

Uher 4400 "Report Monitor" Portable Tape Recorder



General Description: The Uher 4400 "Report Monitor" is an open-reel portable tape recorder with 5-inch reel capacity and selectable speeds of $7\frac{1}{2}$, $3\frac{3}{4}$, $1\frac{1}{2}$ and $\frac{3}{8}$ inches-per-second. The head configuration is quarter-track on $\frac{1}{4}$ -inch tape, permitting stereo in both directions of tape travel, or mono back and forth twice over the full length of tape. Three heads are used, with the separate record and play heads permitting off-the-tape monitoring while recording.

The 4400 runs on five size-D dry cells which fit into the bottom of the machine. It also runs on a power unit/charger (Uher model Z125 A1) which may be substituted for the dry cells and used either externally or also fitted into the space otherwise used for the dry cells. When used externally, the charger's line cord must be plugged into an AC outlet, while a special multi-pin socketed cable links the charger to a connector on the recorder. When placed inside the machine, the AC line cord still is used but the cable link between the charger and the deck is no longer needed. The charger has a voltage selector for running off 220 or 115 volts AC mains. The model 4400 also will run off a special storage battery available from Uher which too fits into the deck's battery compartment. The 4400 also can be used with vehicular batteries via a special Uher connecting harness. For carrying the 4400, there is a detachable handle that slips over projecting pins on the deck's sides. In addition, optional leather carrying cases are available.

Except for the headphone monitor jack, signal input and output connectors are the European-type multi-pin types requiring either corresponding connectors or suitable adaptors for microphones and line signal devices. Provision is made for two microphones, and high-level inputs.

For playback, the model 4400 has a small built-in speaker, and there are connectors for feeding signals to external speakers, amplifier or headphones.

The topside of the deck contains the reel compartment and head assembly under a hinged transparent cover. The speaker opening is below and to the left; the transport keys are below and to the right.

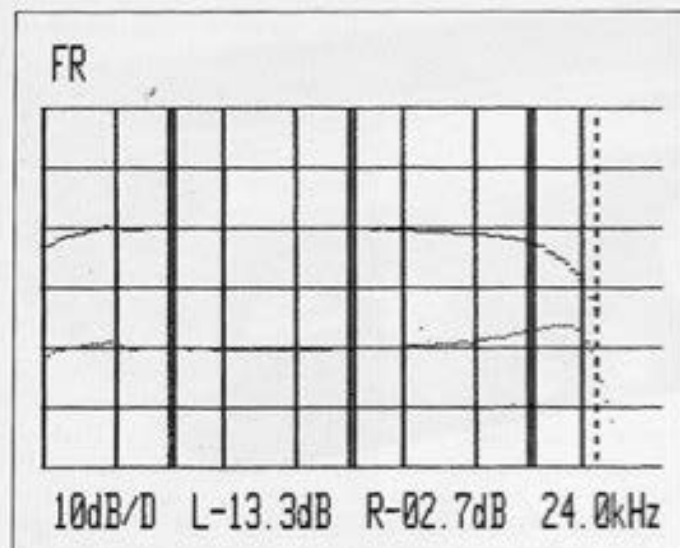
The labels for the transport keys are printed along

the front edge of the machine and include the functions of rewind; start; pause; stop; record; fast-forward. The keys are mechanically operated, and they permit a limited kind of "fast-buttoning." From rewind you can go directly into fast-forward, and also into the record mode by holding down the start (play) and record keys at the same time. You cannot, however, go directly into the play mode from rewind. From fast-forward, you can go directly into record or play. From the record mode you can go into fast-forward but not rewind. From play you can go directly into fast-forward (but not rewind), and you also can go directly into record by holding down the start and record buttons at the same time. The pause button must be manually released if it is engaged.

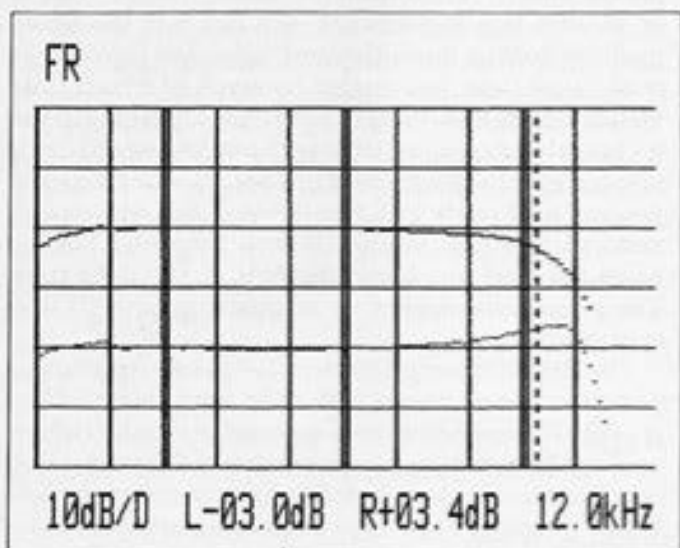
The left-hand portion of the front panel contains two peak level signal meters calibrated from under -20 to $+3$ dB. The second meter also contains a battery-check reading. Between the meters are three LEDs indicating operating mode, and a tape/source monitor switch. Below the meters are three knobs for channel 1, channel 2 and master recording level which may be used as a fader for handling both stereo channels at once and also for handling the combined signal when two inputs are being mixed to a mono signal.

The right-hand portion of this panel contains a 3-digit tape-index counter and reset button; a switch for checking battery condition; a second switch for lighting the meters; a mono/stereo selector; the tape-speed selector (marked in cm) which also serves as the power on/off switch; a monitor volume control; and a tone-control (treble cut) combined with a switch to turn on or off the deck's built-in speaker (which, in stereo mode, presents an "A plus B" mono-summed signal). The two mic inputs near the bottom may be used for individual channel microphones. The mic 1 input also may be used for a stereo microphone when a small switch at the extreme right is used; in this case, the mic-2 socket is inactive.

Test Results: For a portable, the Uher 4400 has some pretty rigorous specifications—and they all were confirmed or bettered in our lab tests—(see our table of



(A)



(B)

Fig. 1: Uher 4400: Frequency response, record/play of unit. In upper traces, cursor is positioned to show cut-off point (-2.7 dB) for -10 dB record level (A). In lower graphs, cursor has been set to show cut-off (12 kHz) for 0 dB record level.

"Vital Statistics"). Some of the highlights are shown in the accompanying graphic plots. We measured frequency response at the deck's highest speed of $7\frac{1}{2}$ ips for two record levels of 0 dB and -10 dB. Both response curves are shown in Fig. 1. In both (A) and (B) of Fig. 1, the upper plot shows response at the 0 dB level; the lower plot, at -10 dB.

It must be noted that " 0 dB" on this machine's peak-reading meters is like no other " 0 dB" we have seen recently. It corresponds here to a whopping record level of about 450 nanowebers-per-meter. That's more than twice as much magnetization level as Dolby calibration level, which accounts for the seemingly

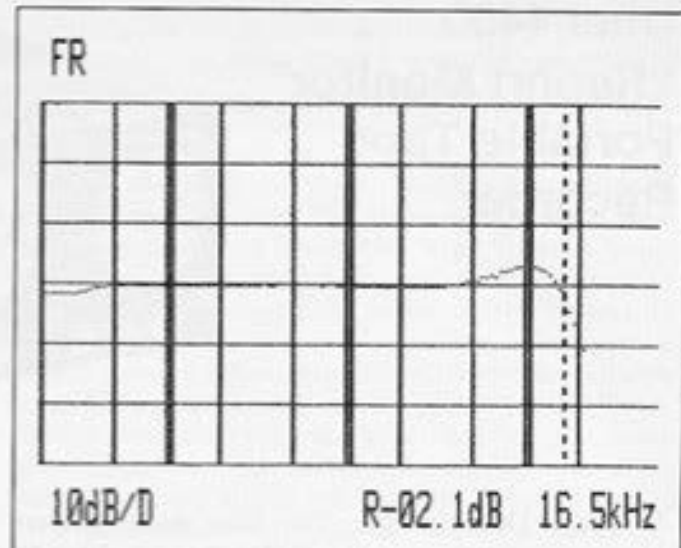


Fig. 2: Uher 4400: Record/play response at -10 dB record level, $3\frac{3}{4}$ ips.

high third-order distortion figures shown in the "Vital Statistics" table. These figures are all with reference to this inordinately high " 0 dB" level as shown on the deck's meters.

At a more realistic -10 dB record level, response extended to beyond 24 kHz (represented by the "R" curve in Fig. 1A, which shows the response as being down by 2.7 dB at 24 kHz). At this highest speed headroom is, of course, far better than one would find on any cassette deck, as evidenced by the upper trace of Fig. 1B, which was recorded at a " 0 dB" level and which extends to 12 kHz for the -3 dB rolloff point at this very intense magnetization level.

As might be expected, the slower speeds pulled down the high-end response, as shown in Figs. 2 and 3, for $3\frac{3}{4}$ and $1\frac{1}{2}$ ips, respectively. These plots were made at a record level of -10 dB relative to the Uher's " 0 dB" meter indications, so we are still dealing with a fairly high record level (around 150 nWb/m), considerably higher than would be obtained by using a nominal -20 dB level on most cassette decks.

Third-order distortion levels for mid-frequencies are shown in Figs. 4, 5 and 6. In each display, the cursor has been set to read third-order distortion for a nominal 0 -dB record level as per the Uher's own meters. Of course, if we were to back off a little—even by a few dB—we can see that in all three cases, the distortion decreases rapidly to more reasonable amounts. We did not bother to present results for the lowest speed of $\frac{1}{2}$ ips, since the pattern for both frequency response and distortion is clearly established by the presentations for the three higher speeds.

Mechanically, the Uher 4400 was faultless. Wow-and-flutter for the higher two speeds came in well below spec, and while the transport keys are mechanically activated they did prove responsive, and even permitted a measure of fast-buttoning including run-in recording directly from playback.

General Info: Dimensions are 11½ inches wide; 4 inches high; 9 inches deep. Weight is c. 3.8 kg (c. 8.4 lbs.) less batteries. Price is \$1,361.25.

Individual Comment by L.F.: I must confess that I have problems understanding the philosophy of the Uher Company of West Germany. They seem to have been left behind by the rest of the recording world and continue to live under the delusion that portable cassette recorders are just a fad that will soon go away. Mind you, I think their little model 4400 is quite a mechanical and electronic achievement, but why anyone in his or her right mind would spend well over a thousand dollars for an open-reel machine that accommodates only 5-inch reels is something I fail to understand. Not when there are some magnificent portable cassette decks around that are far easier to handle in the field, yield excellent fidelity, low wow and flutter and—at the standard cassette speed of 1½ ips—deliver frequency response at least as good as that of this Uher machine when it is operated at 3¾ ips.

I also wonder why, for example, with such excellent engineering in the electronic section of the model 4400, Uher couldn't have come up with a transport system that turns itself off when the tape runs out. Even lowly portable dictation-type cassette decks selling for under \$100 have that feature. And how come the pause key has to be physically lifted or retracted to terminate the pause action, instead of simply pushing down on it as one does with every other piano-key type pause button?

Oh, I know there are some readers who swear by their Nagra open-reel recorders and are hoping that I will say that the Uher is a poor recordist's Nagra. Sorry folks, that is just not the case. Any machine that carries a plus-or-minus 1.5 percent tolerance for speed accuracy is not, to my way of thinking, a professional machine. I suppose if you are a journalist out in the

field and need to do a long, long interview, or record a very long event on tape with no interruptions whatever, the 4-hour recording time per tape run using "double-play" tape at the 1½ ips speed may be something you will cherish. Just think, however, if the designers of this machine had moved the hubs upward and outward by just about one inch, the machine would have been able to accommodate 7-inch reels, and so the same recording time could have been available at a higher speed, such as 1¾ ips, where response extends to beyond 13 kHz instead of only to the measured 5.4 kHz for the -3 dB point at the 1½ ips speed. Admittedly, this would have meant that the machine would have to be operated with its hinged cover open, but I at least would prefer that to the 5-inch reel limitation.

Having said all that, I get to the good news, which is the remarkable electronic performance of this deck as

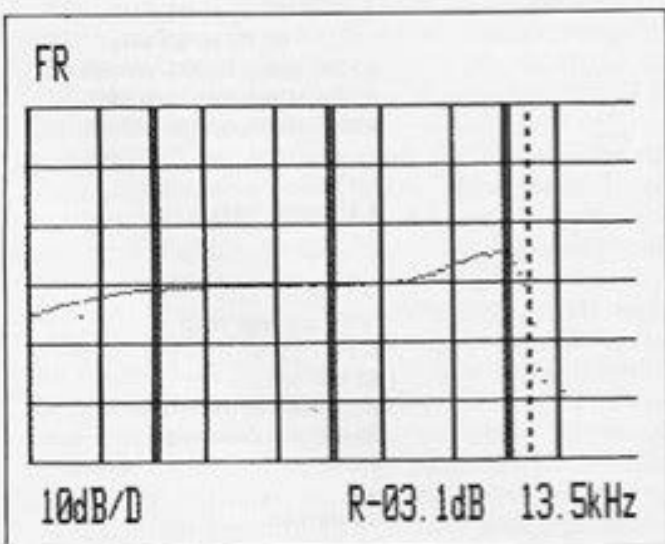


Fig. 3: Uher 4400: Record/play response at -10 dB record level, 1½ ips.

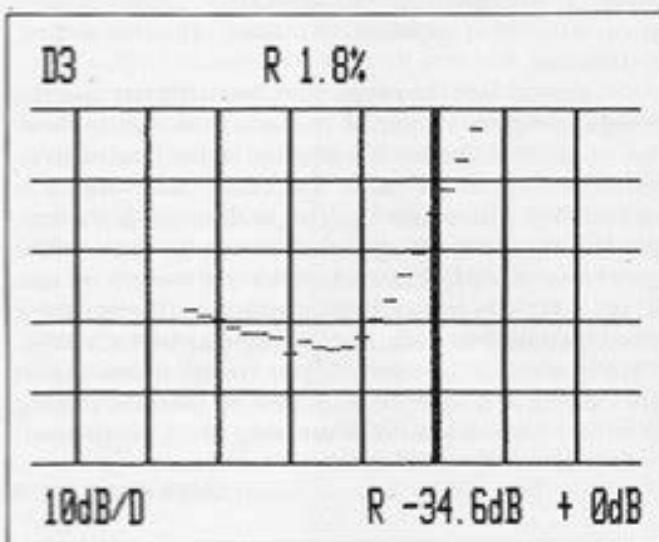


Fig. 4: Uher 4400: Third-order distortion vs. record level at 7½ ips.

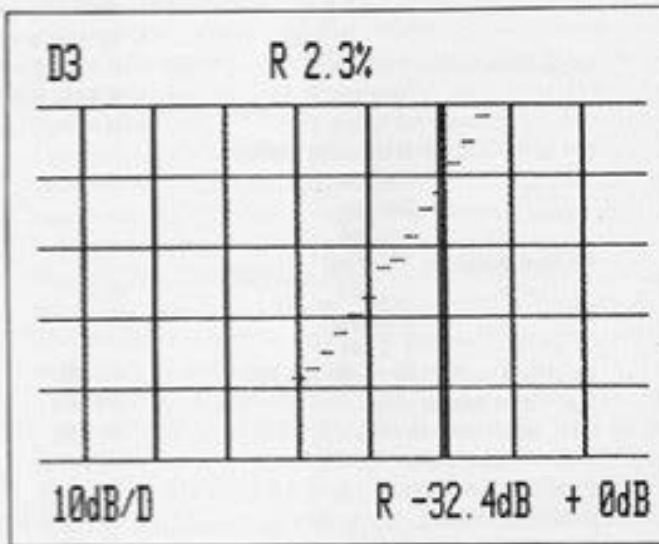


Fig. 5: Uher 4400: Third-order distortion vs. record level at 3¾ ips.

presented elsewhere in this report. The 4400 does have excellent response and headroom at its higher speeds, and even at 1 1/8 ips headroom is still higher than found on most cassette decks using the nominal -20 dB record level. Having a built-in speaker is useful for monitoring in the field, and of course the multiple ways in which the unit can be powered (AC, dry cells, special storage battery, and even car battery with suitable cable adaptor) constitute the basic reason for the existence of this little open-reel machine. Now, if only I could find a basic reason for its price...

Individual Comment by N.E.: In the context of so much ongoing development and refinement of the cassette format, a portable open-reel recorder such as this Uher seems somewhat like an antique automobile—all spruced up and elegant and even capable of splendid performance, but obviously outdated as a general interest product. At least, that is a first impression.

On second look, however, the Uher 4400 has specific things going for it that no cassette deck—portable or not—can offer. One is its enormous signal headroom as confirmed in our lab tests. The other thing—which is self-evident and requires no test to discern—is the simple fact that it is the open-reel format using standard quarter-inch tape. Thus, whatever one records on this kind of deck is instantly compatible with any larger fixed-installation deck also using quarter-inch tape. This means, for instance, if you record something in the field that is later to be edited, or used for mixing down, or for any kind of processing in which an open-

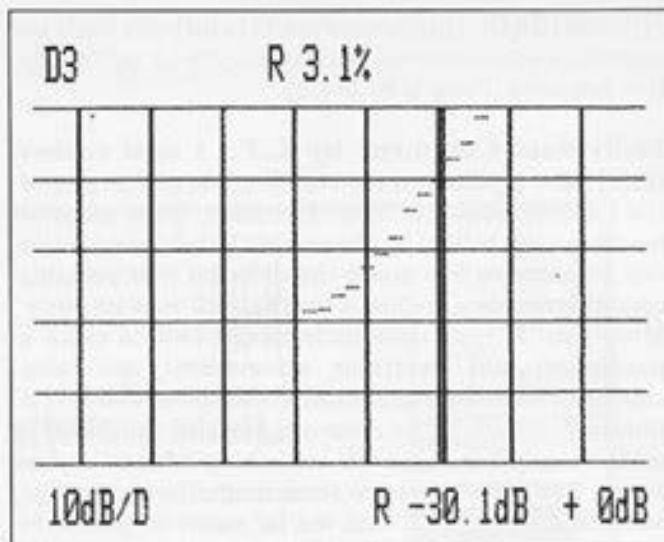


Fig. 6: Uher 4400: Third-order distortion vs. record level at 1 1/8 ips.

reel end-result tape is the desired goal, you do not first have to dub a second generation tape from the original, as you most certainly would have to do if you started with a cassette tape.

The big question then becomes one of weighing that kind of convenience and "signal purity" against the size, cost and weight of the Uher vis-a-vis those of a high-quality portable cassette recorder. And it is how any individual recordist answers this question that may well determine whether it should be added to one's supply of recording devices.

UHER 4400 TAPE RECORDER: Vital Statistics

PERFORMANCE CHARACTERISTIC	MANUFACTURER'S SPEC	LAB MEASUREMENT
Frequency response, 7 1/2 ips	20 Hz to 25 kHz	± 3 dB, 20 Hz to 24.5 kHz
3 3/4 ips	20 Hz to 16 kHz	20 Hz to 17 kHz
1 1/2 ips	25 Hz to 13 kHz	20 Hz to 13.5 kHz
1 1/8 ips	25 Hz to 6 kHz	25 Hz to 5.4 kHz
Wow-and-flutter, 7 1/2 ips	0.15% (DIN)	0.10% (DIN); 0.07% WRMS
3 3/4 ips	0.20% (DIN)	0.13% (DIN); 0.08% WRMS
1 1/2 ips	NA	0.25% (DIN); 0.14% WRMS
3rd order HD @ 0 VU (450 nWb/m)		
7 1/2 ips	NA	1.8%
3 3/4 ips		2.3% (see text)
1 1/2 ips		3.1%
Record level for 3% THD		
7 1/2 ips	NA	+ 1 dB
3 3/4 ips		+ 0.5 dB (see text)
1 1/2 ips		0 dB
Best S/N ratio, std tape, 7 1/2 ips	64 dB	62 dB
Mic input sensitivity	0.1 mV	0.1 to 40 mV (variable)
Line input sensitivity	50 mV	50 mV min (variable)
Line output level	0.775 V	0.8 V
Phone output level	2 V	2 V
Bias frequency	100 kHz	Confirmed
Erase ratio	80 dB	80 db
Speed accuracy	± 1.5%	- 0.3%