

**FCC Part 24 Transmitter Certification**  
**Test Report**

**FCC ID: SO4YX500-PCS**

**FCC Rule Part: CFR 47 Part 24 Subpart E**

**ACS Report Number: 04-0364-24E**

Manufacturer: Wireless Extenders  
Equipment Type: PCS Band Bi-Directional Booster  
Model: YX500-PCS

**Manual**

# **Wireless Extenders**

## **YX500-PCS Installation Guide**

---

## Copyright Notice

This manual is copyrighted. All rights reserved. This manual, whole or in part, may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form for distribution. This manual, whole or in part, may not be modified without prior consent, in writing, from Wireless Extenders.

Copyright © 2004 by Wireless Extenders, 11450 Technology Circle, Duluth, GA 30097, U.S.A.

---

## Trademarks

---

## FCC Information

FCC ID: SO4YX500-PCS

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in the residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or a professional installer for help.

---

## Industry Canada Regulations

This Class [\*] digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. 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.

Cet appareillage numérique de la classe [\*] répond à toutes les exigences de l'interférence canadienne causant des règlements d'équipement. L'opération est sujette aux deux conditions suivantes: (1) ce dispositif peut ne pas causer l'interférence nocive, et (2) ce dispositif doit accepter n'importe quelle interférence reçue, y compris l'interférence qui peut causer l'opération peu désirée.

---

## Repairs and Replacements

Repair and Replacement Requests during Limited Warranty Period

During the Limited Warranty Period, Wireless Extenders will repair or replace (at Wireless Extenders discretion), without charge to the purchaser, any defective system components, provided that the system is returned promptly upon discovery of the defect while the product is still under warranty. To obtain service, the system must be: [{What is Wireless Extender's return and repair policy?}](#)

# Table of Contents

---

<b><i>YX500-PCS Package Contents</i></b> .....	<b>1</b>
<b><i>YX500-PCS Product Overview</i></b> .....	<b>1</b>
Overview .....	1
Why Cellular Signals Can be Weak .....	2
<b><i>Safety and Product Warranty Information</i></b> .....	<b>3</b>
Safety Guidelines.....	3
Limited Liability .....	4
Repair and Replacement Requests .....	4
<b><i>Preparing to Install the YX500-PCS</i></b> .....	<b>6</b>
Check the Signal Strength .....	6
Determine the Needed Coverage Area.....	6
Location of Attic Antenna and Base Unit .....	6
Power Requirements .....	7
Installation Tools .....	7
<b><i>Installing the YX500-PCS</i></b> .....	<b>7</b>
Installing the Signal Antenna .....	7
Running the Coaxial Cable .....	8
Installing the Base Unit.....	9
<b><i>Troubleshooting</i></b> .....	<b>12</b>
Base Unit LED Operation.....	12
<b><i>Technical Specifications</i></b> .....	<b>14</b>
<b><i>Antenna and Base Unit Accessory Options</i></b> .....	<b>14</b>

## YX500-PCS Package Contents

---

Before you begin installing the YX500-PCS, make sure all of the following parts came with your kit:

Item	Quantity	Part#	Description
1	1	DMAN-0001	YX500-PCS Installation Guide
2	1	APRD-0001	YX500-PCS Base Unit
3	1	CANT-0002	YX500-PCS Base Unit Antenna
4	1	CANT-0001	YX500-PCS Signal Antenna
5	1	CCBL-0001	35' White RG6@ 3GHZ Coaxial Cable
6	1	CPSP-0001	YX500-PCS Base Unit Power Supply
8	2	CHDW-0001	Self-tapping 7/8" Philips Screw
9	2	CHDW-0002	Self-tapping #6 Sheet Rock Anchor

{insert photo showing labeled package contents}

## YX500-PCS Product Overview

---

### Overview

Thank you for selecting the Wireless Extenders YX500-PCS. With the YX500-PCS, you will now be able to use your cell phone virtually anywhere inside your home or office. Gone are the days when you have to find a specific spot or walk outside to get a strong enough signal. Like a skylight that brings sunlight into your home, the YX500-PCS brings strong cellular signals into your

home or office.

By following the simple instructions in this installation guide, you will soon be enjoying wireless where you want it.

---

**Why Cellular Signals Can be Weak**

There are several obstacles that can contribute to the poor reception you receive in your home or office:

**Proximity of the Cellular Tower to your Home/Office**

Unlike the sun, strong cellular signals do not fill the sky from every direction. While cell phone providers have tried to strategically install cellular towers to provide the best possible coverage, local ordinances and nature (e.g., lakes, rivers, mountains) can impose restrictions on where these towers can be placed.

**Obstructions Caused by Buildings and Land Masses**

Like the sun when it sits low in the sky during early morning and late afternoon, cellular signals can be completely blocked or deflected by buildings, the walls of the building you are in, clusters of trees, hills, etc.

**Figure 1 - Temporary Picture**

{illustration showing how cellular signals are blocked}

# Safety and Product Warranty Information

---

**Safety Guidelines** Please adhere to the following safety guidelines during the installation of the YX500-PCS.

## **Specific Absorption Rate**

In accordance with FCC requirements of human exposure to radiofrequency fields, the radiating element shall be installed such that a minimum separation distance of 8 inches (20cm) is maintained between the radiating element and the user and/or general population.

## **Ladders**

If a ladder is required to install the YX500-PCS, make sure that the ladder feet are on a flat surface and the ladder is securely fixed. It is highly recommended that you have someone assist you while you are on the ladder.

## **Power Tools**

You should always wear proper eye protection when working with power tools.

## **Outdoor Installation of the Signal Antenna**

If you decide to install the Signal Antenna outdoors, installation must be in accordance with Article 810 of the National Electric Code. Please consult a professional installer for more information.

## **Grounding the Signal Antenna**

Make sure that the Signal Antenna is properly grounded if you decide to install it outdoors. This will help protect your property and the Base Unit against lightning strikes during a lightning storm.

## **Securing Cable with a Drip Loop**

If you install the Signal Antenna outdoors, create a drip loop with the coaxial cable at the point where the cable enters the building. This can be done by twisting and securing the cable into a loop near the entry point. This will help prevent moisture from gathering at entry point and leaking into the building.

---

### **Limited Liability**

In no event shall Wireless Extenders be liable for any direct, indirect, special, punitive, incidental, exemplary or consequential damages, or any damages, whether in an action under contract, negligence, or any other theory, arising out of or in connection with the use, inability to use, or performance of the information, services, products, and materials available from this manual. These limitations shall apply notwithstanding any failure of essential purpose of any limited remedy. Because some jurisdictions do not allow limitations on how long an implied warranty last, or the exclusion or limitation of liability for consequential or incidental damages, the above limitations may not apply to you.

---

### **Repair and Replacement Requests**

During the Limited Warranty Period, Wireless Extenders will repair or replace (at Wireless Extenders discretion), without charge to the purchaser, any defective system components,



provided that the system is returned promptly upon discovery of the defect while the product is still under warranty. To obtain service, the system must be: **{What is Wireless Extender's return and repair policy?}**



**Warning:** Changes or modifications not expressly approved by Wireless Extenders could void the user's authority to operate this equipment.

Draft

## Preparing to Install the YX500-PCS

---

### Check the Signal Strength

Before installing the YX500-PCS in your home, make sure that your cell phone is able to receive a signal on the outside of your home or in the attic. Like a skylight that brings sunlight into a room, the YX500-PCS can only bring cellular signals into your home if cellular signals are reaching the outside of your home.

Simply go outside or go into your attic with your cell phone and check the number of signal bars that are displayed. On most cell phones, two bars represent a sufficient signal for completing a call.

**Weak Signal**      **Strong Signal**  
{illustration of cell phones with weak and strong signals}

---

### Determine the Needed Coverage Area

Identify the location in your home/office where you need the signal coverage the most. The YX500-PCS can cover approximately 2500 square feet. However, walls, ceilings or floors can limit the coverage area. Rooms unobstructed by walls (e.g., a kitchen that opens up to a great room) will allow for a greater area of coverage.

---

### Location of Attic Antenna and Base Unit

- The Signal Antenna and Base Unit must be at least 16 feet apart, and the Signal Antenna must be mounted in a vertical position.
  - If the distance between the Signal Antenna and the Base Unit is greater than 35 feet, additional
-

coaxial cable will be required. For the best performance, The cable length should not exceed 60 feet.

---

### **Power Requirements**

The Base Unit can be plugged into a standard 2-prong 110 VAC receptacle using the supplied power supply.



**Warning:** The YX500-PCS base unit should only be used with the supplied power cable. Attempts to use other power cables will void the warranty.

---

### **Installation Tools**

The following tools are required to install the YX500-PCS:

- Nn-size wrench
- Nn-size [Philips-head] screwdriver
- Standard drill with nn” bit (optional)
- PCS Cell phone operating at1900 MHz
- Multi-meter for testing electrical continuity and AC line voltage (for troubleshooting only)

## **Installing the YX500-PCS**

---

### **Installing the Signal Antenna**

Once you have confirmed that you have a cellular signal either outside your home or inside your attic, you are ready to install the Signal Antenna.

{ insert picture of Signal Antenna and mounting parts}

**photo**

Using the supplied mounting parts, install the Signal Antenna. For the best signal reception, the antenna should be installed at the highest possible point in your attic.

{insert picture of attic installation}

**1 drawing – inserting wire into base**

**with exploded view of screws;**

**2<sup>nd</sup> drawing – attaching antenna to a mast**

**3<sup>rd</sup> drawing – show Signal Antenna mounted to wood beam and antenna mounted to mast.**

Do not tightly secure the Signal Antenna until you have connected the coaxial cable to the Base Unit and made sure it is working properly.

---

### **Running the Coaxial Cable**

After installing the Signal Antenna, connect the coaxial cable to the antenna and run it to the location in your home where you plan to install the Base Unit. It is highly recommended that you refrain from securing your cable, drilling any holes, etc. until you complete and test the installation of the Base Unit.

<b>Note:</b> If the distance from the Signal Antenna to the Base Unit exceeds 35 feet, you will need to purchase additional coaxial cable
---

and connectors.

---

## **Installing the Base Unit**

For the widest possible signal reception, it recommended that you install the YX500-PCS Base Unit in the middle of a room or on an interior wall. This is because the Base Unit uses an omni-directional antenna, which like a lantern delivers the signal in a circular pattern around the antenna.

The Base Unit can either be directly mounted on a wall or set on a furniture piece (e.g., a bookshelf, desk, filing cabinet, end table etc.). The Base Unit performs best when positioned four feet above the floor.

### **Placing the Base Unit on a Piece of Furniture**

The Base Unit is designed so that it easily sits on the flat surface of a furniture piece. With a design that is very similar to a cordless phone base station, the Base Unit easily blends into any room.

Perform the following steps to position the Base Unit on a furniture piece:

1. Attach the coaxial cable, which should already be attached to the Signal Antenna, to the Base Unit.

**Figure 2 - Attach power and coaxial cables to the Base Unit**

{Malcolm Frontier Cad illustration showing power and coaxial cables attached to base unit}

2. Attach the antenna to the Base Unit and position it so that it is at a 90 degrees angle to the Base Unit.
3. Set the Base Unit on a furniture piece.
4. Plug the Base Unit's power supply into a wall outlet.
5. Turn your on your cell phone and check the signal strength. You should now have wireless where you want it.

**Note:** If you are unable to position the Base Unit so that the LEDs shine a steady green, you may have to move the Base Unit to another location in the room, or mount it on a wall.

### **Wall Mount**

The Base Unit can also be easily mounted on a wall using the included mounting bracket hardware. Perform the following steps to mount the Base Unit on a wall:

1. Attach the coaxial cable, which should already be attached to the Signal Antenna, to the Base Unit.
2. Attach the power supply cable to the Base Unit and plug the power supply into an outlet.
3. Attach the antenna the Base Unit.

4. Holding the Base Unit, adjust its position on the wall until the LEDs shine a steady green. The Base Unit can be mounted on the wall with the antenna pointing to the ceiling or towards the floor.
5. Attach the self-tapping wall/ceiling anchors to the wall and attach the Base Unit.
6. Turn on your cell phone and check the signal strength. You should now have wireless where you want it.

**Note:** If you are unable to position the Base Unit so that the LEDs shine a steady green, you may have to move the Base Unit to another wall in the room.

## Troubleshooting

### Base Unit LED Operation

In most cases, problems with the YX500-PCS can be diagnosed using the Base Unit's LEDs.

Mode	LED Settings	Action
Normal / Idle	Power LED = Solid Green Signal LED = Off Install LED = Off	None
Call Detected	Power LED = Solid Green Signal LED = Flashing Green Install LED = Off	None
Oscillation – Caution	Power LED = Off Signal LED = Off Install LED = Solid Red	An oscillation was detected and the Base Unit is attempting to correct it. After several minutes, you may need to move the antenna(s) to increase separation.
Oscillation – Reduced Range	Power LED = Solid Green Signal LED = Off Install LED = Flashing Red (20 seconds)	An oscillation was detected. The Base Unit has corrected it, but is operating with reduced range. To improve range performance, you must move the antenna(s) to increase separation. You may cycle power to re-check for this condition.
Oscillation – Base Unit Shutdown	Power LED = Off Signal LED = Flashing Red Install LED = Flashing Red	An oscillation was detected but the Base Unit is unable to correct it. You must move the antenna(s) to increase separation and then unplug the Power cable.
User Caution	Power LED = Solid Green Signal LED = Flashing Red Install LED = Off	User's phone/device is very close to the Base Unit. Move the phone/device away from the Base Unit to avoid User Shutdown.



Mode	LED Settings	Action
User Shutdown	Power LED = Off Signal LED = Solid Red Install LED = Off	User's phone/device is too close to the Base Unit. The Base Unit has temporarily shut down to prevent network problems.
Network Caution – Reduced Range	Power LED = Solid Green Signal LED = Flashing Red (20 seconds) Install LED = Flashing Red (20 seconds)	<p>The Signal Antenna is receiving a strong signal from a nearby cell tower (probably another service provider) and is operating with reduced range. Try making one or more of the following adjustments:</p> <ol style="list-style-type: none"> <li>1. Position the Signal Antenna so that it is pointing in the direction of the closest tower.</li> <li>2. Move the Signal Antenna to another part of the attic.</li> <li>3. Contact a professional installer for assistance. You may need to have a directional antenna installed.</li> </ol>
Network Overdrive – Base Unit Shutdown	Power LED = Off Signal LED = Solid Red Install LED = Solid Red	<p>The Signal antenna is receiving too much signal from a nearby cell tower (probably another service provider). Try one more of the following to correct the problem:</p> <ol style="list-style-type: none"> <li>1. Slightly adjust the position of the Signal Antenna so that it is pointing toward the closest tower.</li> <li>2. Move the Signal Antenna to another part of your attic.</li> <li>3. Contact a professional installer for assistance. You may need to have a directional antenna installed.</li> </ol>

## Technical Specifications

Frequency	1850-1990 MHz (PCS only)
Networks:	CMA, GSM, TDMA
Total Signal Gain:	60dB (adaptive)
Output Power:	< 0.5 Watt EIRP (with included antenna)
Base Unit Weight:	1 lb.
Base Unit Size:	5" x 7" x 2"
Power Input:	90 – 120 VAC 60Hz
Power Output:	5VDC, 1.5A
FCC ID:	SO4YX500-PCS
Industry Canada Approved	
Patents pending	

## Antenna and Base Unit Accessory Options

---

## *Safety Precautions*

### CAUTION



For INDOOR use, an Omni-Directional Antenna with a maximum gain of 8 dBi is authorized for use with this unit.

Inside antennas must be positioned to observe minimum separation of 20 cm. (~ 8 in.) from all users and bystanders. For the protection of personnel working in the vicinity of inside (downlink) antennas, the following guidelines for minimum distances between the human body and the antenna must be observed.

The installation of an INDOOR antenna must be such that, under normal conditions, all personnel cannot come within 20 cm. (~ 8.0 in.) from any inside antenna. Exceeding this minimum separation will ensure that the employee or bystander does not receive RF-exposure beyond the Maximum Permissible Exposure according to section 1.1310 i.e. limits for General Population/Uncontrolled Exposure.



For OUTDOOR use, a Directional Antenna up to a maximum gain of 14 dBi is authorized for use with this unit. The Outside antenna must be positioned to observe minimum separation of 120 cm. (~ 4 ft.) from all users and bystanders. For the protection of personnel working in the vicinity of outside (uplink) antennas, the following guidelines for minimum distances between the human body and the antenna must be observed.

The installation of an OUTDOOR antenna must be such that, under normal conditions, all personnel cannot come within 120 cm. (~ 4 ft.) from the outside antenna. In all installations, the antenna should never be mounted such that the main beam is directed toward an area where workers or bystanders may be present. Exceeding this minimum separation will ensure that the worker or bystander does not receive RF-exposure beyond the Maximum Permissible Exposure according to section 1.1310 i.e. limits for General Population/Uncontrolled Exposure.