Equipment Profiles (continued)

H. H. Scott LT-112B-1
FM Stereo Tuner Kit

MANUFACTURER'S SPECIFICATIONS—
Usable Sensitivity (IHF): 1.8 µV. Cross-
Modulation Rejection: 90 dB. Signal-to-
Noise Ratio: 65 dB. Total Harmonic Dis-
tortion: 0.8%/2. Frequency Response: 50-
15,000 Hz ± 1 dB. Capture Ratio: 2:3:5 dB.
Selectivity: 45 dB. Stereo Separation (1
kHz): 40 dB. Audio Output Level: 1.2 V
rms. Dimensions: 15 in. x 12½ in. x 4½ in.
high. Price: $199.95.

Years ago the prospective kit builder was warned against attempting con-
struction of a tuner until he had
attempted less-critical construction
projects, such as an amplifier or a pre-
amplifier. A number of important ad-
vances have enabled H. H. Scott to de-
velop a tuner kit that can be assembled
with such ease that even the neo-
phyte kit-builder need not be afraid to
tackle it:

1. Preadjusted, modular printed-cir-
cuit sections (six, in all) reduce the
amount of actual wiring to an absolute
minimum. Most of the wiring is con-
figured to interconnections between the
modules and the power supply and
selector switch sections. (2) The criti-
cal front end is completely wired and
aligned. (3) Alignment of other tuned
circuits can be accomplished quickly
and easily without using a single in-
strument. (4) The 78 page construc-
tion manual is written and illustrated in
a manner that fairly invites the kit-
builder to dive in and "build" without
the usual fears associated with kit
building. Full color diagrams show
actual placement of wires and parts,
and assembly and wiring instructions
are grouped in easy-to-follow sections.
In addition, the manual serves as a
well-written primer for anyone inter-
ested in the theory of FM and stereo
FM.

The kit was assembled by a person
who had never made such an attempt
before. Except for a slight bending of
a dial pointer to eliminate contact with
the dial face, and a rather sloppy job
of dressing some long wire lengths
(which did not affect performance), he
did a perfect job in about 10 hours.
Pre-
cut, pre-stripped and pre-tinned wires
assisted greatly.

Features
The finished appearance of the LT-
112B rivals that of many quality, fac-
tory-assembled units. It does not have
a "home-built" look! A rich-looking
gold and charcoal-brown dress panel is
offset by a subdued dial-glass area that
employs soft-blue numerals to indicate
frequency, as well as a 0-1000 logging
scale. The multi-function tuning meter
is also contained in the dial glass area.
The lower half of the panel contains
three selector switches, a stereo indi-
cator light, a standard stereo jack from
which an output can be obtained for
making tape recordings. (The stereo
indicator lamp lights up blue, which
doesn't make for good contrast. A red
reflector would have been preferable.)
The first of the selector switches turns
on power to the unit and, in its alter-
ate positions, introduces sub-channel
and noise filters (for the elimination of
noise in less-than-optimum stereo rec-
ception situations. The second switch,
labelled "selector," enables the listener
to choose mono or automatic stereo
listening, with or without interstation
muting. The third switch selects the
various functions of the meter. Its po-
sitions include "signal strength" (in
which the meter is a "peak reading" one),
"multifader" (in which the meter
indicates presence or absence of signal
reflections detrimental to good stereo
FM reception), "center tuning" (in
which the meter becomes a "center of
channel" indicator, for optimum sta-
tion tuning) and finally, "align" (in
which the sensitivity of the meter cir-
cuit is altered to permit its use during
initial r.f. and i.f. alignment upon com-
pletion of the kit). A close-up view of
the meter face is shown in Fig. 2, illus-
trating its dual scale calibration.

The tuning knob is located at the
upper right of the panel, and its action
is fairly smooth and precise, good use
having been made of a heavy flywheel
assembly.

In addition to the usual left and right
outputs and antenna terminals, the
rear apron of the LT-112B has a pair of
jacks for connection to the vertical
and horizontal inputs of an oscillo-
scope. This can provide more mean-
ingful indications of multichannel than
can be obtained by means of an internal
meter. With a 'scope connected, it is
also possible to judge centered-tuning,
as well as modulation pattern of any
given station. For example, Fig. 7
shows a mis-tuned condition with rela-
tively high modulation from an FM
station. In Fig. 8 we deliberately modu-
lated a signal generator ±300 kHz
(more than would ever be encountered
in broadcast practice) in order to dis-
play the perfectly symmetrical, wide-
band response of the i.f. system. The
rear of the tuner also contains right
and left level adjustments, so that
tuner output levels may be adjusted
to match other program source levels
associated with the user's overall music
system.

Top and bottom views of the com-
pleted chassis are shown in Figs. 3 and
4. Careful examination of the under-
side of the chassis discloses that no
effort was made to "dress" wires neatly
—we deliberately wanted to check per-
formance of a set that might be built
by a rank amateur, as this one was.

Circuitry

The circuitry of the Model LT-112B
tuner, as previously mentioned, con-
sists of several modules. The FM front
end contains four solid-state amplifying
device, three of which are FET's.
Five NPN devices are used in the 10.7-
MHz i.f. and limiter strip (which also...
employs a ratio detector as the FM demodulator circuit). The multiplex printed-circuit module employs the popular “switching” circuit for demodulation and includes the automatic switching circuits developed by Scott. In these circuits, switching will only occur to stereo if there is sufficient pilot signal to assure good synchronization with the locally generated 38-kHz signal. Additionally, the switching circuit requires a greater signal-to-noise ratio for it to switch to stereo than for it to switch back to mono. This prevents a marginally acceptable signal from intermittently switching back and forth from mono to stereo. Seven transistors are used in this carefully designed circuit. A small muting-circuit module consisting of two transistors, a “multipath indicator” module consisting of a transistor and two diodes, and an audio-output amplifier module complete the complement of p.c. boards. The latter includes four more transistors as well as the 38-kHz and 19-kHz rejection filter components and level adjustments for left and right output signals.

Performance

In evaluating the specifications and measurements which follow, the reader is reminded once more that this unit was built per the instruction manual and aligned without the use of any professional test equipment. While it is remarkable that most of the specifications of the completed kit were met or exceeded, further alignment using instruments might, we feel, yield even better results. Amazingly, the IF sensitivity could not be improved upon using standard alignment procedures. This speaks very well indeed for the factory alignment of the front end, as well as for the techniques developed by Scott for home alignment without the aid of instruments. Much of the FM performance story can be gleaned from Fig. 5. IF sensitivity at 98 MHz was 2.1 μV, while at 108 MHz (not shown) it measured 1.6 μV, which is right on the specification nose, allowing for normal production tolerances. Ultimate signal-to-noise ratio was exactly 65 dB, as rated, and total harmonic distortion was only 0.4% as against the published figure of 0.8%. Full limiting was achieved with a mere input of 1.6μV!

Stereo FM separation was 35 dB at 1 kHz, a very fine figure, though slightly less than the spec's. Separation at other frequencies is shown in the plot of Fig. 6. Also shown here is the effect on separation when the sub-channel filter is introduced. Note that at the very-high audio frequencies separation is seriously degraded by the filter, as admitted by Scott. Therefore, the filter is really intended for situations in which reduced separation is preferred to very noisy, weak-signal stereo reception. A dual plot of stereo separation is shown in Fig. 9 for 1 kHz and 10 kHz signals.

In use, the Model LT-112B confirmed its measured specifications. At a distance of some 25 miles from the center of the Metropolitan New York area, we were able to receive 38 stations clearly, 12 of which were transmitting stereo FM. None of the twelve required the use of the sub-channel filter. Any evidence of distortion was clearly a case of multi-path problems (as confirmed by the self-contained meter, as well as by scope readings) which were almost completely cleared up by a slight reorientation of our antennas.

If you lean towards kit construction, and have steered clear of FM tuners until now, the Scott LT-112B may well serve as your introduction to this fine program source. You might remove the bottom cover every so often, though, or they'll never believe you built it yourself. More importantly, the stereo FM tuner works beautifully. And there's nothing on the market that is factory-assembled to match its performance, features, and appearance at its price.

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