Ampex AG-440 Cosmetic Evolution

Ampex Corporation introduced the AG-440 reel to reel studio mastering deck in 1967. The model went through 3 generations and was in production into the mid 1980's. The machine is an all-discrete transistor design, with class A electronics. Mechanically, it was an upgrade from the long-lived 350-type transport. The AG-440 transport featured a rigid die-cast assembly that achieved tape stability equal to the larger "brute force" 300-type transport but kept the approximate form-factor and user interface of the popular 350-type. The tape path featured a scrape-flutter idler between the record and play heads, with facilities for a second idler on the other side of the record head.

Full details of these machines are found in their online manuals, generously hosted by Ampex Data Systems. The purpose of this web page is to show and explain the machine's cosmetic evolution, with cursory mention of the various electro-mechanical changes that evolved over its lifespan.

Fig. 1–1. Ampex Model AG–440, Four Channel, Console Mount

This is the original look of the AG-440, the "a" series. Above is a 4-track machine. The machine was originally available in full-track, 2-track and 4-track configurations. Plug-in headblocks and spring-loaded rotating guides (one side for 1/4" tape and one side for 1/2") allowed quick change-overs between quarter-inch and half-inch tape. The original machine used an AC capstan motor and was available in either 7.5 / 15 IPS or 3.75 / 7.5 IPS. Both NAB and CCIR equalization were offered. The transport featured 24V relays and solenoid-controlled tape lifters that automatically kept the tape out of physical contact with the heads during fast-winding. Unlike later models, the lifters would disengage immediately when the machine was switched to stop from either rewind or fast-forward. Thus, to preserve head life (and studio monitor tweeters), the user is well advised to shuttle the tape to a near-stop before hitting the stop button.
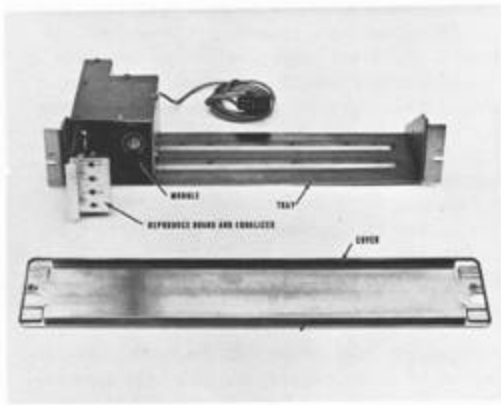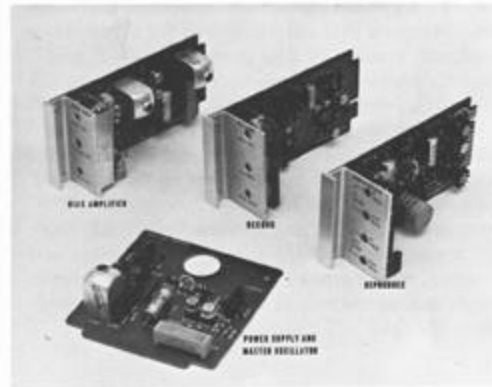
Fig. 1—5. Reproduce—only
Electronic Assembly

Fig. 1—4. Printed Circuit Boards

Fig. 1—3. Record/Reproduce
Electronic Assembly

Above are views of the original 440 electronics, the front panel, removable PWA cards and the AG-445 play-only electronics module. The knobs are similar to those used on the AG-350 and AG-300 machines, small diameter with locking pre-set rings. The larger, square PWA card is the master bias oscillator and power supply regulator circuit to provide 39VDC to the electronics.
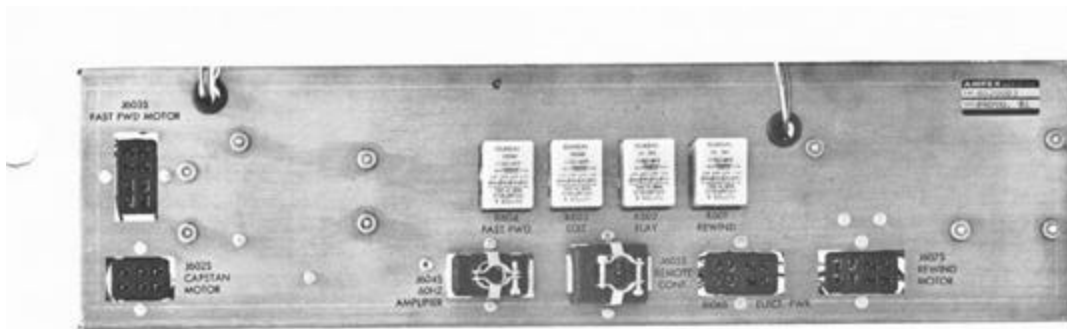

Fig. 2—3. Tape Transport Receptacles

Fig. 2—4. Electronic Assembly Receptacles

Here are the back panels to the 440"a" electronics (bottom) and transport control box (top).
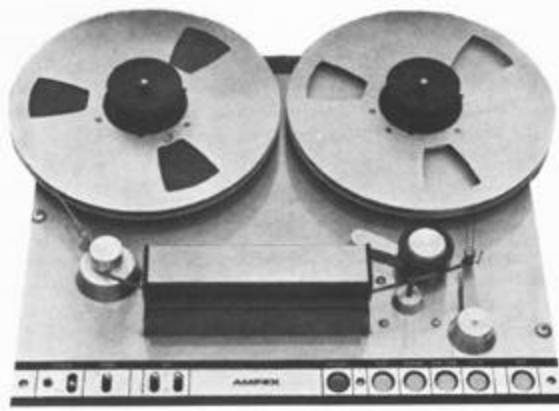
Fig. 1-1 Tape Transport
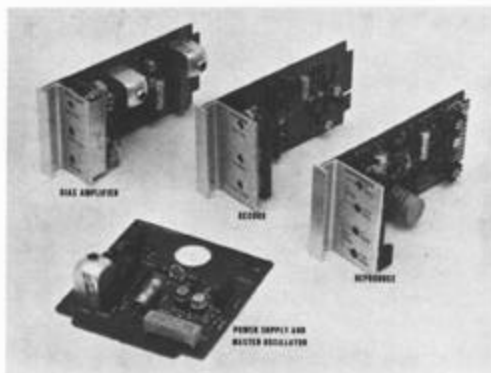

Fig. 1-2. Record/Reproduce Unit
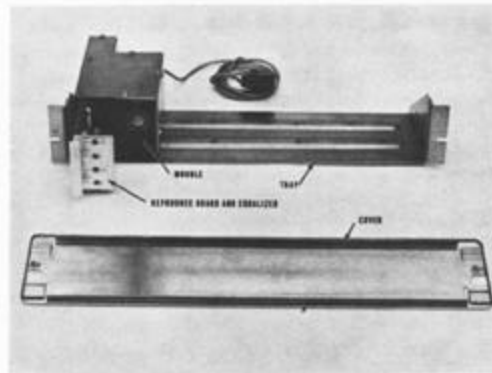

Fig. 1-3. Printed Circuit Boards

Fig. 1-4. Reproduce Electronic Module

In 1969, Ampex rolled out the AG-440B, which was cosmetically similar to the first generation machine but included some updates to the electronics and the transport. As seen in the above photo of the electronics front panel, the knobs were changed to the larger types without locking rings. A clear "memory set" disc was under each knob, to be used to remember standard operating levels. Inside the electronics, a L-C network was added to the repro level circuit to trap bias leakage. These electronics were similar to those used on the production version of the MM1000 1-inch/2-inch multi-track deck. As such, they had a 4-pin jack on the back allowing the record status light for each electronics to run remotely. This feature was more pertinent to the MM1000, which had record-status lights on the remote control unit.

Inside the transport, a lifter-delay circuit was added. This enabled the machine to come to a complete stop from fast-winding before the lifters dropped the tape on the heads. Cosmetically, the transport was identical to the 440"a" on the top plate. Ampex also offered an add-on DC servo capstan motor, which had jumper-selectable speed pairs, any two speeds, of 3.75, 7.5, 15 and 30 IPS.
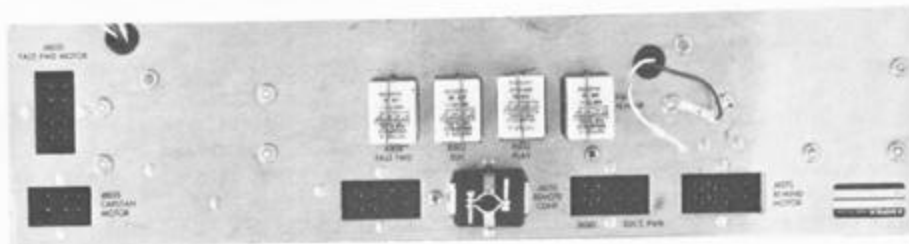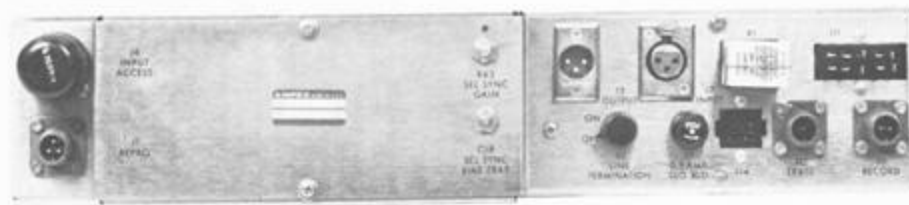
Fig. 2-3. Tape Transport Connector Panel

Fig. 2-4. Record/Reproduce Unit (Rear)

Here are the 440B back panels. Note the 4-pin Jones socket on the electronics.

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AG-440C Tape Recorder/Reproducer

In 1974, Ampex introduced a substantially redesigned AG-440C. This machine offered the DC servo capstan motor as standard, although many were sold with the same AC capstan motor as earlier models. In the transport, a motion-sensing circuit was added so the machine would come to a complete stop from fast-wind before it would kick into play or record. This prevented the "death tape spill" possible on the earlier machines. The transport circuit was also altered to work with the new record circuit in the redesigned electronics, so it is not interchangable with earlier electronics without modification. Above is the 2-track version.

Figure 1-6. One-Channel (1/4-Inch Tape Width)
Recorder/Reproducer

Figure 1-7. Four-Channel (1/2-Inch Tape Width)
Recorder/Reproducer

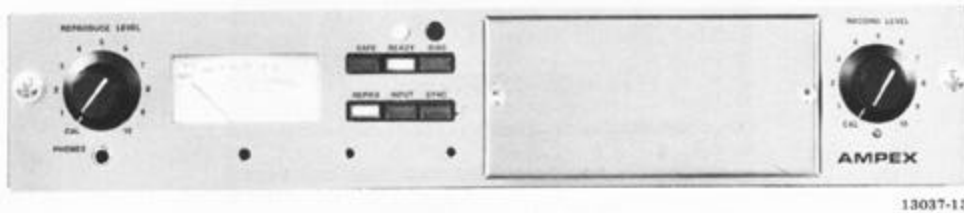Here are the full-track and 4-track versions of the 440C.

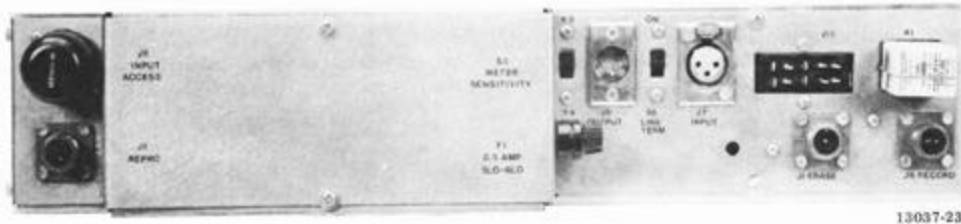Figure 1-2. Record/Reproduce Unit (Front Panel)

Figure 1-4. Record/Reproduce Unit (Rear View)

The 440C electronics, front and rear, are pictured above. Note the smaller-sized VU meter, the "set and forget" level trimmers and the push-button control interface which replaced a slide-switch and a rotary switch on the earlier versions. Inside, the electronics circuitry was substantially redesigned. These electronics do not work with previous versions of the transport.
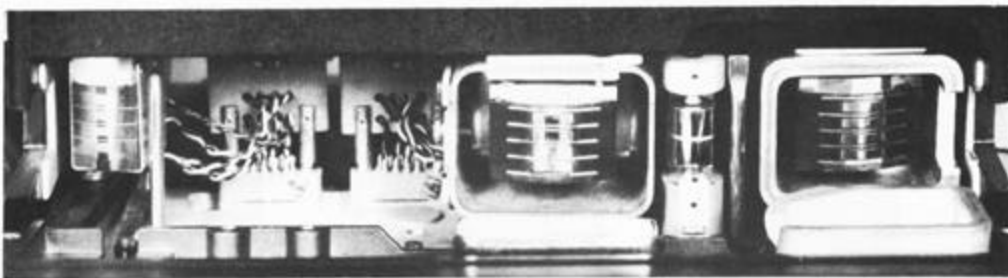

Figure 1-5. Head Assembly

The 440C heads are shown above. This particular block is a 4-track half-inch model. Note the ruby guides on block's entry and exit, on the individual head cans and on the scrape-flutter idler. Ruby guides were new on the AG-440C. The previous models had glass guides on the entry and exit sides of the head block.
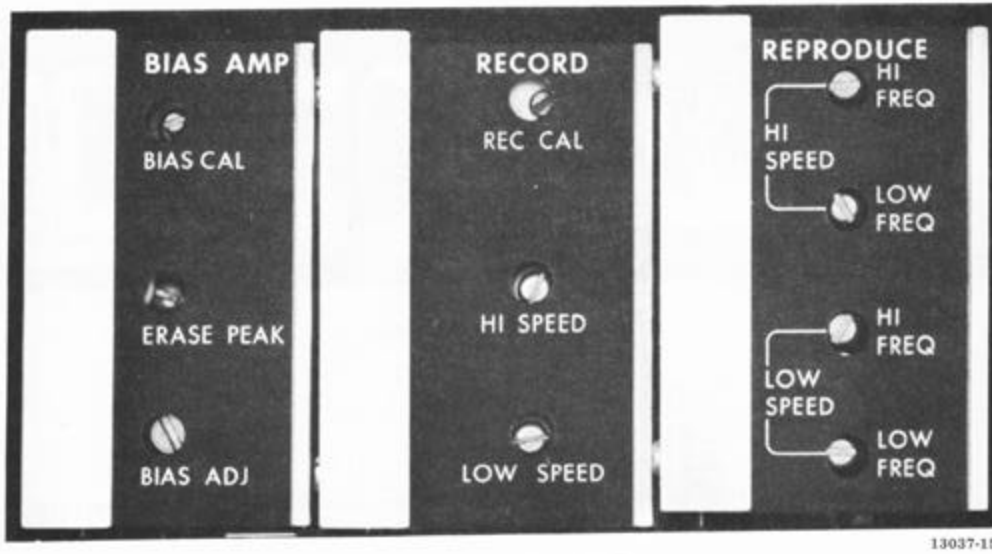
Figure 1-3. Removable Modules

Finally, here is a closeup of the electronics PWA card front panels. All electronics adjustments were made from these panels and the cards could be enclosed behind a stainless panel.

Produced by Tom Fine, 11/04