Home Repeater

User's Guide

(Model#: JAS-HR1900P)

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Table of Contents

1. Security Precautions

- Only use the power supply unit provided with the Home Repeater (DC 5.2 V / 1 A). Comply with the connection values and ratings when connecting the device to the mains.
- Protect the Home Repeater from dampness.
- Never open the device. For electrical safety reasons it may only be opened by authorized service technicians.
- Dispose of the Home Repeater in environmentally safe manner.
- Lightning protection is recommended for all installations

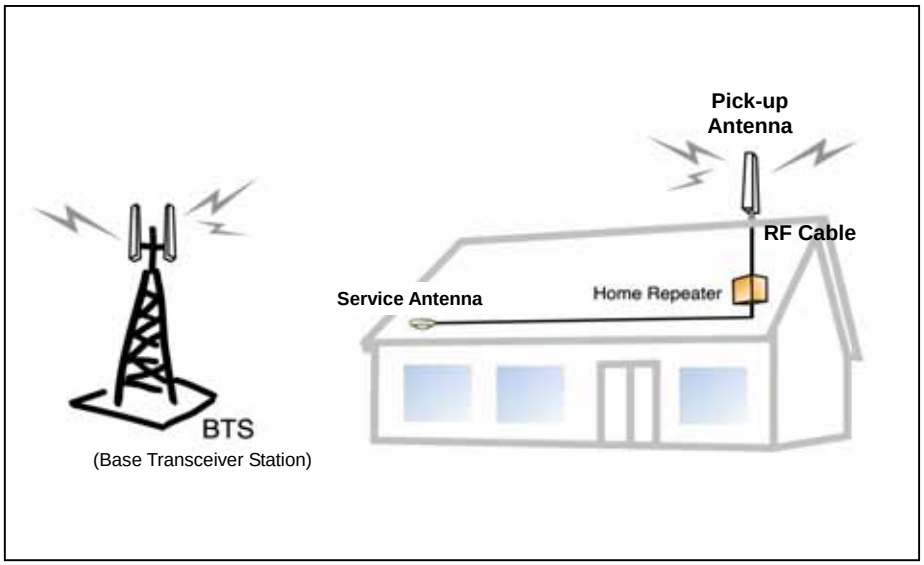
2. Introduction

2.1 Overview

Home Repeater is designed to improve wireless reception in poor indoor coverage areas. Targeted as a cost effective solution for indoor coverage areas from 2,000-sq. ft. to 3,000-sq. ft, JAS Home Repeater will allow users to operate handsets within a building or weak coverage area while maintaining call clarity and quality.

2.2 Operational Concept

The Home Repeater takes the signal from a Pick-up antenna outside a building, amplifies it and rebroadcasts it to the interior of the building with a Service antenna. The same process occurs in the opposite direction taking the signal from the mobile phone and sending it outside via the antenna and amplifier.



3. Installation

3.1 Contents & Feature

3.1.1 Contents

The package contains the following items:

No.	Contents	Q'ty	Remark
1	Home Repeater 	1 unit	Model #: HR1900P
2	Adaptor 	1 unit	Power Supply for Home Repeater *(110~220V/60Hz, +5V, 1.2A)*
3	Screw 	2 units	They are used to mount bracket installation

3.1.2 Features of Home Repeater

Front Panel

Back Panel

Upper Panel

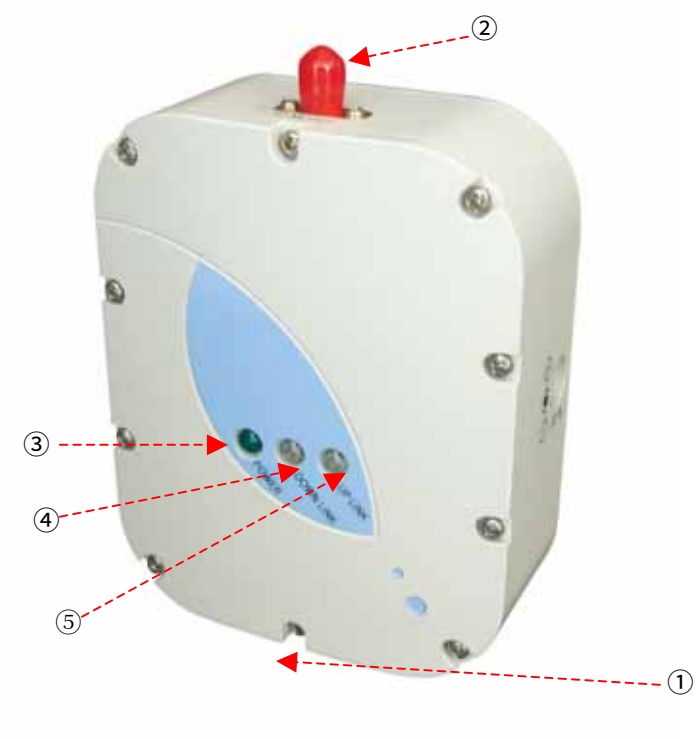
Bottom Panel

Right Panel

Left Panel

3.2 Operating Displays and Connections

3.2.1 Operating Displays:



① To BTS : Port for receiving the signal from BTS, and a signal pick-up antenna should be connected to the port.

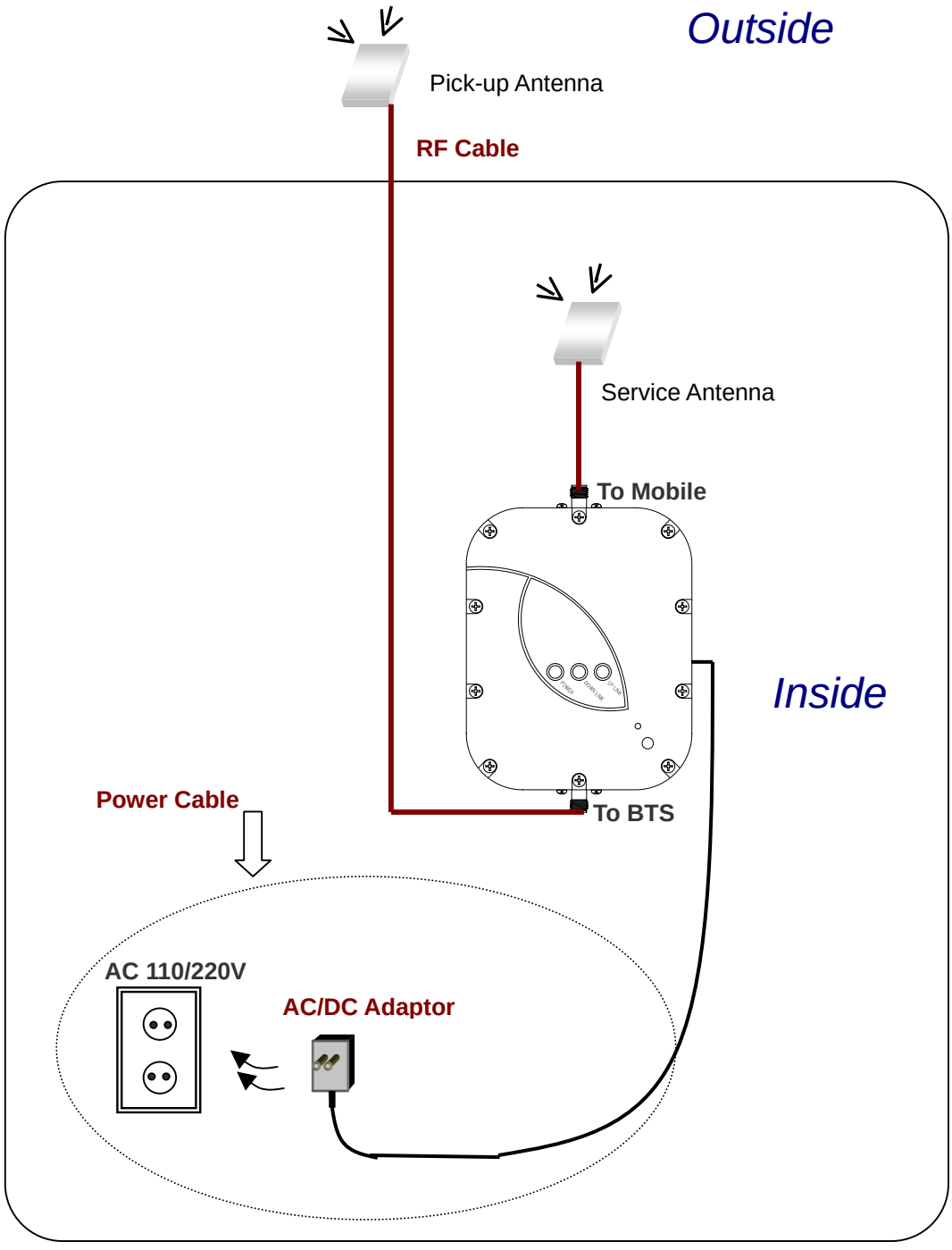
② To Mobile: Port for emitting the amplified signal to mobiles, and service antenna such as dipole, patch, omni antenna should connected to the port.

LED Displays

The front panel of the Home Repeater contains LED displays that show the operating state and simplify installation and fault finding in the network.

LED		State	Status
③	Power	On	The Repeater has been switched on.
		Off	The Repeater has been switched off.
④	Down Link	Green	The Repeater is working normally.
		Blinking	The Repeater is shut down.
⑤	Up Link	Green	The Repeater is working normally.
		Blinking	The Repeater is shut down.

3.2.1 Set up the Home Repeater



※ Please read the following information before installing your Home Repeater. Many mistakes can be avoided by considering over this information

3.2.1.1 Power Consumption

- The power supply of the Home Repeater accepts 110~220V, +5V, and 1.2A.

3.2.1.2 Operating Environment

- Temperature range: 0℃~+50℃
- Maximum Humidity: 95%

3.2.1.3 You need to determine the following things for the Home Repeater installation:

- A position where the pick-up antenna is to be installed:
  a. The pick-up antenna should be located in a position with at least a 3'radius clear of obstructions and other radiating elements.
  b. You may decide the position with checking out with the antenna level bars of your mobile phone. If the number of antenna level bars of your mobile phone is one or two when you check on the position of patch antenna, it would be OK.
- However, if there is no antenna level bars on your mobile phone, you had better change the position of patch antenna.
- You should decide the position where the Home Repeater should be installed.
  a. You may install the Home Repeater on the wall or using wall mount bracket that are provided with Home Repeater.

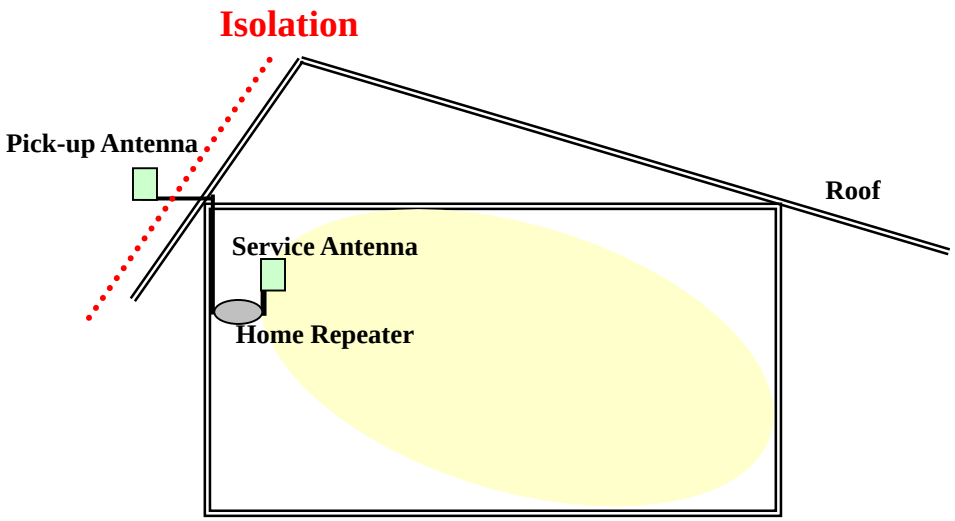
※When you install Home Repeater, you must consider minimum isolation between pick-up antenna and Home Repeater.

; If there is not enough isolation insurance, the Home Repeater will be defective. As you can see the following illustration, the Home Repeater and pick-up antenna must be isolated from each other. If the building is made of concrete or other signal blocking material, the isolation is sufficient.

- After you confirm the length of cable needed to connect from the pick-up antenna to the Home Repeater, you may connect the Home Repeater and pick-up antenna. The cable should be tied up on the wall or ceiling between pick-up antenna and Home Repeater.

※IMPORTANT!

1. The Home Repeater is designed to be used to cover only inside of buildings. It is NOT designed to be used to cover outside of building such as playground, open area parking lots, farmland, and etc.
2. The Home Repeater may penetrate down to the lower floor depending on the amount of mass or materials contained within the floor. There is no way to know whether the signal can penetrate to the lower floor without installing another Home Repeater or additional service antenna.



3.2.2 Connection

It is very important to connect The Home Repeater with antennas and cables. For selection of antennas and cable, you may read section 6 for guidance of antennas and cable

4 Appendix

4.1 Trouble Shooting

If Home Repeater does not operate properly after installation and the signal level of your mobile is same as before, make sure that the installation procedures as described in this manual were followed correctly. You may check out the following step for the inspection

4.1.1 Inspection Procedure

No.	Inspection Step	Remark
1	Power LED	The green light should be on if the power is on.
2	Down link LED	The green light should be on, if it is normal. If green and red light is blinked, please check next step.
3	Up link LED	The green light should be on, if it is normal. If green and red light is blinked, please check next step.
4	Connection of the port (To mobile & To BTS)	To Mobile: The dipole antenna (Service antenna) should be connected tightly. To BTS: The donor antenna (Patch antenna) should be connected tightly.
5	Cable connection to donor antenna	The cable should not be broken or any other damaged.

- ♦ If the signal level of your mobile is still same as before, you might change the donor antenna location to get better signal from base station.
- ♦ If there is any obstacle between Home Repeater and mobile, the signal of your mobile would be fluctuated. You may check the location of Home Repeater and re-install it.
- ♦ If the red light in LEDs of Home Repeater is still blinked and the signal level of mobile is same as before although you inspect them through the above procedure, you may contact sales agent or manufacturer.

5 Specification

No.	Parameters		Specifications		Remarks
			Downlink	Uplink	
1	Frequency Range		1930 ~ 1990 MHz	1850 ~ 1910 MHz	60MHz B.W
2	Output Power		+7dBm [Max.]		
3	Gain		50dB ±2dB/Fc		
4	Gain Flatness		≤ 7dB		
5	In Band Spurious	Fc +885KHz	≥ -45dBc/30KHz		
		Fc -885KHz	≥ -45dBc/30KHz		
		Fc +1.98MHz	≥ -50dBc/30KHz		
		Fc -1.98MHz	≥ -50dBc/30KHz		
6	Out of Band Spurious	Less than -13dBm/1MHz	≥ -13dBm		
7	P1dB		≥ +14dBm		
8	Output IP3		≥ +24dBm		
9	Down/Up Link shutdown Function		≥ +9dBm		
10	Noise Figure		≤ 7dB		@ Full Band
11	V.S.W.R		≤ 1 : 2.0		Up/Down Link Port
12	Impedance		50Ω		
13	Operating Temperature		0℃ ~ +50℃		
14	Dimension (W x H x D)		mm x mm x mm		Without Connector
15	Weight		≤ 600 g		
16	RF Connector		SMA-Type (Female)		Up/Down Link Port

6. Guidance for Antennas and Cable

This is a guidance for customers' selection of antennas and cables. You may read carefully and try to find out the best type of each antennas and cables.

6.1 Antenna

When you receive the Home Repeater, you need two antennas and some length of cable. One of the antennas is pick up antenna that is for receiving signal from outside of the building. The other antenna is service antenna that is for transmitting signal to inside of the building.

6.1.2 Pick-up Antenna

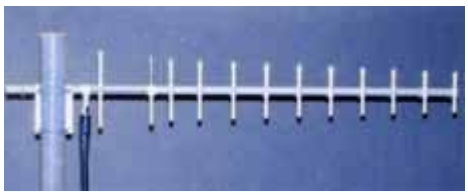
Normally, patch or yagi antenna is used for pick up antenna that is installed outside of building that has 7 ~ 12dBi gain. This antenna should be installed after confirmation of line of sight. Line of sight means that the antenna should be able to see the base station and to be located on the direction to the base station. If not, the signal is not enough for the Home Repeater to emit to the mobile.

If you can not find a location or direction of base station, you may use your mobile phone to confirm the position of pick-up antenna. When you see the level of antenna level on your mobile phone, it should be at least 2 or 3 bars for the position of pick-up antenna.

If you want to get stronger signal from base station, you may use another antenna that has more gain such as 10dBi or 12dBi. <Figure 3> shows different types of pick-up antennas

6.1.3 Service Antenna

Normally, patch or dipole antenna is used for the service antenna. Dipole antenna has 0dBi gain. If you would like to use patch antenna for service antenna, you might need to use cable that you also consider the cable loss.

Pick-Up & Service Antennas		Specification
Yagi Antenna		- Frequency Range: CDMA - Gain; 12dBi - Polarization: Vertical - Horizontal Beam Width: 42° - Vertical Beam Width: 38°
		- Frequency Range: PCS or GSM1800 - Gain: 10dBi/12dBi - Horizontal Beam Width: 43° - Vertical Beam Width: 40°
Patch Antenna		- Frequency Range: PCS or GSM1800 - Gain: 8dBi - Polarization: Vertical - Horizontal & Vertical Beam Width: 70°
		- Frequency Range: CDMA Band - Gain: 7dBi - Polarization: Vertical - Horizontal & Vertical Beam Width: 70°
Dipole Antenna		- Frequency Range: CDMA, PCS, or GSM 1800 - Gain: 0dBi - Polarization: Vertical

<Figure 3 Different types of antennas>

6.1.4 Example of using antenna

- Patch to Dipole

  This is a general case of using antennas. You may use patch antenna for pick-up antenna and dipole antenna for service antenna. You can use this antenna for small office and home which has dimension up to (32ft x 32ft).

- Patch to Patch

  You may use patch antenna for both pick-up and service antenna. You can use this antenna for dimension up to (42ft x 42ft).

- Yagi to Patch (Dipole)

  If it is not easy to install Patch antenna for donor, for instance, basement, you may use yagi antenna for pick-up antenna.

6. 2 Cable

The RF cable is for connection between the Home Repeater and patch antenna (Pick-up antenna). The following information is the specification of the RF cable.

	Specification	Remark
Model	RG 58	
Cable Loss	0.7dB/3.28ft	
Connector type	SMA type	

※ As much as you use the cable, there would be more loss on the cable. Therefore, you should calculate the maximum cable length regarding antenna usage. Because the Home Repeater has 50dB gain which is fixed.

7. Service (Customer Care)

If you need further assistance with your installation or any problem with *Home Repeater*, please call us at 82-2-330-5865 or send E-mail to smp500@jasteletech.com. Also you may contact sales representative.