

YAMAHA K-220

*Natural Sound Stereo Cassette Deck
High-Performance Two-Motor Transport
 μ Computer-Controlled Transport
Auto Source Change/Auto Rec Mute/Full Auto Repeat
Dolby B-C Type Noise Reduction*



OWNER'S MANUAL

Thank you for purchasing the Yamaha K-220 stereo cassette deck.

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IMPORTANT

Please record the serial number of your unit in the space below.

Model: **K-220**

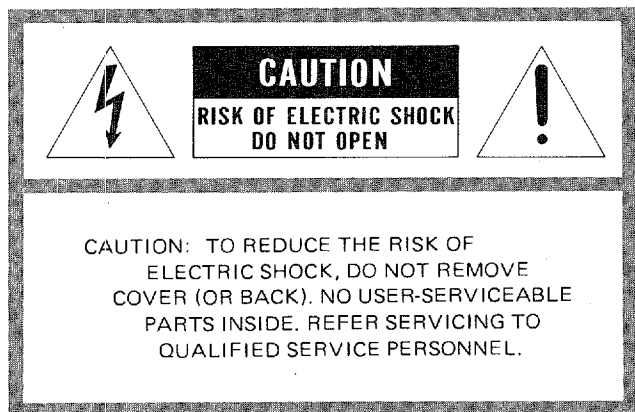
Serial No.:

The serial number is located on the rear of the cabinet.
Retain this Owner's Manual in a safe place for future reference.

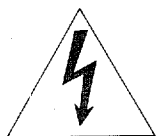
WARNING

To prevent fire or shock hazard, do not expose this appliance to rain or moisture.

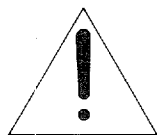
SAFETY INSTRUCTIONS



• Explanation of Graphical Symbols



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert you to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert you to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

1 Read Instructions — All the safety and operating instructions should be read before the appliance is operated.

2 Retain Instructions — The safety and operating instructions should be retained for future reference.

3 Heed Warnings — All warnings on the appliance and in the operating instructions should be adhered to.

4 Follow Instructions — All operating and other instructions should be followed.

5 Water and Moisture — The appliance should not be used near water — for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near swimming pool, etc.

6 Carts and Stands — The appliance should be used only with a cart or stand that is recommended by the manufacturer.

7 Wall or Ceiling Mounting — The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.

8 Ventilation — The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.

9 Heat — The appliance should be situated away from heat sources such as radiators, stoves, or other appliances that produce heat.

10 Power Sources — The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

11 Power-Cord Protection — Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

12 Cleaning — The appliance should be cleaned only as recommended by the manufacturer.

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CAUTION: READ THIS BEFORE OPERATING YOUR K-220

13 Nonuse Periods — The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.

14 Object and Liquid Entry — Care should be taken so that objects do not fall into and liquids not spilled into the inside of the appliance.

15 Damage Requiring Service — The appliance should be serviced by qualified service personnel when:

- A. The power-supply cord or the plug has been damaged; or
- B. Objects have fallen, or liquid has been spilled into the appliance; or
- C. The appliance has been exposed to rain; or
- D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
- E. The appliance has been dropped, or the cabinet damaged.

16 Servicing — The user should not attempt to service the appliance beyond those means described in the operating instructions. All other servicing should be referred to qualified service personnel.

1

The K-220 is a sophisticated stereo cassette deck. To ensure proper operation for the best possible performance, please read this manual carefully.

2

Choose the installation of your K-220 carefully. Avoid placing it in direct sunlight or close to a source of heat. Also avoid locations subject to vibration and excessive dust, heat, cold or moisture. Keep it away from such sources of hum as transformers or motors.

3

Do not open the cabinet as this may result in damage to the deck or electrical shock. If a foreign object should get into the deck, contact your local dealer.

4

When removing the power plug from the wall outlet, always pull directly on the plug; never yank the cord.

5

Do not use force when operating switches and knobs.

6

When moving the deck be sure to first pull out the power plug and remove all cords connecting the deck to other equipment.

7

Do not attempt to clean the K-220 with chemical solvents as this may damage the finish. Use a clean, dry cloth.

8

Never allow metallic items (e.g. screwdrivers, tools, etc.) to come near the record/playback head assembly. Doing so may not only scratch or damage the head's mirror-smooth finish, it may change the magnetic characteristics of the heads, causing a deterioration in reproduction performance quality.

9

Although the record/playback head used in the K-220 is a high quality permalloy laminate head with outstanding reproduction characteristics, it can become dirty through the use of old tapes or from dust accumulation over time. This can have a serious effect on reproduction quality. Clean the heads regularly with one of the commonly available head cleaners or with cleaning solutions as explained later in this manual.

10

Be sure to read the "Troubleshooting" section of this manual for advice on common operating errors before concluding that your K-220 is faulty.

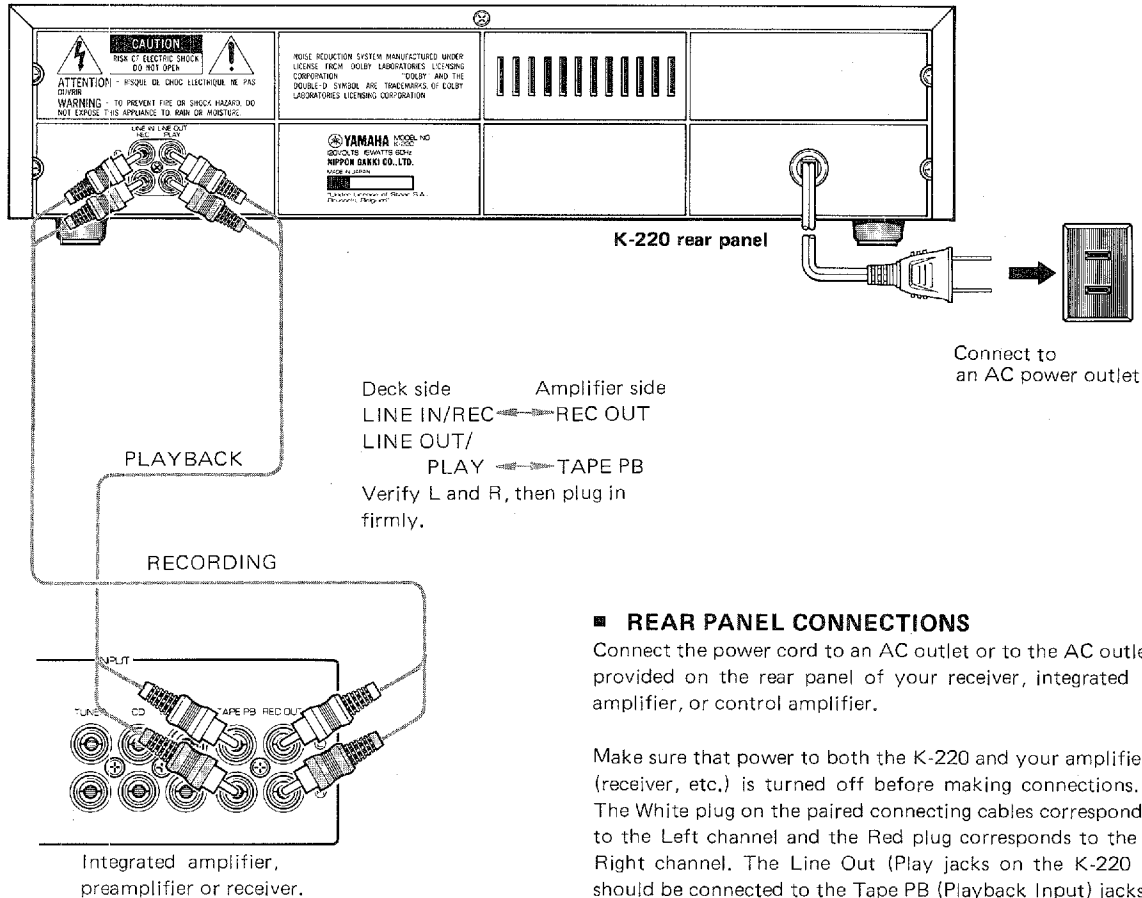
11

Keep this manual in a safe place for future reference.

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CONNECTION DIAGRAM

Be sure to connect the left (L) and right (R) channels consistently.



*Please refer to the amplifier instruction manual for more detailed instructions on connecting the deck to your system.

REAR PANEL CONNECTIONS

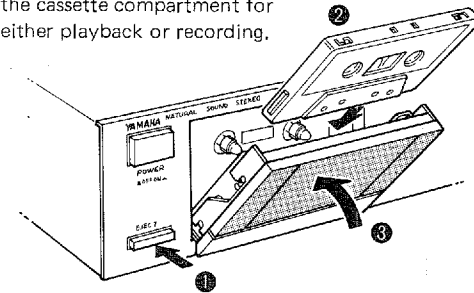
Connect the power cord to an AC outlet or to the AC outlet provided on the rear panel of your receiver, integrated amplifier, or control amplifier.

Make sure that power to both the K-220 and your amplifier (receiver, etc.) is turned off before making connections. The White plug on the paired connecting cables corresponds to the Left channel and the Red plug corresponds to the Right channel. The Line Out (Play) jacks on the K-220 should be connected to the Tape PB (Playback Input) jacks on your amplifier, and the Line In (Rec) jacks on the K-220 should be connected to the Rec Out (Rec Output) jacks on your amplifier. Make sure that the left and right channel connections are properly made, and that the plugs are inserted firmly.

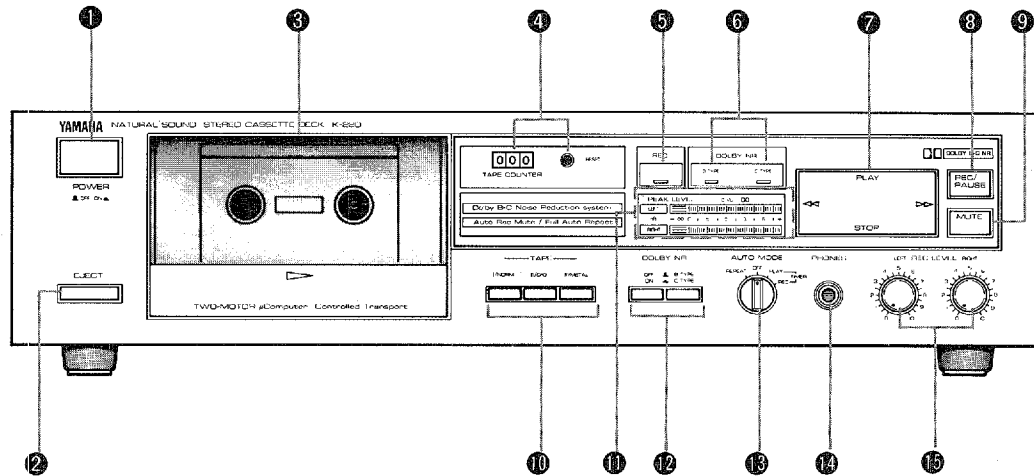
HOW TO LOAD AND UNLOAD CASSETTES

1. Open the cassette compartment cover by pressing the Eject button.
 2. The side of the tape you wish to record or playback should be facing the front. Insert the cassette with the exposed tape edge down, and fit it into the chamber.
 3. Push the cassette cover closed until you hear an audible click.
 4. To unload the cassette, press the Eject button.
- * Remember to keep the cassette compartment cover closed when not using the deck to protect the heads and inner assembly from exposure to dust and other foreign elements.

The exposed edge of the tape should be facing down when inserted into the cassette compartment for either playback or recording.



FRONT PANEL PARTS AND FUNCTION



1 Power Switch (POWER)

This is a "push-on, push-off" type power switch.

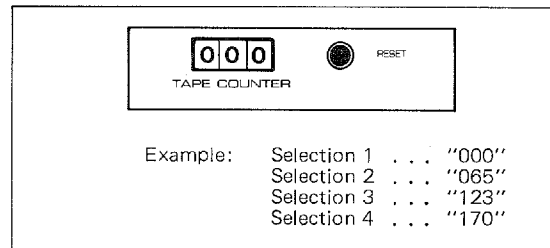
2 Eject Button (EJECT)

To load a cassette tape, press the Eject button and the cassette compartment cover will open. Keep cover closed when the deck is not in use to protect heads and mechanism from dust, etc.

3 Cassette Compartment

4 Tape Counter/Reset Button (TAPE COUNTER)

Before recording a tape, it's a good idea to press the Reset Button to set the tape counter to "000". This allows you to keep track of where on the tape individual selections begin and end, so that setting the tape counter to "000" again before playback will let you use it as a guide in locating selections on the tape during playback.



5 Rec Indicator (REC)

When the Rec/Pause button is pressed, the Rec stand by mode will be engaged, and this indicator will light. It will flicker during the Auto Rec Mute mode.

6 Dolby NR Indicators (DOLBY NR)

The corresponding Dolby NR indicators will light up when the Dolby NR switch is turned on, and either Dolby B or C type noise reduction is selected.

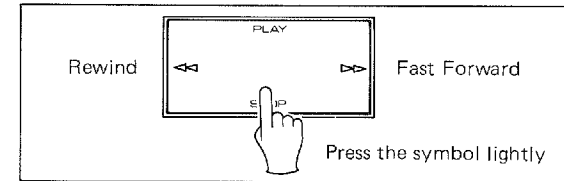
7 Rewind/Play/Fast Forward/Stop (Tape Travel Operation Control Panel)

REW Press the "◀◀" section of the control panel to rewind the tape.

PLAY Press the "PLAY" section of the control panel for playback. It is also necessary to use this control to engage the record mode. To begin recording, it is necessary to engage the Play mode while in Rec Standby.

FFWD Press the "▶▶" section of the control panel to fast forward the tape.

STOP Press the "STOP" section of the control panel to stop the tape while in any mode.

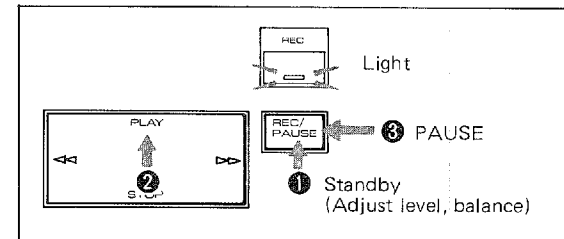


* The deck will stop automatically when the tape reaches the end of a side during playback, record, fast forward or rewind.

* Pressing the control panel in between the indicated sections instead of directly on them may give you a mode other than the one you want.

8 Rec/Pause Button (REC/PAUSE)

Pressing this button engages the Rec Standby mode, and a red indicator "REC" will light. While in this mode, the level meters will function, allowing you to monitor the recording signal level of your program source and set the proper recording level before beginning to record. (Please refer to the "Setting the Recording Level" section of this manual.) To initiate recording from the Rec Standby mode, press the Play button. Pressing the Rec/Pause button during actual recording engages the Pause mode, and the Play button will be automatically released. To begin recording again from the Pause mode, press the Play button.



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9 Rec Mute Button (MUTE)

During Recording: When the MUTE button is pressed at any time during recording, a 4-second blank interval is automatically recorded on the tape. Then, the Rec Pause mode is engaged automatically. (Auto Rec Mute Operation)

In order to record a blank interval longer than 4 seconds, press the MUTE button and hold it in for the desired length of time. After the button is released, the 4-second blank interval will also be recorded automatically, after which the Rec Pause mode is engaged automatically. To create a blank interval on the tape during continuous recording, press the Play button during rec mute operation.

10 Tape Selector (TAPE)

Press the appropriate button for the type of tape being used—Normal (I/NORM), Chrome (II/CrO₂), or Metal (IV/METAL). The K-220 will adjust the proper bias, level, and equalization settings for the type of tape being used. (Please refer to the "Cassette Tapes" section of this manual).

* This deck is not suited for use with Ferrichrome (FeCr) tapes.

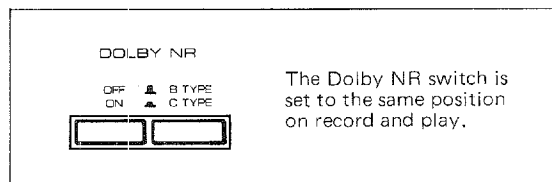
11 Peak Level Meters (LEVEL)

Indicates the peak of the signal level during recording and playback over a range from -10dB to +6dB.

12 Dolby NR Switch (DOLBY NR)

Dolby noise reduction is an extremely effective method of reducing background hiss on tapes. The K-220 incorporates both Dolby B NR and the newer Dolby C NR system. Dolby C NR is approximately twice as effective as Dolby B NR, providing new levels of noise-free performance. Switch the Dolby NR system on with the button on the left, then select Dolby B or C NR with the button on the right.

Tapes recorded with Dolby B NR should be played back with Dolby B NR on, and tapes recorded with Dolby C NR should be played back with Dolby C NR on. Tapes not Dolby NR-encoded should be played back with Dolby NR off.



* Dolby and the double D mark are trademarks of Dolby Laboratories Licensing Corp. Dolby noise reduction system manufactured under license from Dolby Laboratories Licensing Corp.

13 Auto Mode Switch (AUTO MODE)

Repeat: This will initiate repeat playback for one entire side of the cassette tape. After the tape has been reproduced, it will be rewound to the beginning, and it will be played back again. This function will stop after 16 consecutive operations.

Timer Play: By using a separately available timer, this function permits timer activated playback, so you can wake-up to your favorite music, etc. (See page 7.)

Timer Rec: By using a separately available timer, this function allows you to carry out unattended recording. (See page 7.)

* Turn the corresponding switches off when not using the repeat playback feature or the timer feature. Especially for the TIMER REC position, the unit will stay in the recording mode as long as the power is on, and therefore can accidentally erase the prerecorded contents of the tape.

14 Headphone Jack (PHONES)

Connect a set of headphones here for monitoring recording or playback.

15 Recording Level Controls (REC LEVEL)

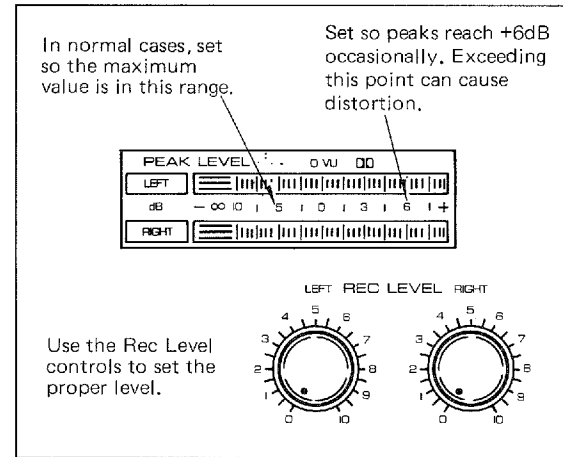
These controls are used to adjust the input level of the signal coming from the rear panel input jacks for recording, and the adjustable signal level is displayed on the Level meters. (Please refer to the "Setting the Recording Level" section of this manual for an explanation of how to set proper recording levels.)

* Auto Source Change

When tape playback has finished and the auto stop function has cancelled the play mode, the LINE IN signal (if the tuner is connected to the LINE IN inputs, then the tuner output signal) will automatically be switched to. Signal level can then be adjusted with the REC Volume control.

■ SETTING RECORDING LEVEL

In order to make recordings with the best possible signal-to-noise ratio, it is important to set the recording level at the highest level possible without introducing distortion. Push the Rec/Pause button to engage the rec standby mode, and play a section of the program to be recorded. Watch the level meters and adjust the recording level so that the average meter reading is between -5dB and +3dB, with occasional peaks no higher than +6dB. Adjust the level balance as necessary. Now you are ready to begin recording.

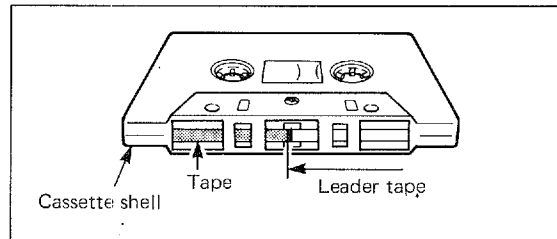


RECORDING AND PLAYBACK

■ RECORDING

● Prior To Recording:

1. Make sure that all power cord connections and all connections between components are properly made.
2. Check that the AUTO MODE switch is off, then turn on the Power switch.
3. Open the cassette compartment cover by pressing the Eject button.
4. Load a cassette tape and briefly fast forward the tape to get past the leader tape on the beginning of the cassette.



4. Select the proper Tape Selector setting for the type of tape being used — Normal (I/NORM), Chrome (II/CrO₂), or Metal (IV/METAL).
5. For recording to be made with Dolby NR, turn the Dolby NR switch on, and select either Dolby B or C.
6. Press the Rec/Pause button to engage the Rec Standby mode.
7. Run a sample of the program source to be recorded through the deck so that a proper recording level can be set using the Rec Level controls and the Level meters. (Please refer to the previous instructions regarding level setting.)
8. Press the reset button to reset the tape counter to the "000" position to reference the position of individual selections on the tape. The tape counter may thus be used as a program guide during later playback.

● Starting To Record:

1. When the "Play" section of the control panel is pressed, the deck will begin recording.
2. You can monitor the recording by connecting headphones or through speakers connected to the amplifier.

3. When MUTE button is pressed during recording, a 4-second blank interval is automatically recorded on the tape, after which the rec pause mode is engaged. (Please refer to page 5 " ④ Rec Mute Button".)
4. If you wish to suspend recording temporarily, pressing the Rec/Pause button engages the Rec Standby mode which serves the same function as a Pause button found on other decks. To begin recording again, press the "Play" section of the control panel.
5. When you have finished recording, press the "Stop" section of the control panel.

■ PLAYBACK

● Prior to Playback:

1. Make sure that all connections between components and all power cord connections are made properly and securely.
2. Make sure that the AUTO MODE switch is set to the OFF position.
3. Turn the Power switch on.
4. Open the cassette compartment cover by pressing the Eject button.
5. Load a recorded cassette tape.
6. Select the proper Tape Selector setting for the type of tape being used — Normal (I/NORM), Chrome (II/CrO₂), or Metal (IV/METAL).
7. For tapes recorded with Dolby NR, make sure that the Dolby NR switch is turned on, and select either Dolby B or C as appropriate.
8. Set the auto mode switch to the REPEAT FULL position when carrying out repeat playback.

● Beginning Playback:

1. When the "PLAY" section of the control panel is pressed, the Play mode will be engaged.
2. Adjust the Balance, Volume, and Tone controls of your amplifier to the desired settings.
3. Press the "STOP" section of the control panel to end play.

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■ TIMER RECORDING/PLAYBACK

When using the Timer Rec/Play switch in combination with a conventional audio timer such as the Yamaha DT-2, it is possible to make recordings and initiate playback at any time automatically by presetting the deck in advance.

● Timer Recording:

1. Refer to the Connection Diagram and make sure that all power cord connections between the timer and amplifier are properly made. No change in any of the other connections between deck and amplifier, etc., is necessary.
2. After turning on the power to each component, select the station on your FM tuner which you want to record and turn down the volume on your amplifier. This will have no effect on the recording signal level. Remember to set the proper recording level for taping from the tuner (as explained earlier in this manual) prior to setting the deck for timer recording.
3. Following the instructions given in the "Prior To Recording" section of this manual, put the K-220 into the Rec mode.

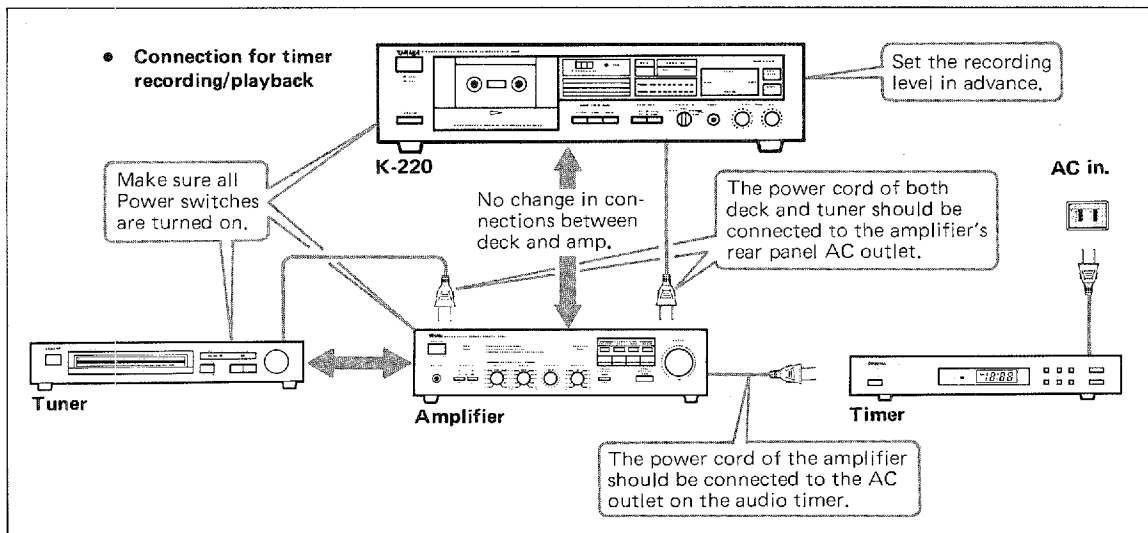
4. Set the AUTO MODE switch to the TIMER REC position.
5. Set the timer to the desired times. It is advisable to set the timer to begin recording slightly before the actual recording time, and to end slightly before the actual recording time, so that you leave some room for later editing.
6. The timer will send power to the amplifier, tuner and deck at the preset time, turning all the components on and initiating the recording mode.

CAUTION:

If the tape cannot be ejected after time recording, turn the AUTO MODE switch off and the K-220's power switch on; the tape can then be ejected.

● Timer Playback:

1. All connections are the same as for timer recording.
2. Following the instructions given in the "Prior To Playback" section of this manual, put the K-220 into the Play mode.
3. Turn on the amplifier and adjust the Balance, Volume and Tone controls.
4. Set the input mode selector of your amplifier to the Tape mode.
5. Set the timer to shut off at the time you wish to end playback.
6. Set the AUTO MODE switch on the K-220 to the TIMER PLAY position.
7. At the preset times, the timer will turn power on to the amplifier and tape deck and begin playback. It will shut power off, at the preset time as well, ending playback.



CASSETTE TAPES/MAINTENANCE

■ CASSETTE TAPES

There are many different types of cassette tapes sold on the market; however, they all conform to standard specifications so that any brand may be used with the K-220.

● Classification of Cassette Tapes By Recording Time

Cassette tapes are available in a number of forms according to the amount of time in minutes it takes to record or playback both sides of the tape.

Type	Record/Playback Time		Length of Tape (m)
	One way (Min.)	Two way (Min.)	
C-45 (C-46)	23	45 (46)	68
C-60	30	60	90
C-90	45	90	135

* Yamaha suggests that you not use C-120 cassettes since the extreme thinness of the tape in these cassettes makes them susceptible to mechanical and electrical problems.

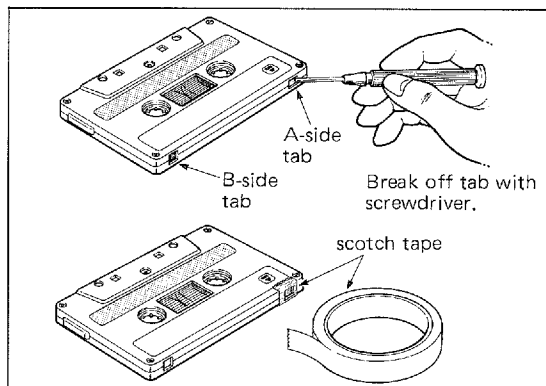
● Classification of Cassette Tapes by Formulation

Cassette tapes are available in four basic types depending on their formulation, or type of magnetic material and manufacturing process. These four types are commonly known as Normal: Type I (LH), Chrome: Type II (CrO₂), Ferrichrome (FeCr), and Metal: Type IV (Metal), and they each require specific bias, level, and equalization settings for optimum performance. The K-220 provides a tape type selector which gives you the proper bias, level, and equalization settings according to which type you have selected.

* The K-220 does not have the required setting for Ferrichrome (FeCr) tape, since this tape formulation is not widely used. Should you use a Ferrichrome tape, it should be recorded and played back at the Normal (LH) settings. This will result in an unnatural high frequency emphasis. But this effect may be compensated for somewhat by adjusting the tone controls of your amplifier.

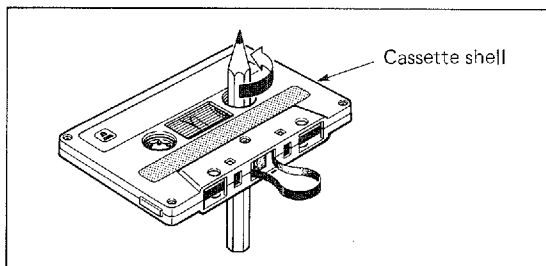
■ PROTECTION YOUR RECORDING

All cassette tapes are provided with erasure protection holes to prevent recorded tapes from being accidentally erased. There is a small tab covering the hole on each cassette, and it should be broken off with a screwdriver after recording a tape. Without this tab covering the hole, it is impossible to record on that tape again; thus, you can keep any recorded tape for as long as you wish without fear of accidental erasure. Should you wish to use a cassette tape protected in this way for later recording, simply covering the hole with scotch tape will permit erasure and re-recording.



■ TAKING UP SLACK IN THE TAPE

Slack in the tape inside of the cassette shell can be corrected by simply inserting a pencil into one of the spools and winding it until all the slack is taken up.



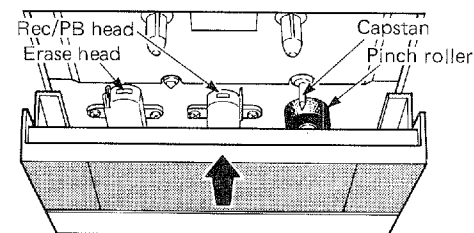
■ STORAGE OF YOUR CASSETTE

After putting a cassette back into its case, store in a location away from exposure to direct sunlight, humidity, high temperatures, and magnetic fields (away from television sets, speakers, etc.). High temperatures and humidity will damage the tape itself, while exposure to magnetic fields may cause a loss of recorded material.

■ MAINTENANCE OF YOUR K-220

After using your K-220 for a certain length of time, it is possible that the sound of your tapes may deteriorate with fading, vibration, or noise as a noticeable result. This is caused by an accumulation of dirt or dust on the heads, capstan, or pinch roller, and magnetization of the heads. It is advisable to periodically clean and demagnetize the heads and to clean the capstan and pinch roller. Use a commonly available cotton swab and head cleaning solution to do this, or use a special head cleaning tape. Head demagnetizers are also commonly available.

- * When cleaning the heads, be careful not to apply unnecessary pressure. When demagnetizing the heads, be sure to follow the instructions of the head demagnetizer carefully.
- * For better access to the head assembly, the cassette compartment cover is detachable by pulling upward on it after it has been opened. To re-attach it, reverse the same procedure.



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DOLBY C-TYPE NOISE REDUCTION

With cassette tapes, the most noticeable form of noise is high-frequency hiss. To reduce this hiss noise, the K-220 has been equipped with a newly developed Dolby C noise reduction system in addition to its conventional Dolby B NR. Either type of noise reduction may be selected with the switch provided.

Dolby B NR has a noise-reduction effect of about 10dB in the high-frequency range. The corresponding figure with Dolby C NR is about 20 dB, but this is over the entire range where the human ear is most sensitive to noise (2 kHz to 8 kHz). Dolby C NR also improves the tape's MOL (maximum output level).

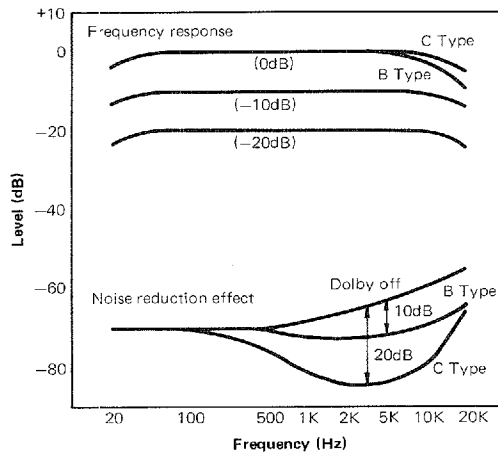
Dolby C NR has two new circuits: a spectral skewing circuit and an anti-saturation network. By improving the saturation level of the tape it is possible to prevent high-frequency loss and encode/decode error, etc., improve dynamic range and signal-to-noise ratio, and make it easier

to set the recording level. With Dolby C NR, it is possible to achieve the same noise reduction effect at both high and low signal levels and to set the recording level at a point where side effects such as "breathing" are eliminated. Also, by expanding the operating frequency range to two octaves more than that of Dolby B NR, overall noise balance is obtained and the system also becomes effective against high frequencies from the power supply.

The graph shows the frequency response and the noise-reduction effect of recording and playback with Dolby B NR and Dolby C NR. The noise reduction effect of Dolby C NR is larger — approximately 20 dB.

Dolby noise reduction is a 2-part process that acts both on recording and playback; be sure that the Dolby NR switch is set to the same position on record and play.

* Noise in the source material can not be reduced with the Dolby NR system.



SPECIFICATIONS

- Type** 4-track, 2-channel recording and playback stereo cassette tape deck
- Heads**
 - Rec/Play head Hard permalloy
 - Erase head Ferrite
- Motors**
 - Capstan DC servo motor
 - Reel Flat torque DC motor
- Wow and Flutter** No more than $\pm 0.15\%$ W.peak
0.08% W.RMS
- Fast winding time** Approx. 95 seconds (C-60)
- Frequency response**
 - Normal tape (-20dB) 40 to 16,000 Hz ± 3 dB
 - Chrome tape (-20dB) 40 to 16,000 Hz ± 3 dB
 - Metal tape (-20dB) 40 to 16,000 Hz ± 3 dB
- Signal to Noise ratio**
 - Dolby off 58 dB
 - Dolby B on 66 dB
 - Dolby C on 74 dB
- Harmonic distortion** Less than 1%
- Input Sensitivity/Impedance**
 - Line 45 mV/50 k-ohms
- Output Level/Load Impedance**
 - Line 360 mV/47 k-ohms
 - Headphones 40 mV/8 ohms
- Power supply** AC120V, 60Hz
- Power consumption** 15 W
- Dimensions (W x H x D)** 435 x 112 x 225 mm
(17-1/8" x 4-3/8" x 8-7/8")
- Weight** 4.0 kg (8 lbs 13 oz)

Specifications subject to change without notice.

TROUBLESHOOTING

Before assuming that your amplifier is faulty, check the following troubleshooting list which details the corrective action you can take yourself without having to call a service engineer. If you have any doubts or questions, get in touch with your nearest Yamaha dealer.

Fault	Cause	Cure
● Tape doesn't move (in recording and playback).	Power plug not properly plugged in.	Check connection, and reinsert plug properly.
	End of tape.	Replace with new cassette tape.
● Tape stops in the middle of recording, or playback.	Slack tape, or tape spillage caught around capstan.	Remove tape.
● Fails to record.	Protective tab broken off.	Cover the hole remaining after removal of tab with scotch tape.
	REC LEVEL control turned down.	Properly re-adjust REC level.
● The recorded sounds are distorted.	Too high REC level.	Properly re-adjust REC level.
	Tape worn.	Replace with new cassette tape.
● Excessive noise. ● Sounds become faint and sometimes inaudible.	Tape worn.	Replace with new cassette tape.
	Connection cord improperly inserted.	Check connection, and reinsert plug properly.
	Head is magnetized.	Demagnetize head with head demagnetizer.
	Head is dirty.	Wipe off dust and dirt with commonly available cotton swab dipped into head cleaning liquid.
● Excessive Wow (Wavering of the sound).	Dirty capstan, pinch roller, etc.	Wipe off dust and dirt with commonly available cotton swab dipped into head cleaning liquid.
	Tape is unevenly wound.	Rewind tape using F. FWD button, or REW button.
● Playback sounds are poorly balanced.	Dolby NR switch not properly set.	Dolby B-encoded tapes: play back with Dolby B on. Dolby C-encoded tapes: play back with Dolby C on. Others: Dolby off.

SINCE 1887  **YAMAHA**
NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN