Fig. 2. Drawing showing the details of the 800B.

with a line-voltage variation of 10 per cent. The tone arm exhibited no serious
nunu-ness down to 10 eps, the limit of our test record, and could track well
with a stylus force of 1 gram, although we used
a force of 1.5 grams for the complete series
of tests. We should mention that the
cartridge we used, and found to be quite
excellent in this system, was the Stanton
481AA. We'll report more specifically on
this cartridge in the near future.

For those interested in an unusually fine
turntable system designed to perform at
top level for a long, long time, we recom-
mand investigating the Stanton 800B sys-
tem.

A delightful feature of the 340-B is its
built-in thinking circuit in the Automatic
Stereo position, the 340-B detects the
presence of an FM stereo broadcast and
automatically does all the internal switch-
ing necessary to process a stereo signal;
if the FM signal is mono, it sets itself to
deliver a mono signal to the speakers.
When it sets itself to stereo, the 340-B
graciously lights an indicator lamp to in-
form us mere mortals what it has done.
Now if they would only include a circuit to
start the coffee pot ....

Another unique feature is the special
balancing circuitry which permits balanc-
ing the speaker systems with any kind of
program material, mono or stereo. One
need only switch between the Bal-R and
Tri-i. positions on the Selector switch, and
listen for equal loudness from both speak-
ers. If they are not equal one rotates the
balance control until they are. Simple and
effective.

Now let's look at the individual sections
of the 340-B:

The Tuner
The r.f., i.f., and detector sections are
well-known Scott circuits, clearly related
to the long line of Scott tuners. The r.f.
section uses two triodes (6JS8/6H8C tri-

twin triode) in a cascode configuration,
followed by a 6L8 oscillator-mixer. The
entire front end assembly, including the
first i.f. transformer, is a sub-assembly
familiar to those who have seen Scott tun-
ers in the past; it has achieved recognition
as the "silver-plated" front end. Following
these are two L.F. amplifier stages employing
6A6A tubes. The signal-strength meter is
located at this juncture, before the signal
proceeds to the limiter stage (6L86).

From the limiter the signal goes to the
wideband ratio detector. As we said be-
fore, this part is really quite similar, if not
identical, to the Scott 350C. Indeed, the
multiplex circuitry is also identical. The
major area of difference is the automatic
switching with the indicator light. The
automatic switching is completely elec-
tronic so that it is quiet as can be. It's
not fooled by random noise either as some
of the early stereo indicator circuits were.
Except for the set warmup time, we found
that the indicator very rarely would be
triggered by anything but a stereo broad-
cast.

The final processes in the tuner section
are to amplify and de-emphasize the audio
signal. Now, on to the amplifier section:

The Amplifier
As we indicated previously, the amplifier
is rated at 35 watts per channel music
power, and 30 watts per channel steady
state. The output stage used to achieve this
is a pair of 7291 pentodes in push-pull
with 450 volts on the plates, and 340 volts
on the screen. Well-filtered d.c. is pro-
vided for biasing.
The triode section of a 6L8 is used as a
phase splitter, the pentode section operat-
 ing as a voltage amplifier. Feedback from
the 16 ohm tap of the output transformer
goes to the cathode of the pentode section.
The preamp section utilizes four triodes
(two 225X7 twin triodes), two in the
front end to amplify low-level signals and
provide appropriate equalization. The re-
maining two triodes provide sufficient gain
to drive the lower end of the output trans-
fomer and filter networks. Well-filtered d.c. is also
provided for the filaments of all the pre-
amp triodes.
The power supply utilizes eight IN560
diodes in two bridge configurations, one
bridge for B-plus and the other for the
d.c. element and bias supply. Additional
separate transformer windings are used to
provide a.c. filament voltage for the ampli-
der tubes, which do not require d.c., and
for all the tuner tubes.

Performance
Before detailing the vital statistics we
have arrived at on the 340-B, we must
point out that tuner statistics are not yet
completely revealing, at least as far as the
current consumer is concerned. In other
words, most consumers, when confronted
with an army of technical measurements,
is not usually qualified to make valid de-
nuctions from these numbers. For instance,
the fact that some numbers are higher, or
lower, than equivalent ones for a different
tuner does not necessarily mean that one is
better than the other. That is the reason
we always provide value judgments on this
type of product.

Thus we say that the Scott 340-B is a
top-notch tuner-amplifier; in fact a top-
 Notch tuner and a top-notch amp. If
you wish to use these individual functions
(as in tape recording FM broadcasts, or

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THE CIPHER DENON 800 TAPE RECORDER

Many discerning audiophiles first became acquainted with the Cipher line of tape recorders at the 1963 New York High Fidelity Show. This line consists of a number of more or less “garden variety” recorders of fairly conventional appearance and characteristics, topped off by Model 800, which encompasses many operational features that make it especially suitable for the serious recordist who enjoys conveniences usually found only in professional-type machines. Made in Japan by Denon Corporation, a subsidiary of Nippon Columbia, the Cipher is distributed in the U.S. by Inter-Mark Corporation. Denon also makes a computer professional machine, and readers may remember seeing one of these units pictured in the “Hi-Fi and Electronics in Japan” section in the March, 1965, issue.

The Cipher 800 is comparatively large, measuring 29 in. high, 16 3/4 in. wide, and 8 3/4 in. deep, and weighing 55 lbs.

The 800 is a 3-motor, 3-head machine, with pushbutton operating controls. Five buttons are provided—Record, Rewind, and Fast Forward. In addition, there are two rotary switches—one to control a.c. power and select tape speeds of 7 1/2 and 3 3/4 ips, and the other to select right or left channels for mono recording, or stereo. A slide switch connects the monitor jacks and the VU meters to either the record circuitry or to the playback amplifiers. In addition, there are dual-concentric record level and playback controls. Line-level input and output phone jacks are located in a compartment on the right side of the case, accessible by a hinged door, which also provides access to an octal socket for the remote control switch box, and also accommodates the power cord. Microphone jacks are located on the front panel, as are two headphone monitor jacks, one for each channel.

Unanounced as we received the machine without either operating instruction book, service manual, or schematic, we were in about the same position as the average purchaser of a recorder before he reads the instruction book, and consequently we are unable to give a circuit description as we usually do. However, certain information can readily be gleaned from a general inspection of the recorder, and from conventional performance measurements. Bias frequency is approximately 71 ke, permitting recording to at least 14 ke on the basis of having a bias frequency at least five times the highest signal frequency. Separate right and left bias controls are provided under a protection cover on the rear of the case, along with a bias-balance control to adjust the bias current to optimum waveform. The following shows playback performance from Ampex Standard Frequency Tape No. 31321-01, 71/2 ips:

<table>
<thead>
<tr>
<th>Frequency—cps</th>
<th>Relative Output—db</th>
</tr>
</thead>
<tbody>
<tr>
<td>700</td>
<td>0.0</td>
</tr>
<tr>
<td>1500</td>
<td>+0.6</td>
</tr>
<tr>
<td>1200</td>
<td>+2.0</td>
</tr>
<tr>
<td>10000</td>
<td>+3.1</td>
</tr>
<tr>
<td>5000</td>
<td>+1.7</td>
</tr>
<tr>
<td>2500</td>
<td>+0.1</td>
</tr>
<tr>
<td>1000</td>
<td>0.0</td>
</tr>
<tr>
<td>500</td>
<td>+0.5</td>
</tr>
<tr>
<td>250</td>
<td>+1.5</td>
</tr>
<tr>
<td>50</td>
<td>+2.3</td>
</tr>
</tbody>
</table>

At standard operating level (3 cent harmonic distortion), the maximum playback level measured 2.6 volts. At 3/4 ips, playback response, measured with Ampex Standard Tape No. 31331-01 is shown in Table II.

<table>
<thead>
<tr>
<th>Frequency—cps</th>
<th>Relative Output—db</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>1.6</td>
</tr>
<tr>
<td>7500</td>
<td>1.6</td>
</tr>
<tr>
<td>5000</td>
<td>2.0</td>
</tr>
<tr>
<td>2500</td>
<td>1.6</td>
</tr>
<tr>
<td>1000</td>
<td>1.8</td>
</tr>
<tr>
<td>500</td>
<td>1.0</td>
</tr>
<tr>
<td>250</td>
<td>0.5</td>
</tr>
<tr>
<td>100</td>
<td>0.0</td>
</tr>
<tr>
<td>50</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Maximum playback output at standard operating level measured 2.05 v.

Frequency response in the record-playback mode at 3/4 ips is shown in Table III. Feeding in a constant signal of 1.0 v, and with the recording volume control set for a “0” indication on the VU meter at 1000 cps, it was noted that this indication varied slightly with frequency, as noted in the second column of figures in the table. The third column indicates playback level.

![Image of Cipher Denon Model 800 recorder.](image)

Fig. 4. The Cipher Denon Model 800 recorder.

<table>
<thead>
<tr>
<th>TABLE III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency—cps</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>1000</td>
</tr>
<tr>
<td>1500</td>
</tr>
<tr>
<td>1200</td>
</tr>
<tr>
<td>1000</td>
</tr>
<tr>
<td>7000</td>
</tr>
<tr>
<td>5000</td>
</tr>
<tr>
<td>3000</td>
</tr>
<tr>
<td>1000</td>
</tr>
<tr>
<td>500</td>
</tr>
<tr>
<td>250</td>
</tr>
<tr>
<td>50</td>
</tr>
</tbody>
</table>

Thus it is seen that the playback output relates quite closely to the VU meter indication, even though there is a small variation with frequency, given that when a constant-voltage signal is fed in, Ku-out harmonic distortion, measured with normal VU indication of "0" level measured 2.5 per cent at 1000 cps, 2.0 per cent at 10,000 cps, and 2.0 per cent at 100 cps.

Now and stutter measured 0.17 per cent at 1/2 cps, 0.2 per cent at 3000 cps.

Record-play response at 3/4 ips measured within ±2 db from 50 to 7000 cps.

Mechanical

For its mechanical features, the Denon Cipher 800 rates high honors. Since all tape handling is done by relay-actuated solenoids, the pushbuttons, required only to make electrical contacts, are smooth and without any mechanical resistance. A tensioning lever at the right side of the cabinet actuates the stop relay, so that the transport stops when the tape runs out, regardless of direction of motion. A tensioning arm is provided at the left side to smooth out tape movement off the feed reel. In the play and record modes, the idler roller is held against the capstan by a spring, and a shielding cover is closed to mate with the playback head shield. While it is possible to operate the pushbutton in an incorrect sequence and break the tape, we must admit that we have never yet seen a pushbutton-controlled machine which would not break tape with incorrect operation. That is, you can break tape if you try, but you are not likely to do it with reasonably intelligent operation.

In short, we found this machine a delight to use in every respect. We would like to see this recorder incorporate a remote digital counter into the remote switch panel, and we feel that provision should have been made for a stereo headphone jack, rather than for mono jacks. This writer is a very minor critic, of course, and it is likely that any recordist would replace one of the jacks within the first week that he had the machine in his possession, assuming he was interested in any amount of stereo recording.

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