NEC

# *D*$^{term}$® Cordless DECT

## REPEATER GUIDE
## DTL-RPT-1

**INT-2072 (DECT)**
**DOCUMENT REVISION 1**

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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 cabinet 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 Unified Solutions, Inc., 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.

### 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 CHECKING THE PACKAGE CONTENTS

You should have received the following items:

- ❑ DTL-RPT-1 DECT repeater
- ❑ AC adapter
- ❑ Mounting screw and wall anchor

## SECTION 2 HOW IT WORKS

The DTL-RPT-1 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.

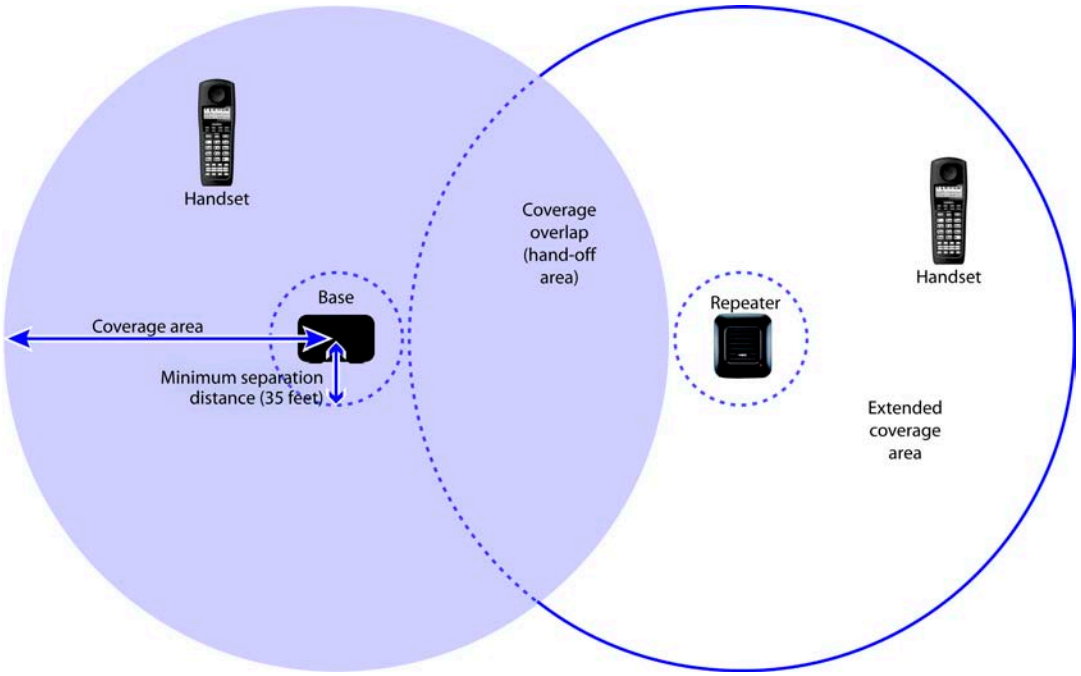


**Figure 2-1 Single Repeater Attached to Base**

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

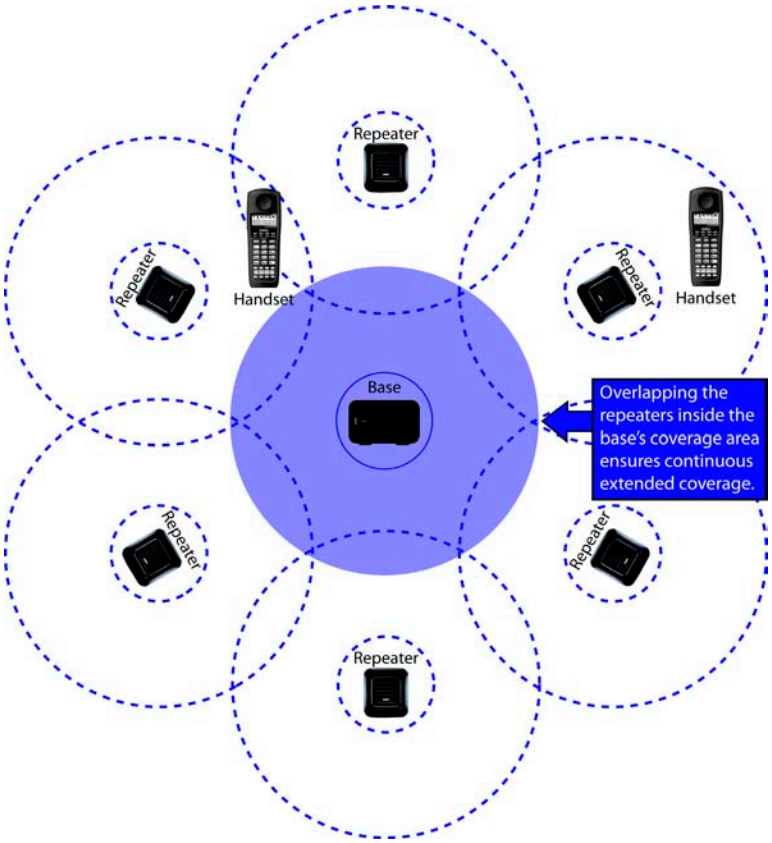


**Figure 2-2 Six Repeaters Attached to Base**

In addition, the DTL-RPT-1 supports a sequential or "daisy chain" layout to extend coverage in a single direction. Up to three repeaters can be installed in sequence.

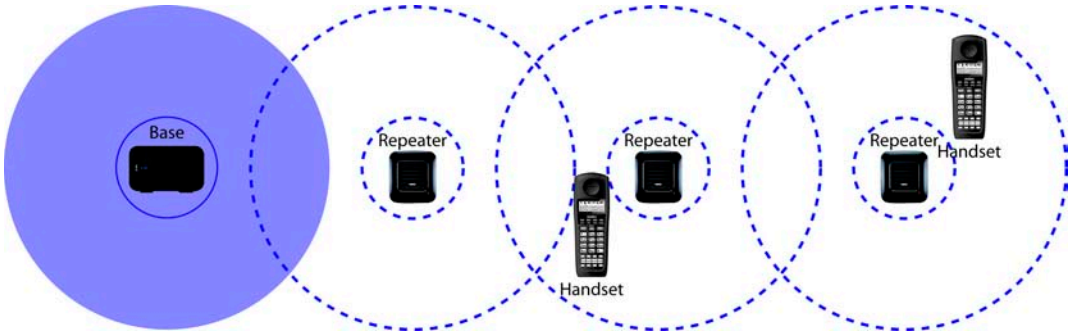


**Figure 2-3 Daisy-Chain Layout**

## SECTION 3 FEATURES

- ❑ Automatic registration to the base
- ❑ Up to six repeaters per base station
- ❑ Up to three repeaters in a sequential or daisy-chain layout
- ❑ Two internal antennas to support two simultaneous calls
- ❑ Repeater connection verification tone
- ❑ Low power consumption

### 3.1 Specifications

The following specifications apply to the NEC *D*$^{term}$ Cordless DECT repeater.

| | |
|---|---|
| AC Power Adapter: | Input: 100 -240VAC 50 -60Hz (RJ-11)<br>Output: 5 V dc , 500 mA |
| Frequency Band: | 1920MHz - 1930MHz |
| Transmit Power: | 100mW |
| Receiver Sensitivity: | <-91 dBm at $10^{-3}$ BER |
| Standards: | Designed in accordance with the Digital Enhanced Cordless Telecommunications (DECT) standard<br>Compliant with TBR6, TBR22 (Generic Access Profile, GAP), and ETS 300 700 - ETSI Wireless Relay Station Specification |

## SECTION 4 SETTING UP YOUR REPEATER

Before installing the repeater, you need to activate the repeater mode on your base and then register the repeater to the base and any handsets. 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 this base (you must complete the registration process separately for each repeater)
- ❑ At least one of the AC adapters supplied with the repeaters

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

### 4.1 Automatic Registration

The repeater seeks out the base with strongest DECT/GAP signal and automatically registers to that base.

1. Make sure the repeater is powered off (i.e., the AC power adapter is not connected).
2. Set the base into registration mode. (Consult the owner's manual that came with your base station for more information).
3. Use the AC adapter to connect the repeater to a standard 120 V AC outlet. (Do not use a power outlet controlled by a wall switch.) The LED on the repeater flashes briefly, then remains on and steady.

   ✎ *If the LED continues to flash, try registering the repeater again.*

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.

### 4.2 Registration for a Daisy-Chain Layout

Registering the repeaters to operate in a daisy-chain or sequential layout requires network administrator access and configuration software. Contact your installer or refer to the DTL-RPT-1 Administrator's Guide (provided with the configuration software) for more information.

### 4.3 Registering to a Different Base

Once the repeater is registered, you need to reset it before you can change the registration to a different base. If you want to reset the repeater and clear its registration, follow the steps below:

1. Disconnect the power.
2. Reconnect the power for 1 to 5 seconds, and disconnect it again.
3. Reconnect the power for 25 to 35 seconds.
4. Disconnect the power, and perform the registration procedure with the new base.

# SECTION 5 INSTALLING THE REPEATER

## 5.1 Finding the Right Location

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.

## 5.2 Map the Base Coverage Area

To find the best location for the repeater, you need to determine the base coverage area. Stand near the base and make a call. Walk away from the base with the handset, and make a note where the signal becomes weaker. The optimum 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 signal became weaker.

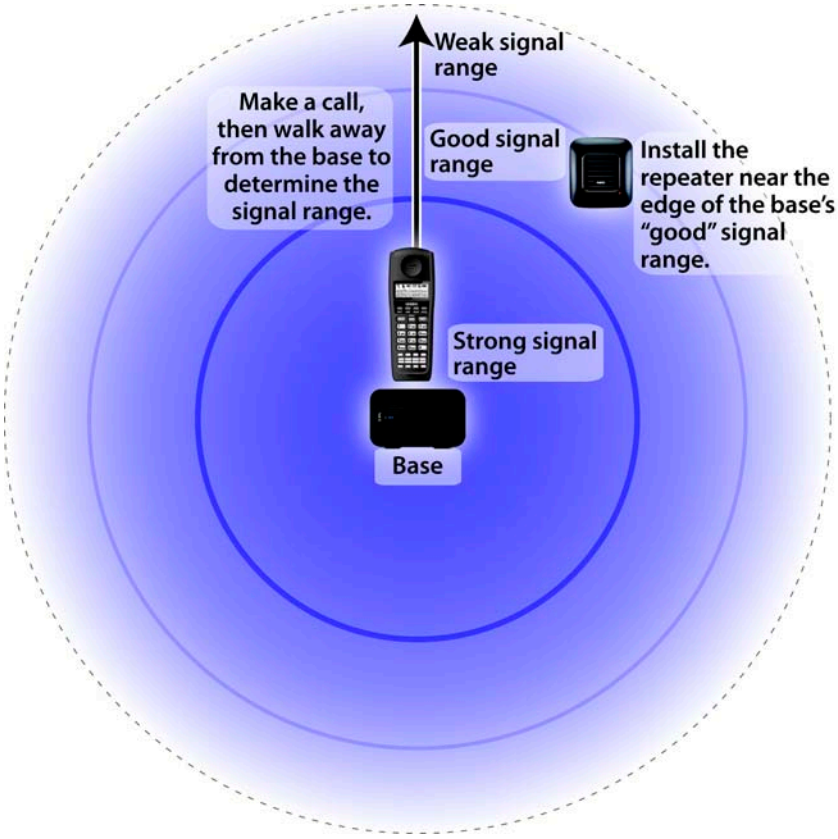


**Figure 2-4 Base Coverage Area**

## 5.3 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.

## 5.4 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 center of the top edge.
2. From the edge mark, measure down approximately 1-1/2 inches, and mark the screw location.
3. At the screw location, use a 3/16ths drill bit to make a pilot hole approximately one inch deep.
4. Place the wall anchor into the pilot hole and tap it gently with a hammer until the anchor is flush with the wall.
5. Insert the mounting screw into the anchor, leaving approximately 1/4 inch space between the screw head and the wall.
6. Put the wall mount slot on the back of the repeater over the screw head and slide the repeater down into place.

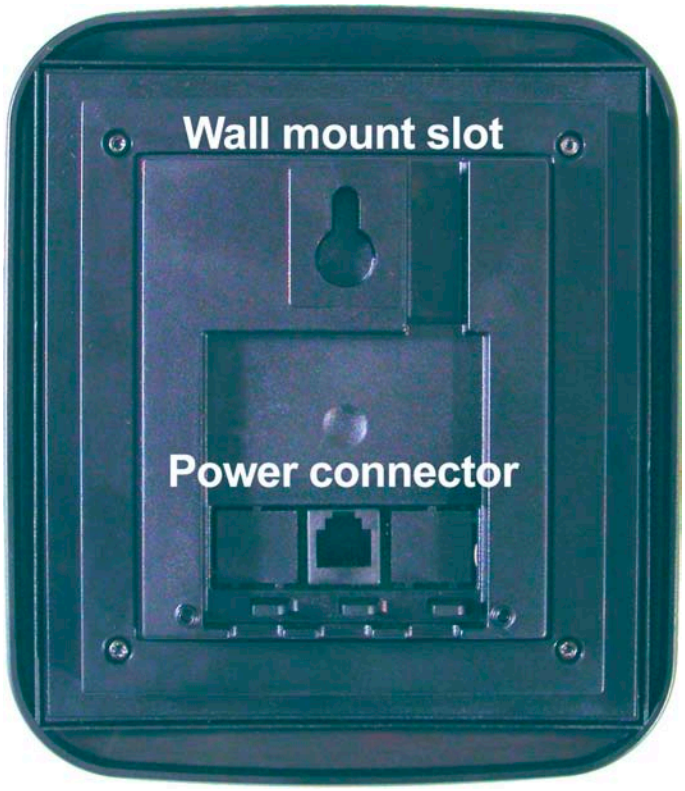


**Figure 2-5 Wall Mounting Repeater**

7. Connect the repeater to the 120 V AC power outlet.

## 5.5 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.

### 5.5.1 Incorrect Installation

Figure 2-6 Incorrect Installation illustrates repeaters that have been incorrectly installed.

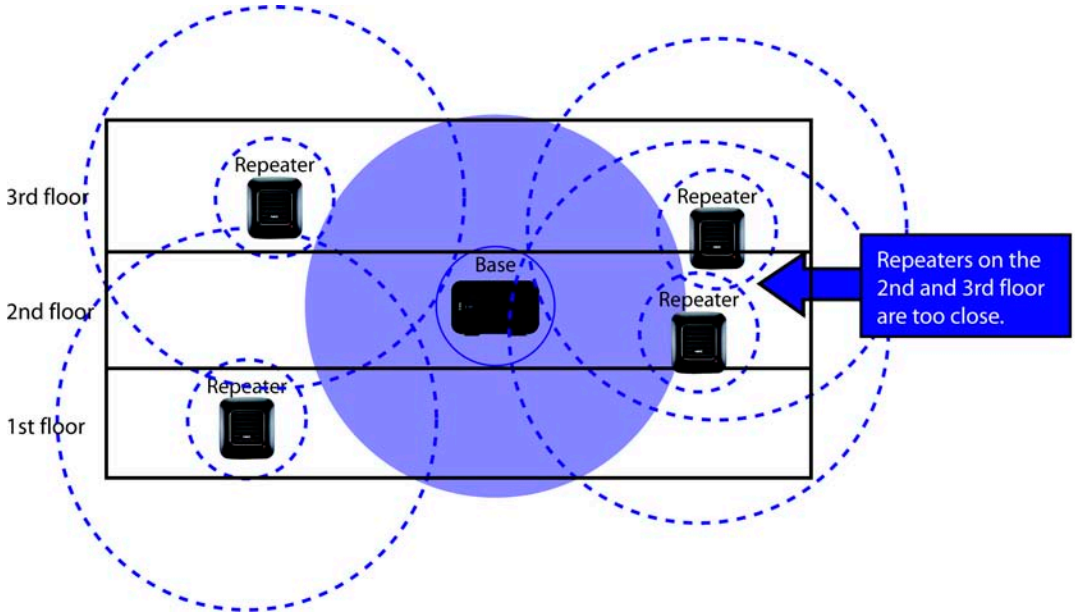


**Figure 2-6 Incorrect Installation**

### 5.5.2 Correct Installation

Figure 2-7 Base Coverage Area illustrates repeaters that have been correctly installed.

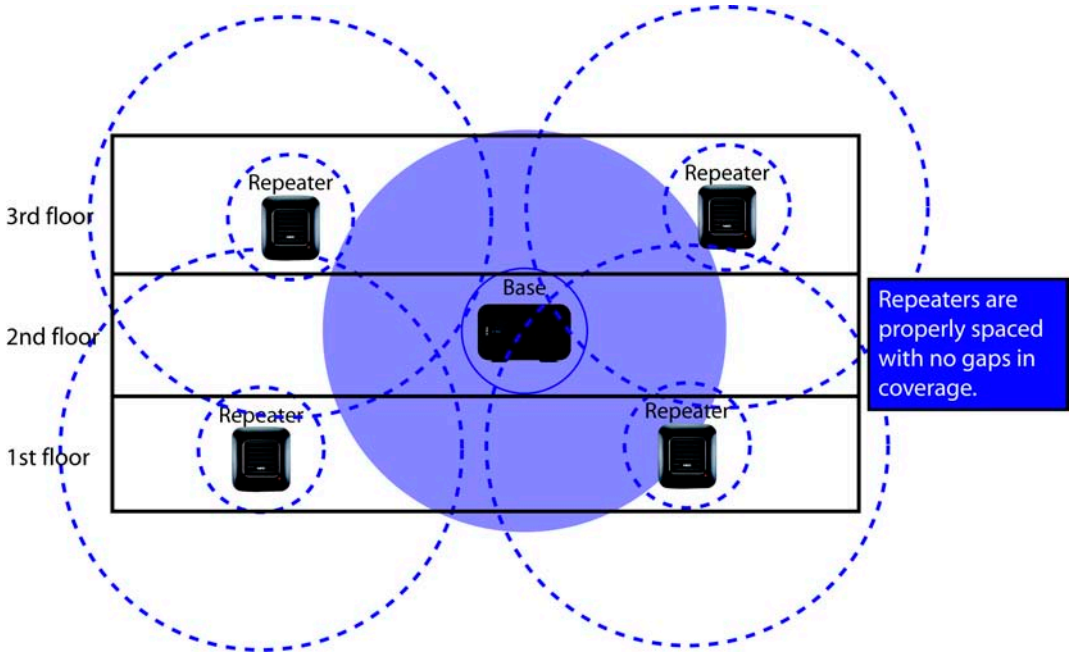


**Figure 2-7 Base Coverage Area**

### 5.5.3 Daisy-Chain Installation

You can combine "normal" and "daisy-chain" connections to create a wide variety of coverage configurations, as long as you have no more than six repeaters per base unit.

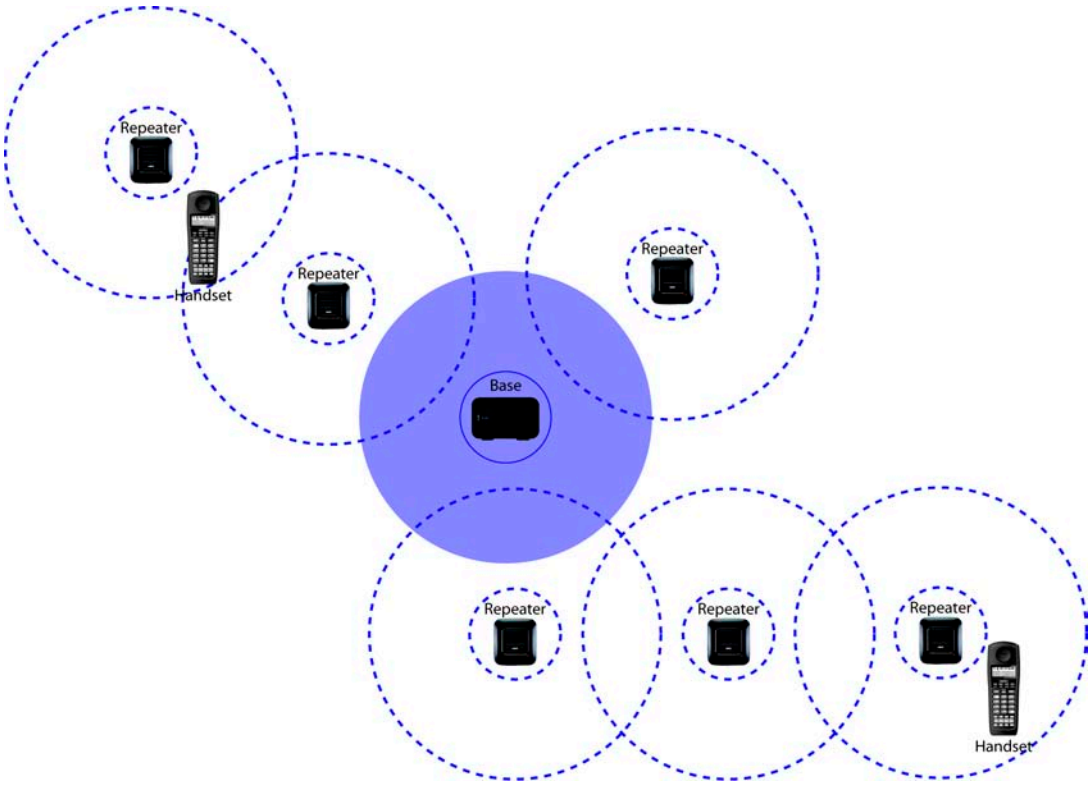


**Figure 2-8 Daisy-Chain Layout**

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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.<br>*and/or*<br>The LED on the repeater won't stop flashing. | Moving the repeater closer to the base.<br>Checking for interference from electronic devices.<br>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.<br>Making sure there is at least 35 feet between repeaters.<br>Resetting the repeater and registering it to the base again (refer to Chapter 2, 4.3 Registering to a Different Base on page 2-5.) |
| I used to be able to connect to the base, but now I can't. | Making sure the repeater is powered on.<br>Resetting the repeater and registering it to the base again (refer to Chapter 2, 4.3 Registering to a Different Base on page 2-5.) |
| When I'm on a call, the handset starts beeping. | Turning off the verification tone (refer to Section 2 Turning on the Verification Tone on page 3-2). |

## SECTION 2 TURNING ON THE VERIFICATION TONE

The verification tone is a useful tool for troubleshooting installation problems. If you activate the verification tone, a handset beeps whenever it moves into the extended coverage area of the repeater. The handset will beep every few seconds as long as it is connected to the repeater. This lets you use the verification tone to map the coverage area of each repeater.

1. Disconnect the power.
2. Reconnect the power for 1 to 5 seconds, and disconnect it again.
3. Reconnect the power and wait for the LED on front of the repeater to start a slow flash.
4. Disconnect the power, and immediately reconnect it. The verification tone is then activated.
5. To turn the verification tone off again, repeat the procedure.

## SECTION 3 MAINTENANCE

***Unplug the repeater from the wall outlet before cleaning!***

- ❑ Wipe the front of the repeater front 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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## REPEATER GUIDE

## DTL-RPT-1

**NEC Unified Solutions, Inc.**

**Document Revision 1**