course, we are in good signal area and use a multi-element directional antenna with a rotator in our tests, but the results obtained with this receiver are as good or better than those obtained with any units tested at this location to date. There is no point in resorting to superlatives with regard to the audio performance. Suffice it to say that there was ample power for driving any speaker system connected and that we (and several qualified listeners) could detect no form of distortion from this receiver in any of our listening tests. With that conclusion out of the way, we really began to enjoy the many control features of the Marantz Nineteen, the most important of which, by far, is the built-in oscilloscope display. It has appeared on Marantz tuners and receivers before (Model 18 receiver and Model 20 tuner) and even been reviewed in this magazine before, but for the benefit of newer readers who are unfamiliar with its versatile applications, we shall describe it with the aid of some illustrative diagrams from the owner's manual. By depressing the TUNING pushbutton and the SCOPE ON button on the front panel of the receiver, the scope trace appears as a short vertical line as you tune in an FM station. When the vertical line is centered, the station is perfectly tuned. This application is shown in Figs. 9-A. When the TUNING button is released and the MULTIPATH button is depressed, the display becomes a horizontal trace. The width of the trace determines modulation amounts, as shown in Figs. 9-C, whereas the shape of the trace determines the presence or absence of multipath interference, as shown in the diagrams. Minimum multipath is achieved by rotating the antenna while observing the scope display.

When both the MULTIPATH button and the TUNING button are released, the scope provides still another series of displays, as shown in Figs. 9 -D. In this setting, it is possible to analyze separation of any of the signal sources heard on the receiver. (It is also possible, incidentally, to detect stations that broadcast in stereo while actually playing monophonic records!) Interestingly, when last we used this facility (in reviewing the Model 18 in an earlier issue), we found at least a couple of stations which were inadvertently broadcasting stereo with channel signals out of phase. Evidently, station practice in this regard must have improved over the past year, since we found no such errors this year.

In all, this scope display alone is worth the differential between this receiver and its closest priced competition. Combined with the excellent performance specifications which are both measurable and discernible, the $1000.00 receiver has so very much going for it that the price does not seem as high as you might have imagined. *L.F.*

**Check No. 43 on Reader Service Card**

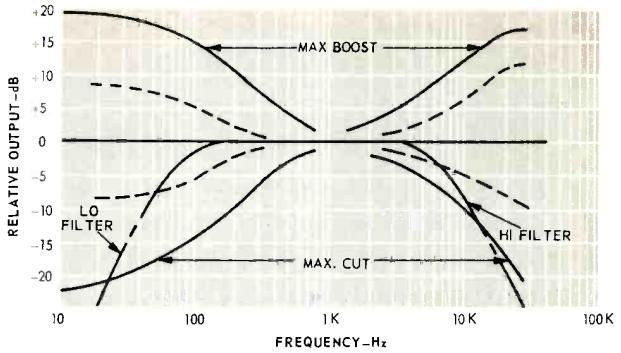


**Fig. 8**—Tone control and filter characteristics.

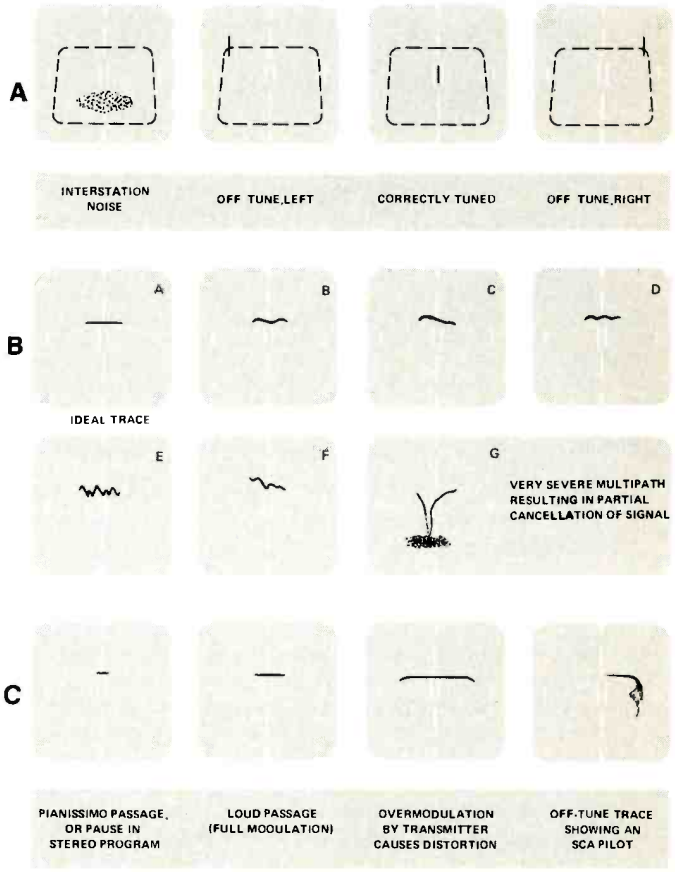


**Fig. 9**—Analysis using the built-in oscilloscope. **A**—center-of-channel tuning. **B**—antenna orientation. **C**.—modulation characteristics. **D**—stereo separation.