

Mobile Signal Booster

User Manual





INVERSIONES S & U, C.A.

Teléfonos: (0241) 416.1769 / (0414) 405.2338

E-mail: invsiu@hotmail.com

Preface

We appreciate that you selecting our signal amplifier.

The detailed User Manual is attached to this machine so that you can get familiar to operate it as soon as possible, from which you will get the information of product introduction, operation instructions, system settings and safety precautions, etc.

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Safety Warning

Users must follow the below principles:



1 Repeater should follow system requirement of communication equipment, assure good groundings and lightning protection.



2 The power supply voltage of repeater should meet the standards of security requirement; any repeater-operator can operate only after cutting power in advance. Only the professional can operate electrified.



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



4 Do not open the repeater; touch the module of repeater, even not to open the cover of module to touch the electronic component, the components will be damaged due to electrostatic



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

1. Purpose

As the domestic mobile communication industry develops rapidly, the amount of mobile communications users increases so steadily that the cell planning gets smaller and smaller while the base station positions get lower and lower. On the other hand, as city construction develops, more and more high-rise buildings are set up constantly, based on the shadow effect of the radio propagation, the mobile communications may get a signal blind spot behind or between the buildings. Moreover, in order to avoid interference from adjacent districts, the main lobe of the antenna radiation orientation of the cell mobile communication base station in construction has a bigger down-tilt obliquity, thus the signals usually can not be received effectively in the high and medium parts of the high rise buildings. Furthermore, due to the shield effect to electro-magnetic waves caused by buildings, the mobile communication signals cannot be received in tunnels, subways, underground stores, entertainment complex, parking fields, hotels, office buildings and other large-size and closed buildings.

Signal amplifier is an effective device that makes up the insufficient base station coverage in the mobile network, enlarges the coverage area of the base station and fills in the blind spots, which adopts double-ended duplex design and external power supply with advantages of convenient mounting and high reliability. The bandwidth of the signal amplifier may cover GSM, CDMA, DCS, PCS, WCDMA with compatibility between digital

system and analogue system.

2. Technical features

- High system gains
- Full duplex and double-end design, external power supply, and convenient installation
- ALC technology with auto-steady function adopted.
- Provide power indication and uplink and downlink indications.
- With the amplified linear power, the intermodulation and spuriousness are suppressed effectively.
- The reliability conforms to GB6993-86 standards.
- The electromagnetic compatibility conforms to ETS300 609-4 standards

3. Application.

This product is suitable for operation of mobile phones in a weak signal area!



4. Technical specifications

Model		TE-9102A	TE-9102B	TE-9102C
Frequency range		Uplink 890-915MHz		
		Downlink 935-960MHz		
Model		TE-9102A-C	TE-9102B-C	TE-9102C-C
Frequency range		Uplink 824-849MHz		
		Downlink 869-894MHz		
Model		TE-9102A-I	TE-9102B-I	TE-9102C-I
Frequency range		Uplink 806-824MHz		
		Downlink 851-869MHz		
Gain (dB)	Uplink	Gp≥55	Gp≥65	Gp≥45
	Downlink	Gp≥60	Gp≥70	Gp≥50
Gain adjustable(only B/B-C/B-i)		MGC≥30dB		
Output power		≥20dBm	≥23dBm	≥20dBm
Pass band ripple		≤5dB		
I/O impedance		50Ω/N Connector		
I/O return loss		≤-8dB		
Noise figure		≤-8dB		
Intermodulation attenuation(Po=13dBm)		≤-40dBc		
Transmission		≤0.5μs		
Ambient		-10℃~50℃		
Power supply		AC110~240V±10% 45~55Hz		
Reliability		To the GB6993-86 standard		
Electromagnetic		To the ETS300 694-4 standard		
Function		a) Power supply LED enote b) Export power LED enote		
RF Connector		N-Female		
Size		184mm×107mm×33mm		
Size(TE-9102B/B-C/B-i)		190mm×107mm×33mm		
Weight		< 1.2 Kg		

Model		TE-9050	TE-9060	TE-9070
Frequency range		Uplink	890-915MHz	
		Downlink	935-960MHz	
Model		TE-8050	TE-8060	TE-8070
Frequency range		Uplink	824-849MHz	
		Downlink	869-894MHz	
Gain (dB)	Uplink	Gp≥45	Gp≥55	Gp≥65
	Downlink	Gp≥50	Gp≥60	Gp≥70
Output power		≥17dBm	≥17dBm	≥20dBm
Pass band ripple		≤5dB		
Guard band rejection		(BW-60dB) ≤42MHz , (BW-70dB) ≤45MHz		
I/O impedance		50Ω/N Connector		
I/O return loss		≤-8dB		
Noise figure		≤-8dB		
Intermodulation attenuation(Po=13dBm)		≤-40dBc		
Transmission		≤0.5μs		
Ambient		-10℃ ~ 50℃		
Power supply		AC110~240V±10% 45~55Hz		
Reliability		To the GB6993-86 standard		
Electromagnetic		To the ETS300 694-4 standard		
Function		a) Power supply LED denote b) Export power LED denote		
RF Connector		N-Female		
Size		135mm×85mm×28mm		
Size(TE-90/8070)		150mm×85mm×28mm		
Weight		< 0.8 Kg / (TE-90/8070 <1.2 Kg)		

Specification		TE-1860	TE-1850
Frequency range		Uplink	1710-1785MHz
		Downlink	1805-1880MHz
Specification		TE-1960	TE-1950
Frequency range		Uplink	1850-1910MHz
		Downlink	1930-1990 MHz
Specification		TE-3G60	TE-3G50
Frequency range		Uplink	1920-1980MHz
		Downlink	2110-2170 MHz
Gain (dB)	Uplink	Gp≥55	Gp≥45
	Downlink	Gp≥60	Gp≥50
Output power		≥17dBm	≥17dBm
Pass band ripple		≤10dB	
I/O impedance		50Ω/N Connector	
I/O return loss		≤-8dB	
Noise figure		≤-8dB	
Intermodulation attenuation (Po=13dBm)		≤-40dBc	
Transmission		≤0.5μs	
Ambient		-10℃～50℃	
Power supply		AC110～240V±10% 45～55Hz	
Reliability		To the GB6993-86 standard	
Electromagnetic		To the ETS300 694-4 standard	
Function		a) Power supply LED denote b) Export power LED denote	
RF Connector		N-Female	
Size		150mm×85mm×28mm	
Weight		< 0.8 Kg	

Model		TE-9102A-D	TE-9102C-D
Frequency range		Uplink	1710-1785MHz
		Downlink	1805-1880MHz
Model		TE-9102A-P	TE-9102C-P
Frequency range		Uplink	1850-1910MHz
		Downlink	1930-1990 MHz
Gain (dB)	Uplink	Gp≥55	Gp≥45
	Downlink	Gp≥60	Gp≥50
Gain adjustable		MGC≥30dB	
Output power		≥20dBm	≥20dBm
Pass band ripple		≤10dB	
I/O impedance		50Ω/N Connector	
I/O return loss		≤-8dB	
Noise figure		≤-8dB	
Intermodulation attenuation (Po=13dBm)		≤-40dBc	
Transmission		≤0.5μs	
Ambient		-10℃～50℃	
Power supply		AC110～240V±10% 45～55Hz	
Reliability		To the GB6993-86 standard	
Electromagnetic		To the ETS300 694-4 standard	
Function		a) Power supply LED denote b) Export power LED denote	
RF Connector		N-Female	
Size		220mm×107mm×33mm	
Weight		< 1.2 Kg	

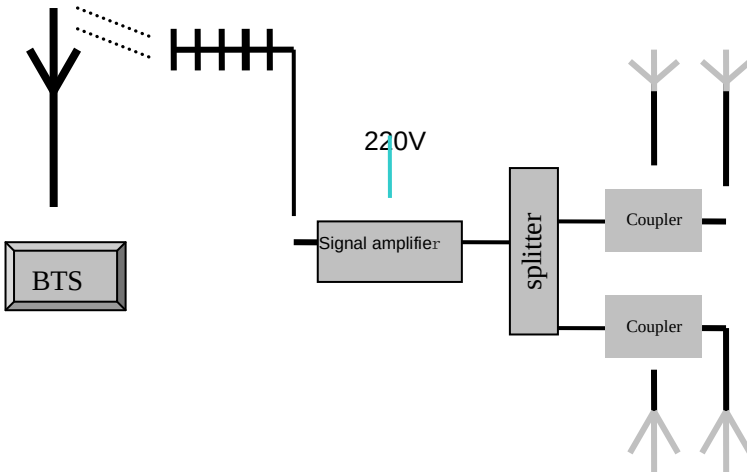
Model		TE-9018A	TE-9018B	TE-9018C
Frequency range		Uplink 890-915MHz/ 1710-1785MHz		
		Downlink 935-960MHz / 1805-1880MHz		
Gain (dB)	Uplink	GSM Gp≥55 DCS Gp≥50	GSM Gp≥65 DCS Gp≥55	GSM Gp≥45 DCS Gp≥45
	Downlink	GSM Gp≥60 DCS Gp≥55	GSM Gp≥70 DCS Gp≥60	GSM Gp≥50 DCS Gp≥50
Gain adjustable		MGC≥30dB		
Output power		≥20dBm	≥20dBm	≥20dBm
Pass band ripple		≤10dB		
I/O impedance		50Ω/N Connector		
I/O return loss		≤-8dB		
Noise figure		≤-8dB		
Intermodulation attenuation (Po=13dBm)		≤-40dBc		
Transmission		≤0.5μs		
Ambient		-10°C~ 50°C		
Power supply		AC110~240V±10% 45~55Hz		
Reliability		To the GB6993-86 standard		
Electromagnetic		To the ETS300 694-4 standard		
Function		a) Power supply LED denote b) Export power LED denote		
RF Connector		N-Female		
Size		196mm×136mm×38mm		
Weight		< 2Kg		

Model		TE-8019A	TE-8019B	TE-8019C
Frequency range		Uplink 824-849MHz/ 1850-1910MHz		
		Downlink 869-894MHz / 1930-1990MHz		
Gain (dB)	Uplink	CDMA Gp≥55 PCS Gp≥50	CDMA Gp≥65 PCS Gp≥55	CDMA Gp≥45 PCS Gp≥45
	Downlink	CDMA Gp≥60; PCS Gp≥55	CDMA Gp≥70 PCS Gp≥60	CDMA Gp≥50 PCS Gp≥50
Gain adjustable		MGC≥30dB		
Output power		≥20dBm	≥20dBm	≥20dBm
Pass band ripple		≤10dB		
I/O impedance		50Ω/N Connector		
I/O return loss		≤-8dB		
Noise figure		≤-8dB		
Intermodulation attenuation (Po=13dBm)		≤-40dBc		
Transmission		≤0.5μs		
Ambient		-10℃~50℃		
Power supply		AC110~240V±10% 45~55Hz		
Reliability		To the GB6993-86 standard		
Electromagnetic		To the ETS300 694-4 standard		
Function		a) Power supply LED denote b) Export power LED denote		
RF Connector		N-Female		
Size		196mm×136mm×38mm		
Weight		< 2Kg		
Installation Type		Wall Installation		

Model		TE-903G-A	TE-903G-B	TE-903G-C
Frequency range		Uplink 890-915MHz/ 1920-1980MHz		
		Downlink 935-960MHz / 2110-2170MHz		
Gain (dB)	Uplink	GSM Gp≥55 3G Gp≥50	GSM Gp≥65 3G Gp≥55	GSM Gp≥45 3G Gp≥45
	Downlink	GSM Gp≥60 3G Gp≥55	GSM Gp≥70 3G Gp≥60	GSM Gp≥50 3G Gp≥50
Gain adjustable		MGC≥30dB		
Output power		≥20dBm	≥20dBm	≥20dBm
Pass band ripple		≤10dB		
I/O impedance		50Ω/N Connector		
I/O return loss		≤-8dB		
Noise figure		≤-8dB		
Intermodulation attenuation (Po=13dBm)		≤-40dBc		
Transmission		≤0.5μs		
Ambient		-10℃~50℃		
Power supply		AC110~240V±10% 45~55Hz		
Reliability		To the GB6993-86 standard		
Electromagnetic		To the ETS300 694-4 standard		
Function		a) Power supply LED denote b) Export power LED denote		
RF Connector		N-Female		
Size		196mm×136mm×38mm		
Weight		< 2Kg		

5. System structure

A simple signal amplifier system is composed of a host signal amplifier, reverse antenna and in-door covering system. Reverse antenna aims at the reverse base station that requires for expanding the coverage, the BTS Port of the host signal amplifier is connected with reverse antenna and User's Port is connected with in-door covering system. As shown in the following diagram, firstly, the indoor signals introduced by the signal amplifier are divided into two-way signals by splitters, then each signal is distributed two antennas through a coupler with the power distribution ratio equal to circuit exhaust ratio so as to ensure both of the antennas to obtain equal power (splitter and coupler may can be configured flexibility). It shall be attached importance that at least 15dB of the isolation shall be bigger than the plus between reverse antenna and covering system for meeting the requirements of $C/I \geq 15\text{dB}$ of the GSM/CDMA/DCS/PCS/WCDMA system.

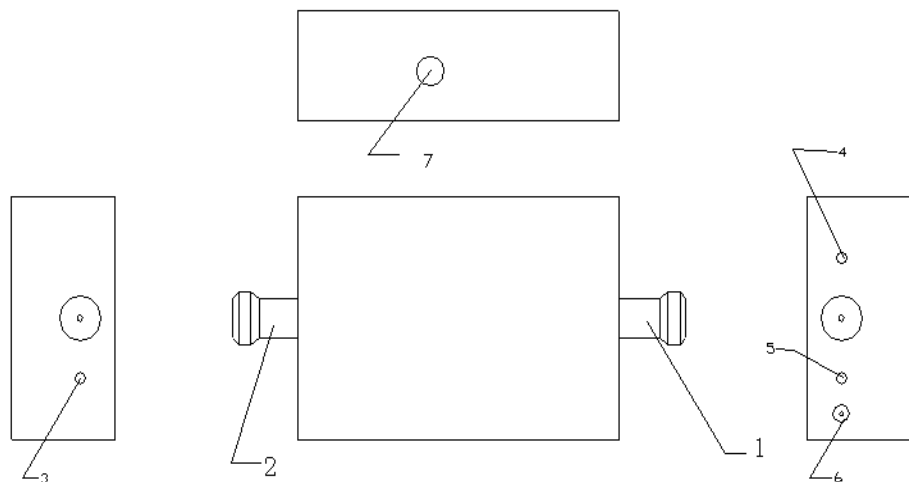


System structure diagram

6. Operation instructions

6.1. Descriptions of the overall dimension of the equipment

The whole-set shape is shown as follows:



- ① RF Port BTS Port (Uplink input, Downlink output) connected with reverse antenna facing to the base station.
- ② RF Port User's Port (Uplink input, Downlink output) connected with indoor covering system
- ③ Uplink power indicator light
- ④ Downlink power indicator light
- ⑤ Power indicator light
- ⑥ Power interface

⑦ Adjustable gain

	Attenuation (dB)				
	1	2	3	4	5
Uplink	1	2	4	8	16
Downlink	1	2	4	8	16

6.2 Instructions on installation

- Firstly, select an appropriate position to mount. The signal amplifier is better to be mounted close to walls. At the position selected, punch a hole in the wall as shown in the diagram and aim the bolt at the hole. Then fasten and fix with expansion bolts.
- Connect the BTS Port (① in the diagram) with out door reverse antenna through radio frequency cable. In general, the reverse antenna is mounted at a higher position. Yagi antenna and panel antenna may be used. The main lobe of the antenna radiation is oriented towards the base station and the reverse antenna and base station antenna should be visible as possible.
- Connect User's Port (② in the diagram) with the ports of indoor covering system or indoor relay antenna. In general, the indoor covering system is composed of several splitters, couplers, expansion amplifiers and antennas and applied as per specific

- engineering design for the purpose of satisfying the signal covering demands in large area or complicated terrain indoor space. In the case of small area indoor space, the requirements for covering can be satisfied by using single relay antenna with the option of hanging antenna or ceiling antenna.
- d) Finally, connect the power interface shown as ⑥ in the diagram to 5V3A power adapter and power on the adapter with 220v AC. The signal amplifier installation is thus completed.
 - e) Omni antenna (Indoor ceiling omni antenna or whip antenna), suitable to installed in the center and radiate all directions;
It is better to use a directional panel antenna or Yagi when the coverage shape is long and narrow (corridors, long row of houses in two sides, tunnels or elevators or rural open space)

6.3. Debugging and commissioning

1. Power on with 220V AC at the premise of no fault being found in inspection. The glowing indicator light shown as ⑤ in the above diagram is means the power supply works normally.
2. If the reverse antenna is mounted correctly, the Downlink power indicator light should be on. In this case, the covering area of the equipment shall be larger than that in the technical specifications.

3. If the required covering area is too large and the Downlink power indicator light is off after powering on, it means that the input power is not sufficient and the position of the reverse antenna should be adjusted to receive more strong downlink signals.
4. When the debug is completed, select more than 20 points in the covering area to test the signal level and talking effect of the mobile phone. It should be ensured that the signal bar shall be fully filled with strong signal in 90% of the covering area, and less than 5% of the covering area can have two signal bars. Meanwhile talking clearly and no interruption occurs.
5. Switch off and then power on, check whether it is normal. Then test with mobile phone, the working state shall remain same as the original. Keep it running for one to two hours around for further test.
6. Recheck the whole system and clean up the working site.
7. Record the work and fill in the Engineering Records Form in details and make the archives as well.

Notice:

1. The signal amplifier must be put into operation as per the above mentioned steps strictly.
2. Ensure safety of the equipment and personnel. Be sure that there is no connection fault before powering on.

3. Well Record the process and any fault shall be reported.

6.4 System maintenance

The strict power supply protection and power protection measures in the design of the signal amplifier assure high reliability of the equipment. When it is put into operation, rarely is manual maintenance required. But for assuring the high reliability of the communication in the covered area, it is recommended to check them half a year regularly, which shall include:

1. Check the reverse antenna system: find out if the antenna orientation or position is changed, or if the bolt is unfastened or loosened.
2. Check the indoor covering system: find out if the lines are removed or if the fixed devices are loose and if power is well connected. Remove the potential hazards as early as possible, if any.
3. Check transmitting power: find out if the panel indicator lights of the signal amplifier are working normally. The power indicator light should be on and the Uplink and Downlink power indicator lights should be on as well.
4. Timely remove the malfunction if any. Record the maintaining process and fill in related forms.

7. Descriptions on maintenance

7.1. Faults

1. When 220V AC is connected, the power indicator light is not on.
2. The power supply is normal, but the Uplink and Downlink power indicator lights are not on even with the signals received.

7.2. Troubleshooting

1. When the 220V AC is powered, the power indicator light is not on. Firstly, check if the AC socket is in good conditions and then check if the 220V power is in the normal state with a multimeter at the voltage of AC 750V.
2. If the power supply is confirmed to be normal and the signal is applicable, the Uplink and Downlink power indicator lights are not on, check if cables are correctly connected, and if the position and orientation of the antenna are appropriate.
3. The above-mentioned check methods are mainly applied for jobsite maintenance. In general, only a multimeter is used instead of large size instruments. Please contact the manufacturer if the malfunction still cannot be removed after implementing the above-mentioned methods of 1 and 2. HP8713C network analyzer may be used for testing in the process of maintaining in the labs or production plants. Different malfunctions shall adopt different methods.

Service is forever

This User Manual concerns the signal amplifier product series of us. Some omissions are inevitable due to insufficient preparing time. For any question, please contact us for correction. We are ready for reply and serve you wholeheartedly.

We sincerely hope that this User's Manual will bring you convenience, the changes of the standards, technical requirements or varieties of product dimensions involved in this User Manual may result in revision without notification to you as technology develops and time goes by.