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NEC

D^{term}® Cordless DECT

DTL-RPT-2 REPEATER GUIDE

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Chapter 1 *Legal and Warranty Information*

SECTION 1 IMPORTANT SAFETY INSTRUCTIONS

When using the telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electrical shock, and injury to persons, including the following:

- ❑ Read and understand all instructions.
- ❑ Follow all warnings and instructions marked on the product.
- ❑ Do not use this product near water; for example, near a sink or in a wet area.
- ❑ Do not place this product on an unstable cart, stand, or table. The telephone can fall, causing serious damage to the unit.
- ❑ To protect the product from overheating, do not block or cover any slots or openings in the base unit. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless the proper ventilation is provided.
- ❑ This product should be operated only from the type of power source indicated on the marking label.
- ❑ Do not allow anything to rest on the power cord. Do not locate this product where the cord will be damaged by people walking on it.
- ❑ Do not overload wall outlets and extension cords, as this can result in the risk of fire or electrical shock.
- ❑ Never push objects of any kind into this product through the base unit slots, as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock. Never spill liquid of any kind on the product.
- ❑ To reduce the risk of electric shock, do not disassemble this product. Contact qualified service personnel when some service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the appliance is subsequently used.

Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

- ❑ When the power supply cord is damaged or frayed.
- ❑ If liquid has been spilled onto the product.
- ❑ If the product has been exposed to water or rain.
- ❑ If the product does not operate normally when following the operating instructions. Adjust only those controls that are covered by the operating instructions. Improper adjustment of other controls can result in damage, and will often require extensive work by a qualified technician to restore the product to normal operation.
- ❑ If the product has been dropped, or the case has been damaged.
- ❑ If the product exhibits a distinct change in performance.

SECTION 2 IMPORTANT ELECTRICAL CONSIDERATIONS

Do not attempt to unplug any appliance during an electrical storm.

Unplug all electrical appliances when you know an electrical storm is approaching. Lightning can pass through your household wiring and damage any device connected to it. This repeater is no exception.

Changes or modifications to this product not expressly approved by NEC Corporation of America, or operation of this product in any way other than as detailed by this manual, could void your authority to operate this product.

SECTION 3 FCC REGULATORY INFORMATION

3.1 Part 15 Compliance

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. Privacy of communications may not be ensured when using this phone.

- ❍ Certification numbers:
  - ✎ FCC ID: AMWUU228
  - ✎ Industry Canada IC: 513C-UU228

3.2 Privacy Information

Cordless telephones are radio devices. Communications between the handset and base of the cordless telephone are accomplished by means of radio waves which are broadcast over the open airways. Because of the inherent physical properties of radio waves, communication can be received by radio receiving devices other than your own telephone unit, consequently, any communications using the cordless telephone may not be private.

3.3 Radio Interference Information

Radio interference may occasionally cause buzzing and humming in your cordless handset, or clicking noises in the base unit. This interference is caused by external sources such as TV, fluorescent lighting, or electrical storm. Your unit is NOT DEFECTIVE. If these noises continue and are too distracting, check around your office to see what appliances may be causing the problem. In addition, we recommend that the base not be plugged into a circuit that also powers a major appliance because of the potential of interference. For best performance, ensure that the antenna on the base unit is fully extended.

In the unlikely event that you consistently hear other voices or distracting transmissions on your telephone, you may be receiving radio signals for another cordless telephone or other source of interference. If you cannot eliminate this type of interference, you need to change to a different channel.

Finally, it should be noted that some cordless telephones operate at frequencies that may cause interference to nearby TVs and VCRs. To minimize or prevent such interference, the base of the cordless telephone should not be placed near or on top of a TV or VCR. If interference is experienced, moving the cordless telephone farther away from the TV or VCR will often reduce or eliminate the interference.

Radio interference causes interruptions in conversation. When this happens, your unit is not defective. When noise continues, move to a different location while you talk. (You might even need to move the base unit.) When the situation persists, contact National Technical Assistance Center.

SECTION 4 I.C. NOTICE

4.1 Terminal Equipment

NOTICE: This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

4.2 Radio Equipment

The term “IC:” before the radio certification number only signifies that Industry Canada technical specifications were met. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. “Privacy of communications may not be ensured when using this telephone.”

Chapter 2 *Getting to Know Your Repeater*

SECTION 1 FEATURES

- ❑ Automatic registration to the base
- ❑ Up to six repeaters per base station
- ❑ Weather resistant design
- ❑ Low power consumption

1.1 Specifications

The following specifications apply to the NEC *D*^{term} Cordless DECT DTL-RPT-2 Repeater.

AC Power Adapter:	Input: 100 ~240VAC 50 ~60Hz Output: 5 V DC, 500 mA
Unit weight	5 oz (142g)
Frequency Band:	1920MHz ~ 1930MHz
Transmit Power:	100mW
Receiver Sensitivity:	<-96 dBm at 10^{-3} BER
Operating Temperature	32^{o} to 122^{o} F (0 to + 50^{o}C)
Standards:	Designed in accordance with the Digital Enhanced Cordless Telecommunications (DECT) standard. Compliant with TBR6, TBR22 (Generic Access Profile, GAP), and ETS 300 700 - ETSI Wireless Relay Station Specification.
Weather Protection Rating	IP54 (weather resistant). Protected against dust and weather hazards such as rain and sleet; also protected against sprayed oil and noncorrosive coolants.

SECTION 2 CHECKING THE PACKAGE CONTENTS

You should have received the following items:

- ❑ repeater
- ❑ AC adapter
- ❑ Mounting screws and wall anchors

SECTION 3 HOW IT WORKS

The DTL-RPT-2 Repeater repeater lets you extend the coverage area of your *D*^{term} DECT Cordless telephone system in all directions, including up and down. If the repeaters are installed so their coverage area overlaps the coverage area of the base, the base can hand-off calls to the repeaters as the user moves from one coverage area to another. When connected to the repeater, the mobile handset operates the exact same way as it does when connected to the base, and the hand-off from the base to the repeater can be completely invisible to the end user, even during an active call.

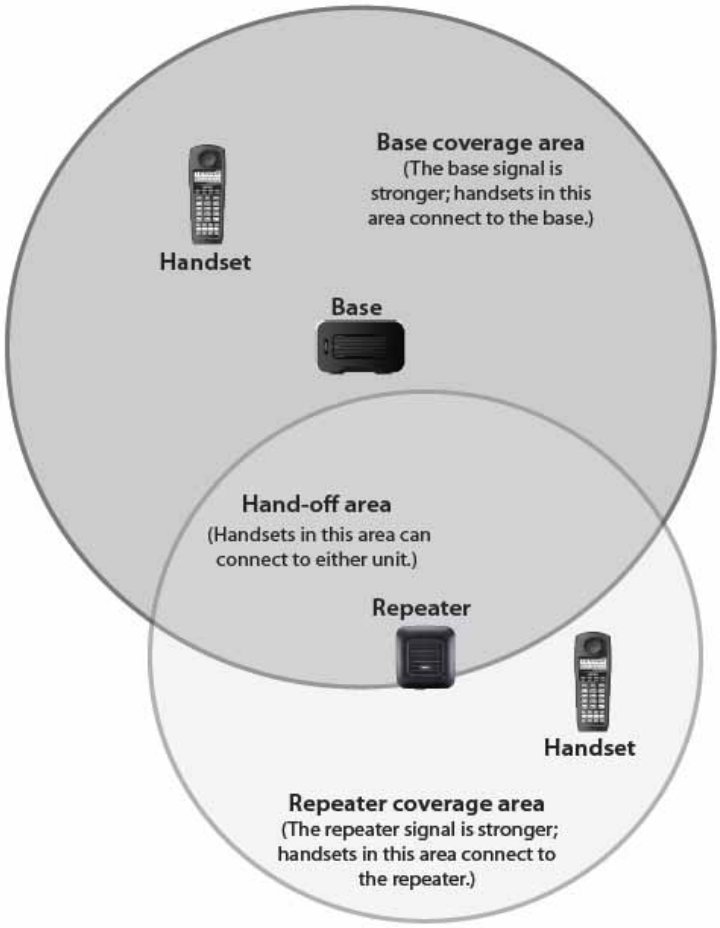

Figure 2-1 Single Repeater Attached to Base

Configurations

Each base supports up to six repeaters, so you can extend coverage in all directions, including through floors and ceilings.

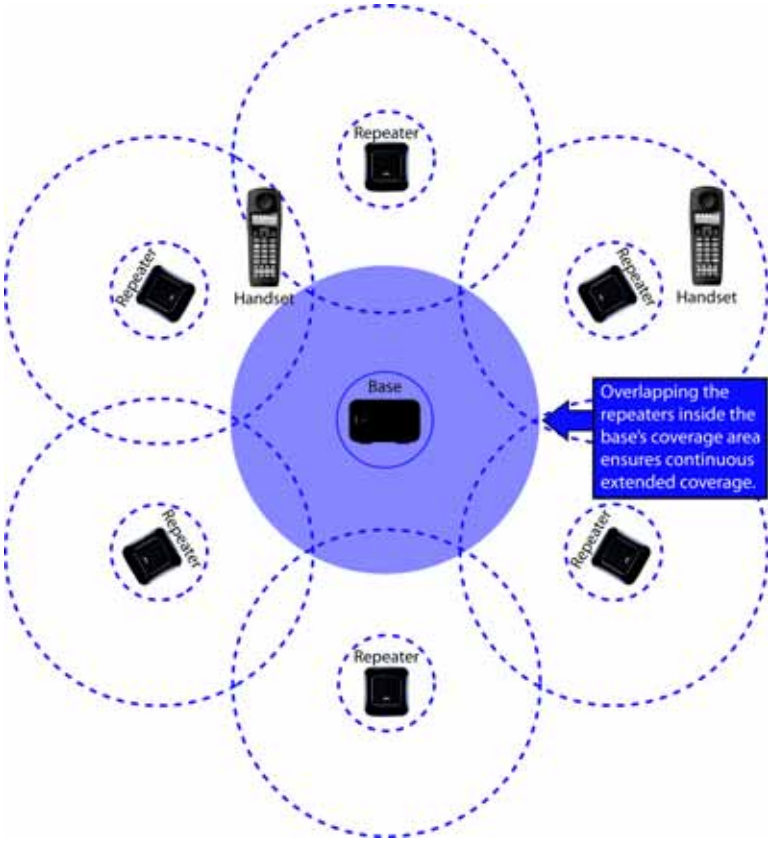

Figure 2-2 Six Repeaters Attached to Base

In addition, the DTL-RPT-2 Repeater supports a sequential or "daisy chain" layout to extend coverage in a single direction. Up to three repeaters can be installed in sequence.

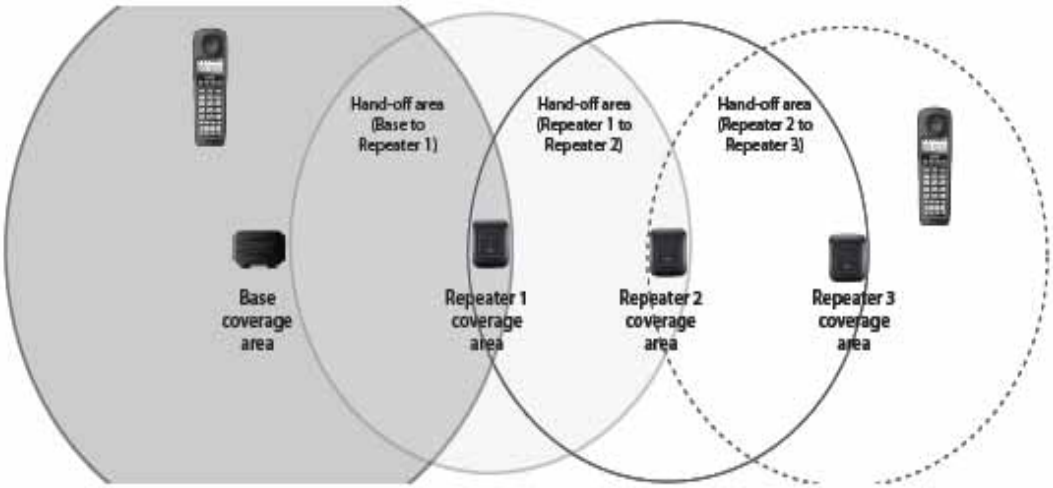

Figure 2-3 Daisy-Chain Layout

When a repeater powers on, it searches for signals from the base and any other repeaters registered to the same base. The repeater will automatically connect to the strongest available signal. You can combine "star" and "daisy chain" layouts to create a wide variety of coverage configurations, as long as you have no more than six repeaters per base unit.

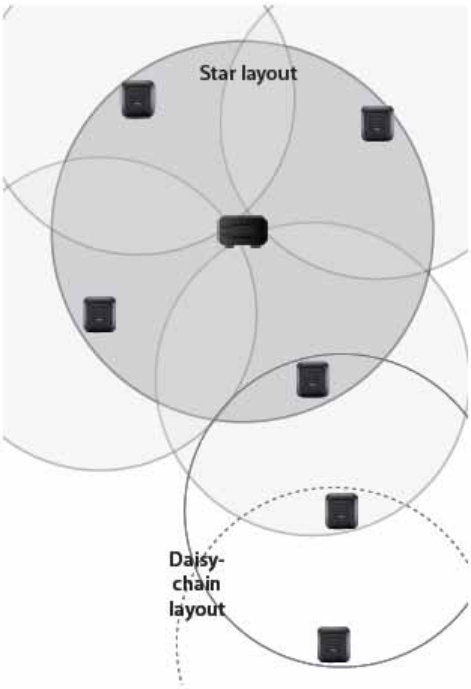

Figure 2-4 Combo Star and Daisy-Chain Layout

SECTION 4 SETTING UP YOUR REPEATER

Setting up the repeater involves four basic steps:

1. Install the AC adapter on the repeater unit.
2. Register the repeater to the base.
3. Position the repeater at the proper installation site.
4. Install the repeater in its final location.

✎ *Use ONLY the power adapter that came with your repeater. A different power adapter may cause an electrical hazard or damage the repeater.*

✎ *You can register up to six repeaters to a base. Repeat these steps as needed.*

These procedures refer to items on the back of the DTL-RPT-2 Repeater:

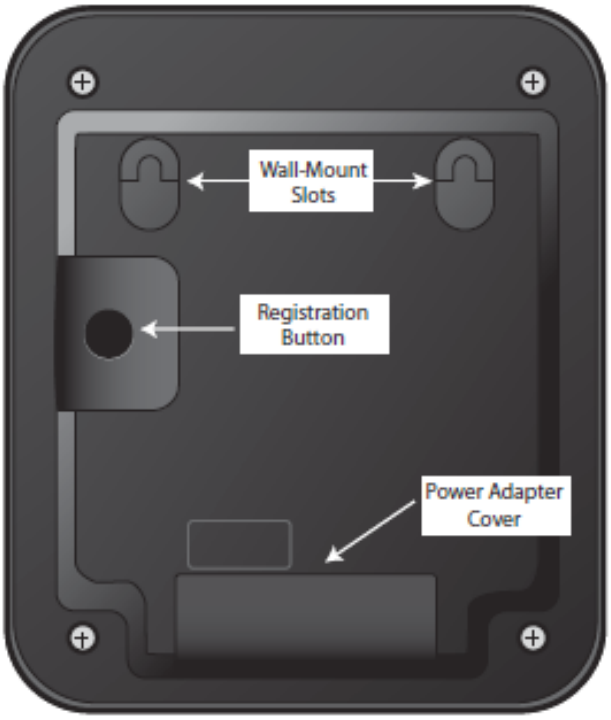

Figure 2-5 Back View of the DTL-RPT-2 Repeater

During registration, the LED on the front of the repeater will blink. The table explains what the LED blink patterns indicate.

Table 2-1 Repeater LED Patterns

State	Meaning
Steady On	The repeater is registered to a base and has a good signal from that base (or another repeater registered to that base).
Slow blink (one blink per second)	Standby mode. The repeater is not registered or cannot be connected to the registered base.
Flicker (2 rapid blinks per second)	The repeater is in registration mode (it is looking for a base to register to).

SECTION 5 INSTALLING THE AC ADAPTER

1. Using both thumbs, press down on the raised ridges of the adapter cover on the repeater until you hear a click.

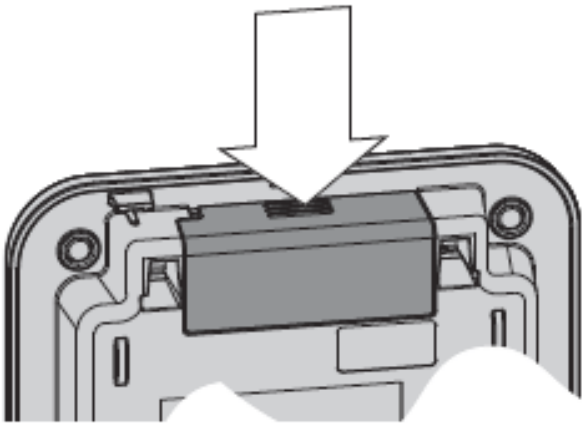

Figure 2-6 Removing the Adapter Cover

2. Being careful not to angle the cover, gently pull to remove it.

3. Insert the AC adapter connector into the yellow adapter opening. Thread the cord according to the illustration.

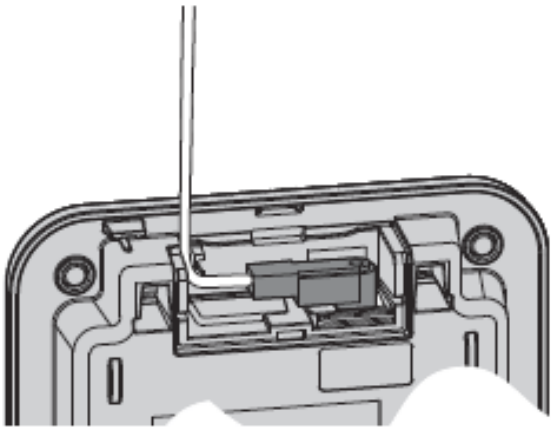

Figure 2-7 Threading the AC Adapter Cord

4. Carefully replace the cover, and press until you hear it click. Do not angle it as you replace it.

5. Use the AC adapter to connect the repeater to a standard 120 V AC outlet. (Do not use an outlet controlled by a wall switch!) The LED on the repeater flashes briefly, then remains on and steady.

SECTION 6 ACTIVATE REGISTRATION MODE ON BASE

You need to activate registration mode on your base before you can register your repeater to it. Refer to the Owner's Manual for your base unit for registration instructions.

✎ *You only have to activate registration on the base once, regardless of how many repeaters you want to register (up to 6).*

6.1 Register Repeater to Base

You can register up to six repeaters to each base. Repeat these steps as needed for each repeater. The repeater seeks out the base with strongest DECT/GAP signal and automatically registers to that base. Make sure no other bases in range are in registration mode. If more than one base is in registration mode at the same time, you cannot control which base the repeaters register to.

Before you start the registration process, be sure you have:

- A working base
- A working handset registered to that base
- Any repeaters you want to register to that base (you must complete the registration process separately for each repeater).
- At least one of the AC adapters supplied with the repeaters. If you have multiple repeaters to register, you can power up one repeater, register it, power it off, and then use that AC adapter for the next repeater. The repeater remains registered to the base, even if power is disconnected.

✎ *Use ONLY the power adapter that came with the repeater. A different adapter may cause an electrical hazard, or damage the repeater.*

6.2 Registration

1. Press and hold the registration button on the base until the Power LED on the base begins to blink.
2. On the back of the repeater, press and hold the registration button until the repeater LED on the front settles into a slow blinking pattern. The repeater is now in registration mode.
3. Release the button on the repeater and wait for the LEDs on the repeater and base to stop blinking and remain steady on (this can take about 60 seconds).

Table 2-2 Trouble Table

If the LED...	Try...
Continues to flash	Registering the repeater again.
Does not turn on (no power to unit)	- Disconnect the repeater's AC adapter and wait about 10 seconds. Reconnect the adapter and try these procedures again. - Checking that only one repeater is in registration mode. Only one repeater can be registered at a time. - Plugging the adapter into a different outlet.

4. The repeater is now registered to this base and is ready to use. You can safely disconnect the power and move the repeater to the selected location.; the repeater will stay registered to the base even if you disconnect the AC adapter, or there is a power failure.

6.3 Changing Registration

To change the registration (register the repeater to a different base), just register the repeater to the new base. The repeater automatically erases the link to the old base when it registers to the new one.

SECTION 7 POSITIONING THE REPEATER(S)

To get the best operating conditions for the repeater, it is important to place it correctly. Here are a few tips for placing repeaters:

- ❑ Place the repeater as high as possible, but ***at least 6 feet off*** the ground.
- ❑ Make sure you have good reception from the base.
- ❑ Make sure the location is close to a standard 120 V AC power outlet. Never install electrical cords across a traffic area: they can create a trip hazard or become damaged and create a fire or electrical hazard.
- ❑ Allow ***at least 35 feet*** between repeaters (if you are installing repeaters across multiple floors, remember to allow 35 feet ***vertically***, also).
- ❑ Avoid sources of electrical interference, such as hi-fi systems, office equipment or microwave ovens.
- ❑ Avoid heat sources and direct sunlight.
- ❑ Avoid things that can interfere with radio signals, such as metal doors, thick walls, niches and cupboards.

7.1 Map the Base's Coverage Area

To find the best location for the repeater, you need to determine the base coverage area:

1. Stand near the base and make a call on the handset that is registered to that base.
2. Continue the call and carry the handset away from the base. Make sure you travel at least 35 feet (about 10 meters) away from the base.
3. Make a note where you begin hearing noise on the line (the signal is getting weaker). The best location for the repeater is as far from the base as possible while still maintaining a good signal, or just inside the location where the noise became noticeable.

   ✎ Make sure the repeater is at least 35 feet away from any bases or any other repeaters (no matter which base they are registered to).

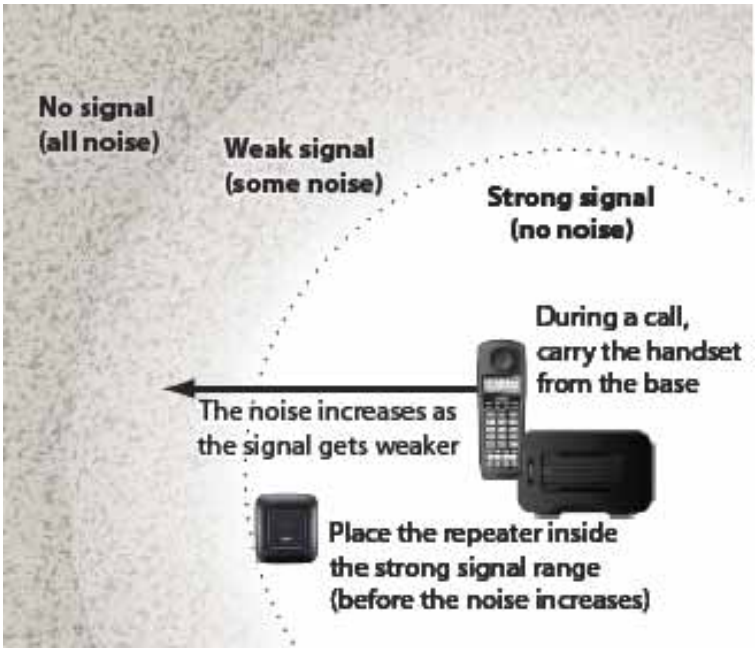

Figure 2-8 Mapping the Base's Coverage Area

7.2 Test the Location

To test the location, plug the AC adapter into the repeater, then hold the repeater in the place where you plan to mount it. The LED should remain on and steady, indicating that the repeater has a good signal from the base.

If the LED flashes, the repeater is not getting a good signal. The repeater may be too far away from the base, there may be interference from electronic devices, or the signal might be blocked by thick walls or metal objects. Try moving the repeater to another location.

7.3 Daisy-chaining Repeaters

To install repeaters in a daisy chain layout, you need to find the coverage area of each repeater.

1. Stand near Repeater 1 and make a call on the handset.

2. Continue the call and carry the handset away from Repeater 1, just as you did to determine the coverage area for the base.

3. Make a note where you begin to hear noise on the line (the signal is getting weaker). The best location for Repeater 2 is as far from Repeater 1 as possible while still maintaining a good signal.

4. Repeat the process with Repeater 3, if necessary.

7.4 Multiple Repeater Systems

You can register up to six repeaters to one base as long as the repeaters are a minimum of 35 feet apart. Remember the signal can cross through walls and floors. Figure 2-9 Incorrect Installation illustrates repeaters that have been incorrectly installed.

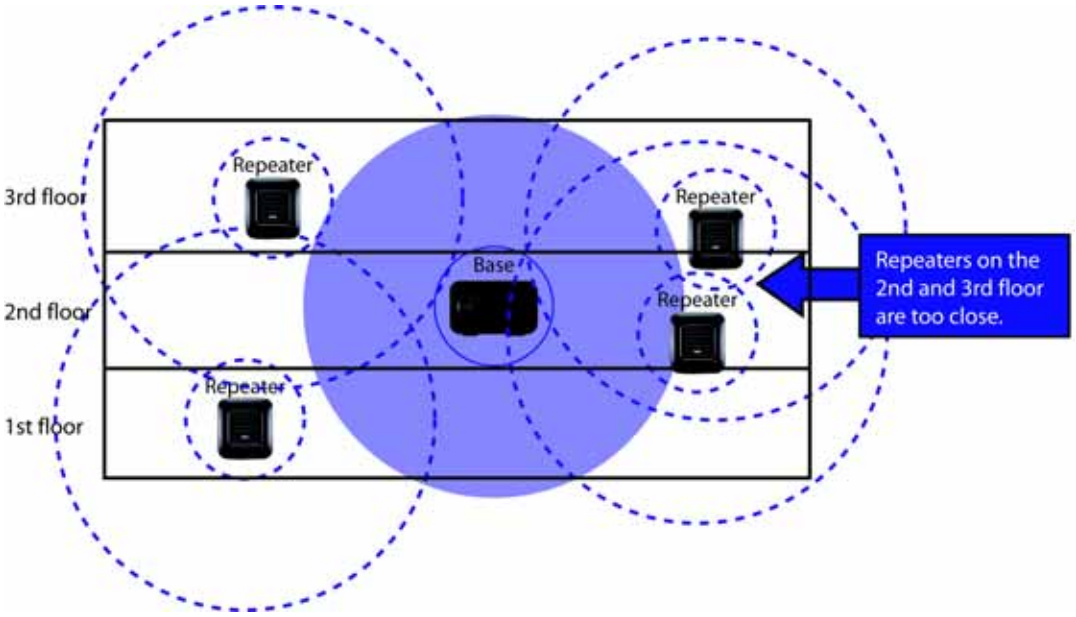

Figure 2-9 Incorrect Installation

Figure 2-10 Correct Repeater Installation illustrates repeaters that have been correctly installed.

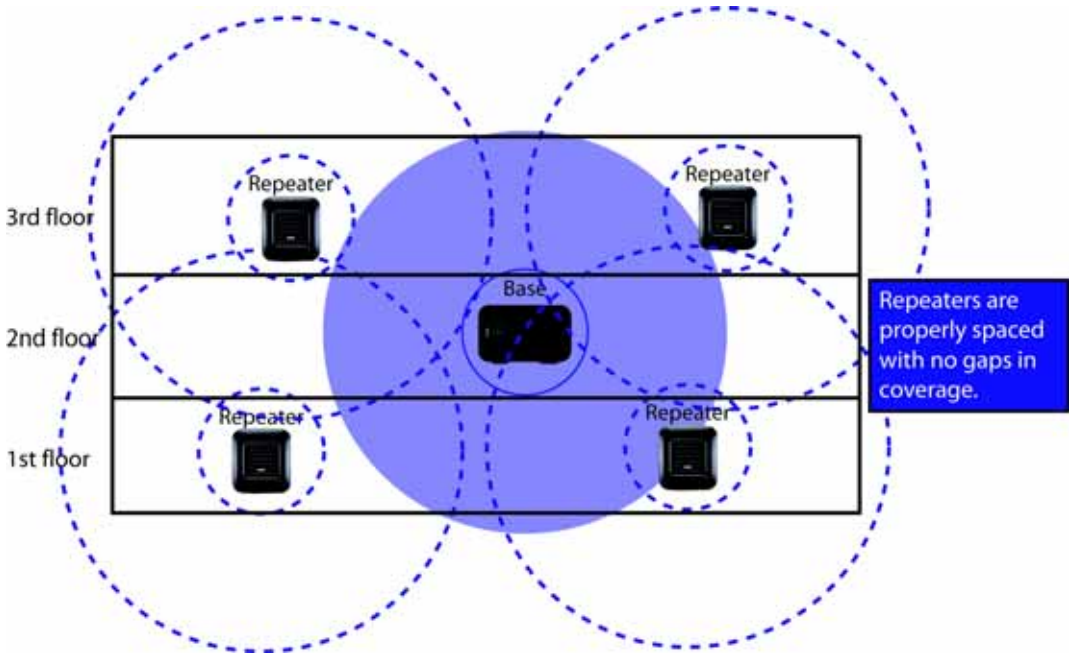

Figure 2-10 Correct Repeater Installation

SECTION 8 INSTALLING THE REPEATER

Be sure the wall material can hold the weight of the repeater. Never install a repeater in damaged or decaying wall material.

1. Hold the repeater in its final location, and mark the location of one of the two wall slots along the top of the repeater.
2. From that mark, measure down approximately 1-1/2 inches (about 38mm), and mark the screw location.
3. Measure over 2-3/8th inches (about 60mm) and mark the second screw location.
4. At the screw location, use a 3/16ths drill bit to make a pilot hole approximately one inch deep.
5. Place the wall anchor into the pilot hole and tap it gently with a hammer until the anchor is flush with the wall.

6. Insert the mounting screw into the anchor, leaving approximately 1/4 inch space between the screw head and the wall.
7. Repeat steps 4~6 for the second mounting screw.
8. Place the repeater over the screw heads and slide it down into place.
9. Connect the repeater to the 120 V AC power outlet.

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Chapter 3 *Troubleshooting and Maintenance*

SECTION 1 TROUBLESHOOTING CHART

The following chart provides common problems and possible solutions.

Problem	Try
There is a lot of static when calls hand-off to the repeater. *and/or* The LED on the repeater won't stop flashing.	Moving the repeater closer to the base. Checking for interference from electronic devices. Making sure the repeater is not too close to metal objects or thick walls.
Calls won't hand-off to the repeater.	Making sure the repeater is inside the base's good signal range. Making sure there is at least 35 feet between repeaters. Resetting the repeater and registering it to the base again.
I used to be able to connect to the base, but now I can't.	Making sure the repeater is powered on. Resetting the repeater and registering it to the base again.
I can’t register a repeater to the base, and the repeater is connected through another repeater.	Make sure there are not already six repeaters registered to the base. Make sure there are not already two repeaters connected to the first repeater. Re-register the problem repeater to the base. Re-register both repeaters to the base.
I can’t register a repeater to the base, and the repeater is connected directly to the base.	Make sure there are not already six repeaters registered to the base. Unplug the problem repeater for about 10 seconds, and then try again.

SECTION 2 MAINTENANCE

Unplug the repeater from the wall outlet before cleaning!

- ❑ Wipe the front of the repeater with ***a damp cloth*** or ***an antistatic wipe.***
- ❑ Do not apply liquid cleaners directly on the repeater.
- ❑ Never use aerosol cleaners or solvents.
- ❑ To avoid static discharge, never use a plain dry cloth.

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