

# **User's Manual**

**F23K-CP/F20K-CP/F17K-CP/F13K-CP/F10K-CP**

**MADE IN HUAPTEC**

*We Improve Your Mobile Signal*

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## How it works

F23K-CP/F20K-CP/F17K-CP/F13K-CP/F10K-CP is designed to help mobile users amplify weak signals of 2G, 3G. They are bi-directional amplifiers.

The donor antenna receives the signals from the cell tower, amplifies it, and transmits to the signal booster. Then the indoor antenna will receive the signal and retransmit it to your mobile device.

The signals produced by your phone are also amplified by the indoor antenna via the booster and donor antenna.

## Package contents



Dual band Signal booster



Wide band Yagi antenna



Indoor panel antenna



RF cables



Power supply 12V/3A

Other authorized different size and color shells are acceptable.

## Optional antenna kits



## Omni ceiling antenna

### Outdoor ceiling mount dome antenna

## Whip antenna

Warning: Unauthorized antennas, cables, and/or coupling devices are prohibited by new FCC rules. Please contact FCC for details: 1-888-CALL-FCC.

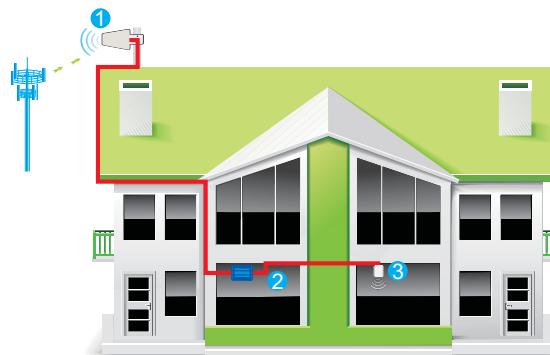
## Installing your hardware

## Before you install

- Make sure you have sufficient cable length between proposed donor/server antenna location and booster connector.
- Make sure the position you install the booster is near to one existing electrical outlet, and well ventilated, away from excessive heat, moisture, and direct sunlight.

## Installation overview

- Install your donor antenna on the roof where there is the strongest signal.
- Mount your signal booster, connect the cables to the signal Booster from the outside antenna and inside antenna at the designated ports, and connect the booster to the AC supply(make sure all the cables are connected).
- Install the indoor antenna where you want to improve the signal.



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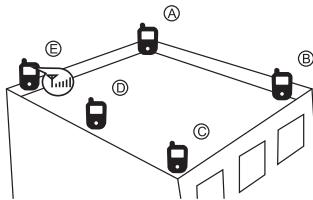
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### Find the area with the strongest signal

The booster's main function is to improve weak RF signals of an area. The signal strength from the outdoor antenna directly affects the efficiency of indoor coverage.



### Installing Outdoor Antenna

- Select a proper place to install the donor antenna.

Normally the roof of the building is a good choice. As shown from the above graph, you need test the signals from A to E, and select a place with best signal for installation.

- Select direction of donor antenna.

The donor antenna should point to the tower for better signals.

- Installation of outdoor antenna

In most cases, Wide Band Yagi antenna is the best choice. You can also choose outdoor panel antenna or YAGI antenna as other options.

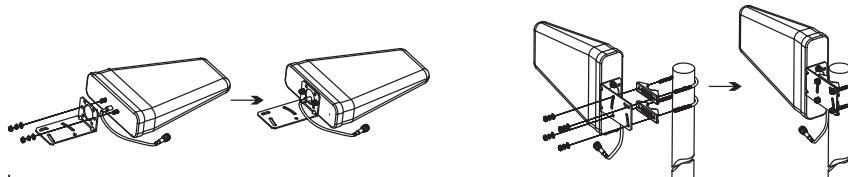
There are 2 types of installation: wall mount or pole mount. Pole mounts are recommended for your convenience.

Step1: Find an existing pole or obtain a pole of 1 to 2 inches in diameter, install the pole in the desired location.

Step2: Unscrew nuts from antenna base by hands or with a wrench, if needed. Fix horizontal plate of the L-bracket on the antenna base with screws.

Step3: Unscrew nuts and washers from U-bolt, slide both brackets onto U-bolt.

Step4: Fit the assembly on the pole in the desired location. Slide the vertical plate of the L-bracket onto the U-bolt and secure it with the washers and nuts provided. Before tightening the nuts be sure to fix the antenna at the necessary height and directed towards the nearest base tower. Do not over tighten.



#### Notes:

- wrap waterproof tape around the connectors between donor antenna and feeder lines to avoid water or other kinds of damage.

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### Installing Indoor Antenna

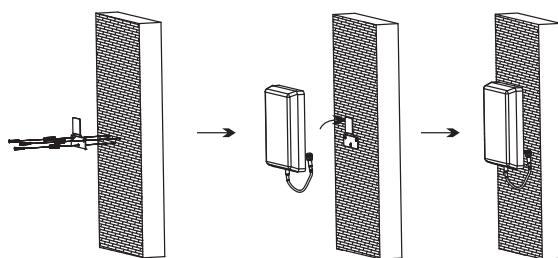
In most cases, Indoor panel antenna is the best choice. You can also choose omni-directional antenna as another option.

Step1: Select a place on a wall projecting the area where you want reception.

Normally, to provide an overall coverage, you will need to choose a corner.

Step2: Mount the bracket on the wall after drilling the screw to the wall.

Step3: Put the panel antenna on the bracket.



When you choose Indoor ceiling omni antenna or whip antenna, the best place to install it is the center of your house as the graph shows.

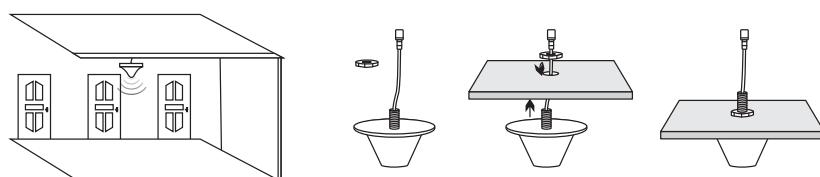
Install the omni ceiling antenna as shown on the graph below.

Step1: Drill a hole in the ceiling.

Step2: Unscrew a fixing nut from the antenna. Pass the antenna cable through the hole. Screw the fixing nut back onto the antenna, leaving the cable in the ceiling crawl space, and fasten.

Step3: Connect N-male cable to the cable connector on the omni ceiling antenna.

Step4: Tighten fixing nut to secure the antenna. Do not over tighten.



### Installing the signal booster

Step1: Select a location close to a power outlet on a wall.

Step2: Mount the booster with the screws included as shown in the figure.

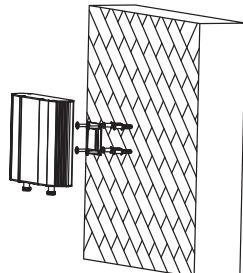
Step3: Connect the outdoor antenna cables to booster connector marked "outdoor". Tighten the connection with hand or wrench.

Step4: Connect the indoor antenna cables to booster connector marked "indoor". Tighten the connection with hand or wrench.

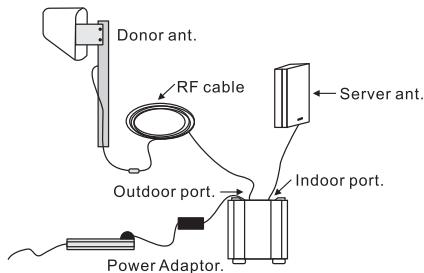
Step5: Connect the AC power cord to the signal booster, then connect the plug to the electrical outlet.

Step6: Power on the booster.

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Booster installation



Connection from cable to Booster

### Booster Commissioning

After powering on the booster, it will automatically adjust for best performance with the **intelligent automatic gain control** function. No manual operation is needed.

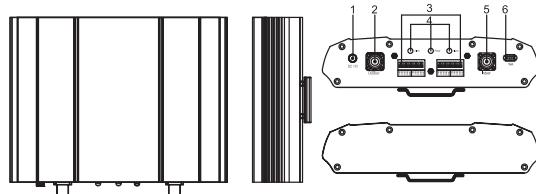
- If the alarm LED is green, that means the booster is working properly. In this case, you can check the coverage, if it is good, the commissioning is finished. If not, you can adjust the outdoor antenna location to get a better signal strength and move the indoor antenna to face the weak signal area directly.
- If the alarm LED is quick flashing green that means that output power is over rated. You can check the coverage, leave it as it is if it's good, if not or you don't feel comfortable about alarm LED quick flashing green, you can adjust the antennas' directions or locations to lower down receiving signal level.
- If the alarm LED is flashing red, that means that the booster auto shuts off for protection due to much over rated output power. You can adjust the antennas' directions or locations to lower down receiving signal level.
- If the alarm LED is off, that means that the booster auto shuts off for protection due to very severe self-oscillation. You can adjust the antenna to enhance the isolation which normally can be fulfilled by adding the distance or barrier between the outdoor and indoor antenna. Adjust until the alarm LED turns green or slow flashing green.

If the alarm is still quick flashing green, flashing red or off, the MGC function can provide further assistance as shown below.

### Booster's port description

The following image shows the key components of the booster. There are 4 parts. The first part is the connectors to the outdoor antenna and indoor antenna. The second part is the power indicator, which will show the power status. The third part is the alarm LED for each band, 2 LEDs to support PCS,CDMA separately. The forth part is DIP switch for MGC function. The following table and graph show the details.

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1. Connect to power supply 2. Connector to outdoor antenna 3. Gain attenuation DIP switches  
 4. LEDs indicator 5. Connector to indoor antenna 6. Set

### LEDs indication

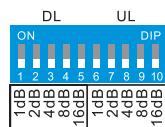
Status and definition of POWER indicators:

Status	Definition
Green	Normal
Off	DC power problem

Status and definition of alarm indicators (only works for downlink signals):

Status	Alarm
Green	<p>It is working in linearity.</p> <p>Warning: Input signals may be not enough, so please check on coverage effect, do not do anything if it is good, otherwise please increase receiving signal level.</p>
Slow Flashing Green	<p>Working properly. (Full output power)</p> <p>Not working properly. (There is a little stronger input signal)</p>
Quick Flashing Green	<p>Check coverage, leave it as it is if it's good;</p> <p>If coverage is not good or you don't feel comfortable about alarm LED quick flashing green, please check the troubleshooting to get solutions.</p>
Quick Flashing Red	<p>There is strong input signal to lead that booster shut off ,    Please check the troubleshooting to get solutions.</p>
OFF	<p>There is severe self oscillation to lead that booster shut off, Please check the troubleshooting to get solutions.</p>

### Manual gain control (MGC)



The DIP switches are used for manually adjusting their respective band gain attenuations.  
 Switches 1-5 control downlink attenuation. And 6-10 control uplink attenuation.  
 The DIP switches have default 'OFF' status; please push relevant switches to "ON" position if certain attenuation value needs to be achieved.

The booster will work on its MAX gain mode. In some cases, we won't need such big values. MGC function will help to provide a loss. For example, in the above image, 1 represent 1dB and 3 represent 4 dB, if you press both 1 and 3 button, you can get a loss of 1 dB plus 4 dB which is 5 dB loss. The principle is same for the other band.

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## Troubleshooting

Problem	Resolution
The signal booster has no power.	Check that the booster switch is turned on. Check that the AC outlet is working.
The booster's power is on but the phone is not connected into the network and still can not communicate.	Try to fasten the connections between the different parts of the system. Change the direction of donor antenna or its installation position. Use barriers (like buildings) to block signals of other operators.
Good downlink signal with poor communication quality	Check whether there's interference. Consult the operator whether the signal source base station works well. Adjust uplink gain to balance uplink and downlink.
The power is on but the coverage is not good.	<p>Firstly check whether the alarm LED is quick flashing green or flashing red. The status that shows the over rated output power, please adjust the antennas' directions or locations to lower down receiving signal level.</p> <p>Secondly check whether the alarm LED is off. the off status shows the insufficient isolation.</p> <p>One of below actions are recommended to eliminate isolation problem.</p> <ol style="list-style-type: none"><li>1. Adjust the antennas' directions or locations or enlarge the distance between them.</li><li>2. Add the vertical or horizontal distance between outdoor antenna and indoor antenna.</li><li>3. Use the barrier like walls to increase the isolation.</li><li>4. Change indoor antenna(indoor antenna can be changed to other antenna type which has better directional antenna pattern, also you can let indoor antenna and outdoor antenna point opposite direction).</li></ol> <p>Thirdly add the attenuation by the DIP switches or you can reduce the booster's gain by external attenuator or replace with lower gain antenna if the above methods don't work.</p> <p><b>Target:</b> The work is accomplished until alarm LED is "Green" or "Slow Flashing Green". Please note that "Green" LED may lead to lower coverage, which shall be improved by adjusting the outdoor antenna to get stronger receiving signal.</p>

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## Specifications (for IC)

UL Frequency Range(MHZ)	824-849 / 1850-1910
DL Frequency Range(MHZ)	869-894 / 1930-1990
Supported Standards	CDMA,WCDMA,GSM,EDGE,HSPA+,EVDO,LTE and all cellular standards
Band Width	25MHz/60MHz
Band Width(-20dB)	30MHz/70MHz
F10K-CP Max. Gain	60±3dB(UL)/65±3dB(DL)
F13K-CP Max. Gain	60±3dB(UL)/65±3dB(DL)
F17K-CP Max. Gain	65±3dB(UL)/65±3dB(DL)
F20K-CP Max. Gain	65±3dB(UL)/70±3dB(DL)
F23K-CP Max. Gain	70±3dB(UL)/75±3dB(DL)
F10K-CP Nominal passband gain	52-63dB/42-63dB(UL) 57-68dB/47-68dB(DL)
F13K-CP Nominal passband gain	52-63dB/42-63dB(UL) 57-68dB/47-68dB(DL)
F17K-CP Nominal passband gain	57-68dB/47-68dB(UL) 57-68dB/47-68dB(DL)
F20K-CP Nominal passband gain	57-68dB/47-68dB(UL) 62-73dB/52-73dB(UL)
F23K-CP Nominal passband gain	62-73dB/52-73dB(UL) 67-78dB/57-78dB(DL)
F10K-CP Max. Output Power	17±2dBm(UL)/10±2dBm(DL)
F13K-CP Max. Output Power	17±3dBm(UL)/13±2dBm(DL)
F17K-CP Max. Output Power	17±2dBm(UL)/17±2dBm(DL)
F20K-CP Max. Output Power	17±2dBm(UL) / 20±3dBm(DL)
F23K-CP Max. Output Power	17±4dBm(UL) / 23±2dBm(DL)
F10K-CP Rated Output Power	17dBm(UL) / 10dBm(DL)
F13K-CP Rated Output Power	17dBm(UL) / 13dBm(DL)
F17K-CP Rated Output Power	17dBm(UL) / 17dBm(DL)
F20K-CP Rated Output Power	17dBm(UL) / 20dBm(DL)
F23K-CP Rated Output Power	17dBm(UL) / 23dBm(DL)
MGC (Step attenuation)	15dB/5dB step or 31dB/1dB step
I/O Port	N-Female
Impedance	50ohm
Environment Conditions	IP40
Dimensions	4.7*5.3*1.6inch /120*135*40mm or 8.6*6.5*2inch /218*165*50mm
Weight	≤ 5.5Lbs. / 2.5Kg
Power Supply	Input AC100~240V, output DC12V / 3A

The Maximum indoor and outdoor Gain is 7.0 dBi

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## Specifications (for FCC)

UL Frequency Range(MHZ)	824-849 / 1850-1910
DL Frequency Range(MHZ)	869-894 / 1930-1990
Supported Standards	CDMA, WCDMA, GSM, EDGE, HSPA+, EVDO, LTE and all cellular standards
Band Width	25MHz/60MHz
Band Width(-20dB)	30MHz/70MHz
F10K-CP Max. Gain	60±3dB(UL) / 65±3dB(DL)
F13K-CP Max. Gain	60±5dB(UL) / 65±6dB(DL)
F17K-CP Max. Gain	65±6dB(UL) / 65±6dB(DL)
F20K-CP Max. Gain	65±3dB(UL) / 70±3dB(DL)
F23K-CP Max. Gain	70±3dB(UL) / 75±3dB(DL)
F10K-CP Nominal passband gain	52~63dB/42~63dB(UL) 57~68dB/47~68dB(DL)
F13K-CP Nominal passband gain	52~63dB/42~63dB(UL) 57~68dB/47~68dB(DL)
F17K-CP Nominal passband gain	57~68dB/47~68dB(UL) 57~68dB/47~68dB(DL)
F20K-CP Nominal passband gain	57~68dB/47~68dB(UL) 62~73dB/52~73dB(DL)
F23K-CP Nominal passband gain	62~73dB/52~73dB(UL) 67~78dB/57~78dB(DL)
F10K-CP Max. Output Power	17±2dBm(UL) / 10±2dBm(DL)
F13K-CP Max. Output Power	17±3dBm(UL) / 13±2dBm(DL)
F17K-CP Max. Output Power	17±2dBm(UL) / 17±2dBm(DL)
F20K-CP Max. Output Power	17±2dBm(UL) / 20±3dBm(DL)
F23K-CP Max. Output Power	17±4dBm(UL) / 23±2dBm(DL)
F10K-CP Rated Output Power	17dBm(UL) / 10dBm(DL)
F13K-CP Rated Output Power	17dBm(UL) / 13dBm(DL)
F17K-CP Rated Output Power	17dBm(UL) / 17dBm(DL)
F20K-CP Rated Output Power	17dBm(UL) / 20dBm(DL)
F23K-CP Rated Output Power	17dBm(UL) / 23dBm(DL)
MGC (Step attenuation)	15dB/5dB step or 31dB/1dB step
I/O Port	N-Female
Impedance	50ohm
Environment Conditions	IP40
Dimensions	4.7*5.3*1.6inch / 120*135*40mm or 8.6*6.5*2inch / 218*165*50mm
Weight	≤5.5Lbs. / 2.5Kg
Power Supply	Input AC100-240V, output DC12V / 3A

The Maximum indoor and outdoor Gain is 7.0 dBi

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 30cm from nearby persons.

**Notice:**Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

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## FCC RF Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 30cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

**WARNING.** This is **NOT** a **CONSUMER** device. It is designed for installation by **FCC LICENSEES** and **QUALIFIED INSTALLERS**. You **MUST** have an **FCC LICENSE** or express consent of an FCC Licensee to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation.

## IC RF Exposure Statement

The device is in compliance with RF exposure limits. The minimum distance from body to use the device is 30 CM.

Le présent appareil est conforme aux normes de sécurité ou aux limites d'intensité de champ RF. La distance minimale du corps à utiliser le dispositif est de 30 CM.

## Notice

The Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5dB, especially where the output signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device.

La puissance de sortie nominale indiquée par le fabricant pour cet appareil concerne son fonctionnement avec porteuse unique. Pour des appareils avec porteuses multiples, on doit réduire la valeur nominale de 3,5 dB, surtout si le signal de sortie est retransmis et qu'il peut causer du brouillage aux utilisateurs de bandes adjacentes. Une telle réduction doit porter sur la puissance d'entrée ou sur le gain, et ne doit pas se faire au moyen d'un atténuateur raccordé à la sortie du dispositif.

## Warnings

Users must follow the below principles:

 Booster should follow system requirement of communication equipment, assure good grounding and lightning protection.

 The power supply voltage of booster should meet the standards of security requirement; any operation shall be carried out only after cutting off power in advance. Only the professional is authorized for the operation.

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Do not dismantle machine, maintain or displace accessories by yourself, because in this way, the equipment may be damaged and you may even get an electric shock.



Do not open the booster, touch the module of booster, or open the cover of module to touch the electronic component. The components will be damaged due to electrostatic.



Please keep away from heating-equipment, because the booster will dissipate heat during working. And do not cover booster with anything that influences heat-dissipation.



The use of unauthorized antennas,cables, and/or coupling devices not conforming with ERP/EIRP and/or indoor-only restrictions is not permitted



This device does not support home/personal use.