Cat. No. 32-2041

OWNER'S MANUAL

Please read before using this equipment.

MPA-31

20-Watt AC/Mobile PA Amplifier

Radio Shack®

FEATURES

Your new Radio Shack MPA-31 20-Watt AC/Mobile PA Amplifier gives you 20 Watts of solid power for your PA system. Its wide frequency response easily handles amplification of voice and music. It operates on either 120 volts AC or 12 volts DC power so you can use it in meeting halls and auditoriums, at sports evets, in schools, in the office for paging systems — anywhere you need to deliver special announcements with great sound.

It includes the following features:

Microphone Input Jacks — let you connect up to two microphones.

Auxiliary Input Jacks — lets you connect a variety of audio input sources for music and special effects.

70-Volt Line Output — lets you connect line transformers for a multiple-speaker PA system.

Master Volume Control — lets you adjust the overall sound level.

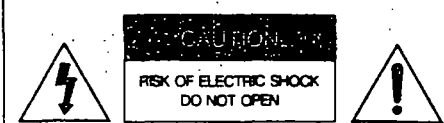
TONE Control — lets you customize the tone of the sound to suit your personal preferences depending on the acoustics, speakers, and sound source.

Read this manual carefully. It describes various speaker connections to help you select the best arrangement for your system and also explains how to use the amplifier.

The serial number is on the amplifier's back panel. For your permanent records, we recommend you record it below.

Serial Number: _____

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS AMPLIFIER TO RAIN OR MOISTURE.



CAUTION: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT REMOVE THE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

This symbol is intended to alert you that dangerous uninsulated voltage within the product's enclosure might be of sufficient magnitude to constitute a risk of electric shock. Do not open the product's case.

This symbol is intended to inform you of important operating and maintenance (servicing) instructions in the papers accompanying this product.

PREPARATION

PLACING THE AMPLIFIER

Before you use your amplifier, be sure you choose a location with adequate ventilation. Do not place the amplifier on thick carpeting (which can restrict the air flow) or near a heat source, such as a heat vent or radiator (which can cause the amplifier to overheat).

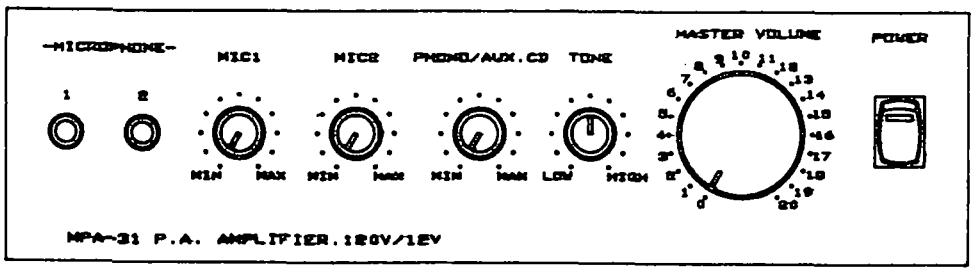
PRESETTING THE CONTROLS

Setting the Amplifier

Warning: A sudden high output from the amplifier could damage your hearing or the speakers connected to the amplifier's output.

To avoid accidentally overdriving a channel or prematurely amplifying an audio input, set the amplifier's controls to the levels shown below before you connect the AC power cord or turn on power.

Control	Setting
POWER	Off
MIC 1, MIC 2, PHONO/AUX.CD	MIN
TONE	MID
MASTER VOLUME	0



Setting the Input Sources

To avoid sudden audio from the input sources, set their controls to the levels shown below before you connect their output jacks to the amplifier's input jacks.

Audio Device	Control	Setting
Turntable	Power	Off
Tape Deck	Power	Off
CD Player	Power	Off
Amplifier/Receiver	Power	Off
	Tone	Flat

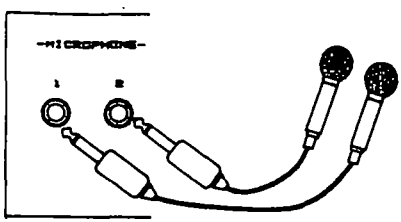
CONNECTING AUDIO COMPONENTS TO THE AMPLIFIER

You can connect optional components (such as microphones, tuners, turntables, or CD players) to your amplifier to expand your system. Your local Radio Shack store carries a wide selection of audio components, adapters, microphones, and speakers.

Caution: Make sure you make all the connections to the amplifier and speakers before connecting and turning on power.

Connecting Microphones

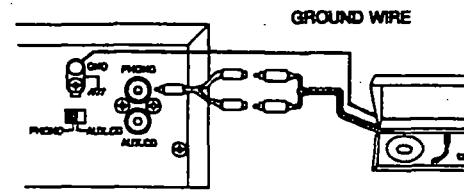
You can connect a microphone to one or both of the amplifier's **MIC 1** and **MIC 2** input jacks. The microphone(s) can be high- or low-impedance and must have a $^1/_4$-inch plug.



Connecting a Turntable

You can connect an audio input source, such as a magnetic cartridge turntable to the amplifier's **PHONO** jack.

Caution: Do not connect a high level audio input source, such as a ceramic cartridge turntable, to the **PHONO** input jack. Doing so could cause sound distortion.



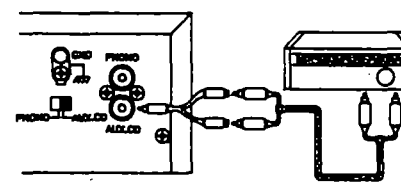
Notes:

- To avoid a low frequency hum, connect your turntable's ground wire (usually black or green) to the amplifier's **GND** screw.

- To prevent a beat or howling sound during monaural operation in the **PHONO** mode, separate the **PHONO** input line from the speaker wire.

Connecting an Auxiliary Audio Source

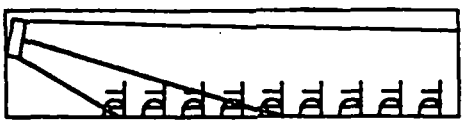
You can connect an auxiliary audio input source (such as a tape deck, CD player, ceramic cartridge turntable or tuner) to the amplifier's **AUX.CD** jack.



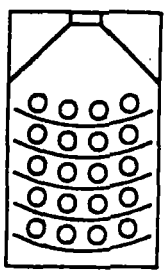
Note: To connect a stereo audio source to the **AUX.CD** jack, use a shielded Y-adapter, such as Cat. No. 42-2438 (not supplied).

PLACING THE SPEAKERS

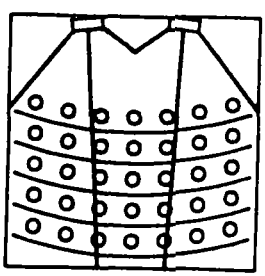
Speaker placement depends on your room's size and arrangement. We recommend you play a wide-range recording and experiment with speaker placement until you find the locations that result in the best sound. The following drawings show recommended speaker placements for typical, narrow, and wide sound coverage.



Typical Coverage



Single Speaker (Narrow Coverage)



Two Speakers (Wide Area Coverage)

Use the shortest length of wire possible to connect the speakers. After placing the speakers, determine the wire length and choose the appropriate gauge size as follows:

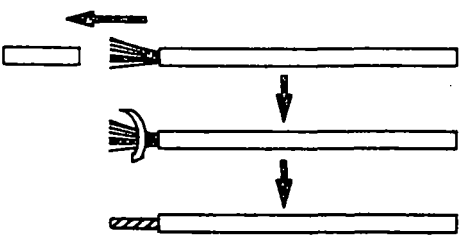
Wire Length	Wire Gauge
25 feet or less	18-gauge
Over 25 feet	16-gauge

Note: If you connect speakers without transformers, the speaker wire should be no longer than 50 feet.

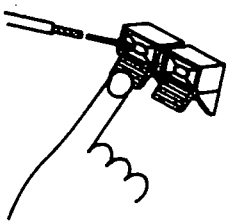
CONNECTING THE SPEAKERS

You can connect one or more 4-, 8- or 16-ohm speakers, with or without transformers, between the amplifier's output and the speakers' input. To ensure equal volume from each speaker, all the connected speakers should have the same impedance rating.

Remove about 1 inch of insulation from the end of each wire. Then twist the exposed wire to secure all its strands.



Connect the speaker wire to the amplifier and the speaker(s) by pressing down on the appropriate push terminal lever and inserting the end of the twisted wire into the terminal's hole. Then release the lever to secure the wire.



Phasing the Speakers

Proper phasing is important when you use more than one speaker in the same room or area. Out-of-phase speakers can lose up to one-half of their potential volume, and can have a significantly decreased bass effect.

Most speaker terminals are color-coded or have a mark that indicates the terminal's polarity. Usually, terminals with positive polarity are red or have a plus symbol (+), and terminals with negative polarity are black or have a minus symbol (–).

Phasing is correct when you connect + to + and – to –.

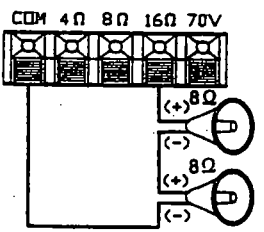
Determining Total Speaker Impedance

Caution: A total speaker impedance that is higher than 16 ohms or lower than 4 ohms can damage your amplifier or speakers.

Before you connect speakers to the amplifier, you must determine the total speaker impedance. In determining the total speaker impedance, you must first determine if your speakers are connected in series, parallel, or a series/parallel combination.

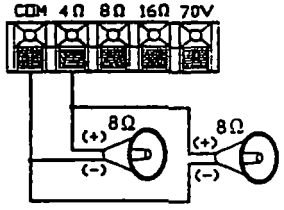
- Speakers are connected in series when the first speaker's positive terminal is connected to the next speaker's negative terminal. Determine the total speaker impedance of speakers connected in series by adding up the individual impedances of all the connected speakers.

  For example, if you want to connect two 8-ohm speakers in series, add 8 (the impedance of one speaker) plus 8 (the impedance of the other speaker) for a total speaker impedance of 16 ohms.



- Speakers are connected in parallel when all their negative terminals are connected together and all their positive terminals are connected together. Determine the total speaker impedance of speakers connected in parallel by dividing the impedance of one speaker by the number of speakers.

For example, if you plan to connect two 8-ohm speakers in parallel, divide 8 (the impedance of one speaker) by 2 (the number of speakers) for a total speaker impedance of 4 ohms.



- If you connect more than two speakers using only series or only parallel connections, the total impedance might exceed the amplifier's maximum impedance (16 ohms) or fall below its minimum impedance (4 ohms).

  For example, if you connect four 8-ohm speakers:

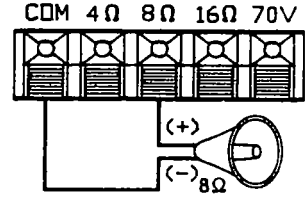
  - In series, the total impedance is 32 ohms (8 + 8 + 8 + 8 = 32). This exceeds the maximum rating.

  - In parallel, the total impedance is 2 ohms (8 divided by 4 = 2). This falls below the minimum rating.

  You can arrive at a proper total impedance by combining series and parallel connections.

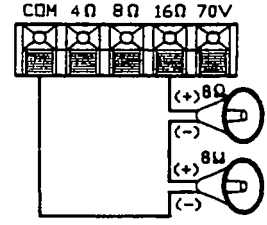
Connecting Only One Speaker

Connect the speaker's negative (−) terminal to the amplifier's **COM** terminal. Then connect the speaker's positive (+) terminal to the terminal that matches the speaker's impedance (4Ω, 8Ω, or 16Ω).



Connecting Speakers in Series

Follow these steps to connect speakers in series.



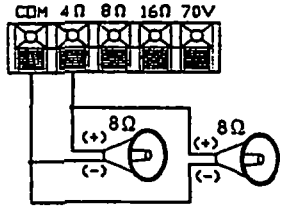
1. Connect the first speaker's positive (+) terminal to the second speaker's negative (−) terminal.

2. Connect the first speaker's negative (−) terminal to the amplifier's **COM** terminal.

3. Connect the second speaker's positive (+) terminal to the amplifier's 4 Ω, 8 Ω, or 16 Ω terminal that matches the toal speaker impedance.

Connecting Speakers in Parallel

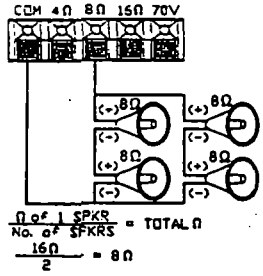
Follow these steps to connect speakers in parallel.



1. Connect the speakers' negative (–) terminals together.
2. Connect the speakers' positive (+) terminals together.
3. Connect the speakers' negative (–) terminals to the amplifier's COM terminal.
4. Connect the speakers' positive (+) terminals to the amplifier's 4Ω, 8Ω, or 16Ω terminal that matches the total speaker impedance.

Connecting Four Speakers in Series/Parallel Combination

Follow these steps to connect four speakers in series/parallel combination.



1. Group the four speakers into two pairs.
2. Connect each pair of speakers in series. The total impedance of each pair is 16 ohms (8 + 8 = 16).
3. Connect the two pairs of speakers in parallel. The total impedance of both pairs is 8 ohms (16 / 2 = 8).
4. Connect both speakers' negative (–) terminals to the amplifier's COM terminal.
5. Connect both speakers' positive (+) terminals to the amplifier's 4Ω, 8Ω, or 16Ω terminal that matches the total speaker impedance.

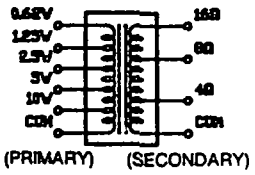
Connecting Speakers with Transformers

For the best results when you connect two or more speakers to your system, we recommend you use a line transformer (such as Cat. No. 32-1031, not supplied) for each speaker.

Transformers offer these advantages:

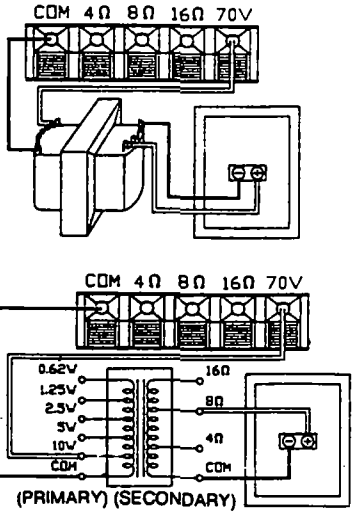
- You can connect speakers with different impedances without causing differences in output between the speakers.
- You can add or remove a speaker from the system without having to recalculate the entire system's impedance.
- You can reduce signal loss when you use speaker wire over 50 feet long.

Line transformers have several connectors called taps. The primary taps (on one side of the transformer) are the inputs and are rated in watts. The secondary taps (on the opposite side of the transformer) are the outputs and are rated in ohms.



Cautions:

- Before you connect the speakers, be sure the total wattage of the primary taps you intend to use does not exceed the amplifier's maximum 20-watt output power rating.
- Avoid multiple connections to the amplifier's **70V** and **COM** terminals.



1. Connect a wire from the amplifier's **70V** terminal to the transformer's primary tap that matches your speaker's wattage rating.

   Note: Usually, each speaker in a system uses the same wattage tap. If you want a particular speaker to have a higher volume level, use a higher wattage tap on its transformer.

2. Connect a wire from the amplifier's **COM** (common) terminal to the C (common) taps on the transformer's primary side.

3. Connect a wire from the speaker's positive (+) terminal to the transformer's secondary tap that matches the speaker's total impedance (4 ohms, 8 ohms, or 16 ohms).

4. Connect a wire from the speaker's negative (−) terminal to the C (common) tap on the transformer's secondary side.

CONNECTING POWER

You can power your amplifier from standard AC power or from a 12-volt DC power source (such as your vehicle's battery).

Using AC Power

To use standard AC power, simply plug the supplied AC cord into any standard AC outlet.

Using Vehicle Battery Power

You can power the amplifier from your vehicle's 12-volt battery.

Cautions:

- Your vehicle must have a negative-ground electrical system. If you are unsure about what type of electrical system your vehicle has, ask your vehicle dealer.

- Disconnect the AC cord before you connect the DC power cable.

To use 12-volt DC power, connect the supplied DC power cable's small end to the amplifier's **12V NEGATIVE GND** jack. Then connect the cable's other end to your vehicle's cigarette-lighter socket.

Replacing the DC Cable's Fuse

The cable's 4A, 125-volt in-line fuse protects your amplifier from voltage surges. If the amplifier's power indicator does not light when you press **POWER**, check the fuse. If it is blown, replace it with a 4-amp, 125-volt fuse (such as Cat. No. 270–1010, not supplied).

To replace the fuse, unscrew the tip of the cigarette-lighter plug. Then remove the old fuse and insert the new fuse. Secure the fuse by reattaching the plug's tip.

Replacing the Amplifier's Fuse

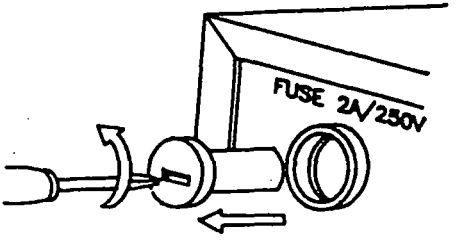
The fuse (located on the back of the amplifier) protects your amplifier from power (voltage or current) surges. If the **POWER** indicator does not light when you press **POWER**, the fuse might be blown.

Caution: Use only an identical 5 × 20 mm, fast-acting, 2-amp, 250-volt fuse (such as Cat. No. 270-1052).

Follow these steps to replace the amplifier's fuse.

1. Unplug the amplifier's power cord.

2. Using a flatblade screwdriver, push and turn the fuse holder's cap counterclockwise until the fuse holder pops out.



3. Remove the fuse holder and replace the fuse.

4. Using a flatblade screwdriver, push and turn the fuse holder's cap fully clockwise to replace it.

VEHICLE INSTALLATION

Before you install the amplifier in your vehicle, read the following hints to help you select a proper mounting location:

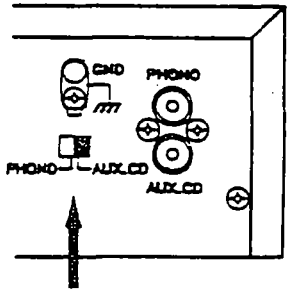
- Choose a mounting location in your vehicle where all the amplifier's controls are easy to reach but do not interfere with the operation of the vehicle. The most common location is under the dashboard directly over the drive shaft hump.
- Be sure all wires and cables are away from the brake, clutch, and accelerator.
- Be sure the mounting location allows enough leg room for passengers.
- Mount the amplifier so you can easily remove it for service or maintenance.
- Do not mount the amplifier in the air stream path of a heater or air conditioner.

After you select a mounting location, follow these steps to mount the amplifier in your vehicle.

1. Position the left and right mounting brackets on the desired mounting surface and mark the mounting holes.
2. Use a drill with a $^1/_8$-inch bit to drill holes on the marked location.
3. Mount the brackets using a universal mounting bracket set (Radio Shack Cat. No. 270-023).
4. Attach the amplifier to the brackets using the machine screws.

USING YOUR AMPLIFIER

1. Set **PHONO/AUX.CD** on the back of the amplifier to **PHONO** or **AUX.CD** depending on which input scurce you want to mix.

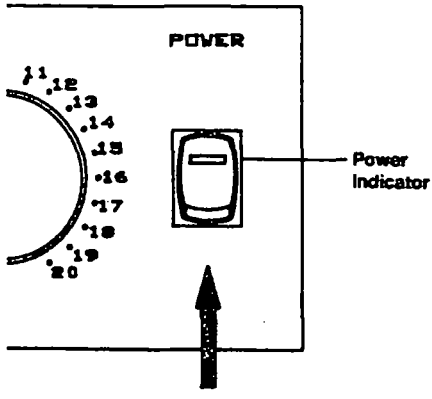


Notes:

- The microphones connected to **MIC 1** and **MIC 2** and the audio input source connected to either the **PHONO** or **AUX.CD** input jacks are all used at the same time.

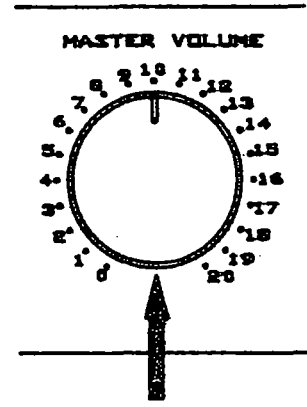
- You can connect input sources to **PHONO** and **AUX.CD** at the same time, but you can use only one source at a time.

2. Press **POWER**. The POWER indicator lights.

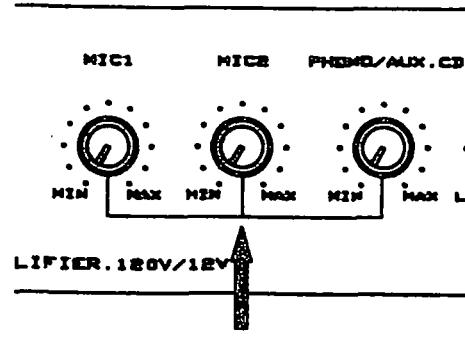


3. Start play on the audio input source.

4. Set **MASTER VOLUME** to **10** (mid position).



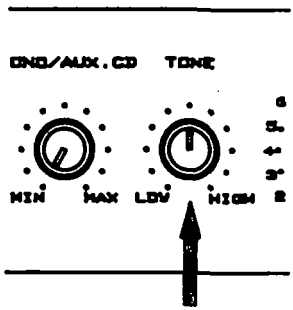
5. Adjust **MIC 1**, **MIC 2**, and **PHONO/AUX.CD** to the desired volume and balance.



6. Adjust **MASTER VOLUME** to the desired level.

Caution: Be careful not to raise the volume level too high. Doing so might overload the system.

7. Adust **TONE** toward **LOW** to adjust the sound toward a low frequency tone, or toward **HIGH** to adjust it toward a high frequency tone.



Notes:

- Leaving **TONE** set at the mid position produces a flat, unadjusted tone.
- If feedback occurs, turn **TONE** toward **LOW** or turn down the volume.

8. Press **POWER** to turn off the amplifier.

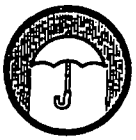
TROUBLESHOOTING

Your MPA-31 Amplifier should require very little maintenance. If you do have problems, refer to this chart for possible solutions. If you cannot solve the problem, contact your local Radio Shack store for assistance.

Nothing works	If you are using AC power: - Check the AC fuse (on the back panel). If the fuse is blown, replace it with a 2-Amp, 250-Volt fuse (see "Replacing the Amplifier's Fuse" on Page 10). - Check to make sure the Ac outlet has power. - Check the power connections to the rest of the system (turntable, CD player, tuner, etc.)
	If you are using vehicle battery power: - Check the DC cable's in-line fuse. If the fuse is blown, replace it with a 4-Amp, 125-Volt fuse (see "Replacing the DC Cable's Fuse" on Page 10). - Check to make sure the vehicle battery has power. - Check to make sure the DC adapter is properly connected.
	Make sure none of the speaker wiring, microphone cables, or other connecting cables are defective.
No signal from an audio input source	Check the control setting.
	Check the connections between the amplifier and the input source.
	Make sure a microphone is not defective.
Hum from PHONO	Connect the turntable's ground wire (usually black or green) to one of the GND screws on the back of the amplifier.
Hum from other inputs	Make sure there are no low level inputs connected to the PHONO/AUX.CD jack.
Feedback "squeals"	Move the microphone further away from the output speakers or use a directional microphone.
	Adjust the TONE controls if necessary.
Amplifier overheats	Be sure you have provided adequate ventilation to the amplifier.
Weak speaker response	Be sure you correctly calculated the total speaker impedance.

CARE AND MAINTENANCE

Your new Radio Shack MPA-31 20-Watt AC/Mobile PA Amplifier is an example of superior design and craftsmanship. The following suggestions will help you care for the amplifier so you can enjoy it for years.



Keep the amplifier dry. If it gets wet, wipe it dry immediately. Liquids might contain minerals that can corrode electronic circuits.

Use and store the amplifier only in normal temperature environments, and avoid sudden temperature changes. Temperature extremes can shorten the life of electronic devices and distort or melt plastic parts.

Handle the amplifier gently and carefully. Dropping it can damage the circuit boards and can cause the amplifier to work improperly.

Keep the amplifier away from dust and dirt, which can cause premature wear of parts.

Wipe the amplifier with a damp cloth occasionally to keep the amplifier looking new. Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the amplifier.

Modifying or tampering with the amplifier's internal components can cause a malfunction and might invalidate the warranty. If the amplifier is not performing as it should, take it to your local Radio Shack store for assistance.

SPECIFICATIONS

Output Power at 4 Ohms 1 kHz, 10% THD ..... 20 Watts
Power Bandwidth at 5W, 10% THD, Aux Input ..... 150 Hz–20 kHz

T.H.D at 10W, 1 kHz with 30 kHz Low Pass Filter
- MIC 1 ..... 0.22 %
- MIC 2 ..... 0.21 %
- AUX.CD ..... 0.20 %
- PHONO ..... 0.24 %

Input Sensitivity at 10% THD, 1 kHz
- MIC 1 ..... 2.5 mV
- MIC 2 ..... 2.5 mV
- AUX.CD ..... 150 mV
- PHONO ..... 2.5 mV

Signal to Noise Ratio (Input Shorted) with 30 kHz Low Pass Filter
- MIC 1 ..... 60 dB
- MIC 2 ..... 60 dB
- AUX.CD ..... 65 dB
- PHONO ..... 60 dB

Frequency Response at 4 Ohms +1/–3 dB
- MIC 1 ..... 150 Hz-15 kHz
- MIC 2 ..... 150 Hz-15 kHz
- AUX.CD ..... 150 Hz-15 kHz
- PHONO (RIAA 100 Hz/10 kHz) ..... +11.9 dB/–12.1 dB

Hum and Noise at 4 Ohms with 30 kHz Low Pass Filter
- at Master Volume Min ..... 3 mV
- at Master Volume Max and Others Min ..... 30 mV

Tone Control (High Cut at 10 kHz) ..... –15 dB
Power Requirement ..... 120V AC 60 Hz
Dimensions (HWD) ..... 3 × 11 1/4 × 8 3/4 inches
Weight ..... 7.7 lbs

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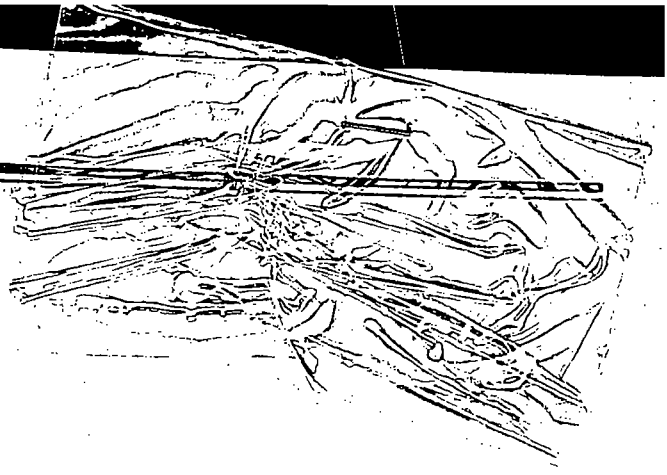

RADIO SHACK LIMITED WARRANTY

This product is warranted against defects for 1 year from date of purchase from Radio Shack company-owned stores and authorized Radio Shack franchisees and dealers. Within this period, we will repair it without charge for parts and labor. Simply **bring your Radio Shack sales slip** as proof of purchase date to any Radio Shack store. Warranty does not cover transportation costs. Nor does it cover a product subjected to misuse or accidental damage.

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We Service What We Sell 9/94

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