

## To user

Thanks!

Digital repeater (is briefly referred to as repeater below), use the high performance radio frequency module, Control panel, Power supply module and Built-in duplexer (Optional), designed as 50w professional repeater.

Repeater use the modular design, with high performance and easy to maintain, convenient to update and the interface opening features.

Repeater main functions are wireless transfer, support local PTT calling and support expanding function, is convenient for users to add other communication functions, which will bring a lot of convenience for your work and life.

Repeater use the most advanced and superb technology hope our quality will satisfy you.

## Contents

USER INSTRUCTIONS .....	2
SAFETY PRECAUTIONS.....	3
OOBA.....	4
PRODUCT INTRODUCTION .....	4
FRONT PANEL INTRODUCTION .....	4
PANEL INTRODUCTION .....	4
FUNCTION INTRODUCTION .....	5
REPEATER OPERATION .....	8
TURN ON/TURN OFF REPEATER .....	8
INDICATION OF TRANSIT.....	8
SOFTWARE OPERATION .....	9
PANEL KEY OPERATION AND DIGITAL DISPLAY .....	9
PANEL OPERATION.....	12
OVERALL FRAMEWORK.....	12
SET UP DISPLAY .....	12
PASSWORD AUTHENTICATION.....	16
SHORTCUTS.....	16
TROUBLESHOOTING GUIDE .....	16

## User instructions

- ◆ Would you please read this manual carefully before using this product, so that you can more easily handle the operation of this machine. When you use this product, we think that you have read the instructions already. ◦
- ◆ Please carefully keep this instruction for future reference.
- ◆ In order to safeguard the legitimate rights and interests of you, so please seriously truthfully fill in the user's warranty Card " when buying our products, and ask for the purchase vouchers.
- ◆ Because this product relates to upgrade and improve, the company reserves the rights of changing the soft specifications without prior notice to at any time in this manual. This manual mentioned product specifications and information is only for reference.

## Safety Precautions

For the safety and effectiveness of your operation, please read below information carefully.

- ◆ High voltage and high temperature, be careful for electric shock and burn
- ◆ Maintenance work must be professionals and technicals, don't dismounting.
- ◆ Setting and install must be approved of the radio administrative department.
- ◆ Repeater has the ground terminal, which should be carefully ground for the safety and performance of the machine.
- ◆ The installation of the antenna must be the lightning protection measure, otherwise may cause serious lost.
- ◆ Please use the qualified antenna, anti-thunder, feeder, power divider to make sure the correct of installation

## OOBA

Please be careful when open the packing box, confirm whether has goods inside of the box, if you find something miss or been damage, please contact dealer.

Item	No.
Repeater	1
AC power supply line	1
USB data line	1
Microphone	1
Coaxial cable (for duplexer)	1
User manual	1
Warranty Card	1

## Product Introduction

### Front panel introduction



**Front view**



**Front panel larger view**

Indicator	Color	Functional description
TX	green	Always on, the repeater is transmitting signals
RX	green	Always on, the repeater is receiving signals
LNK	green	Always on, the link is successful
ERROR	red	On or flashes, error occurred
DC	green	Always on, DC power supply equipment
POWER	green	TS B transmit
A、 B	green	Digital time slot one receive signal, A light on. Digital
		time slot two, B light on. Analog doesn't light.

### Digital tube (two bits) instruction

Including two bits eight segments digital tube, the function as below:

- 1) Instruct current working channel number during working condition.
- 2) Use to display current menu option or some function parameter figures during key operation
- 3) Display current error code when the repeater appear warning.

### Front panel board MIC interface

Front panel board MIC interface use to internet microphone, local PTT can be use as talking or use as base station to call.

### Key function detailed description

Button	Name	Menu guide function	Parameter editor function
	C	1.short press back to up menu or root menu 2.long press back to standby mode and lock the keyboard	Clear or cancel current parameter value
	Left	1. Up level menu 2. Shortcut menu: decrease channel	Value decrease
	Right	1. Next level menu 2. Shortcut menu, increase channel	Value increase
	Ok	Enter next level menu	Confirm and save current parameter value
	F1	Function key 1 (software defines)	Figure 1
	F2	Function key 2 (software defines)	Figure 2
	F3/v_	1.Function key 3 (software defines) 2.Shortcuts menu: volume down	Figure 3

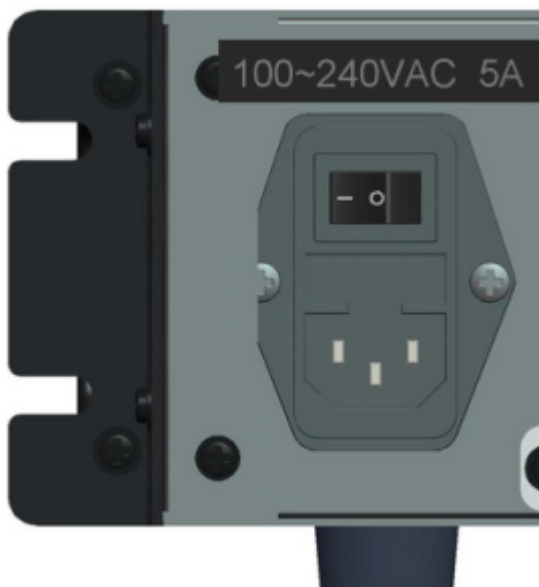
	F4/v+	1.Function key 4 (software defines) 2.Shortcuts menu: volume up	Figure 4
--	-------	--	----------



Rear view



Outside interface large picture



Power supply interface and large switch picture

### Rear panel port introduction

Port name	Function declaration
USB	Connect with PC, use ain programming、 software update。
EXT-I/O	Outside expand interface, including the signal connected with outside and control the Pin, use as specific expanding function. Outside look structure define the interface.
RJ11	Connect with PSTN telephone network or PABX internal telephone network, use as expanding interworking call with telephone network.
ANT/TX	Connect with antenna when duplexer installed, connect with transmit antenna when duplexer uninstalled。
ANT/RX	connect with transmit antenna when duplexer uninstalled。

### Rear panel EXT-I/O port definition

Pin No.	Definition	Function declaration
Pin1	-13v	Power ground
Pin2	IO_CLKX'	CLKR output signal, LVTTTL_3.3V
Pin3	UART3_RX'	UART3_RX serial port
Pin4	IO_PTTI	PTTR input signal, LVTTTL_3.3V
Pin5	SEL0_IN/SEL0_OUT	Expanding IO-0 LVTTTL_3.3V
Pin6	DG	Digital
Pin7	AG	Analog

Pin8	EXT__IO_UF_OUT	Extend AF output
Pin9	EXT__Ext_MIC	Extend MIC input
Pin10	+13v	12V_OUT 500mA_max
Pin11	IO_DX	DATAR peripheral equipment information
Pin12	IO_FSX	FSR sync output
Pin13	IO_CLKR	CLKR input signal
Pin14	Ext_BOOT0	Guidance enabled
Pin15	DG	Digital
Pin16	AG	Analog
Pin17	NDET_OUT	Expanding port (output)
Pin18	NDECT_IN	Expanding port (input)
Pin19	UART3_TX	UART3_TX serial port
Pin20	O_PTTO	PTT output
Pin21	IO_DR	DATAR peripheral equipment voice data
Pin22	IO_FSR	FSR signal lock input
Pin23	DG	Digital
Pin24	AG	Analogue
Pin25	RSSI_IN	Extension field intensity level(0~3V) (in)
Pin26	RSSI_OUT	Extension field intensity level (out)

## Repeater operation

### turn on/turn off repeater

Press “power switch to the ”one” direction to turn on, then the speaker will make a sound, the ‘PWR’ indicator turning red, device start working, the system is going to stand by condition.

### Audio, data transmit

Repeater receive the upstream RF signal, automatically control the transmitter (excitation module and power amplifier module) to transfer, which will enhance the received signal to increase communicate distance.

### Indication of transit

- 1) ‘A’ and ‘B’ indicator turning light when device is working, indicate the signal is digital,TS1 is during communication when ‘A’ turning light,TS2 is during communication when ‘B’ turning light.
- 2) ‘TX’ and ‘RX’ indicator turning light or ‘A’ and ‘B’ not turning light, indicate the signal is analogue signal.



## Panel key board and display



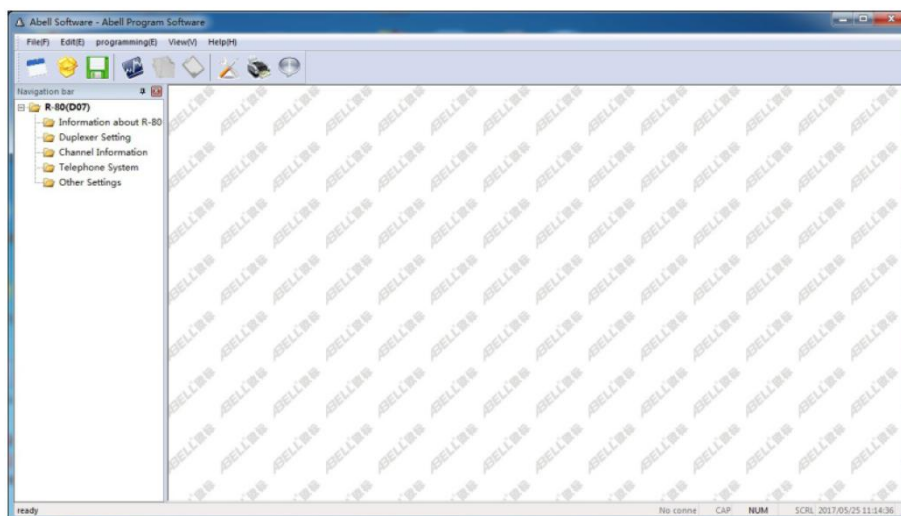
Key and Display

### Key tone

1. Operate to modify working parameter and operate optional menu key, once “beep” informed.
2. Operate parameter error and operate invalid, continual short “beep” sound informed.

### Programming software operation

- 1) programme wire joint  
Run R-80 programme software installation package, then it will automatically install
- 2) Configure the setup parameters  
Repeater connect with PC through USB programme cable, open up the repeater power supply after the device being normal working condition, run the R-80 software to the interface bellowed:

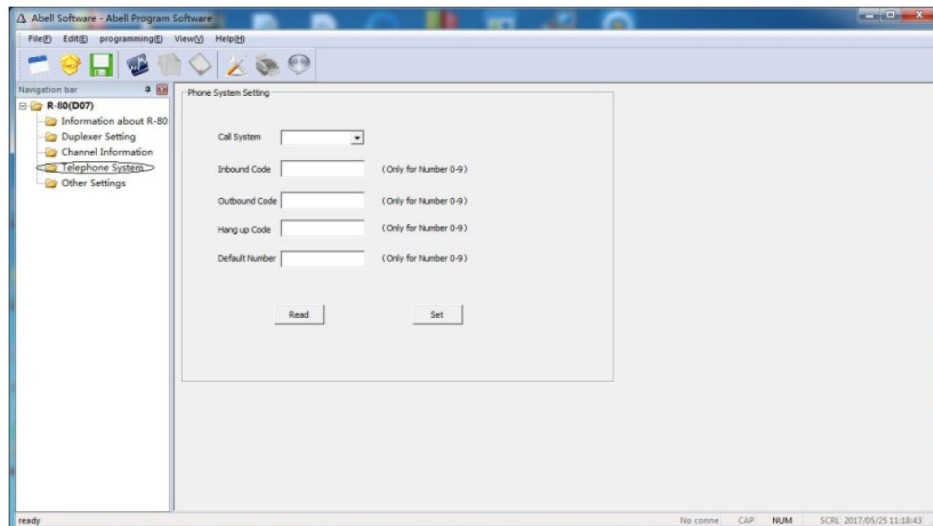


Please refer to “R-80 digital repeater software operation instruction manual” to set up channel, receive and transmit frequency, power, color code and monitor, PTT and so on.

### Two way radio calling

#### 1) Repeater configuration

- ① Find “telephone system” in R-80 programme software, configuration as bellowed:



- a) Calling settings: according need to set whether opening call for or not, default yes: available for call in or call out.
- b) Call in password: when others call the repeater telephone number, they will need to input this password.
- c) Call out password: when you need to call others telephone number, you need to input this password.
- d) Hang up password: when the calling is over, the repeater need to input this password to hang up.
- e) Embedded password: The repeater default calling out number.

② Only digital channel can use the telephone call function, and choose microphone PTT function, transmit prior option, wireless priority.

## 2) Two way radios' configuration

Handsets must be digital and support PSTN function, we use HYT PD680 as an example.

① Choose the telephone system under handset digital channel configuration parameter, telephone system one (if you choose none, PSTN can not calling), transmit permission options: allow transmit or color code idle, do not choose channel idle.

② enter menu options: general setting, digital general, basic setting, do not choose Miscellaneous, use single call, back call and all call.

## Answer and make a phone call

- ① handset make a phone call (for example: call out password is: 222)
  - a) Dial any number: press the PTT button, input :call out password+ \* + phone number + #.  
For example, call 26000000, firstly, press the PTT button, input 222+26000000 on two way radios' keyboard at the same time, then release PTT button, after a few second, you can see the radios send the phone call from the display, then you can have a call if other side answer.
  - b) Dial embedded number: press PTT buttons on two way radios, input call out password+ #,

for example, the embedded number is 075526000000, firstly, press the PTT button, input 222# on keyboard, then release PTT, after a few seconds you can have a call with 075526000000.

② Handsets (repeater) answer the call (the call in password is :111 )

If other side use the plane or phone to call the handsets (repeater), after get through you need to input call password+#(111#), then you can have a call.

③ Handsets(repeater) hang up the phone, ( the hang up password is 333 etc):

When the call is over, if the other side not hang up, the repeater will hang up itself, the operation is : press the PTT, then input: hang up password +# (333#).

## Panel operation

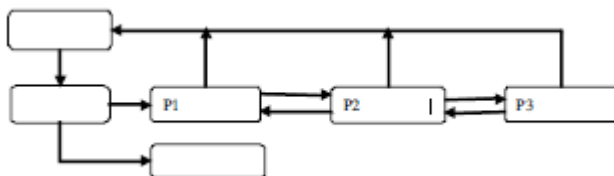
### Holding state

When the device start to work, the panel enter holding state, and will display current channel number, the picture below is channel number 8.








### Menu function

Panel function operation include: channel switching, monitor volume adjustment, monitor switch (P1), transmit power regulation (P2), password changing (P3), the channel switching and the volume adjustment are in shortcut menu, others are general function, operation mode is different, the operation process like below:




If the device does not open the password lock function, press “OK” button to pass password authentication process.

### Password authentication

- 1) If the current state is menu lock state, press “OK” or shortcuts function button enter password authentication, the digital tube will display  and shining, wait for you to enter password. The password consist of “1” “2” “3” “4” in any random order, six figures, corresponding button is     ;



- 2) After input the password, press , if the password is correct will enter the menu “P1” or performs shortcuts, or will occur warning.

- 3) Press **C** before **OK** will remove the password number you input.
- 4) In any menu press **C**, the device will enter password lock up state and holding state.
- 5) Long time (more than 30 seconds) no button been press, the device will enter password lock up state and holding state.

### Channel switching

Channel switching function is shortcuts menu function, directly press **◀** or **▶** to change the current channel, if the menu have password lock, you need the password authentication, channel number will display “01-99”, when you press **◀** or **▶**, digital display shining, when you changing to target channel, then press **OK** to confirm, digital display stop shining, repeater will change to target channel to start work, press **C** back to holding state, and display the current work channel number.



### Volume adjustment

Volume adjustment function as shortcut menu function, press **F3** or **F4**, changing speaker volume, the volume can be U1 to U8 level, U1 is the lowest, U8 is the highest, when you press **F3** or **←**, the digital display will start to shine, when you adjust to target volume level, and press **OK** to confirm, the digital display will stop shining, the device monitor volume will be set up as target volume level. The follow picture display been set in U8 level, and will become effective when the next profession come, press **C** to come back to holding state.



Volume adjustment

### Monitor switch

- 1) In the holding state, press **OK** to enter monitor switch menu, digital display “P1”, and then press “**▶**” to enter menu option, press **OK**, then enter monitor switch set up operation interface.
- 2) Digital display “ON” or “OF” and shining, respectively represent turn on or turn off monitor switch.
- 3) Press **OK** to confirm, digital display stop shining, the value will be saved and become effective when the next profession come, press **C** to cancel the operation.



- 4) Press **C** again back to P1 menu interface.

#### Power regulation

In the P1 interface, press **◀** to enter power regulation menu option, digital display “P2”, press **▶** back to P1 interface, press **OK** to enter power regulation set up operation interface, the process like below:



- 1) Digital tube alternately display current power level L1 to L9 and current level power value, “L1” responding to 5W, “L9” responding to 45W, the picture below shows the current power level is level 6, the input power is 30W.
- 2) Press **◀** or **▶** to decrease or increase the power level, digital tube alternately display new level “L1 to L9” and responding power value.
- 3) Press **OK** to confirm, digital display stop shining, the value will be saved in the device, and become effective when the next profession comes, press **C** to cancel the operation.
- 4) Press **C** to cancel the operation.

#### Password changing

In the P2 interface, press **▶** to enter password changing menu interface, the digital tube shows P3, you need verify old password before you change password, after the verification pass through, you can changing the password, and the default factory password is “1 1 1 1 1”, the process like below:



P3

- 1) Press **OK** firstly, password authentication, the digital tube shows **FF** and shining,

the detailed process please refer to the “Password Authentication”

- 2) After the password authentication pass, will have a tone mean you are correct, then you can start to set your new password.
- 3) Press any combination of **F1** **F2** **F3** **F4**, set new six figures password, and then press **OK** to confirm.
- 4) Repeat the up process, when these two times password are the same, the repeater will have a tone mean you are correct, the interface back to the P3 interface, mean the new password become effective, if the device have a warning alarm, which mean you are failed to set up a new password, please input the new password again.
- 5) Press **C** to cancel the operation and press **C** again to back to the original interface.



## Troubleshooting guide

Description	Reason	Solution
Boot problem	<ol style="list-style-type: none"> <li>1. The power cord is in poor contact.</li> <li>2. The power cord is broken.</li> <li>3. The fuse of power supply and insurance board are broken.</li> <li>4. Switching power supply failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Re-plug the power cord</li> <li>2. Replace the power cord</li> <li>3. Replace the fuse</li> <li>4. Replace the switching power supply</li> </ol>
Write frequency software failed to connect	<ol style="list-style-type: none"> <li>1. Control line is broken</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace the control line.</li> </ol>
Failed to set up a call	<ol style="list-style-type: none"> <li>1. Frequency of transmission and reception, colour code of transmission and reception, retuned code, are different from the handsets.</li> <li>2. Channel parameter beyond the diplexer working bandwidth, equipment trouble light will be light, the speaker will warning alarm, the fault code is 12;</li> <li>3. Receive module failed, the fault code is 30, 31,32.</li> <li>4. Stimulus module failed, the fault code is 20,21,22.</li> <li>5. Control panel failed, the fault code is 40,41,42.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect channel parameter: the repeater high frequency transmit, low frequency receive: repeater transmit frequency is corresponding to the handsets' receive parts, repeater's receive frequency is corresponding to the handsets' transmt frequency, the colour code and retuned code is the same with handsets.</li> <li>2. Change the channel parameter in the frequency of diplexer work range or change</li> </ol>



		<p>the channel parameter frequency of the diplexer.</p> <ol style="list-style-type: none"> <li>3. Replace the receive module</li> <li>4. Replace the stimulus module</li> <li>5. Replace the control panel.</li> </ol>
<p>Communication Distance become shorter</p>	<ol style="list-style-type: none"> <li>1. Antenna head be watered</li> <li>2. Antenna is in poor connection</li> <li>3. Frequency disruption</li> <li>4. Repeater transmit power decrease</li> <li>5. Receive module sensitivity decrease</li> </ol>	<ol style="list-style-type: none"> <li>1. Examine the antenna head, use the waterproof daub</li> <li>2. Replace the antenna.</li> <li>3. Find out the frequency disrupted or change.</li> <li>4. Replace the power amplifier module.</li> <li>5. Replace the receive module.</li> </ol>
<p>Indicator light no display, speaker no sound.</p>	<ol style="list-style-type: none"> <li>1. Flat cable broken.</li> <li>2. The display board broken</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace the flat cable.</li> <li>2. Replace the display board.</li> </ol>

When the repeater have some error, the error light will light up, the speaker will have a warning alarm, the digital tube will show the fault code. After the warning occur, firstly, check if the communication is OK, if don't, restart the repeater, if still not work, please contact with the dealer around you.

The fault code as below:

Alarm class	Alarm item	Fault condition	LED display code	sound
RF power amplifier	0.not detected RF power amplifier	I2C is blocked	10	
	1.E2PROM fault	I2C is blocked	11	
	2.RF power amplifier fault	PA_ERRLED=1	12	
	3.RFpower amplifier overheat	PA_TEMPDEC > PA_CAP_TEMP	13	
	4.RF power amplifier overflowing	PA_CURRENT > PA_CAP_CURRENT	14	
	5.RF power amplifier overvoltage	PA_VOLTAGE > PA_CAP_V_MAX	15	
	6.RF power amplifier undervoltage	PA_VOLTAGE < PA_CAP_V_MIN	16	
Stimulus module	0.not detected stimulus module	I2C is blocked EX_PLLLD=0	20	
	1.E2PROM fault	I2C is blocked	21	
	2.Transmit frequency losing lock	RX-PLLLD=0	22	
Receive module	0.not detected receive module	I2C is blocked EX_PLLLD=0	30	
	1.E2PROM have problems	I2C is blocked	31	
	2.receive frequency is locked.	RX-PLLLD=0	32	
Control panel	0. Control panel have some problems		40	
	1.E2PROM have problems		41	
	2.Digital module fault	HR500_RESET_INT=0,SPI can not read	42	
Channel parameter	1. Transmit frequency is over	Stimulus module parameter, power	01	

fault	range	amplifier module, duplexer parameter		
	2. Receive frequency is over range	Receive module parameter	02	
	3. Board-band, narrow-band	Stimulus module parameter, receive module parameter	03	
	4. Transmit power is over range	Power module, duplexer parameter	04	

### **FCC Compliance Notice**

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.

Any changes or modifications not expressly approved by the party responsible for compliance could void

the user's authority to operate the equipment.

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 a 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 an experienced radio/TV technician for help.

#### **Operational Instructions and Training Guidelines**

To ensure optimal performance and compliance with the occupational/controlled environment RF energy exposure limits in the above standards and guidelines, users should always adhere to the following procedures:

Antenna gain must not exceed 5dBi

The antenna must be installed complying with the requirements of manufacturer or supplier, and it must be at least 110cm away from human body.