epcom®

Triple Band Signal Amplifier

EP20-TB-4G User Manual

PLEASE READ THE INSTRUCTION CAREFULLY BEFORE ANY OPERATIONS, AND KEEP FOR FUTURE REFERENCE.

	The power supply to the signal amplifier should comply with the standards of security requirements.
	Please ensure grounding, waterproof and lightning protection while installing the signal amplifier.
	The signal amplifier should be installed and initiated by professionals only.
	Dismantling the signal amplifier to maintain or replace inside components is not recommended.
	Keep the signal amplifier away from any heat sources and do not install it in a confined space.

CONTENT

Package Contents


signal amplifier, 1pc


outdoor antenna, 1pc


indoor antenna, 1pc


cable, 15 + 5 meters


power adapter, 1 set


installation screws, 1 bag



Antenna installation kit, 1 bag

Product Description

EP20-TB-4G signal amplifier has high intelligence and excellent tech index, empowered with EDA digital simulation and unique 50Ω impedance match wiring technology. It is equipped with electronic devices and RF components originated from international famous brands.

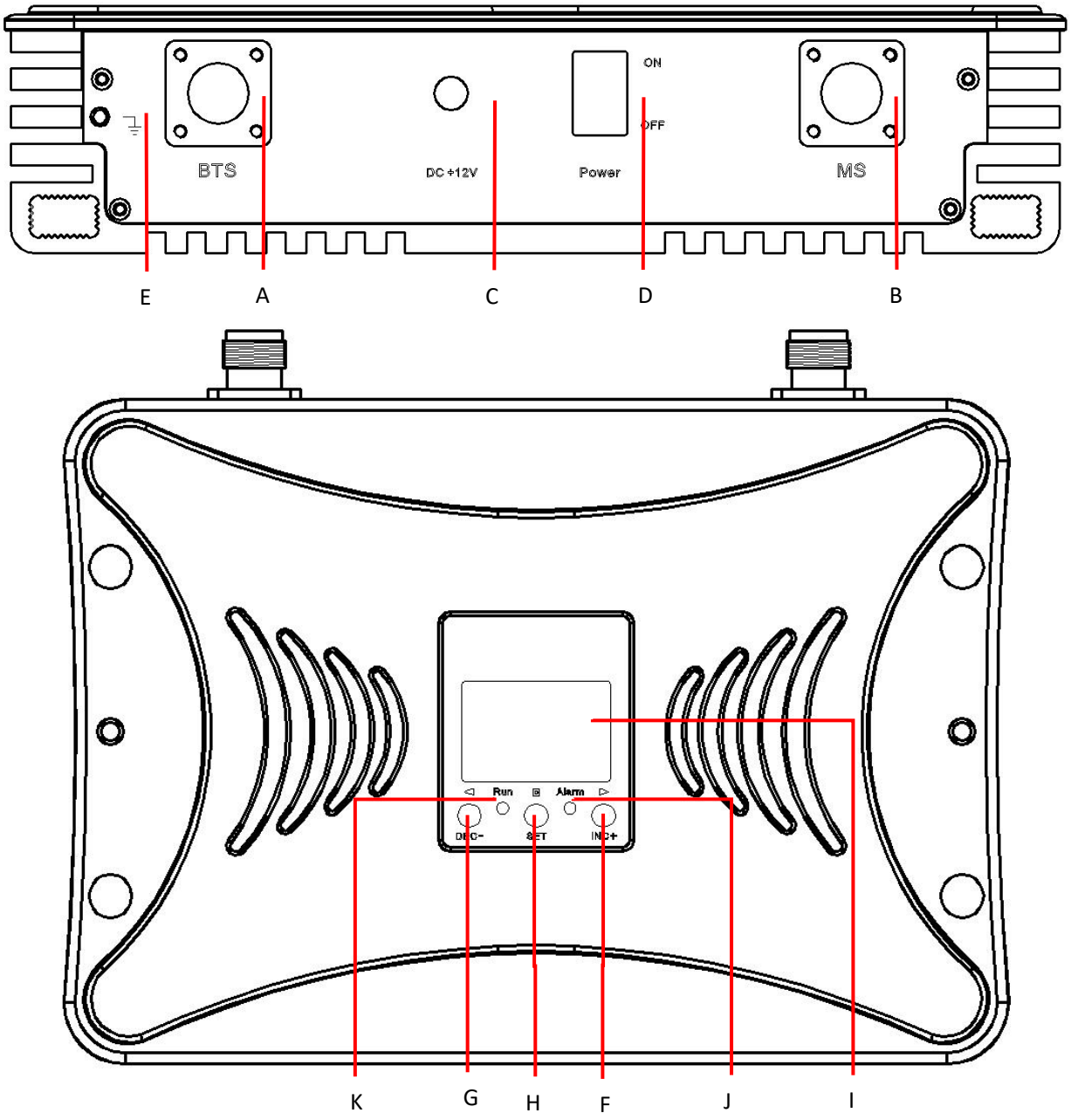
It provides 2G, 3G, 4G coverage solutions for different cities in Mexico. Besides its elegant appearance, compact size and easy-to-install, it can cover an area of 800㎡ with proper installation and operation. That makes it an excellent option to solve weak signal problems for home, office, elevator and basement, etc.

Product Features

- **LCD display** of frequency band, output power, gain, alarm and working status.
- Support multiple systems for **2G 3G 4G** networks.
- Real time isolation check, so as to alarm when self-oscillation occurs.
- **Self oscillation cancellation**, auto degrade the gain when insufficient isolation detected.
- **Auto shut-off,** if over input signal or severe self-oscillation occur, no interference to BTS.
- **Auto stand-by**, when no active mobile users in the coverage area, and auto turn on if an active user is detected, lower interference to BTS.
- **MGC/manual gain control**, to attenuate the gain with 1dB step among the range of 31dB.
- **ALC/auto level control**, to limit the output power among safety range, to keep stable signal coverage and extend device lifespan.

- Linkage between uplink and downlink gain, keeping uplink and downlink balanced.
- **MTBF** can be up to 100,000 hours

Interface Description



- A: N - Female Connector to outdoor antenna
- B: N - Female Connector to indoor antenna
- C: DC power supply plug-in
- D: Power switch
- E: Grounding screw
- F: Push to increase gain value
- G: Push to decrease gain value
- H: Push to select or to next line
- I : LCD Screen

- J : ALC alarm indicator。
- K: Working status indicator

Operation and display

a. LCD Display

After power-on and starts running, device will display frequency band on home page. It will scroll the real-time gain of UL/DL, output power of downlink, ISO and ALC alarm on the screen. (as Figure 1)

Figure 1

b. View the Working Frequency Bands

Keep pressing “SET” button till “Band 5: 850 MHz” is flashing. Then press “INC+” or “DEC-” to switch to another frequency band. At last, press “SET” button to confirm(as Figure 2 and Figure 3).

Figure 2

Figure 3

c. View the Output Power

Keep pressing “SET” button till “Pout: xx dBm” is flashing on the screen. Then the real-time downlink output power will be displayed on the right side of the screen (as Figure 4).

Figure4

d. View the Gain and Gain Attenuation Setting

First, select the frequency you want to set, according to precious guide of "c". Then press “SET” button to light up “Gain UL” on the screen and uplink gain will be displayed on the right side(as Figure 5). Press “INC+” or “DEC-” button to attenuate uplink gain(as Figure 6). Similarly, press “SET” button, light up “Gain DL” on the screen(as Figure 7). Then press “INC+” or “DEC-” button to attenuate downlink gain(as Figure 8).

Figure 5

Figure 6

Figure 7

Figure 8

e. Auto Stand-by Function

When uplink input signal is lower than -80dBm (no phone being used in the coverage area), uplink signal output will be automatically shut off. “Work” at the left bottom of the screen will light off while LED indicator “Run” will be flashing (as Figure 9). When uplink input signal is higher than -75dBm(Using phone being detected), uplink will automatically restart and LED indicator “Run” will light up(as Figure 10).

Figure 9

Figure 10

f. ISO, Self-oscillation Cancellation and Auto Shut-off

Device can detect the real time isolation. If isolation between outdoor and indoor antennas is insufficient, the “I.S.O” at the middle bottom of the screen will light up and ALC inside the device will work and automatically attenuate the gain to make it work normally(as Figure 11).

When severe self-oscillation occurs(isolation between outdoor and indoor antenna is lower than gain value of 15dB), signal output will automatically shut off to avoid self-oscillation and causing interference to the BTS. Meanwhile, “I.S.O” at the middle bottom of the screen will be flashing and Run indicator will be red color(as Figure 12).

In this case, users should turn off device, change the direction and height of the antennas so that there is enough isolation for the device to run normally, then restart the signal amplifier.

Figure 11

Figure 12

Technical Specification

Items		Uplink	Downlink
Frequency Range	850 Band 5	824~849	869~894
	1700/2100 Band 4	1710~1785	1805~1880
	1900 Band 2	1920~1980	2110~2170
Output Power		15±2 dBm	20±2 dBm
Gain		65 ± 3dB	70 ± 3dB
Gain Flatness		6 - 8 dB	
VSWR		≤2.5	

Items		Uplink	Downlink
Auto Level Control Range		≥30dB	
Max. input power without damage		0 dBm	
Intermodulation Products		≤-40 dBc	
Spurious Emission	9KHz~1GHz	≤-36 dBm	
	1GHz~12.75GHz	≤-30 dBm	
Manual Gain Control Range, 1dB step		0 - 31dB	
Noise Figure		≤8 dB	
ACRR(W)	5MHz	≥ 20dB	
	10MHz	≥ 20dB	
EVM		≤ 8~12.5%	
Time Delay		≤1.5 μs	
RUN Indicator	Normal	Green & ON	
	Idle Turn-off	Green & flashing	
	ISO alarm	Orange (auto degrading of system gain, because of insufficient isolation)	
	Not working	Red	
ALC Alarm Indicator	Not active	Green	
	Active 5 ~ 10dB	Orange	
	Active 15 ~ 25dB	Red	
LCD Screen	Band	Display of frequency band	
	Gain	Display of UL & DL Gain	
	Pout	Display of DL Output Power	
	Work	Working normally: displayed, Auto shut-off: not displayed	
	ISO	Working normally: not displayed; isolation alarm & auto degrading gain: display; Auto shut-off for severe self-oscillation : displayed & flashing	
	ALC	Not active: not displayed; active @ 5-10dB: displayed; active @15-29dB: displayed & flashing	
Auto Stand-by	@ max gain, UL input signal is ≦ -80dBm (threshold value) for 5±1 continuous minutes, UL PA will turn OFF; when UL input signal is > -75dBm, UL PA will turn ON immediately.		
Self-oscillation Cancellation & Auto Shut-off	Real-time isolation check & alarm: if self-oscillation occurs (isolation is lower than gain), device auto degrade the gain to cancel the self-oscillation; If it is severe self-oscillation (isolation ≦ gain value of -15dB or below), the device will be automatically shut off.		
Over Input Shut-off	If input power is out of ALC range, UL and DL PA will be turned OFF in 5s. The system will automatically restart the device every 30±5s. If input power is out of ALC range for 5 times after re-starting, the device will be permanently turned OFF until it is powered on again.		
Power Supply		DC: 12V (AC: 110 - 240V)	

Items	Uplink	Downlink
Power Consumption	< 25 W	
RF Connector	N-Female	
I/O Impedance	50Ω	
Environment Class	IP40, for indoor	
Operating Humidity	< 90%	
Operating Temperature	-10℃~ +50℃	
Heat Dissipation	Conventional	
Size	L206xW140xH37mm	
Weight	≤ 3Kg	

Installation Guides

a. Installation Site Requirements

1) The amplifier should be installed in a place with stable and independent power supply.

2) The amplifier should be installed in the space without corrosive gas, smokes and leaky liquids.

3) The amplifier had better be installed on the wall that is ventilated, waterproof, lightning-proof and without sunshine.

4) The height of the installation site should be safe and easy for cabling, maintaining & good for heat dissipation.

b. Installation Tools

No.	Items	Quantity	Remarks
1	Impact drill	1	Drill holes on wall, <self-provided>
2	Wrench	1	Reinforce the interface connection, <self-provided>
3	Mobile phone for testing	1	Test installation effectiveness, <self-provided>
4	Multimeter	1	Test voltage and wiring connection, <self-provided>
5	Screwdriver	1	Tighten or fasten the device, <self-provided>
6	Waterproof tape	A few	Prevent liquid from leaking into the feeder interface, <self-provided>

c. Installation Steps

1) Find a site with the strongest signal for the outdoor antenna with your mobile phone by the way below. And temporarily install the outdoor antenna. The direction of the outdoor antenna should be towards to nearest base station.

iPhone: Dial *3001#12345#*, then press call. Select “Serving Cell Measurement” to see the RSRP or RSSI.

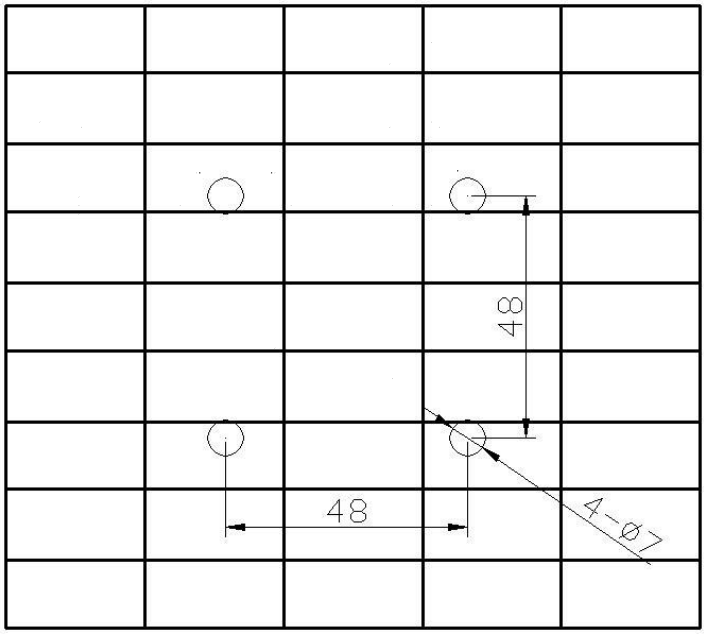
Android: Setting→ About Phone → Status or Network → Signal Strength or Network Type

and Strength (options depends on different phone models)

2) The installation site of the indoor antenna should be in the central of the weak signal zones that you want to amplify the signal. The distance between outdoor and indoor antennas is at least 5 mts vertical or 10 mts horizontal.

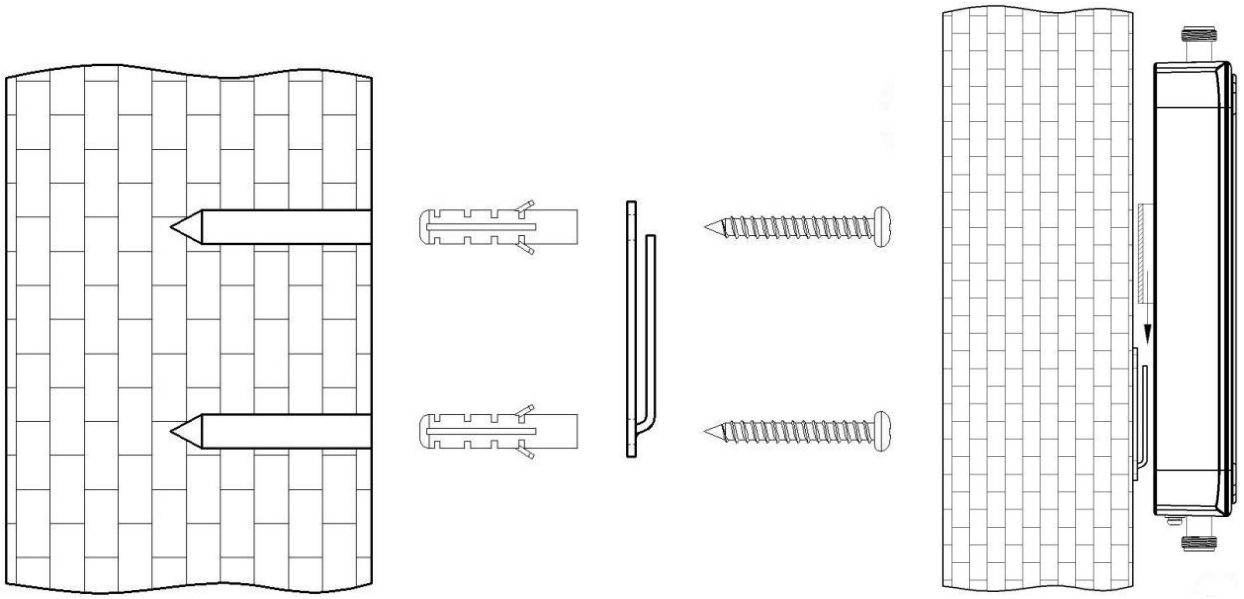
3) Find a suitable site for the amplifier(better a solid wall), according to the installation requirements and dimension of the amplifier.

4) Estimate and mark the sites for installation holes of U-shaped back holder. Drill holes with the impact drill. Sizes of holes are 7mm. The expected sites are as follow: (unit: mm)



3) Put the expansion plug(size: 8mm) into the 4 drilled holes.

4) As shown in the figure, align the fixing holes of the U-shaped back holder with corresponding holes on the wall. Then drive 4 pcs of M6*40 screws into the expand plugs with screwdriver. Finally, hang the amplifier firmly on the U-shaped back holder.



d. Antenna Connections

Installation and connection of the antennas should follow the requirements as following:

1) Wrap the waterproof tape around the connection part of the outdoor antenna and outdoor cable, keeping it away from water oxidation and corrosion.

2) The vertical distance between the indoor and outdoor antennas should be over 5m, and the transmit direction of indoor antenna should not aim at the outdoor antenna.

3) It will be better if there is a wall between outdoor and indoor antennas.

e. Trial Operation

1) If possible, please wire up the grounding screw of amplifier to the ground wire of the power line.

2) Make sure the feeder cables between the amplifier and antennas are firmly connected.

3) Connect the DC plug of 12V/3A power adapter to DC+12V port of the amplifier. Then put AC plug connecting to the nearby 110-240V power outlet.

4) Check if the amplifier can work normally or not, by checking the operation parameters on the screen, according to the guides of the previous “Operation and Display Description”part.

5) Test the signal intensity and call quality with a mobile phone in the coverage area.

Maintenance and Repairing

FAQ and Solutions

Problems	Possible causes	Solutions
Screen and indicator lights off	Disconnected to power source	Check the power adapter and power outlet, and reconnect it

ISO on the screen flashes after powered on	Not enough isolation between outdoor and indoor antennas	Change the distance and directions of the antennas, until ISO is not flashing
Everything is okay after starting, but no improvement of signal strength	The network of SIM card does not comply with that of the amplifier	Change SIM card or amplifier
	The indoor antenna is not successfully connected	Fasten the connection of the inside cable and connectors
	The indoor antenna is damaged	Replace the indoor antenna
Effectiveness of the amplifier degrades after working for some time	The outdoor antenna is damaged	Replace the outdoor antenna
	The outdoor antenna get loose and is not aiming towards the BTS	Change the direction of outdoor antenna and fasten it
	Feeder cable is damaged	Replace the feeder cable

Notices

Power-off is recommended in any of the following situations:

- Power supply is abnormal.
- Liquid leaks onto or into the device, or too close to a fire.
- Working conditions are abnormal, and overheating or strange smells are founded.