



## PERREAUX TU-3 FM TUNER

*Julian Hirsch, Hirsch-Houck Laboratories*

**P**ERREAUX, a New Zealand manufacturer of audio components, is best known in this country for its rugged, high-quality power amplifiers and preamplifiers. The company also manufactures an FM stereo tuner, the TU-3, built to the same exacting standards as its other products. The Perreaux TU-3 was designed to provide high-quality reception with a minimum of gadgetry and features that do not contribute to its listening performance.

The tuner's silver-colored panel contains a single tuning knob, a few buttons, and a display window. The frequency of the digital-synthesis TU-3 is controlled by a phase-locked-loop (PLL) circuit. The tuning knob, which has a large number of detented positions, shifts the frequency in 100-kHz increments. The

frequency display uses large, blue fluorescent numerals and also shows an ST indication when a stereo transmission is received.

The TU-3 can store the frequencies of six preset stations. A row of red LED's indicates relative signal strength. The only other front-panel controls are buttons for switching power and stereo/mono mode. In the stereo mode, stereo/mono switching is automatic. Selecting mono reception disables both the stereo multiplex decoder and the interstation-noise muting. The multiplex decoder, like the tuner's frequency-selection system, uses a PLL circuit.

A three-position toggle switch in the rear of the TU-3 selects the FM de-emphasis time constant: 50 microseconds, or  $\mu\text{s}$  in Europe, Australia, and New Zealand, and 75  $\mu\text{s}$  in

the United States and Canada. The third setting, 25  $\mu\text{s}$ , is used when listening to a station employing Dolby B encoding (this also requires an external Dolby decoder). In addition to the de-emphasis switch, the rear of the tuner has an F connector for a 75-ohm FM antenna and a socket for the detachable power cord. A 300- to 75-ohm matching

*The tuning knob of the TU-3 provides the accuracy and precision of digital synthesis yet retains most of the basic "feel" of analog tuning. Combined with the six presets, this is, in many respects, the ideal system.*

transformer is supplied for use with 300-ohm FM antennas.

The low-profile Perreaux TU-3 measures 19 inches wide (including the rack-mounting extensions), 13½

## FEATURES

- Digital-synthesis FM tuner
- PLL synthesizer circuit
- Knob tuning in 0.1-MHz steps
- PLL stereo multiplex decoder
- Six station presets
- Stereo/mono switch, interstation-noise muting in stereo mode
- 75-ohm antenna jack, adaptor for 300-ohm antenna
- Switchable de-emphasis (25, 50, or 75  $\mu$ s)

## LABORATORY MEASUREMENTS

**Mono usable sensitivity** (75-ohm input): 16.8 dBf (1.9  $\mu$ V)  
**50-dB quieting sensitivity** (75-ohm input): mono, 15.6 dBf (1.65  $\mu$ V); stereo, 38 dBf (21.8  $\mu$ V)  
**Signal-to-noise ratio** at 65 dBf: mono, 77 dB; stereo, 72.5 dB  
**Distortion** at 65 dBf: mono, 0.185%; stereo, 0.17%  
**Frequency response:** 30 to 15,000 Hz +1.1, -0 dB

**Stereo separation** (at 65 dBf) at 100, 1,000, and 10,000 Hz: 37, 47, and 36 dB  
**Capture ratio** at 65 dBf: 1.75 dB  
**AM rejection** at 65 dBf: 50 dB  
**Selectivity:** alternate-channel, 2.5 dB  
**Image rejection:** 84 dB  
**19-kHz pilot-carrier leakage:** -66 dB  
**Hum:** -76 dB

inches deep, and 1 $\frac{3}{4}$  inches high. It weighs about 13 pounds. Price: \$795. Perreux International, Dept. SR, 4701 Hudson Dr., Stow, OH 44224.

### Lab Tests

The frequency response of the Perreux TU-3 was flat over most of the audio range, rising gently above a few kilohertz to +1.1 dB at 15,000 Hz. Its channel separation was 47 dB at 1,000 Hz, decreasing smoothly to 27 dB at 30 Hz and 33 dB at 15,000 Hz. The tuner's usable sensitivity (in mono) was 16.8 dBf (1.9 microvolts, or  $\mu$ V, at its 75-ohm antenna input). The muting and stereo switching thresholds were identical at 18 dBf (2.2  $\mu$ V).

The measured distortion levels in mono and stereo were close to the tuner's rating and consisted entirely of second and third harmonics. We found, however, that the output waveform was clipped (on its positive peak) when we modulated the test signal 100 percent at frequencies below 1,000 Hz. For some of our measurements, we were forced to use 90 percent modulation instead of the usual 100 percent. The tuner's noise levels were appreciably lower than rated in both mono and stereo. Its fixed output voltage measured 640 millivolts, which was considerably higher than the rated 330 millivolts. The signal-strength indicator came on at levels ranging

from 10 dBf (0.85  $\mu$ V) to 60 dBf (275  $\mu$ V).

### Comments

The Perreux TU-3 is a pleasingly simple, attractive tuner that exemplifies the "minimalist" design philosophy. Its only external features that are not related to its principal function are the six preset station selectors and the signal-strength indicators, both of which are very worthwhile conveniences for any tuner to have.

Those people who prefer to turn knobs instead of pressing buttons when operating their hi-fi equipment will find the tuning knob of the TU-3 eminently satisfactory. It provides the accuracy and precision of digital-synthesis tuning yet retains most of the basic "feel" of analog tuning. When combined with the convenience of preset station memories, this is, in many respects, the ideal tuning system.

The TU-3 operated flawlessly and sounded every bit as good as any FM tuner we have used at our location. The distortion we observed at 100 percent modulation during bench tests was never audible, nor is it ever likely to be. Most FM stations take care to limit their peak modulation level to slightly under 100 percent, and the effect we observed (which may have been peculiar to our test sample) never occurred below 90 to 95 percent modulation,

and even then only at frequencies below 400 Hz.

The key performance specifications of the tuner were somewhat unusual, however. Its image-rejection specification of 80 dB is a good one, yet the tuner surpassed it comfortably. The capture-ratio and AM-rejection ratings, neither of which was especially noteworthy, were met satisfactorily. Probably the least impressive specification for this tuner is its selectivity, rated at 45 dB for alternate-channel spacing. Doubtless this is more than sufficient for many countries (including New Zealand), that do not have the population density and spectrum crowding typical of the United States. (New Zealand, we're told, has all of two FM stations.)

In our tests, the tuner came quite close to meeting its selectivity specification, but even so its suitability for use in this country may depend on specific location. In a crowded metropolitan area, or if your favorite station is located only one or two channels away from a stronger station, it would not be the tuner of choice. In fairness to the TU-3, however, we never experienced problems with such interference in the metropolitan New York area, since the few good-music stations here are well removed (in frequency) from possible sources of interference.

We noted with some amusement that Perreux, which stresses the listening qualities as well as the specifications of its amplifiers in its catalogs and brochures, says of the TU-3: "We have not commented on tuner specifications, since they have much to do with reception and little to do with sound quality . . ." Given the nature of the programming and audio quality of most FM broadcasting in this country (and, by inference, in New Zealand as well), this statement applies to just about any tuner one might name.

In any case, we found the Perreux TU-3 to be an unusual, handsome, well-built product that is likely to extract all the quality available from any FM broadcast. It is expensive, to be sure, but, as with Perreux amplifiers, its construction quality is commensurate with its price.

*Circle 143 on reader service card*