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CREEK 3140
FM TUNER**Manufacturer's Specifications****50-dB Quieting Sensitivity:** Mono, 14.7 dBf; stereo, 36.1 dBf.**Ultimate S/N at 1 kHz (CCIR/ARM):** Mono, 74 dB; stereo, 65 dB.**THD:** 0.25% at 100% modulation, 1 kHz.**Muting Threshold:** 17.2 dBf.**Alternate-Channel Selectivity:** 100 dB.**AM Rejection:** 66.5 dB.**Pilot-Tone Rejection:** 66 dB at 19 kHz, 100 dB at 38 kHz.**Capture Ratio:** 1.3 dB.**Stereo Separation:** 24 dB at 1 kHz, 26 dB at 5 kHz, 27 dB at 10 kHz.**Output Level:** 2.33 mV for 100% modulation (RCA outputs).**Dimensions:** 16½ in. W × 2½ in. H × 6½ in. D (42 cm × 6.4 cm × 16.5 cm).**Weight:** 7¼ lbs. (3.3 kg).**Price:** \$375.**Company Address:** c/o Music Hall, 108 Station Rd., Great Neck, N.Y. 11023.

For literature, circle No. 95

Wide
Narrow
Local
Dx
Mono
AFC
offCAS3140
CREEK
AUDIO SYSTEMS

FM Stereo Tuner

Tuning

Filter

Designed and made in the U.S.

I don't know who wrote the owner's manual for this FM-only British tuner, but whoever did must have been conforming to an unusual set of specification standards. I couldn't make head or tail of the specs found in the booklet supplied with the 3140; fortunately, the U.S. distributors of this fine-sounding unit from Creek Audio Systems were able to supply the specs listed above.

Having said all that, I must admit that a great deal of thought went into the design of the Creek 3140. As is true of many car stereo tuner circuits, this home component employs a form of automatic stereo "blend" so that, as signals become progressively weaker, the tuner makes a gradual

transition from stereo to mono rather than switching noisily between them.

The tuning indicator, mono/stereo switching, and the blend and muting functions are controlled by signals derived from three reception parameters: S/N, detuning, and overall signal strength. The frequency display is digital, calibrated in 100-kHz increments, but the 3140 does not have frequency-synthesized tuning. Thus, if a signal is not precisely on a standard station frequency (a problem with many cable FM signals), the unit can still be tuned accurately.

Muting is gradual, but still fast enough to make the tuning knob appear to operate like a clickless rotary switch, as the

The AFC circuit has little effect as the 3140 moves between stations; it takes hold only when perfect tuning is achieved.

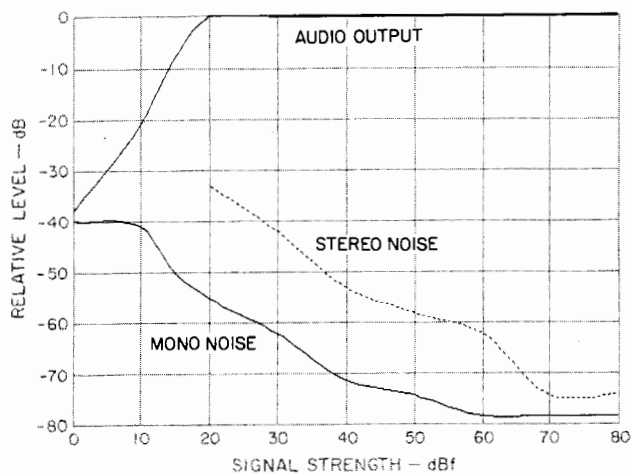


Fig. 1—Mono and stereo quieting characteristics. Also note limiting; see text.

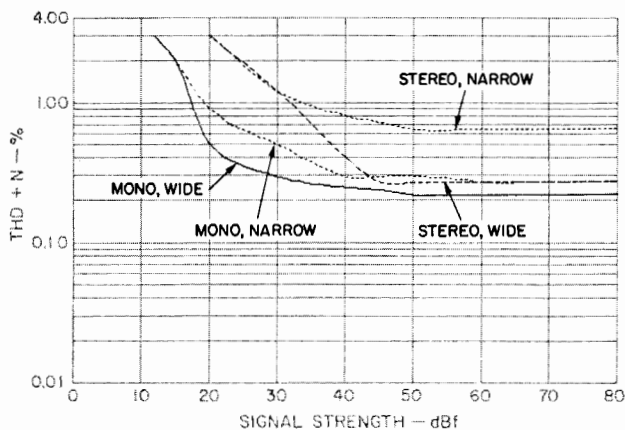


Fig. 2—THD + N vs. signal strength for wide and narrow i.f. modes.

owner's manual puts it. Whenever a station signal is encountered, the 3140 unmutes briskly but smoothly at the point where the station is perfectly tuned, and an indicator just above the knob lights up. This effect is much more gradual, and less switch-like, when the AFC (automatic frequency control) is switched off. With AFC on, the desired signal seems loudest when the set is perfectly locked in, getting quieter as you tune away to either side. There is none of the "thump" you usually hear when dialing through FM stations with tuners having conventional circuitry.

Two additional circuit features are worth mentioning. The first, a form of gated AGC (automatic gain control), prevents

the front-end from having its gain (sensitivity) reduced when you're listening to a weak signal that is close in frequency to a stronger one. Creek calls the second circuit refinement Detuning-Limited AFC. When tuning from one station to another, AFC is, in effect, negligible or nonexistent. When perfect tuning has been achieved, full-strength AFC takes hold. This action prevents the 3140 from jumping from one strong station to another as it is tuned, missing weaker stations that may lie in between.

Control Layout

The Creek 3140 is very understated in design; it is housed in a wooden wrap and painted black, with the wood grain showing through the paint. It is, in fact, so typically British in its understated look that one almost expects the spoken word received via its circuitry to have the very distinguished BBC accent!

Four pushbuttons near the left end of the simple front panel control i.f. bandwidth (wide or narrow), reception mode (local or distant), stereo defeat, and AFC defeat. A small indicator light above the stereo-defeat button illuminates when a stereo signal is captured. The frequency display is just to the right of center on the panel; farther to the right is the rotary tuning knob (with the light that indicates center tuning just above it) and a power on/off button.

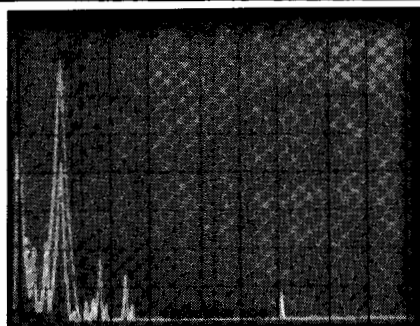
The rear panel is equipped with both a 75-ohm coaxial connector and separate 75- and 300-ohm screw-terminals, for FM antennas. Wisely, I think, Creek does not pack a 300-ohm wire dipole with each set, as so many other manufacturers do. I say wisely because the absence of such a minimal antenna encourages the user to install a more appropriate one. In fact, the company devotes two full pages of its manual to an illuminating discussion about signals, "aerials" (the term our British cousins still use for antennas), and noise.

In addition to the usual rear-panel left and right output jacks, there is a multiple-pin DIN connector; this is common in European equipment but has never gained much favor here. If you can, I would suggest that you obtain the necessary DIN cable and connect it to this output rather than to the individual phono-tip jacks. Why? Because the output level at the phono jacks is only 150 mV or so, while the output at the DIN connector is more than 0.5 V for each channel. In all likelihood, any other program sources connected to your system will yield much higher output voltages (especially CD players, which typically deliver 2.0 V at maximum recorded level). The great difference in loudness levels that you would thus encounter when switching between the 3140's low-level outputs and the normal outputs of a CD player would likely shock your ears, even if it didn't blow your speakers, and would necessitate constant volume adjustment on the associated amplifier or preamplifier.

Measurements

Figure 1 shows how background noise decreases with increasing signal strength for mono and stereo reception. Mono usable sensitivity measured approximately 12 dBf, and stereo usable sensitivity was 20 dBf. Mono 50-dB quieting was 16 dBf; for stereo, 37 dBf of signal power was required for the same level of quieting. Signal-to-noise ratio

Separation was only 30 dB, but it stayed at that level across the entire band. In prior tuner tests, I had never seen this occur.



A

B

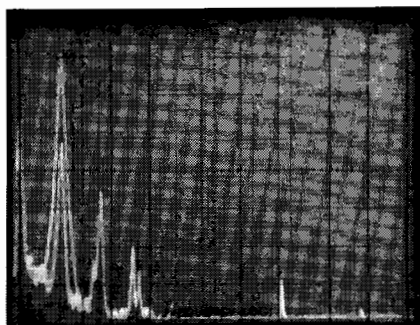


Fig. 3—Crosstalk and distortion products resulting from 5-kHz modulation in one channel, for wide (A) and narrow (B) i.f. modes. See text.

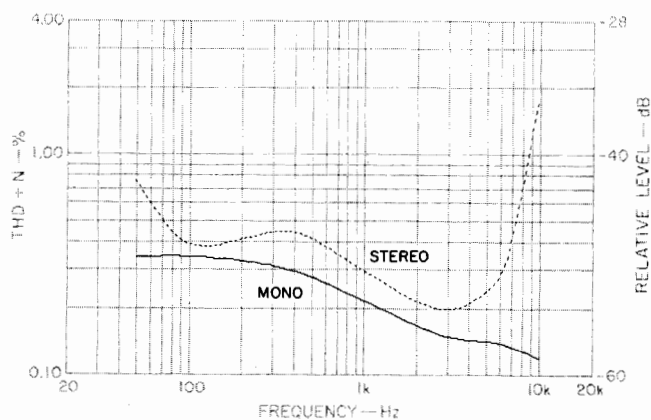


Fig. 4—THD + N vs. frequency for wide i.f. mode.

for strong signals measured 78 dB in mono and 74 dB in stereo. Notice, however, that limiting seemed rather poor for this tuner, compared to that of many others I have measured recently. The top curve represents the desired audio output signal, which did not reach its ultimate, fully limited level until signal strength had increased to 20 dBf.

Although sensitivity and S/N measurements hardly vary at all when switching between a tuner's narrow and wide i.f. modes, harmonic distortion certainly does. Figure 2 shows THD + N as a function of signal strength for both bandwidths of the 3140. As I expected, distortion was lower for both mono and stereo when the wide i.f. mode was used. Yet even in wide mode, the levels of THD + N were higher than I've become accustomed to seeing in modern tuners. Not that the Creek didn't meet its published specification; it did. THD for a 1-kHz signal, measured in the wide i.f. mode, was just over 0.2% in mono and was 0.27% in stereo. In the narrow i.f. mode, THD for a 1-kHz signal increased to 0.27% in mono and to 0.65% in stereo.

Figures 3A and 3B depict in another fashion the difference in distortion between the two i.f. operating modes. Figure 3A shows what happens in wide mode when a 5-kHz signal modulates one stereo channel of an FM generator; the sweep is linear from 0 Hz to 50 kHz. The largest spike, near the left, is the reference 5-kHz output signal from the desired channel; the spike within it shows the amplitude of 5-kHz signal measured at the unmodulated channel's output. The short spikes just to the right represent second- and third-harmonic distortion components that show up as crosstalk at the unmodulated channel's output. The short spike farthest to the right represents the lower sideband of the suppressed 38-kHz subcarrier, 5 kHz removed from the subcarrier frequency. (The area to the left of the 5-kHz spike shows only artifacts of the test equipment and should be ignored.) Amplitudes of crosstalk and sideband components remained substantially the same when I switched to the narrow i.f. mode (Fig. 3B), but note the significant increase in distortion amplitude, which is to be expected when the i.f. band is narrowed.

Figure 4 shows how THD + N in mono and stereo varied as a function of modulating frequency. This test was made only with the wide i.f. setting. Strangely, mono THD seemed to decrease at higher frequencies, even though I did not use any sort of band-pass filter when making the measurements. In stereo, distortion also declined with rising frequency up to 3 kHz, and remained reasonably low to about 6 kHz. Beyond that point, however, the readings increased sharply, owing not so much to harmonic components as to the appearance of nonharmonically related "beats" between the pilot frequency (19 kHz) and the modulating frequency. These beats were not nearly as severe as in some more costly tuners that I have measured.

Frequency response of the 3140 in wide i.f. mode was essentially flat from 30 Hz to 10 kHz and was off by -1.2 dB at 15 kHz. It remained the same in narrow mode, as would be expected. The slight roll-off at 15 kHz is evident in Fig. 5, which also depicts stereo separation (lower trace) over the range from 20 Hz to 20 kHz. Although separation in the wide mode was only about 30 dB, it was maintained almost precisely at that figure across the entire audio band (and

My measurements for this tuner aren't the best, but that's not the full story. The sound was excellent, and imaging was realistic.

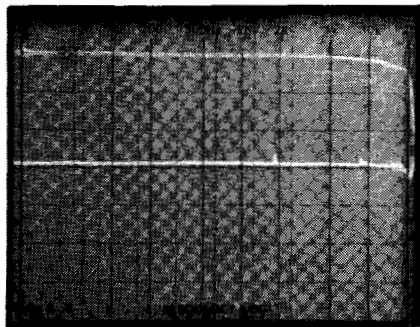


Fig. 5—Frequency response (top trace) and separation vs. frequency. Note how separation is maintained across band; see text.

was similarly constant, but about 5 to 6 dB lower, in narrow mode). Such uniformity of stereo separation is something I have never seen in any tuner before. Most tuners give up a good deal of their separation at the low and high frequency extremes; I suspect that some competitors would like to know how Creek managed to avoid this. Anyone who could

combine this uniformity with a higher separation figure would really have something to patent!

Capture ratio measured 1.2 dB for the wide i.f. mode and 3.0 dB for the narrow mode. Selectivity was 32 dB for the wide setting and 85 dB for the narrow. AM suppression was exactly 50 dB.

Use and Listening Tests

The understated appearance of the Creek 3140 is in sharp contrast to the emphasis its designers have placed on accurate tuning, accurate frequency response, and adaptability to all sorts of reception environments. Though the lab results fall short of the best I have ever encountered, as I have noted more than once, measurements don't always tell the full story. Separation of 30 dB is enough to provide realistic stereo imaging, and 0.27% distortion in the FM stereo mode is low enough so as not to detract from the otherwise excellent sound of a properly transmitted FM broadcast. What's more, unlike many other imports from the "mother country," this one carries a quite reasonable price tag. I do take exception to one statement made by Creek in the owner's manual: "Our philosophy is to design products with facilities which benefit the user rather than the reviewer. . . ." I say, old chaps! What makes you think we reviewers aren't users—and listeners too? Pip, pip, and cheerio!

Leonard Feldman