REALISTIC

STA-2250
DIGITAL SYNTHESIZED AM·FM STEREO RECEIVER

31-2095
CONTROLS AND FEATURES OF YOUR STA-2250

The STA-2250 is a Milestone in Receiver Technology—all digital Tuning. Not just a digital readout added to a conventional tuning system, the CMOS LSI Frequency Synthesizer does away with mechanical tuning problems.

Digital frequency display with LED signal strength indicators and FM stereo indicator

Metal ventilation grid and top cover lets the STA-2250 “breathe”

Push-button features for the most demanding audiophile—loudness, stereo/mono switch, low and high filters and MPX filter

Selector determines the desired program source

Real wood veneer case on both sides

Microprocessor controlled memory allows instant selection of 8 AM and 8 FM stations

PHONES jack for private listening

Separate POWER switch—no need to disturb other controls. Built-in protection relay prevents damage from voltage peaks during power-on cycle

Tape MONITORing and DUBBING controls—copy tapes, make recordings while listening to another source or record from any source in the system

Detented concentric VOLUME and BALANCE controls

Press A (Main) or/and B (Remote) to select desired set of speakers
Your new REALISTIC STA-2250 incorporates the very latest in microprocessor and MOSFET technology to deliver versatility and performance unmatched in its price range!

The built-in CMOS LSI Frequency Synthesizer eliminates the usual dial scale and replaces it with a digital readout. Your STA-2250 tunes up or down the AM and FM bands automatically. The FM front-end uses a dual-gate MOSFET for immunity from overloading due to strong local signals.

Up to 16 stations (8 for FM and 8 for AM) can be programmed into the microprocessor controlled memory, ready for one-touch recall. Memory contents is automatically protected for up to one hour of power loss.

The FM IF section incorporates 3 stages resulting in very high gain with outstanding limiting characteristics (for ultra-low-noise FM reception). Three linear-phase ceramic filters give superb selectivity with low distortion. You get outstanding stereo reception with state-of-the-art separation through the quadrature FM detector and PLL stereo detector.

The Power Amplifier delivers a solid 50 watts RMS per channel – enough to drive two pairs of even the most inefficient speaker system!

Your Realistic STA-2250 is unlike any other Receiver you’ve ever owned. We urge you to carefully read all of this manual to become acquainted with the many unique features of this fine Receiver.

**RADIO SHACK LIMITED WARRANTY**

This equipment is warranted against defects for 2 years from date of purchase. Within this period, we will repair it without charge for parts and labour. Simply bring your sales slip as proof of purchase date to any Radio Shack store. Warranty does not cover transportation costs. Nor does it cover equipment subjected to misuse or accidental damage.

*We Service What We Sell*

For your own protection, we urge you to record the Serial Number of this unit in the space provided. You’ll find the Serial Number on the back panel of the unit.

**Serial Number:**

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**SPECIFICATIONS**

**PRE-AMPLIFIER & AMPLIFIER**

- Minimum Audio Output Power at no more than 0.05% Total Harmonic Distortion into 8 ohms, over the audio spectrum 20 – 20,000 Hz
- Frequency Response (20 – 20,000 Hz)
- IM Distortion at 3 dB below full output
- Sensitivity for full output
  - PHONO: 2.2 mV
  - AUX: 160 mV
  - TAPE IN 1, 2: 160 mV
- Tone Controls: BASS (100 Hz) = -10 dB, TREBLE (10 kHz) = -10 dB, MID RANGE (1.5 kHz) = -56 dB
- High Filter (10 kHz): -6 dB
- Low Filter (50 Hz): -3 dB
- Signal-to-Noise Ratio
  - PHONO: 85 dB
  - AUX and TAPE IN 1, 2: 90 dB
  - Crosstalk (AUX): 55 dB
- Loudness Compensation at 30 dB below full output
  - 6 dB at 100 Hz
  - 4.5 dB at 10 kHz
- TAPE OUT 1, 2 Level: 140 mV
- TAPE OUT 1, 2 (DIN) Level: 3.3 mV

**FM TUNER**

- Sensitivity (10 kHz): 2 μV (11.3 dB)
- Sensitivity for 50 dB Quieting: 3.5 μV (16 dB)
- Limiting Sensitivity (-3 dB): 1.5 μV
- Signal-to-Noise Ratio (1 mV): 67 dB
- Image Rejection: 75 dB
- IF Rejection: 95 dB
- Capture Ratio: 1.5 dB
- Harmonic Distortion
  - Mono: 0.2%
  - Stereo: 0.3%
- Muting Sensitivity: 5 μV
- ACA: 65 dB
- AM Suppression: 50 dB
- Stereo Separation (1 kHz): 48 dB
- Search Sensitivity: 6 μV
- TAPE OUT Level (1 mV): 640 mV

**AM TUNER**

- Sensitivity Radiated
  - 250 μV/m for 20 dB S+N/N
- Distortion (5 mV/m): 20 μV
- Selectivity: 1.0
- Image Rejection: 32 dB
- IF Rejection: 32 dB
- AGC Figure of Merit: 47 dB

**RF Interference Rejection**

**ANTENNAS**

- AM: Built-in ferrite loopstick
- FM: Dipole antenna provided
- Plus terminals for external antenna.

**POWER REQUIREMENTS**

- 120V AC, 60 Hz (600 watts max.)
Getting To Know Your STA-2250

Here's a quick overview of the versatile controls of your STA-2250. Complete instructions for installation and operation will follow later in the Manual.

Selector
Determine the desired program source.
AM: Activates the AM tuner.
FM: Activates the FM tuner.
FM MUTE: Activates the built-in FM tuner and eliminates interstation noise when tuning for FM stations. Receiver will then be silent until you tune a strong (5μV or better) station. (Set to FM position to receive weak FM stations.)
PHONO: Activates the PHONO jacks on the rear panel. The turntable connected to these inputs must have a magnetic phono cartridge.

AUX: Activates the AUX jacks on the rear panel. Connect any high-level source (tape deck, TV audio, ham radio, turntable equipped with a ceramic or crystal phono cartridge, etc.).

TAPE MONITOR
 Lets you monitor signals connected to TAPE 1, TAPE 2, or the program SOURCE determined by the Selector switch. Switch must be in SOURCE position if you wish to hear your Receiver's sound (AM, FM, PHONO, etc.). To monitor signals connected to TAPE 1 IN, use position 1; for monitoring TAPE 2 IN, use position 2. This switch will be of special benefit when used with a three-head tape deck (one with monitoring facilities).

TAPE DUBBING
Control the tape dubbing (duplicating) functions. With switch in center (SOURCE) position, both sets of TAPE OUT jacks will carry the same signals as determined by the Selector switch. Use 1 → 2 position to dub directly from TAPE 1 IN to TAPE 2 OUT, and 2 → 1 position to dub from TAPE 2 IN to TAPE 1 OUT.

BASS, MIDRANGE, TREBLE
These controls let you precisely adjust the frequency response in three different ranges: low-frequency, midrange (voice range), and high frequency. Each control is divided into eleven "steps" for fast and convenient resetting to any desired position.
VOLUME and BALANCE
These two controls are combined on one dual concentric knob. The outer knob (away from panel) controls volume and the inner ring (closer to panel) controls the balance (relative sound level) of the Left and Right channels. At center-detented position, balance from Left and Right channels will be equal. The volume control is divided into 21 steps for easy resetting to desired volume level.

DIGITAL TUNING SEARCH
Selects the Auto or Manual Tuning mode; press in to set the Auto Tuning mode.

Auto Tuning DOWN/UP
Press UP (or DOWN) side of key to scan to next higher (or lower) frequency station (AM or FM).

Manual Tuning DOWN/UP
Press UP to move up in frequency. Press DOWN to move down in frequency. (This stops at every frequency regardless if there is a station there or not.) Keep pressing to keep tuning.

SPEAKERS
Are push-buttons — press in to connect the desired pair of speakers. A is for the "main" speakers and B is for the "remote" speakers. When using headphones, you'll probably want to leave both buttons out for private listening.

POWER
Push to turn the Receiver on. After about 5 seconds, you'll hear a faint click as the speaker protection relay closes and applies power to the speakers. Press again to turn off.

PHONES Jack
Plug in stereo headphones for private listening. Leave SPEAKERS switches in the "out" position so you don't disturb others (this turns the Speakers off).

MEMORY SET
Press to set the Receiver to accept the displayed frequency into memory.

MEMORY LED
Shows the Receiver is ready to memorize a station frequency after you press MEMORY SET button.

PROGRAMMABLE MEMORY Buttons (1—8)
Use to set up to 16 of your favorite stations in memory for immediate recall by pushing one button. (You can set 8 for FM and 8 for AM.)

SIGNAL Level
Green LED indicator shows the relative strength of AM or FM signal. When you select the AM or FM mode, 1st LED indicator will always light up regardless of signal strength.

Digital Display Panel
Indicates receiving frequency, for AM or FM.

STEREO Indicator
This bright green LED lights up if the MONO button is out and you are tuned to a stereo FM signal.

LOUDNESS
When listening at low volume settings, press in the LOUDNESS button. This overcomes the human ear's reduced sensitivity at low listening levels by boosting low and high frequencies.

MONO
Pressing the MONO button defeats stereo operation, the resulting signal is a composite (Left + Right). When you listen to weak FM stereo stations, pressing the button will reduce the noise, but of course the signal will no longer be stereo.

LOW and HIGH FILTERS
Help to filter out noise. Press HIGH FILTER to remove hiss and scratch noise. Press LOW FILTER to remove low frequency hum or turntable rumble.

MPX FILTER
When making Dolby NR recordings of FM stereo signals, press this button in. Also, when you listen to weak FM stereo broadcasting, pressing the MPX FILTER button will help to reduce any noise and hiss, without totally eliminating the stereo separation.
REAR PANEL

(1) Power FUSE  This is the power supply fuse. It protects the Receiver from voltage surges or other abnormal operating conditions. If the Pilot Light does not go on when POWER is pressed, check the FUSE; if it is blown, replace with the same size and value (6A).

(2) AC Cord  Supplies the Receiver's power. Plug the cord into any 120V AC, 60 Hz outlet.

(3) UNSWITCHED AC Convenience OUTLET  Can be used to power any audio accessory up to 100 watts. The front panel POWER switch does not affect this receptacle.

(4) A SPEAKERS Screw Terminals  For use with Speakers which have Screw Terminals. If your speakers have RCA type plugs, use the RCA type jacks provided.

(5) A SPEAKERS RCA Type Jacks  For use with Speakers which have RCA plugs.

Note: Use either RCA jacks or Screw Terminals for A, NOT BOTH.
(6) B SPEAKERS
   Screws Terminals
   For use with Remote Speakers which have Screw Terminals.

(7) TAPE 2 IN/OUT DIN
    Connector
   If your Tape Deck has a DIN jack, connect a cable between the DIN jacks. Use either the 5-pin DIN Connector or TAPE IN/OUT 2 RCA jacks — NOT BOTH. TAPE MONITOR 2 activates this 5-pin DIN Connector.

(8) TAPE OUT 2 Jacks
   Connect the Tape Deck's Auxiliary Input for recording any one of the Receiver's program sources. The output from these and all TAPE jacks is unaffected by VOLUME, BALANCE, LOUDNESS or Tone controls.

(9) TAPE IN 2 Jacks
   Connect from Tape Deck's Output jacks for tape playback. To activate these jacks, TAPE MONITOR must be set to 2.

(10) TAPE 1 IN/OUT DIN
     Connector
     Use as above (7) for a 2nd Tape Deck. Use either the 5-pin DIN connector or TAPE IN/OUT 1 RCA jacks — NOT BOTH. TAPE MONITOR 1 activates this 5-pin DIN Connector.

(11) TAPE OUT 1 Jacks
     Use as above (8) for a 2nd Tape Deck.

(12) TAPE IN 1 Jacks
     Use as above (9) for a 2nd Tape Deck. To activate these jacks, TAPE MONITOR must be set to 1.

(13) AUX Jacks
     Connect output from any high-level source — a 3rd Tape Deck, ceramic or crystal phono cartridge, etc. These jacks are activated when Selector is set to AUX.

(14) PHONO MAG Jacks
     Connect Record Changer/Turntable with magnetic cartridge to these jacks. These jacks are active when Selector is set to PHONO position.

(15) Phono GND Screw
     Connect the ground lead (typically green or black) from the Record Changer/Turntable to this screw (to reduce or eliminate hum).

(16) FM Antenna 300-Ohm
     Screw Terminals
     Connect the Dipole Antenna (provided), or connect external FM antenna here using standard 300-ohm lead-in.

(17) FM Antenna 75-Ohm
     Screw Terminals
     Connect external antennas here using 75-ohm coaxial lead-in. Coaxial cable provides extremely high immunity from static and other noise.

(18) AM Antenna Screw
     Terminal
     Connect an external AM antenna here for long distance AM reception. In most areas the built-in antenna will provide excellent reception.

(19) Built-in Ferrite AM
     Antenna
     Is adequate in most areas for AM reception. Move around on its swivel for best reception.
A TYPICAL SYSTEM
STA-2250, TURNTABLE, 4 SPEAKERS and TAPE DECKS

REALISTIC®
Adding The STA-2250 To Your System

Before making connections, be sure the POWER switch is “OFF” and the AC power cord is not connected.

Note: To reduce hum, use shielded audio cable for all connections except speakers. For speaker connections use lamp cord or speaker cable.

Phonograph
Connect the turntable leads to the PHONO input. If the turntable has a ground wire (usually black or green) connect it to the PHONO GND screw. Plug the turntable AC cord into the AC convenience outlet or wall socket.

Antennas
Your Receiver comes with an FM Dipoole Antenna.
For FM reception, connect it to 300-ohm antenna terminals on the rear. Tack it to the back of a record cabinet or onto a wall — the higher the better. For the best FM reception, you should use an external antenna (see HINTS FOR BETTER SOUND on Page 14).

Speakers
The STA-2250’s output is designed for use with 4 — 16 ohm speakers. If you plan to have both A (main) and B (remote) speakers, you should use 8 or 16 ohm speakers to prevent overload. This Receiver has two sets of A (main) Speaker terminals; choose only one set. If your speakers have RCA plug inputs, use speaker cables with RCA plugs and use the RCA jack speaker outputs.

Note: When using the screw terminals, be sure to observe proper polarity. Most speaker wire is clearly marked with a raised line along one conductor, or has one wire a different color from the other. Connect the (+) Receiver output to the (+) or “marked” (color dot or other marking) Speaker terminal.

Do not allow stray strands of wire to touch adjacent terminals or the metal chassis.

Tape Deck(s)
Connect your Recorder’s inputs (usually labeled AUX or LINE IN) to the Receiver’s TAPE OUT 1 jacks. The Receiver’s TAPE IN 1 jacks should be connected to your Recorder’s PRE AMP OUTPUT or LINE OUTPUT jacks. You can connect a second Recorder’s inputs to the Receiver’s TAPE OUT 2 jacks and the Recorder’s output to the Receiver’s TAPE IN 2 jacks.

Before plugging in the STA-2250:
- Double-check all connections — especially the Speaker connections — to assure that they are all secure and that there are no shorts.
- Set the Volume control to minimum counterclockwise position.
- All push buttons should be out.

Now, connect the power cord to a source of AC power and you are ready for fantastic sound!

AUXiliary Equipment
The auxiliary inputs may be used with any high level source — a second tuner, TV audio, ceramic or crystal phono, an additional tape player or recorder, short wave radio, etc.
Choosing The Rest Of Your System

SPEAKERS
No stereo system sounds better than its speakers, so choose the best you can afford for your "A" or main speakers. With a high quality Receiver like the STA-2250, you should carefully consider Radio Shack's Mach or Optimus series speakers. To appreciate your Receiver's superior performance, we recommend one of the Nova or Minimus speakers as a minimum investment.

Of course there is a wide variety of speakers intended primarily for remote (B) use. Some are weather-proofed for outdoor installations and others offer the convenience of a built-in volume control. Naturally, if you plan to use your B speakers for critical listening, you should consider using the same quality of speakers for both your A (main) and B (remote) installations.

Your nearest Radio Shack has a complete selection of speakers for every application and budget.

TURNTABLE
For convenience, many people prefer a record changer (often called an automatic turntable) to a manual turntable.

A changer will play an entire stack of records and return the tonearm to its rest at the end of the last record.

For the best sound, your turntable should be equipped with a magnetic cartridge. Cartridges equipped with conical stylus (needles) are relatively inexpensive and have good quality sound. But a cartridge with an elliptical stylus follows the record groove more accurately, and so produces better sound.

Your Radio Shack store has a selection of changer systems which come with factory mounted bases and cartridges.

TAPE DECKS
Until recently, reel-to-reel tape decks were the only possible choice for those interested in true high-fidelity.

Recent technological advances have made 8-track and cassette recorders approach the sound quality of reel-to-reel machines.

Reel-to-reel decks are still a must for those who want to edit their own tapes and have marginally the best performance.

The best cassette decks, equipped with special tape bias settings and noise reduction circuitry, will outperform some reel-to-reel decks. They have the additional advantage of compactness and convenient pop-in loading. In addition, cassettes can be used in the car as well as at home.

8-track cartridges provide slightly less fidelity than cassettes, but have several advantages. An 8-track recorder plays prerecorded car tapes at home and can save you money by recording new tapes for your auto. In addition, an 8-track cartridge uses a continuous tape loop which can provide hours of uninterrupted music. Many 8-track playback decks are less expensive than record changers and of course will let you use car tapes at home.

HEADPHONES
Any system can benefit from a good pair of stereo headphones. They provide convenient private listening and many people find the heightened stereo effect exciting.

Your STA-2250's front-panel headphone jack will accept any low impedance stereo headphones. When shopping, wear each pair of headphones long enough to be sure they will be comfortable.

ANTENNAS
Under many conditions your Receiver's AM built-in antenna and FM Dipole antenna should provide adequate AM and FM reception.

However, for optimum reception, an outdoor antenna is still the best bet. See HINTS FOR BETTER SOUND on Page 14.
Operating Your STA-2250

Power On
Press POWER button to turn the Receiver on.

Note: After about 5 seconds, you'll hear a faint click as the protection relay closes. This pause before the output stages are activated protects your speakers and the Receiver's internal circuitry from high-level switching pops and voltage peaks during the power-on cycle. The faint click is your reminder of this vital safety feature. If at any time during operation the protection relays are activated (by a short across the speaker terminals for example), the Receiver will become silent. If this happens, check for improper connections or overheating.

Speakers/Headphones
Press the A and B (or A or B) SPEAKERS button. For private listening, release the SPEAKERS buttons by pressing again and plug a pair of low impedance headphones into PHONES.

Select the Source
Set the Selector to the desired position (AM, FM, FM MUTE, PHONO or AUX).

AM/FM Reception
Press POWER on. Set the Selector switch to AM, FM, or FM MUTE. When POWER is first turned on, the digital display will show the lowest frequency in the band (530 kHz for AM or 88.1 MHz for FM).

Auto Tuning
Press the SEARCH button and press Auto Search — either UP or DOWN. The Receiver will automatically stop at the next station. To continue or make another choice, press Auto Search again.

When you reach the highest frequency (1610 kHz AM or 107.9 MHz FM) in UP Auto Search, it will automatically stop. If you want to continue the Auto Search, press DOWN. The Receiver will continue to scan the band till it comes to the lowest frequency, then stop.

The Auto Tune will only stop at very strong signals on AM and FM. If you want to tune weaker stations, you will have to tune manually. Set the SEARCH button to Manual (out) position for manual tuning.

You may find weaker FM stations noisy. To improve quality, press MPX FILTER. If the station is still noisy, press MONO button.

Manual Tuning
Set the SEARCH button to Manual (out) position. Press UP or DOWN switch until you find the desired station. When you reach the highest frequency in UP Manual SEARCH, it will automatically stop. Press DOWN Manual SEARCH to tune back down the band. The DOWN Manual SEARCH will stop when the lowest frequency is reached.

How to Set the Memory
A total of 16 frequencies can be set into the STA-2250's Memory (eight for FM, eight for AM).

1. Set the Selector to AM or FM.
2. Tune to desired station (either Automatically or Manually).
3. Press the MEMORY SET button. The MEMORY SET indicator LED will be lit.
4. Press MEMORY 1, the MEMORY SET LED will turn off.
5. Repeat steps 2 — 4 until all the stations you want are set into the Memory.
6. Select the other band (AM or FM) and repeat as above for eight more frequencies.

Want to change the stations you've stored in Memory?
Simply add new stations as in steps 1 — 6 and old ones are automatically erased.

Note: You may want to put a small stick-on label above each MEMORY button to show which stations are set in Memory.

Memory Receive
To tune a frequency programmed into Memory, just press the desired Memory button, 1 through 8. If Selector is set to AM you'll receive the AM frequency, if in the FM or FM MUTE mode you'll receive the FM frequency.

Note: When Receiver is unplugged, a built-in Time Constant Circuit will keep the pre-set frequencies in Memory for approximately one hour. If the Receiver is unplugged for more than an hour, you'll have to re-enter stations into Memory.

Listening to Records
Set the Selector to PHONO and adjust the VOLUME, BALANCE, BASS, MIDRANGE and TREBLE controls.

Note: For the best fidelity and longest record life, make sure the cartridge on your turntable is operating within the recommended tracking force. Too light or too heavy tracking forces cause distortion and record wear.

REALISTIC
Auxiliary Sources
You can also connect high-level sources to the STA-2250 for even more versatility and enjoyment. Typical auxiliary equipment would be: tape player, ceramic or crystal-cartridge turntable, TV audio, a UHF or VHF tuner, ham radio, etc. Connect such sources to the rear panel AUX inputs and set Selector switch to AUX.

Volume and Balance
Rotate the outer portion of this dual control (away from panel) clockwise to increase volume to the desired level. If necessary, rotate inner ring (closer to panel) to achieve the correct Left-Right balance according to listening position, program material, etc.

Tone Control Settings
The STA-2250 gives you unusually precise control over the frequency response. You're probably familiar with the use of bass and treble controls, but the MIDRANGE control may seem a little new to you. MIDRANGE (also called "presence") affects frequencies in the human voice range. When you're listening to a vocalist, try varying the MIDRANGE setting. You'll see that an increase in midrange response moves the vocalist "up front", while a decrease moves the singer into the back-ground of the ensemble.

To increase bass, midrange or treble response, rotate the appropriate control clockwise; to decrease, rotate control counterclockwise. In center position, controls are removed from the circuit for a flat, unadjusted response.

For Low Listening Levels
Press LOUDNESS. It boosts low and high frequencies to overcome the human ear's lack of sensitivity at low listening levels.

Tape Functions
Your STA-2250 has two sets of Tape Input and Output jacks on the rear, plus DUBBING and MONITOR switches on the front panel. This makes it easy to copy tapes, make dual recordings or record any program source without changing rear panel connections.

Recording
Set the Selector switch to the desired source — you can record any program source being played through your Receiver. Set TAPE DUBBING to SOURCE position. Adjust Volume, Balance and Tone controls for your preference — they will not affect the output to your Recorder. If you have a 3-head tape deck, you can set TAPE MONITOR switch to 1 (or 2) to hear the recording immediately after it passes the recording head.

When TAPE DUBBING and MONITOR switches are set to their SOURCE positions, the signal you are listening to (AM, FM, PHONO or AUX) will appear at both TAPE 1 and TAPE 2 OUT jacks. So, you can record via either or both jacks.

If you set TAPE MONITOR to other than SOURCE, it will interrupt the "source" signal and connect the Receiver's input to the TAPE IN jacks selected by the position on the TAPE MONITOR switch.
To Duplicate (Dub) Tapes:

Let's say you have Tape Deck "A" connected to TAPE 1 IN and OUT jacks. And you have Tape Deck "B" connected to TAPE 2 IN and OUT jacks.

Put Tape Deck "A" into Play function. Set DUBBING to 1 → 2 and Record with Tape Deck "B". If Tape Deck "B" is a 3-head machine, you can monitor its recording by setting TAPE MONITOR to 2.

You can also record onto Tape Deck "A", when Tape Deck "B" is in the Play mode. Just set DUBBING to 2 → 1. Then, to monitor the recording made on Tape Deck "A" (assuming "A" is a 3-head machine), set MONITOR to 1.

As you use and experiment with these jacks and front panel switches, you'll soon begin to appreciate the unusual flexibility and versatility of these inputs and outputs.

Playback

If you have a Tape Deck connected to one of the TAPE IN jacks, you can set TAPE MONITOR to the desired position, and — regardless of the position of the Selector switch — you will hear the tape being played.

Note: If you have set TAPE MONITOR to 1 or 2 without a signal source being connected to TAPE IN 1 or TAPE IN 2, the Receiver's sound will cease. TAPE MONITOR (1 or 2) interrupts the signal flow through the Receiver and activates TAPE IN 1 or TAPE IN 2 for the input source.

Built-In Protection Circuits

We've already noted it, but let's explain the different types of protection circuits you've got in your Receiver.

You may have noticed some stereo systems which produce loud "pops" in the speakers when power is turned "on", or functions are changed. With high-powered, ultra-clean amplifiers such as the STA-2250, these pops can blow speakers (or at least bother your ears).

But don't worry — it won't happen with your Receiver. We've built-in special relay protection circuitry to prevent such damage. The high-power amplifier output stages are kept off for a few seconds after the power is turned on. This gives the power supply circuitry and audio preamp stages a chance to stabilize — then the relay switches in the high-power amp stages. Of course, this means you don't hear sound for those few seconds — but you won't mind that, now that you know your speakers are protected.

We've also incorporated circuitry which eliminates electronic switching surges that result from Mute releasing and engaging (preventing loud blasts of audio when the mute circuitry switches).

In addition to the above, there is a provision for eliminating Selector switch clicks and pops. Some high-power amplifiers have to be turned down before changing input selector switching — not the STA-2250 (we've taken care of that for you, electronically).

A special note about a special noise protection circuit. If you use 4 ohm speakers, FM off-station "white" noise could damage the power amplifier at high power levels. We've built in a special circuit to counteract this.

If at any time your STA-2250 goes dead, check the obvious (blown fuse, crossed wires, lack of ventilation). The built-in protection circuitry has probably saved you a trip to the nearest repair station.
HINTS FOR BETTER SOUND

Positioning Your Speakers
Placement of speakers is a highly personal matter, depending largely on the arrangement of your listening room and the way you prefer to listen to music.
Where you put your speakers does make a difference in how your system will sound, so before setting on a final arrangement, try several alternatives.
Bass response is highly dependent on speaker location. For maximum bass, place the speakers in the corners of your room. Putting the speakers directly on the floor will make the bass even stronger. If the bass sounds boom and exaggerated, move the speakers away from the corners slightly, pull them out from the wall a little or raise them 6 to 8 inches 15 – 20 cm off the floor.

Antennas
To obtain the very best FM reception you should use an outside antenna. With an outside antenna your Receiver will be able to produce the very finest FM reception — even from some of those distant, weak stations.
If for some reason you cannot install an outside antenna, a set of VHF rabbit ears or those made specially for FM reception work well in suburban areas. Some feature electronic “tuning” and amplification circuits for better reception.
An ordinary rooftop VHF TV antenna provides excellent FM reception. An inexpensive “splitter” permits you to use the TV and FM at the same time with very little signal loss. In extremely weak reception areas, a special outdoor FM only antenna may be the only solution. Such antennas can receive stations up to 175 miles 280 km away over flat terrain.
Many new homes and apartments have built-in 75-ohm antenna lead-in systems. Your Receiver is designed to be used with either 300-ohm or 75-ohm type antenna systems. As illustrated in the antenna connection drawings at the right of page 8, the shield portion of the 75-ohm cable must be connected to the GND screw.
For AM, a long piece of wire strung outdoors between two insulators can greatly increase AM long-distance reception. Or, use Radio Shack’s 278-758 antenna kit.
Note: To protect your Receiver use an antenna static discharge unit (15-911) on any outdoor antenna.

Connecting an L-Pad
In some cases, you may want to vary the volume of the remote, or rear speakers separately. This can be done very simply and inexpensively with a stereo L-pad, such as Radio Shack Catalog No. 40-978.

Stereo
Stereo speakers should be 6 to 8 feet 1.8 – 2.4 m apart. Putting them too close together reduces the stereo effect, while placing them too far apart reduces bass response and creates a “hole in the middle”.
Also, most speakers have a tweeter dispersion angle of about 60°. Ideally your listening position should be in the overlap area so you may want to angle the speakers toward you for better stereo.
CARING FOR YOUR STA-2250

The STA-2250's real-wood veneer should be polished from time to time with lemon oil. Waxing produces a glossy finish but it tends to build up and produces dull coating. Treat the front panel with care — so you don’t scratch it. A window cleaning liquid works well (a small amount of a soft cloth).

Ventilation — can be important. We merely recommend that you don’t place the STA-2250 on a surface which would block air circulation — air must be able to circulate freely around the back, under and over the top of the case. Avoid placing the Receiver on a shag rug, etc. which would block such circulation.

Overload Protection
In addition to “pop” and “click” elimination (for speaker protection — as well as your ears), we have a few more protection circuits you’ll want to be aware of. If too much current flows in the output circuit (from excessive low impedance combinations of speakers that are less than 4 ohms, shorted speaker terminals, etc.) a protection circuit activates immediately. This overload protection can be one of two types — either to completely silence the Receiver, or to drop output considerably. If either condition occurs, you know these protection circuits have taken over. In such case, turn power off and check speaker wiring (be sure no short pieces of wire touch between adjacent speaker terminals and that your speakers cables are not shorted). Also, be sure you are not using 4 ohms speakers if you are using more than one pair.

Thermal Protection
Your Receiver has built-in thermal overload protection. This means it can not become abnormally hot and damage some portion of the circuitry. If internal temperatures do rise abnormally, the Receiver will automatically silence itself. If this happens, check to be sure you have not placed something over the ventilation holes — if you have, remove it. If you are using speakers with excessively low impedance, the amplifier circuit may be overdriven and thus producing excessive heat. This can be caused by using 4 ohm speakers on both Main (A) and Remote (B) speakers — if you use both pairs of speakers, be sure to use either 8 or 16 ohm types.

In any case, if the Receiver does turn itself off, set POWER off, check ventilation and then check to be sure your speakers are properly connected and that you are not using combination of 4 ohm speakers for both Main and Remote. This protective circuit is activated by temperature, thus it may take few minutes for everything to cool down adequately. After you’ve checked and are sure everything is OK, turn POWER “on”. If the Receiver does not come back on you may have to wait for a few more minutes for everything to cool adequately. Also, you might check the rear panel fuse (6 Amp); if it is blown, replace only with the same type and rating.

If You Have Problems
We hope you don’t: but if you do, here are some suggestions:

1. Check all your cable connections. Make sure all the leads and plugs are secure at both ends.
2. Try a different AC outlet if you don’t get any indication of power (and be sure you’ve got the line cord plugged in!).
3. Try interchanging cables and connections on the rear panel — sometimes this will give you a hint of where the problem lies — and may solve the problem for you.
4. If the LED display and indicator lights are on and Meter works — but you have no sound — make sure you didn’t leave TAPE MONITOR in 1 or 2 position. If that is not the case — perhaps the automatic overload protection circuit has activated. In such a case, press off POWER and check your speaker connections,

A. Make sure there is no short across the speaker screw terminals (stray strand of wire touching between terminals or to the metal chassis).
B. If you are using more than one pair of speakers, they must be 8 or 16 ohm type (two pairs of 4 ohm speakers can overload the amplifier circuit and cause the protection circuit to activate).
C. Make sure you’re not overdriving the amplifier with an excessive signal. (This might happen if you mistakenly connected a high-level source to the low-level phone inputs, for example.)
D. Let the Receiver cool down for a few minutes and then turn POWER back on.

5. If the LED display and indicator lights don’t come on, the fuse may be blown. Check it; replace only with a 6 Amp type.

In any case, if none of the above does the job and you still have a problem — help is as close as your local Radio Shack store. Bring your unit in and be ready to describe the symptoms — we will get you back into good stereo sound ASAP!
**THE INSIDE STORY OF A GREAT RECEIVER**

Plastic-encapsulated power transistor output devices — superior linearity, high/wide bandwidth, inaudible THD. High-reliability devices with no tendency toward thermal run-away.

Low level phono input circuits positioned directly at input jacks to minimize hum and RFI (Radio Frequency Interference) pickup. Differential circuitry provides ideal match for any moving magnet type cartridge (no loading).

Varicap diodes replace conventional tuning capacitor assembly — eliminates mechanical tuning problems (noise, dial strings, back-lash).

Dual gate MOSFET FM tuner — immunity from overload and spurious response problems, combined with lowest distortion.

Quadrature FM detector — lowest distortion combined with optimum stability.

1 protective relay circuit and one SCR (Silicon Controlled Rectifier) circuit to assure no damage to speaker or circuitry from overdrive, overload or shorts.

Tone control utilizes differential amplifier circuit for lowest noise & distortion with wide dynamic range.

OCL (Output Capacitor Less) Amplifier circuitry provides extremely wide frequency response.

Plastic-encapsulated output transistors are mounted on oversize anodized aluminium heat-sinks — assures operation in safe thermal region.

Separate power transformer and supply for microprocessor circuitry to totally isolate digital signal noise from signal and audio circuit.

Conservatively rated oversize power transformer — capable of delivering 6 dB power above clipping.

6,800uF electrolytic capacitors in each power supply for maximum reserve power, combined with high-speed recovery for superior high-frequency response.

Modular construction for ease of assembly and service; critical boards are plug-in type.

**Semiconductor complement**
- 5 Variable capacitor diodes
- 43 signal & power diodes
- 10 IC's including microprocessor & PLL
- 9 LED's
- 96 Transistors, including 1 dual-gate MOSFET and 2 signal FETs

**Microprocessor - controlled digital synthesis circuitry** — Quartz-locked for both AM and FM, state-of-the-art stability. PLL (Phase Lock Loop) circuitry assures precise tuning with no possibility of drift.

**Dual-differential circuit drives full pure complementary output**, incorporating feedback design which minimizes Total Harmonic Distortion with optimum stability. Typical THD figure is 0.008% at 50 watts (1kHz).