

AIWA

Simply Advanced

Cassette Decks



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Archiv Michael

AIWA[®]
AIWA AMERICA INC.

AD-F990U



"Simply Advanced": More than a catchword, it's proof that perfect recordings can be made almost effortlessly!

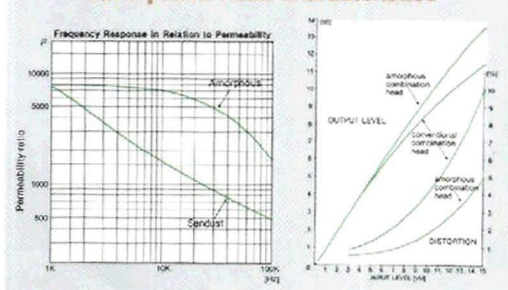
When working out the design for what was to become the most advanced AIWA deck ever produced, engineers began with a fundamental question: "What features", they asked, "can be built in to give users a deck not only with unmatched sound fidelity, but with genuinely automated, failproof operation?" The AD-F990 is the answer. Unquestionably the most superlative performance ever offered in a model of this type, it also features thoughtful human engineering and unprecedented ease of operation.

Amorphous Combination Head

The AD-F990 introduces a newly developed head which promises to surpass almost every previous standard of top performance. Unlike most metals which have a uniform atomic configuration, amorphous alloy is a new non-crystalline material with non-specific, non-directional atomic configuration. When utilized as head material, it is able to display such ideal characteristics as a high maximum magnetic flux density, outstanding signal linearity (due to lower coercivity), and minimal generation of electromagnetic noise. Add to this a remarkable hardness for extra durability, and you can understand why AIWA engineers are so excited over the potential of this new material!



Amorphous head characteristics

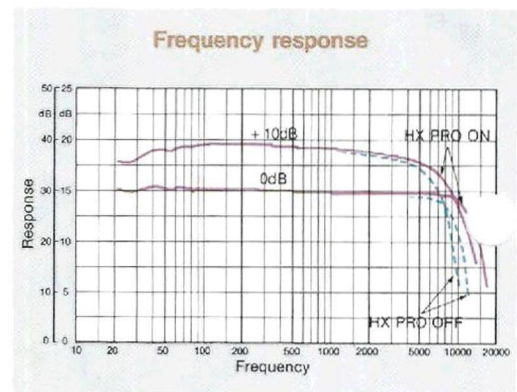
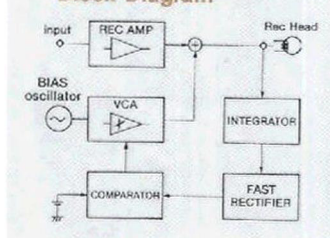


Dolby HX Professional: A revolutionary new approach to the problems of recording bias

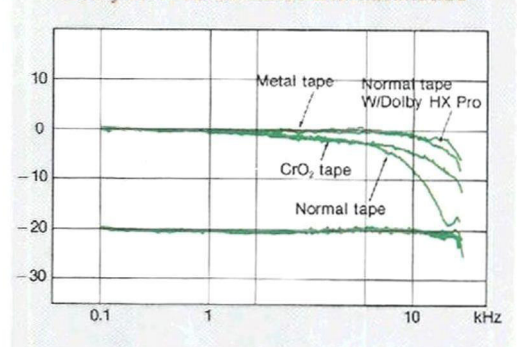
Not noise reduction but an entirely new way of processing signals, this newly-developed circuitry functions during all recordings but requires no processing during playback. For this reason, whether cassettes are recorded with or without Dolby noise reduction you'll have the advantage of full playback compatibility in any type of cassette equipment.

HX stands for "Headroom Extension", and it operates during recording by means of a special circuit which dynamically adjusts bias levels in response to the input signals. This contributes to significant improvements in dynamic range, while at the same time making possible a naturally "flat" response in the upper frequencies. Because the bias level is fixed in conventional cassette decks, they are inevitably handicapped by the phenomena of "self bias" and "mutual bias", resulting in inability to accurately reproduce high frequency signals above a certain volume level. Dolby HX Professional has been specifically designed to deal with this problem. By use of a servo circuit which functions independently in right and left stereo channels during recording, AIWA's new decks can ensure that ideal bias levels are applied at all times. Because this contributes to reducing easily-incurred high frequency tape saturation, you'll be amazed at the clarity and absence of distortion; a definite difference. If you plan to make tapes from digital program sources, AIWA's decks are also designed to take optimum advantage of the increased recording headroom offered by Dolby C noise reduction. Results of recordings in this mode are truly superb: with metal tape, the AD-F990 boasts a frequency response of 20 to 20,000Hz, with signal/noise an outstanding 80dB (above 5kHz).

Dolby HX Professional Block Diagram

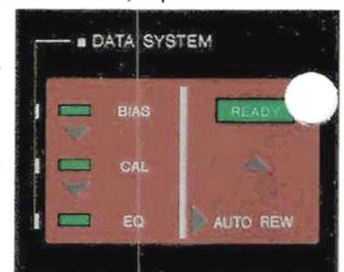


Dolby HX Professional characteristics

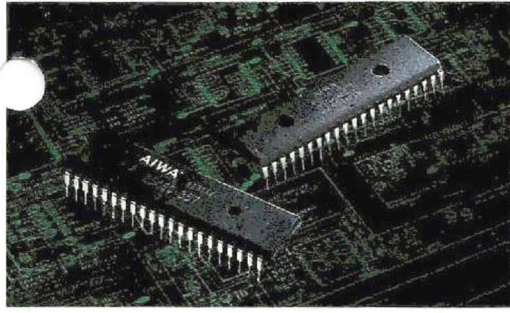


DATA (Digital Automatic Tape Adaptation) system

This sophisticated microcomputerized circuit automatically "tests" each tape prior to recording and adjusts the deck's bias, equalization and sensitivity to optimum levels. Performed automatically within 16 seconds, DATA ensures that virtually any brand of tape you select can deliver its best performance.



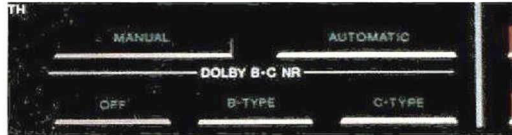
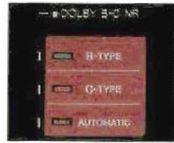
New automated features



Auto Noise Reduction Detector

"Was that tape recorded by Dolby B or C?" "Did I use noise reduction when I made that recording?" Questions such as these are completely unnecessary with the AD-F990.

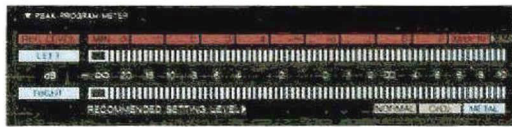
As long as you play a tape recorded by the same machine it will switch to the correct NR setting automatically!



Auto Recording Level Control

This feature completely does away with the need for time-consuming manual adjustment of recording input levels. When recording begins, level is set to the ideal point for the type of tape in use, ensuring optimum recording levels.

(Manual override is available for fadeout, special effects, etc.)




Flat "Keyboard" control panel

A triumph of human engineering, AIWA's design combines the convenience of front loading with the concept of "user-friendly" operation now widely popularized by personal computers. Feather-touch IC logic controls and the record level adjuster are arranged on a flat keyboard panel at the base of the unit. New design ends awkward pushing and poking of inconveniently-angled controls to make operation a real pleasure.

Auto Tape-Source Selector

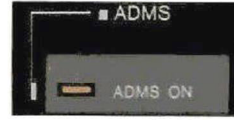
Three-head cassette decks ordinarily require manual switching between TAPE (to hear the recording while in progress), or SOURCE (to monitor the sound from turntable, tuner, etc. being recorded by the deck). But if, for example, a conventional 3-head deck is set to the TAPE setting while in the RECORD/PAUSE mode, no sound will be audible from the system's loudspeakers. AIWA has equipped the AD-F990 with a new circuit which automatically switches the TAPE/SOURCE selector to the user-preferred position (manual override is of course possible).

Mode	Switching
PLAY	Tape
REC	Tape
REC/PAUSE	Source

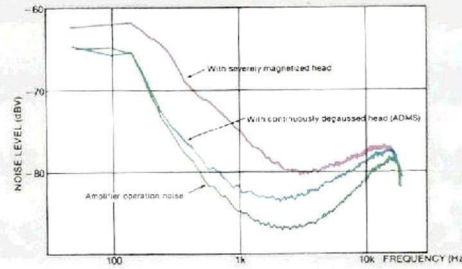


ADMS (Auto-De-magnetizing System)

This fully automatic system eliminates the need for awkward de-magnetizer tools or accessories forever. Each time the unit's power is turned on, a special oscillator circuit "sweeps" the record/playback heads clean of residual magnetization in less than two seconds. By keeping the heads in a continually degaussed condition, low noise, low distortion and optimum frequency response are ensured at all times.



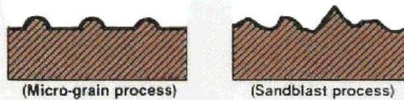
Effect of ADMS operation (Playback noise analysis)



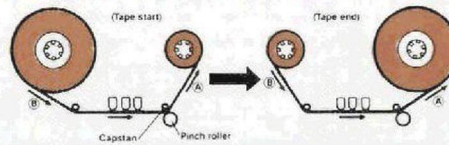
Micro-grain dual capstan transport

An exclusive process which coats the capstan surface with millions of uniform hemispheric domes, AIWA's micro-grain design ensures ideal cohesion between tape, capstans and pinch roller. This virtually eliminates the effects of changes in tape load, reducing modulation noise and resulting in exceptionally low levels of wow & flutter.

Simulated magnification of capstan surface

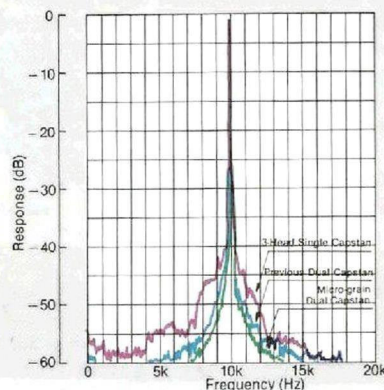


Micro-grain surface eliminates effects of constantly-changing tape load during play.



- Ⓐ Tension: Heavy Ⓐ Tension: Light
- Ⓑ Tension: Light Ⓑ Tension: Heavy
- Real rotation: Fast Real rotation: Slow

Modulation Noise Characteristics



Intro-play facility

Intro-play is an automatic system which searches out the start of each successive recorded tune; it then gives the listener an 8-second sampling of the contents and continues by fast forward to the next. To hear the entire tune, simply touch the PLAY mode at any time during the eight seconds and normal playback will continue. Intro-play functions in both forward and reverse directions.



All-mode tape remaining time display

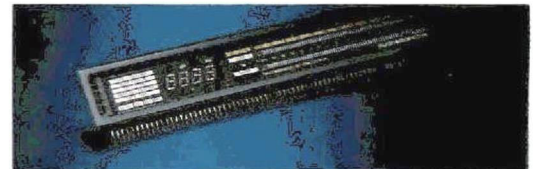
Unlike previous time display counters which functioned only in the normal tape speed modes (PLAY/REC), AIWA deck counters retain precise location of the tape even during Fast Forward and Rewind.

This means that remaining tape time countdown will be displayed accurately regardless of tape length or changes in transport mode.



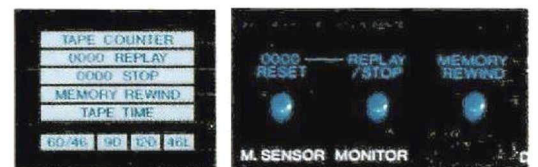
Fluorescent Multi-function Display

In addition to eye-catching peak meter display with a wide -20 to +10dB range, the integrated panel includes easy-to-read indicators for length of tape in use, remaining tape time/tape counter function, memory rewind and recommended maximum peak level for each type of tape.



Memory Rewind and Repeat System

You can use this facility for repeating playback of desired segments between the start and end of the tape; or, for continuous repeat play of the entire tape. The memory function also gives you automatic replay either between tape start or tape end and a point midway on the tape. In any case, the logic controls function rapidly and automatically while you enjoy the music.



Plus:

- Feather-touch electronic recording level control with position indicator
- Fluorescent multi-function display with peak hold
- Microphone jacks (rear panel)
- Auto Rec-mute
- Auto tape selector
- 1-program music sensor
- Switchable MPX filter (rear panel)
- Timer standby recording/playback



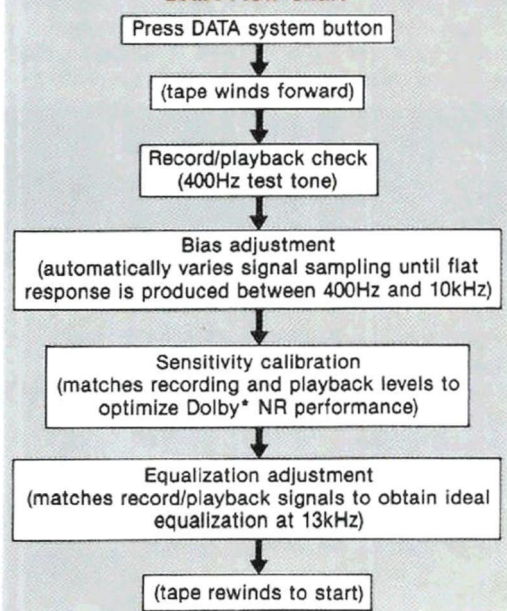
Stunning three-head performance, with an unmatched array of sophisticated features

Offering most of the features incorporated in the AD-F990, this sophisticated 3-head deck's Dolby HX Professional and DATA circuitry ensure sound reproduction that outrivals any other model in its class. From the all-new flat "keyboard" control panel to the unique All-mode remaining tape time display, the AD-F770 is the kind of machine you can depend on for the best in cassette performance.

DATA (Digital Automatic Tape Adaptation)

Is your deck prevented from delivering its best performance with the tape you want to use? The fact is that only a deck like the AD-F770 can ensure ideal matching with every tape brand and formulation. DATA, AIWA's sophisticated built-in microcomputer system, "tests" each tape prior to recording and automatically

DATA Flow Chart

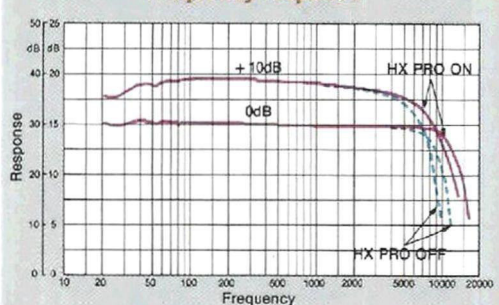


adjusts bias, equalization and sensitivity to ideal levels—in only 16 seconds! Perfect tape compatibility is your assurance of perfect recordings—on any tape.

Dolby HX Professional

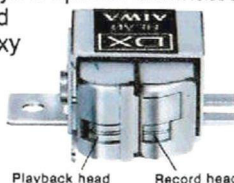
Designed to raise cassette deck performance to the demanding levels required for digital audio sources, this circuitry provides high frequency signals with the ideal bias levels by servo control which automatically functions in response to self-bias and mutual bias levels. And absolutely no encoding is needed for playback, so you can enjoy these tapes anywhere!

Frequency response



DX Combination Head

Designed for extra protection from uneven wear, the DX head employs a special laminated configuration of ultra-hard permalloy chips and epoxy resin. High flux density and superb signal linearity compliment the low-noise construction.



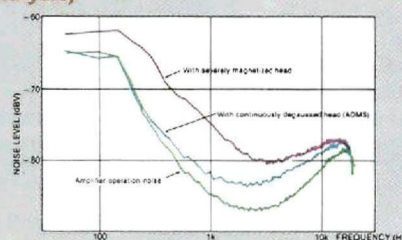
ADMS

An essential part of head maintenance, degaussing used to be an awkward and time-consuming chore until AIWA introduced its original Auto De-magnetizing System (ADMS). This built-in oscillator circuitry functions in a matter of

seconds to remove residual magnetic buildup from the heads each time the unit's power is turned on.



Effect of ADMS operation (Playback noise analysis)



Micro-grain Dual Capstan System

As a cassette plays from start to end, tape is constantly subjected to changes in winding torque due to increasing load on the take-up reel, and this can have a detrimental effect on the quality of playback signals. AIWA's exclusive Micro-grain dual capstans provide more positive cohesion between tape, capstan and pinch roller, thus minimizing modulation noise and resulting in exceptionally low levels of wow & flutter—an inaudible 0.025% (WRMS).

Memory Rewind and Repeat System

This allows repeat playback of any preselected tape segment you designate.



Plus:

- Fluorescent multi-function display with peak hold
- All-mode tape remaining time display
- Dolby B/C noise reduction
- Intro-play track preview
- Memory rewind and repeat system
- Auto Rec-mute
- Auto tape selector
- 1-program music sensor
- Timer standby recording/playback
- Switchable MPX filter (rear panel)
- Stereo microphone inputs (rear panel)



Astonishing high-fidelity reproduction and deluxe features—now more affordable than ever before!

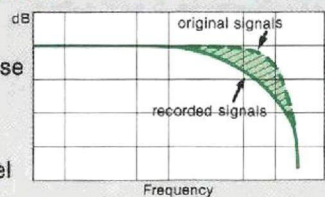
If the AD-F990 and AD-F770 didn't exist, there would still be an AIWA deck rated at the very top in terms of 3-head performance: the AD-F660. Incorporating Dolby HX Professional circuitry for audibly better high-frequency reproduction, this superbly-designed deck has the capability to handle even the most demanding digital program material with flawless fidelity.

How Dolby HX Professional automatically ensures better recordings

Not noise reduction but a completely new type of circuit, this system extends the recording headroom of high-volume, high-frequency signals—exactly what those other decks without this feature are unable to record. This is accomplished by servo control which automatically functions in response to self-bias and mutual bias levels. It's easy to use, because it operates during all recordings. You'll appreciate what it does for your cassettes too; they'll sound better played back in any unit—even a car player or portable—because there's no problem of noise reduction incompatibility!

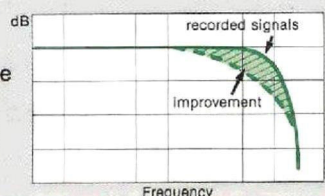
Deck with fixed bias

High-volume signals are not recorded because high frequency causes MOL to exceed permissible level



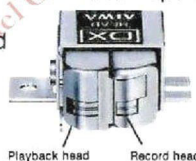
AIWA AD-F660

Dolby HX Professional decreases bias in response to signal input, so high-volume signals can be accurately reproduced



DX Combination Head

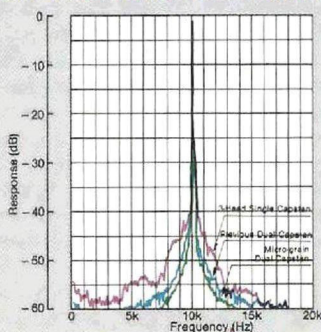
A new formulation combining laminated chips of ultra-hard permalloy with epoxy resin, the DX head offers superior linearity along with improved resistance to saturation and heat buildup. Whether for recording on high-MOL metal tapes or ordinary oxide varieties, the combination Rec/PB head utilized in the AD-F660 ensures wide dynamic range, low noise and minimal contour effect.



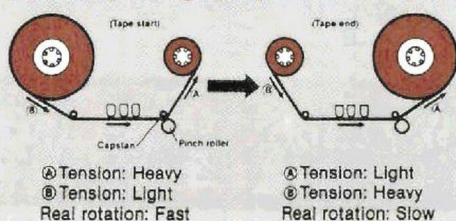
Micro-grain Dual Capstan System

AIWA's original dual Micro-grain capstans, made by an exclusive process which coats the capstan surface with microscopic hemispheric domes (designed to impart ideal cohesion with the tape surface), has been combined with an improved 2-motor drive system for even lower wow & flutter: an unprecedented 0.028% (WRMS).

Modulation Noise Characteristics

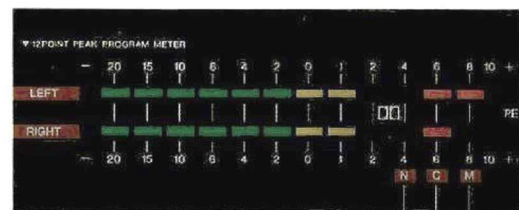


Micro-grain surface eliminates effects of constantly-changing tape load during play.



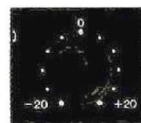
LED Peak Meter Display

Arranged in two rows of 12 LEDs each, the Peak meters feature a wide -20 to +10dB range for precise control over input levels. Three-color sequence changes from green to amber at 0dB, amber to red at 4dB to provide visual warning of approaching tape saturation levels. A 3-second peak hold is also provided.



Bias Fine Adjuster

To ensure optimum response from the wide variety of Normal and CrO₂ tape varieties available, recording bias may be increased or lowered by up to 20%.



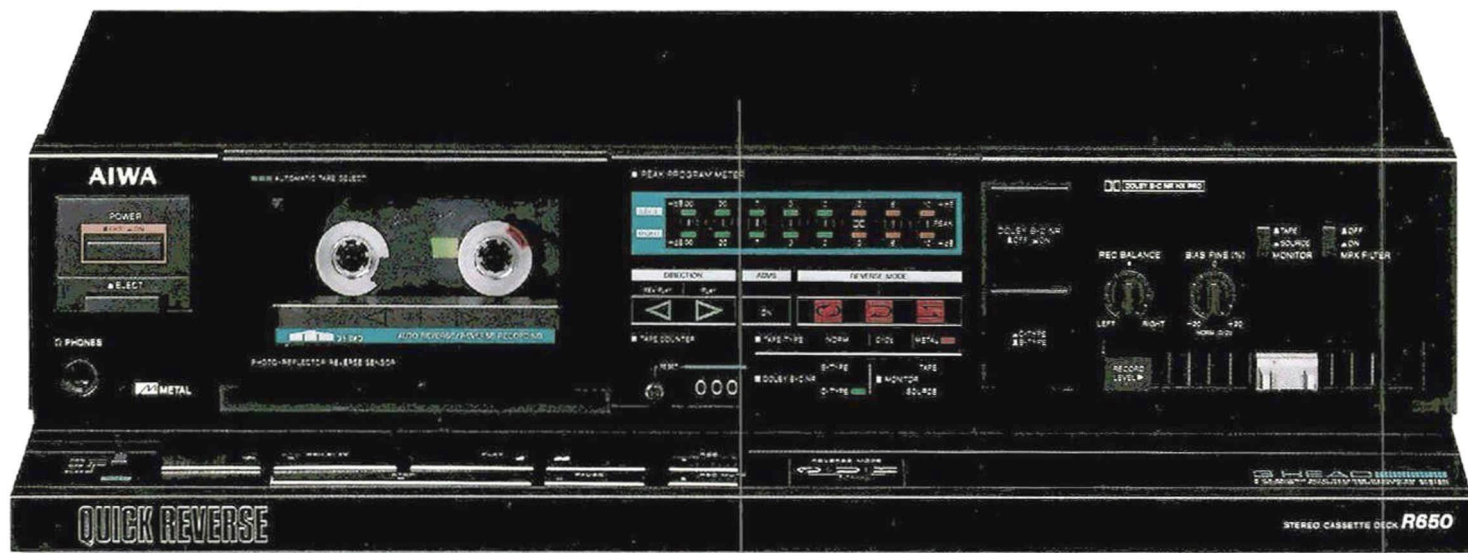
Memory Rewind and Repeat System

You can use this facility for repeating playback of desired segments between the start and end of the tape; or, for continuous repeat play of the entire tape. The memory function also gives you automatic replay either between tape start or tape end and a point midway on the tape. In any case, the logic controls function rapidly and automatically while you enjoy the music.

Plus:

- All-mode tape remaining time display
- Auto Rec-mute
- Intro-play facility
- Dolby B/C noise reduction systems
- ADMS (Automatic De-magnetizing System)
- Auto tape selector
- Wireless remote control connection terminal
- Stereo microphone jacks (rear panel)
- Switchable MPX filter (rear panel)
- Headphone output level selector switch (rear panel)
- Timer standby recording/playback

AD-R650U



The 3-head Deck with the World's Fastest Auto Reverse – just 0.2 seconds

It's a fact that three-head decks are capable of better sound reproduction. Yet more and more people are demanding the convenience of auto reverse. The AD-R650 features the world's fastest auto-reverse. In recording or playback, it reverses in only 0.2 seconds—so fast you hardly hear it. And that's why it offers sound performance previously unheard of from an auto-reverse deck. With a host of AIWA features, such as Dolby B, C, and the Dolby HX Professional system, as well as the "Auto De-Magnetizing System" and AIWA's original flat keyboard design, the AD-R650 brings together sound quality and convenience like nothing else before.

DX Combination Head

For extended durability and increased resistance to saturation and heat buildup, the DX combination head has been crafted of super-hard permalloy laminated in 6 layers with epoxy resin. The guard area is made of extra-durable sendust for superior resistance against head wear. It performs with remarkable linearity, while providing excellent durability and low noise performance.

World's Fastest Auto Reverse Mechanism.

In just 0.2 seconds, the AD-R650 reverses the tape. How did AIWA do it? By mounting the advanced DX Combination Head on a Radial-pivot head system activated by a photoelectronic sensor. It spots the start of the leader tape and reverses both head and tape drive in only 0.2 seconds for auto-reverse operation that's nearly instantaneous. For absolutely precise alignment, the Radial-pivot base and mounting platform are die-cast from an extremely durable alloy for perfect alignment in either direction for years to come.

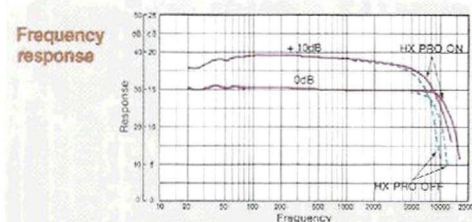


Micro-grain Surfaced Capstan

Tape transport with superior stability is assured with two-motor drive and AIWA's exclusive micro-grain surfaced capstan. It provides excellent cohesion between the tape, the capstan, and the pinchroller for a reduction in modulation and tape dropouts. The result is perfect performance always.

The Dolby HX Professional* Improvement

Dolby B and C noise reduction systems are common in today's cassette decks. That's why AIWA provides them in this deck. But like many of AIWA's finer decks, the AD-R650 brings you something more. It's called Dolby HX Professional*, and it works during recording to extend dynamic range in the high frequencies from to ensure better high frequency linearity from every tape you make. The letters "HX" stand for "headroom extension", and it works by varying the recording bias automatically depending on the demands of the signal. Servo control circuitry responds to prevent the mutual bias effect and the self-bias effect naturally generated by the recording signals themselves. Since no special decoding is required on playback, its benefits can be heard on any type of equipment, including car stereos, portables, and headphone stereo players. Dolby HX Professional also works regardless of tape type, too. It provides an especially pronounced improvement when ordinary normal tape is used. In fact, normal tape performance with HX Pro is superior to CrO₂ performance in conventional decks without HX Pro. In conjunction with Dolby C noise reduction, impressive performance is assured to meet the demands of digital-age music sources.

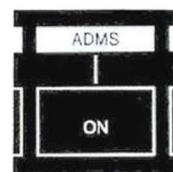


Flat "Keyboard" Control Panel

This AIWA design feature makes deck operation easier than ever, while giving a "computer age" feel and appearance. Feather-touch IC logic controls are arranged keyboard style in this exciting new design concept. A built-in cue and review facility also makes it easy to advance the tape quickly in either direction.

AIWA's Exclusive Auto De-Magnetizing System—ADMS

With ADMS, periodic head de-magnetizing is no longer a hassle. Necessary for optimal recording performance, demagnetizing normally requires the skillful use of cumbersome equipment. AIWA's ADMS uses a special oscillator circuit to sweep the record and playback heads clean of residual magnetism in less than two seconds. It works every time the power is turned on for continually degaussed heads. Consistently low distortion and optimal frequency response are assured at all times.



Bias Fine Adjuster

For normal and CrO₂ position tapes, the bias fine adjuster works to allow "fine tuning" to optimize the frequency response for various tape formulations on the market. Since the AD-R650U has a 3-head design, you can operate this control as you monitor the recording for best results.



Plus:

- Auto tape selector (normal CrO₂, metal positions)
- Auto/Manual Rec-mute
- Timer Rec/Play standby switch
- Two color 8-point LED peak level meter dis
- Sliding recording level control
- Recording balance control
- Oil-damped cassette soft eject
- Stereo headphone jack
- Attractive black finish

AD-R550U

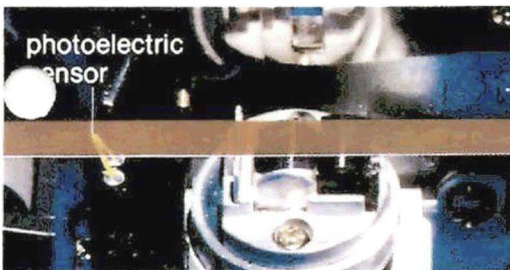


Auto Reverse In The Blink Of An Eye—only 0.2 seconds.

High Performance Meets Auto Reverse! AIWA is proud to present the AD-R550, the auto-reverse deck that delivers true sound fidelity with versatile operation. It features the Dolby HX Professional system for recordings with flatter frequency response and greater dynamic range, as well as many functions and extras found on AIWA's higher-priced models. With its high-tech styling and enhanced ease of operation, the AD-R550 is ready now for the extra demands of digital sound sources.

Quick Reverse Means More Music—the 0.2 second turnabout

The AD-R550 has AIWA's DX head mounted on their Radial-pivot mechanism to ensure precise alignment characteristics in either direction. The Radial-pivot base and head mounting platform are die-cast from super-hard alloy, and can stay accurate for years of quick reverse actions. It is activated by a special photoelectric sensor which spots the end of the magnetic portion of the tape and reverses the head to prevent the 10-15 seconds of leader tape silence. The result is continuous recording or playback from both sides of one cassette, with nearly instantaneous auto reverse action. Front-panel switching of continuous, one-cycle, or unidirectional operation, along with LED indicators for each mode bring extra versatility to your cassette audio enjoyment.



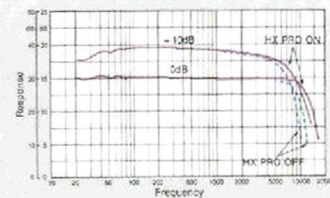
High-Tech "Keyboard" Control for Higher Operability

In keeping with the age of digital audio, the AD-R550 uses AIWA's flat keyboard panel for a "computer age" feel. The benefits are enhanced operability and quieter performance, thanks to the large "feather-touch" IC logic controls. Cue and review is also provided to easily advance the tape quickly in either direction.

Dolby HX Professional

Designed to raise cassette deck performance to the demanding levels required for digital audio sources, this circuitry provides high frequency signals with the ideal bias levels by servo control which automatically functions in response to self-bias and mutual bias levels. This makes an incredible difference in the results: performance with Normal tapes actually superior to that of expensive chrome position tapes in other decks. And absolutely no encoding is needed for playback, so you can enjoy these tapes on any player!

Frequency response

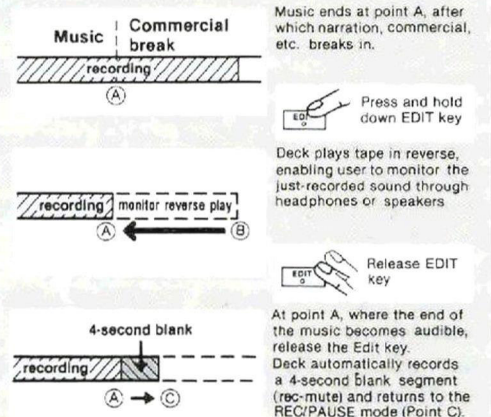


"Edit-assist" Makes Recording Fun

This AIWA feature makes cassette recording as exciting as reel-to-reel studio operations. With AIWA's new Edit-assist function, you can instantly find the exact spot where you want to restart recording. Just hold down the EDIT button and you'll hear the tape being played backwards. When you get to the part where you want to start recording, release the button and the deck will automatically switch to auto-rec-mute and create a four-second blank segment on the tape, then pause into the Record-standby mode. It's like manually rotating the reels of an open reel deck, but a whole lot easier.



"Edit-assist" operation



"Micro-grain" for Transport Precision

With two DC motors, the AD-R550 drive mechanism is designed for stable tape transport in either direction, and incorporates AIWA's "micro-grain" surfaced capstans for improved cohesion between the tape, the capstan and the pinchroller. The result of all these design advantages is remarkably improved tape transport.

Plus:

- Normal/CrO₂ bias fine adjustor
- "Blank Skip" operation
- Memory Rewind and Repeat System
- Two-color FL meter display
- 9-selection music sensor
- Auto/manual Rec-mute
- Auto tape type selector (normal, CrO₂, metal)
- Timer standby record/playback
- Sliding recording level adjustment and rec balance control
- Stereo microphone inputs
- Tape direction and reverse mode indicators
- Oil-damped cassette soft-eject

AD-WX220U

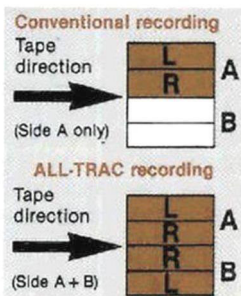
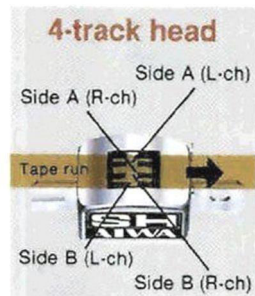


The Double Deck with Four Times the Performance

The WX-220 is no ordinary double cassette deck. Why? Because it offers four times the performance. The WX-220 has a high-precision double speed drive which enables you to copy tapes in half the time. But there's more. Using the ALL-TRAC recording system, both sides of the tape can be copied simultaneously. Add it all together and it's the deck that copies your tapes four times faster than conventional double cassette decks. Together with microprocessor-assisted random program editing, tape dubbing operations are finished quickly and efficiently. Now that's extraordinary performance.

Exclusive ALL-TRAC Recording

Copying a 90 minute tape takes around 23 minutes, a 60 minute tape, just 15 minutes flat. Of course, single side and normal speed dubbing are also possible. The WX-220 gives you both speed and versatility. How does it work? AIWA's exclusive ALL-TRAC Recording system allows simultaneous dubbing both sides of the tape. Just press the HIGH SPEED A+B button and your tape will be ready in one-fourth the normal playing time.

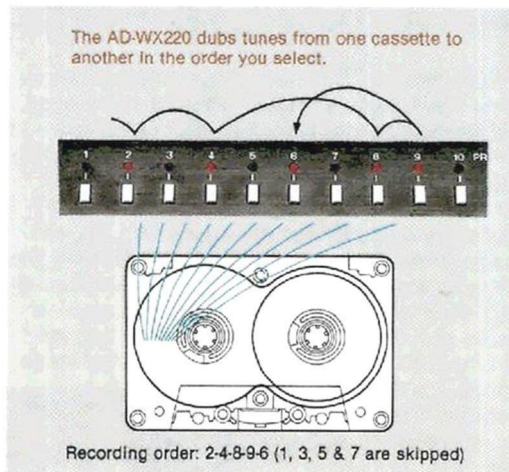


Synchro-dubbing—Three Different Ways

Even though the WX-220 has three different dubbing modes, operation is extremely simple because each mode has its own button. Thanks to AIWA's advanced microprocessor control, just a touch of the dubbing button of your choice is all it takes. No tricky adjustments or switching from side to side. Load the tapes, set the recording level sliders to the DUBBING LEVEL position, and everything's ready to go. Bias and equalization levels have already been set in both decks by the Auto Tape Selector, which adjusts automatically for Normal, CrO₂, and Metal position tapes. With such convenient operation, the WX-220 is halfway finished by the time ordinary double decks are ready to go.

Random Programmable Dubbing And Playback

Want to copy only certain selections from a tape? No problem with the WX-220. By using ten-selection programming buttons, you can specify the tunes to be copied in any order you like. Just set the program selector to the MS (music sensor) mode, and punch in the numbers of the master tape's songs in any order, up to 10 selections. This system even operates during double speed operation to get the job done far quicker than ordinary "stop and search" tape editing necessary with conventional dubbing decks.



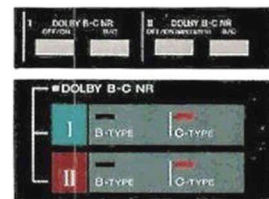
Music Sensor Operation

The music sensor function enables you to quickly cue and play back the song you want to hear from the beginning. With pushbutton convenience, it makes troublesome and time-consuming manual search operations unnecessary.



Random Dolby B/C NR setting in Decks I and II

To keep your tape copies as clear and noise-free as possible, AIWA has included Dolby B and C noise reduction in both decks. In the normal speed dubbing mode, the NR system for each side can be independently switched to allow copying of tapes encoded in either system. Of course, either deck's noise reduction system can be switched as you like.



Plus:

- User-friendly "flat keyboard" control panel
- Simultaneous playback of both decks is possible for exciting mixing effects
- Music Sensor operation during playback
- Auto Rec-mute
- LED level meter display
- Selectable source headphone monitor
- Bias fine adjuster for Normal and CrO₂ tapes ($\pm 20\%$)
- Rec-Synch terminal with AIWA's turntables equipped with this feature



The outperformer: it dubs both sides at twice the speed...all at once.

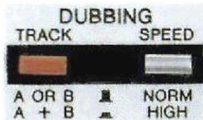
The AD-WX110 is two decks in one—but much more than what you'd get from two separate decks. In addition to saving space it saves you time as well, because it's capable of dubbing cassettes in one-fourth the time of conventional units.

ALL-TRACK RECORDING:

A new, time-saving way to dub cassettes

Double-speed dubbing of both tape sides

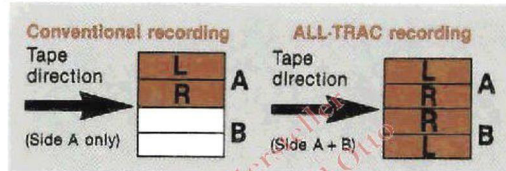
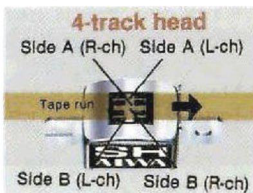
To copy from one cassette to another, you used to need two separate cassette decks. But even the first so-called "W" decks with two cassette mechanisms still required separate operation of each unit, and they could only record at "real time", i.e., the standard tape speed of 1-7/8 in. per second. But now AIWA introduces the AD-WX110: the world's first "W" cassette deck that can copy both sides of the tape at double speed. That means you'll be able to copy the entire contents of a 60-minute cassette in 15 minutes. That's fast!



ALL-TRACK Recording: How does it work?

In conventional decks, the cassette must be turned over to record or play back the tracks on each side. This is because the head itself only contains two tracks (one for each stereo channel). The AD-WX110, however, employs two special 4-track heads which play and record the entire contents of the cassettes. During A + B Synchro Dubbing, two of these tracks record signals in the conventional manner and two in the reverse direction.

When the tape is played back, however, only two stereo tracks will be reproduced at one time, in the same manner as standard cassettes.



A choice of three possible dubbing modes:

"Real time" (Normal speed, one side)

Simply load a recorded tape in Deck I, blank cassette in Deck II; then press the red "Synchro Dubbing" control to start recording. (Real time recording is advised for optimum frequency response).

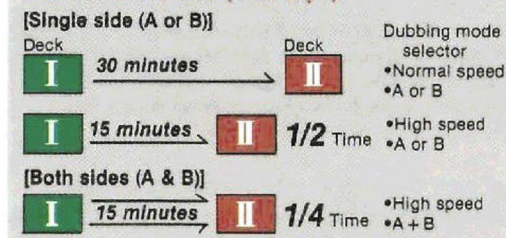
"Half time" (Double speed, one side)

After setting SPEED switch to HIGH position, repeat operations as described above. Copy will be completed in half of normal time (i.e., 30-minute tape will be reproduced in 15 minutes).

"Quarter time" (Double speed, both sides)

Set SPEED switch to HIGH and TRACK switch to A + B. When "Synchro Dubbing" control is pressed Deck II will record material from both sides of tape at double speed. (Entire contents of C-60 cassette will be reproduced in 15 minutes).

DUBBING MODES (C-60 tape)



"Convenient Synchro-Dubbing" Control

This completely eliminates the need for separate operation of RECORD, PLAY and PAUSE functions on Decks I and II. Once cassettes have been loaded, dubbing is automatically activated by a single button.

Continuous I → II playback

The AD-WX110 can also play back two tapes in sequence, giving extended playback time. Once the tape in Deck II comes to an end, Deck I will commence play automatically, making possible up to 1-1/2 hours of uninterrupted listening (with two C-90 cassettes).

Dolby B-C* noise reduction

Equipped with Dolby "C" type noise reduction circuitry, the AD-WX110 is capable of an outstanding 76dB signal/noise ratio, with tape hiss almost entirely suppressed. A Dolby "B" position is also provided.

High fidelity recordings ensured

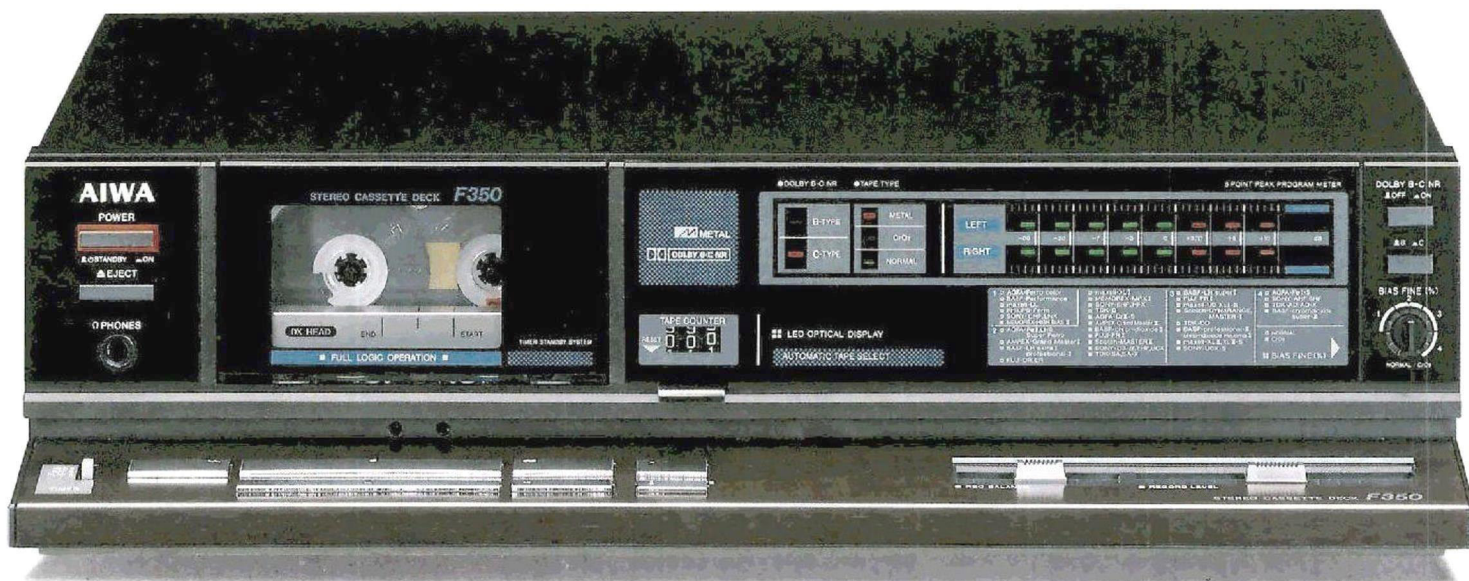
AIWA has built the AD-WX110 to give outstanding sound reproduction. The record/play head in Deck II employs a wide gap for powerful sound with dynamic range; the playback head in Deck I has a narrow 0.7 micron gap to reproduce delicate highs with accuracy. Together they give you the performance of a three-head model plus of course the advantage of two cassettes!

The AD-WX110 also boasts a precision transport mechanism: stable DC servo motors and AIWA's exclusive micro-grain processed capstans minimize tape speed irregularity, making possible a superb 0.05% (WRMS) wow & flutter.

Plus:

- Automatic tape selector (Metal/CrO₂/Normal)
- Music Sensor (one program in Deck I)
- LINE IN connection terminals
- Mic mixing permits insertion of narration, even during dubbing operation
- Timer standby facility
- Rec-mute facility
- LED indicators for tape setting, high speed dubbing, Dolby NR
- Auto replay facility

AD-F350U/AD-F330U



A triumph in human engineering that's priced to please

Here's a 2-head deck that AIWA's especially proud of: a superbly-styled machine with that "extra" edge in features and performance!

Computer-age styling

The age of computers is here, and AIWA designers have carefully styled their new decks to reflect the importance of better human engineering. Take the all-new flat "keyboard" panel, for example. It's angled so you can operate the deck from above, for easy access and more positive operation. After the first few moments at the controls, you'll agree!

Feather-touch IC logic controls with cue & review

Switching from one mode to another is especially easy, and safe too. IC controls contain their own "logic" information, making it possible to switch even from Fast Forward to Rewind without concern over damage to tape or mechanism. AIWA's advanced design also gives you cue & review capability—for speedy program location without having to switch out of the PLAY mode.

User-adjustable Bias Fine Control

Now get the best in performance from the tape you want, without worries over bias incompatibility. The AD-F350/AD-F330 gives you a $\pm 20\%$ range of adjustment that makes it easy to "tune in" optimum bias for Normal and CrO₂ type tapes.



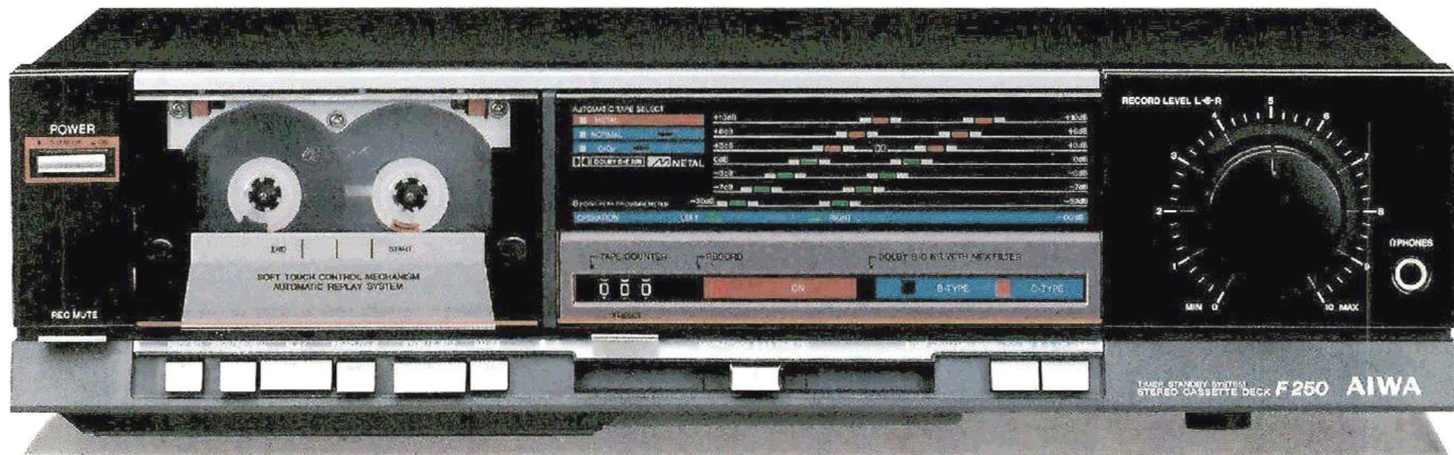
Auto Rec-mute

As an aid to editing recordings, Auto Rec-mute creates a uniform 4-second blank segment on the tape merely by pressing the REC MUTE switch. If longer muting is desired the switch may be held in for as long as required; for muting of less than four seconds, pushing the switch a second time will halt operation.

Plus:

- Functional panel display
- Dolby B/C noise reduction
- Record level control
- High performance DX head
- Auto tape selector (Metal/CrO₂/Normal)
- Timer standby Record/Playback
- Oil-damped cassette soft eject
- Digital tape counter
- Stereo headphone jack
- Microphone jacks (AD-F330 only)

AD-F250U/AD-F220U

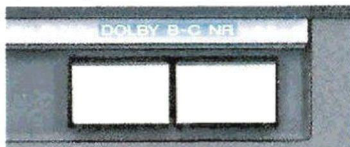


Sophisticated styling + Dolby* C: a true audio value

Exciting styling, true audio value

Dolby* C noise reduction system

A standard feature in almost every high-performance component deck, AIWA now makes Dolby's C noise reduction system more affordable than ever. Dolby C works more effectively, over a wider frequency range, than its predecessor B-type system, and its effect on recordings is amazing: an almost total absence of audible tape hiss, giving the AD-F250/AD-F220 an outstanding signal/noise ratio of 78dB (metal tape/above 5kHz). Dolby C also improves recordings by limiting tape MCL, thus effectively lowering distortion.

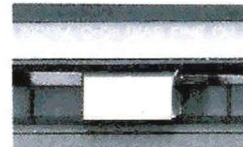


Soft-touch controls with cue/review

A new type of "mecha-logic" system requiring only light finger pressure to operate, the AD-F250/AD-F220's controls are arranged on an angled panel for easy user access. AIWA has also built in cue/review capability, so you'll be able to make quick changes in tape direction to locate the desired tape segment without having to leave the PLAY mode.

Bias Fine adjuster for Normal/CrO₂ tape

No matter what the tape brand, you can easily "fine tune" the AD-F250/AD-F220 for better recording compatibility. The sliding control lets you vary bias by $\pm 20\%$ to adapt this deck to a wide range of Normal and CrO₂ tapes.



High performance DX head

Designed to guard against problems caused by irregular wear at the head's gap edge, this unique head constructed of laminated hard permalloy chips and extra-tough epoxy resin ensures years of durable performance.

Plus:

- Stable tape mechanism
- "Peak-step" LED display
- Auto replay facility
- Auto tape selector (Normal/CrO₂/Metal)
- Oil-damped cassette soft eject
- Mechanical pause control
- Timer standby (Rec/PB) mechanism
- Rec-mute facility
- Independent L/R channel recording controls
- Digital tape counter
- Recording/Tape/Dolby B/C LED indicators
- Stereo headphone jack
- Microphone jack (AD-F220 only)

FEATURE COMPARISON TABLE

	No. of heads		Amorphous Alloy Combination Head	DX Head	0.2sec. Quick Reverses	"W" cassette 1/4 time dubbing	Feather touch IC logic	Soft touch	Transport	Micro grain surfaced capstan	Number of motors	Dolby HX Professional	Dolby C NR	DATA	Bias fine adjuster	Rec mute	Peak display	Auto noise reduction detector	Auto recording level control	Auto Tape/Source selector	ADMS	All-movie remaining tape time display	Music sensor	Intro play	Eject-assist/Blank skip
	3 head	2 head																							
AD-F990U	●	—	●	—	—	—	●	—	●	2	●	●	●	(DATA)	●	FL, W/Peak hold	●	●	●	●	●	1	●	—	
AD-F770U	●	—	—	(Combi)	—	—	●	—	●	2	●	●	●	(DATA)	●	FL, W/Peak hold	—	—	—	●	●	1	●	—	
AD-F660U	●	—	—	(Combi)	—	—	●	—	●	2	●	●	—	●	●	12-point LED, W/peak hold	—	—	—	●	●	1	●	—	
AD-R650U	●	—	—	(Combi)	●	—	●	—	●	2	●	●	—	●	●	8-point LED	—	—	—	●	—	—	—	—	
AD-R550U	—	●	—	●	●	—	●	—	●	2	●	●	—	●	●	2-color FL	—	—	—	—	—	9	—	●	
AD-WX220U	—	●	—	—	—	●	●	—	●	2+2	—	●	—	●	●	8-point LED	—	—	—	—	—	10 (Random)	—	—	
AD-WX110U	—	●	—	—	—	●	—	●	●	1+1	—	●	—	●	●	7-point LED	—	—	—	—	—	1	—	—	
AD-F350U/330U	—	●	—	—	—	●	—	●	●	2	—	●	—	●	●	7-point LED	—	—	—	—	—	—	—	—	
AD-F250U/220U	—	●	—	—	—	●	—	●	●	1	—	●	—	●	●	7-point LED	—	—	—	—	—	—	—	—	

STEREO CASSETTE DECK SPECIFICATIONS

	AD-F990U	AD-F770U	AD-F660U	AD-R650U	AD-R550U	AD-WX220U	AD-WX110U	AD-F350U	AD-F330U	AD-F250U	AD-F220U	
POWER CONSUMPTION	40 Watts	33 Watts	26 Watts	25 Watts	23 Watts	25 Watts	25 Watts	16 Watts	16 Watts	15 Watts	15 Watts	
POWER SOURCE	AC 120V, 60Hz											
DIMENSIONS	16-9/16(W) x 4-3/8(H) x 11-5/16(D) inches (420 x 110 x 286mm)	16-9/16(W) x 4-3/8(H) x 11-5/16(D) inches (420 x 110 x 286mm)	16-9/16(W) x 4-3/8(H) x 11-5/16(D) inches (420 x 110 x 286mm)	16-9/16(W) x 4-3/8(H) x 11-13/16(D) inches (420 x 110 x 300mm)	16-9/16(W) x 4-3/8(H) x 11-13/16(D) inches (420 x 110 x 300mm)	16-9/16(W) x 4-3/8(H) x 12-3/4(D) inches (420 x 110 x 323.4mm)	13(W) x 4-1/4(H) x 12-1/8(D) inches (330 x 107 x 306mm)	16-9/16(W) x 4-3/8(H) x 11-15/16(D) inches (420 x 110 x 303mm)	16-9/16(W) x 4-3/8(H) x 11-3/16(D) inches (420 x 110 x 283mm)	16-9/16(W) x 4-3/8(H) x 11-5/16(D) inches (420 x 110 x 286mm)	16-9/16(W) x 4-3/8(H) x 11-5/16(D) inches (420 x 110 x 286mm)	
WEIGHT	12.1lbs (5.5kg)	12.1lbs (5.5kg)	12.1lbs (5.5kg)	11.0lbs (5.0kg)	11.4lbs (5.2kg)	12.3lbs (5.6kg)	11.5lbs (5.2kg)	8.8lbs (4.0kg)	9.9lbs (4.5kg)	8.8lbs (4.0kg)	9.3lbs (4.2kg)	
TRACK	4-track, 2-channel											
TAPE SPEED	1-7/8ips (4.8cm/sec)											
FREQUENCY RESPONSE												
OVU (Dolby C on)	Normal tape	20-11,000Hz (±3dB)	20-11,000Hz (±3dB)	20-11,000Hz (±3dB)	20-10,000Hz (±3dB)	—	—	—	—	—	—	
	CrO2	20-15,000Hz (±3dB)	20-14,000Hz (±3dB)	20-14,000Hz (±3dB)	20-13,000Hz (±3dB)	—	—	—	—	—	—	
	Metal tape	20-18,000Hz (±3dB)	20-17,000Hz (±3dB)	20-17,000Hz (±3dB)	20-16,000Hz (±3dB)	—	—	—	—	—	—	
-20VU	Normal tape	20-18,000Hz (±3dB)	20-17,000Hz (±3dB)	20-17,000Hz (±3dB)	20-17,000Hz (±3dB)	20-16,000Hz (+2.5dB)	20-16,000Hz (+2.5dB)	20-16,000Hz (+2.5dB)	20-16,000Hz (+2.5dB)	20-16,000Hz (+2.5dB)	20-16,000Hz (+2.5dB)	20-16,000Hz (+2.5dB)
	CrO2 tape	20-19,000Hz (±3dB)	20-18,000Hz (±3dB)	20-18,000Hz (±3dB)	20-18,000Hz (±3dB)	20-17,000Hz (+2.5dB)	20-17,000Hz (+2.5dB)	20-17,000Hz (+2.5dB)	20-17,000Hz (+2.5dB)	20-17,000Hz (+2.5dB)	20-17,000Hz (+2.5dB)	20-17,000Hz (+2.5dB)
	Metal tape	20-20,000Hz (±3dB)	20-19,000Hz (±3dB)	20-19,000Hz (±3dB)	20-19,000Hz (±3dB)	20-18,000Hz (+2.5dB)	20-18,000Hz (+2.5dB)	20-18,000Hz (+2.5dB)	20-18,000Hz (+2.5dB)	20-18,000Hz (+2.5dB)	20-18,000Hz (+2.5dB)	20-18,000Hz (+2.5dB)
S/N RATIO (Dolby B on) (Dolby C on, above 5kHz)	68dB (Dolby B, Metal) 80dB (Dolby C, Metal)	68dB (Dolby B, Metal) 80dB (Dolby C, Metal)	68dB (Dolby B, Metal) 80dB (Dolby C, Metal)	68dB (Dolby B, Metal) 80dB (Dolby C, Metal)	65dB (Dolby B, Metal) 78dB (Dolby C, Metal)	66dB (Dolby B, Metal) 78dB (Dolby C, Metal)	66dB (Dolby B, Metal) 76dB (Dolby C, Metal)	65dB (Dolby B, Metal) 78dB (Dolby C, Metal)	65dB (Dolby B, Metal) 78dB (Dolby C, Metal)	65dB (Dolby B, Metal) 78dB (Dolby C, Metal)	65dB (Dolby B, Metal) 78dB (Dolby C, Metal)	
WOW AND FLUTTER (WRMS)	0.025%	0.025%	0.028%	0.035%	0.038%	0.038%	0.05%	0.035%	0.035%	0.038%	0.038%	
FAST FORWARD AND REWIND TIME (C-60 TAPE)	60sec	60sec	70sec	65sec	65sec	80sec	90sec	70sec	70sec	90sec	90sec	
HEAD	REC/PB: Amorphous alloy Combination Head Erase: Double-gap Sendust Head	REC/PB: DX Combination Head (Sendust Guard) Erase: Double-gap Sendust Head	REC/PB: DX Combination Head (Sendust Guard) Erase: Double-gap Sendust Head	REC/PB: DX Combination Head (Sendust Guard) Erase: Double-gap Sendust Head x 2	REC/PB: DX Head Erase: Double-gap Ferrite Head	PB: Narrow gap 4-ch SH Head REC/PB: Wide gap 4-ch SH Head Erase: 2-track Ferrite Head	REC/PB: SH Head PB: SH Head Erase: Double-gap Ferrite Head x 2	REC/PB: DX Head Erase: Double-gap Ferrite Head	REC/PB: DX Head Erase: Double-gap Ferrite Head	REC/PB: DX Head Erase: Double-gap Ferrite Head	REC/PB: DX Head Erase: Double-gap Ferrite Head	
MOTORS	DC servo motor x 1 DC motor x 1	DC servo motor x 1 DC motor x 1	DC servo motor x 1 DC motor x 1	DC servo motor x 1 DC motor x 1	DC servo motor x 1 DC motor x 1	DC servo motor x 2 DC motor x 2	DC servo motor x 2	DC servo motor x 1 DC motor x 1	DC servo motor x 1 DC motor x 1	DC servo motor x 1	DC servo motor x 1	
INPUT SENSITIVITY IMPEDANCE	MIC	1.0mV/200 ohms-10k ohms	0.3mV/200 ohms-10k ohms	0.3mV/200 ohms-10k ohms	—	0.3mV/200 ohms-10k ohms	0.25mV/200 ohms-10k ohms	0.25mV/200 ohms-10k ohms	—	0.3mV/200 ohms-10k ohms	—	
	LINE IN	50mV/50k ohms										
OUTPUT LEVEL IMPEDANCE	LINE OUT	0.41V/50k ohms or higher	0.41V/50k ohms or higher	0.41V/50k ohms or higher	0.38V/50k ohms	0.38V/50k ohms	0.38V/50k ohms	0.41V/50k ohms	0.41V/50k ohms	0.41V/50k ohms	0.41V/50k ohms	
	HEADPHONE	1.5mW/8 ohms	1.5mW/8 ohms	0.4mW/8 ohms 1.5mW/8 ohms	0.8mW/8 ohms	1.5mW/8 ohms	1.5mW/8 ohms	0.8mW/8 ohms	0.8mW/8 ohms	0.8mW/8 ohms	0.8mW/8 ohms	

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