

ALINCO

VHF/UHF Digital Transceiver

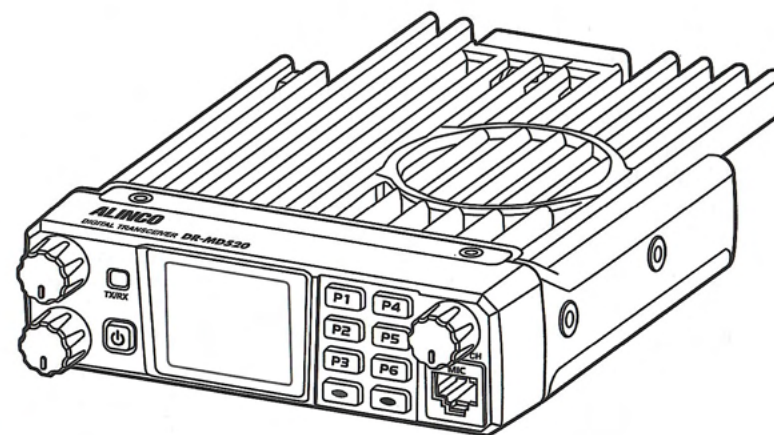
DR-MD520T/E

DMR

Instruction Manual

Thank you for purchasing your new Alinco transceiver. Please read this manual carefully before using the product to ensure full performance, and keep this manual for future reference as it contains information on after-sales services. In case addendum or errata sheets are included with this product, please read those materials and keep them together with this instruction manual for future reference.

- An Amateur Radio License is required to operate this transceiver.
- This equipment complies with part 15 of the FCC Rules. Operation is subject to the condition that this equipment does not cause harmful interference.



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■ Introduction

Please read this manual completely from the first page to the last, to learn all the functions the product offers. It is important to note that some of the operations may be explained in relation to information in previous chapters. By reading just one part of the manual, you may risk not understanding the complete explanation of the function.

■ Safety

It is important that the operator is aware of, and understands, hazards common to the operation of any transceiver.

Before transmitting

There are many radio stations operating in proximity to the frequency ranges this product covers. Be careful not to cause interference when transmitting around such radio stations.

■ Covering ranges

It may vary drastically depending on the type and location of antenna system. Please consult your dealer for details as DR-MD520 requires an external antenna.

■ Lightning

Any person is not safe outdoors during thunderstorms and lightning. Note also that no car provides adequate protection of its passengers or drivers against lightning as well. Therefore, Alinco will not take responsibility for any danger associated with using radios outdoors or inside the car during lightning.

■ Enclosure protection

This transceiver is NOT water and dust protected. Avoid contacts with water and dust, and if wet or dirty, immediately wipe them out with clean dry cloth. This product is NOT anti-explosive.

Never use in close vicinity to explosive gas, combustible dust, on an oil rig or in an open mine.

■ Integrated GPS receiver

An internal GPS receiver is installed in T(FCC) and E(CE) models.

■ When using the GPS receiver

- A GPS receiver is installed under the top panel. When the GPS receiver is activated, do not cover the top part with anything that will block satellite signals.

- GPS signals can't pass through metal objects. When driving or navigating, you may risk not receiving GPS signals if covered by metal roof. External antenna can't be connected, so we recommend to operate near a window or on a deck.

- GPS signals can't reach to the receiver in places like:

- Tunnels or a shadow of tall buildings.
- Underground floors and parking lots
- Under a wide bridge
- In remote forested areas

Also in severe weather conditions, clouds, rain, snow etc may obstruct signals also.

- The Global Positioning System is operated by the U.S. Department of Defense. The Department is responsible for accuracy and maintenance of the system. Any changes by the Department may affect the accuracy and function of the GPS system.

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ALINCO and authorized dealers are not responsible for any typographical errors there may be in this manual. The contents of

this manual may be updated without any notice or obligation. Alinco cannot be liable for pictorial or typographical inaccuracies. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC INFORMATION

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.

WARNING: MODIFICATION OF THIS DEVICE TO RECEIVE CELLULAR RADIOTELEPHONE SERVICE SIGNALS IS PROHIBITED UNDER FCC RULES AND FEDERAL LAW.

CAUTION: Changes or modifications to this device, not expressly approved by Alinco Inc.,could void your authority to operate this device under FCC regulations. Alinco is not responsible for the destruction,damage to, or performance of any Alinco or non-Alinco equipment, if the malfunction is because of:

- Force majeure, including, but not limited to, fires, earthquakes, storms, floods, lightning, or other natural disasters, disturbances, riots, war, or radioactive contamination.
- The use of Alinco transceivers with any equipment that is not manufactured or approved by Alinco.

ABOUT CE AND DOC

Hereby, Alinco Inc. declares that the versions of DR-MD520 which have the "CE" symbol on the product, comply with the essential requirements of the Radio Equipment Directive, 2014/53/EU, and the restriction of the use of certain hazardous substances in electrical and electronic equipment Directive, 2011/65/EU. The full text of the EU declaration of conformity is available at the following internet address: <http://alinco.com/Ce/>

DISPOSAL

The crossed-out wheeled-bin symbol on your product, literature, or packaging reminds you that in the European Union, all electrical and electronic products, batteries, and accumulators (rechargeable batteries) must be taken to designated collection locations at the end of their working life. Do not dispose of these products as unsorted municipal waste. Dispose of them according to the laws in your area.



RF EXPOSURE SAFETY INFORMATION

The information listed below provides you with the information needed to make you aware of RF exposure, and what to do to assure that you operate this radio properly and safely.

Your Alinco radio generates RF electromagnetic energy while transmitting. This means it must be used only by individuals who is properly licensed, aware of the hazards, and the ways to minimize such hazards. This radio is NOT intended for use by the "General Population" in an uncontrolled environment. This radio has been tested and complies with the essential requirements of FCC part 15 and the Radio Equipment Directive, 2014/53/EU, and the restriction of the use of certain hazardous substances in electrical and electronic equipment Directive, 2011/65/EU as an amateur radio equipment.

- Use only Alinco-authorized accessories. The use of other than recommended or approved body-worn accessories may result in RF exposure levels which exceed the environment RF exposure limits.
- The electro-magnetic (radio Frequency) exposure level of this device may exceed the European standards of the hazard level when transmitting at the high-power setting while connected to a unity gain antenna at a distance of approx. 70cm or less from the operator. Furthermore, the hazardous RF exposure level depends on the conditions of the combination of the antenna gain, distance from the operator, output setting and installation environment, therefore the operator may be exposed to stronger RF even at a longer distance. For safety purpose, it is recommended that the antenna be installed outside of, and as far as possible from, the operator's area. Avoid using an excessively high-gained antenna in case the distance between the operator and the antenna is very limited. Always use the minimum necessary output power for communications.

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Electromagnetic Interference/Compatibility

During transmissions, your Alinco radio generates RF energy that can possibly cause interference with other devices or systems. To avoid such interference, turn off the radio in areas where signs are posted to do so. DO NOT operate the transmitter in areas that are sensitive to electromagnetic radiation such as hospitals and blasting sites.

Controlled Use

The radio transmitter is used in situations in which persons are exposed as consequence of their amateur radio operation provided those persons are fully aware of the potential for exposure and can exercise control over their exposure.

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■ PC Programming

To set up and operate DR-MD520, Windows based PC and a provided PC cable ERW-21 is necessary. Software should be available from your dealer; many of them posts software on their sites for free downloads.

- Follow the given instruction to install a driver software provided with the Utility software first then the Utility. The driver may not be necessary depending on the OS you use.

- After the ERW-21 is ready for use, connect it with USB mini plug on the left side of the front panel of DR-MD520. You may disregard the power on/off of the radio while connecting the cable. Use Windows "Device manager" in your PC to locate the assigned COM port number under "Port(COM & LPT)".

- Follow the instruction of software for programming. Instruction appears at the bottom of the program interface. You may need a preprogrammed data file called Codeplug for easier setup. Codeplugs may be available through amateur radio related sites on the internet or through your dealer.

WARNING

■ Handling this product:

-  Be sure to reduce the audio output level to minimum before using a headset. Excessive audio may damage hearing.
-  Do not open the unit without permission or instruction from the manufacturer. Unauthorized modification or repair may result in electric shock, fire and/or malfunction.
-  Do not operate this product in a wet place such as shower room. It may result in electric shock, fire and/or malfunction.
-  Do not place conductive materials, such as water or metal in close proximity to the product. A short-circuit to the product may result in electric shock, fire and/or malfunction.
-  Do not touch the heatsink (on/around the unit mostly found on mobile-base units) as it may become very hot during/after the operation that may risk burn your skin.

■ About power-supply:

-  Use only appropriate, reliable and certified power supply of correct voltage and capacity.
-  Do not connect cables in reverse polarity. It may result in electric shock, fire and/or malfunction.
-  Do not plug multiple devices including the power-supply into a single wall outlet. It may result in overheating and/or fire.
-  Do not handle a power-supply with a wet hand. It may result in electric shock.
-  Securely plug the power-supply to the wall outlet. Insecure installation may result in short-circuit, electronic shock and/or fire.

-  Do not plug the power-supply into the wall outlet if the contacts are dirty and/or dusty. Short circuiting and/or overheating may result in fire, electric shock and/or damage to the product.
-  Do not modify or remove fuse-assembly from the DC-cable. It may result in fire, electric shock and/or damage to the product.

■ In case of emergency:

In case of the following situation(s), please turn off the product, switch off the source of power, then remove or unplug the power-cord. Please contact your local dealer of this product for service and assistance. Do not use the product until the trouble is resolved. Do not try to troubleshoot the problem by yourself.

- When a strange sound, smoke and or strange odor comes out of the product.
- When the product is dropped or the case is broken or cracked.
- When a liquid penetrated inside.
- When a power-cord (including DC-cables, AC-cables and adapters) is damaged.

-  For your safety, turn off then remove all related AC-lines to the product and its accessories including the antenna if a thunderstorm is likely.
-  Turn off the unit, remove the mobile antenna from its base and keep it in the vehicle if a thunderstorm is likely. Please read cautions regarding the lightning-protection on page 9 also.

■ Maintenance

-  Do not open the unit and its accessories. Please consult with your local dealer of this product for service and assistance.

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WARNING



CAUTION

■ Environment and condition of use:

-  Do not use the product in proximity to a TV or a radio. It may cause interference or receive interference.
-  Do not install in a humid, dusty or insufficiently ventilated place. It may result in electric shock, fire and/or malfunction.
-  Do not install in an unstable or vibrating position. It may result in electric shock, fire and/or malfunction when/if the product falls.
-  Do not install the product in proximity to a source of heat and humidity such as a heater or a stove. Avoid placing the unit in direct sunlight.
-  Do not modify, dismantle, incinerate, or immerse the batteries that may be used in accessories you use with this product. Please check your local regulations for details on recycling option or disposal of the batteries in your area.

■ About transceiver

-  Do not connect devices other than specified ones to the jacks and ports on the product. It may result in damage to the devices.
-  Turn off and remove the power-source (AC cable, DC cable etc) from the product when the product is not in use for extended period of time or in case of maintenance.
-  Use a clean, dry cloth to wipe off dirt and condensation from the surface of the product.
-  Never use thinner or benzene for cleaning.

■ About power-supply

-  Use only reliable power supply of specific DC output range and be mindful of the polarity of the cables and DC jack.
-  Always turn off the power supply when connecting or disconnecting the cables.
-  When using an external antenna, make sure that the antenna ground is not common with the ground of the power supply.
-  When a transceiver is powered from an external DC power source, make sure that this power supply has approval to the level of IEC/EN 60950-1.

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■ SUPPLIED ACCESSORIES

Carefully unpack to make sure the following items are found in the package in addition to this manual:

- Transceiver
DR-MD520



- Microphone EMS-88
(with DTMF keyboard)



- Mobile Mounting
Bracket ADFM78



- DC Power Cable with
Fuse Holder
ADUA38



- Hardware Kit for Bracket

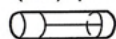
Black screws
(M4X8mm)
4PCS

Tapping screws
(M5X8mm)
4PCS

S-Washer



- Spare Fuses
(15A) 2pcs



- User Manual



- Mic Hanger Unit



- PC Interface Cable
ERW-21



- GPS Antenna
EA-0289



The standard accessories may vary slightly depending on the version you have purchased. Please contact your local authorized Alinco dealer should you have any questions. Alinco and authorized dealers are not responsible for any typographical errors there may be in this manual. Standard accessories may change without notice.

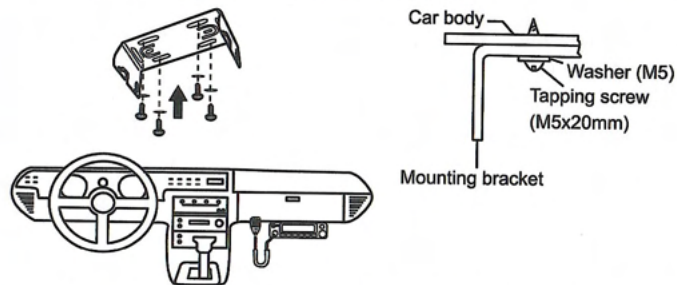
Warranty Policy: Please refer to any enclosed warranty information or contact your authorized Alinco dealer/distributor for the warranty policy.

- In order to operate this product, a properly tuned antenna, its feedline with connectors and fixing hardware are necessary. Please consult with your dealer for details.

MOBILE INSTALLATION

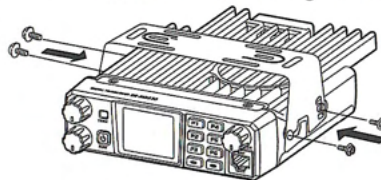
The transceiver may be installed in any position in your car, where the controls and microphone are easily accessible and it does not interfere with the safe operation of the vehicle and air-bags. Modern automobiles are equipped with electronics devices everywhere. After installation and before start driving, be sure that the RF generated from your radio won't cause any interference to your car, especially automatic driving, braking and safety related systems.

1. Install the mounting bracket in the vehicle using the supplied self-tapping screws (4pcs) and flat washers (4pcs).



2. Position the transceiver, then insert and tighten the supplied hexagon SEMS screws.

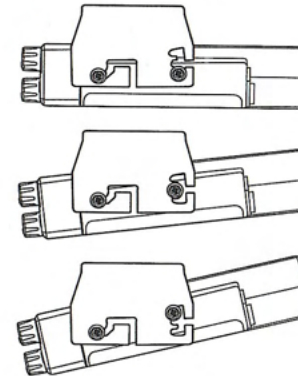
▼ Double check that all screws are tightened to prevent vehicle vibration from loosening the bracket or transceiver.



Caution:

Use only the provided screws otherwise you risk damaging the circuit board, components or fall-off of the unit.

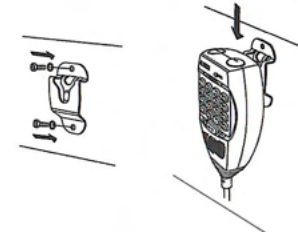
- ▼ Determine the appropriate angle of the transceiver, using the 3 screw hole positions on the side of the mounting bracket.



3. To remove the transceiver, unscrew all fixing hardware, and hold the transceiver in the way that it won't fall from bracket.



4. Install mic hanger unit. Install the mic hanger in the vehicle using the supplied self tapping screws (2pcs) and washers (2pcs).



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■ DC POWER CABLE CONNECTION

✕ MOBILE OPERATION

The vehicle battery must have a nominal rating of 12V. Never connect the transceiver to a 24V battery. Be sure to use a 12V vehicle battery that has sufficient current capacity. If the current to the transceiver is insufficient, the display may darken during transmission, or transmitting output power may drop excessively.

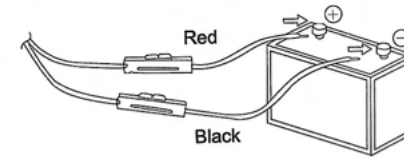
1. Route the DC power cable supplied with the transceiver directly to the vehicle's battery terminals using the shortest path from the transceiver.
 - ▼ Never use the cigarette lighter socket as a DC source.
 - ▼ The entire length of the cable must be dressed so it is isolated from heat, moisture, and the engine secondary (high voltage) ignition system/cables.
2. After installing cable, in order to avoid the risk of damp, please use heat-resistant tap to tie together with fuse box. Don't forget to reinforce whole cable.
3. In order to avoid the risk of short circuit, please cut down connection with negative (-) of battery, then connect with transceiver.
4. Confirm the correct polarity of the connections, then attach the power cable to the battery terminals; red connects to the positive (+) terminal and black connects to the negative (-) terminal.
 - ▼ Never remove the fuse holders from the cable.



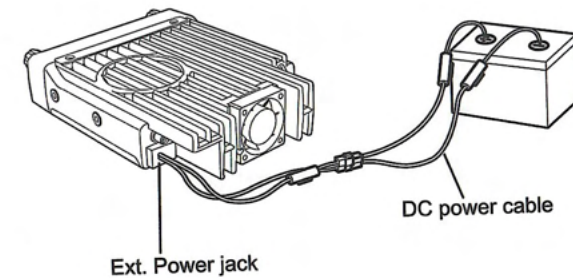
NOTE

DR-MD520 consumes a small amount of standby current at a turn off state. Be sure to disconnect DC cable at the connector before leaving the car for extended period of time to avoid discharge of the car battery.

5. Reconnect any wiring removed from the negative terminal.



6. Connect the DC power cable to the transceiver's power supply connector.
 - ▼ Press the connectors firmly together until the locking tab clicks.

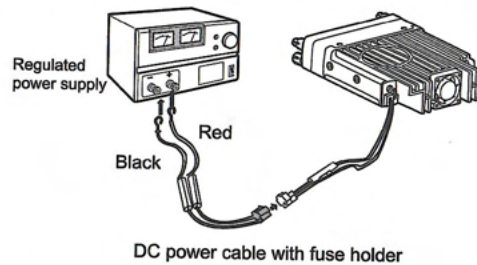


✕ FIXED STATION OPERATION

In order to use this transceiver for fixed station operation, you will need a separate 13.8V DC power supply (not included). Please contact local dealer to require.

The current capacity of your power supply must be 12A or more.

1. Connect the DC power cable to the regulated DC power supply and ensure that the polarities are correct. (Red: positive, Black: negative).
 - ▼ Never directly connect the transceiver to an AC outlet.
 - ▼ Use the supplied DC power cable to connect the transceiver to a regulated power supply.
 - ▼ Do not substitute a cable with smaller gauge wires.



2. Connect the transceiver's DC power connector to the connector on the DC power cable.

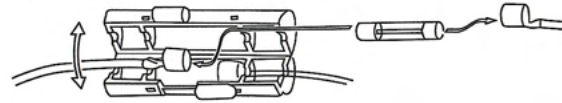
- ▼ Press the connectors firmly together until the locking tab clicks.

NOTE Before connecting DC cables, be sure to turn off the radio and DC power supply. Don't connect the AC cord of the power supply to the wall outlet until all connections are made properly.

✕ REPLACING FUSES

If the fuse blows, determine the cause, then correct the problem. After

the problem is resolved, replace the fuse. If newly installed fuses continue to blow, disconnect the power cable and contact your dealer for assistance.



Fuse Location	Fuse Current Rating
Transceiver	15A
Supplied Accessory DC power cable	15A

Only use fuses of the specified type and rating, otherwise the transceiver could be damaged.

NOTE If you use the transceiver for a long period when the vehicle battery is not fully charged, or when the engine is OFF, the battery may become discharged, and will not have sufficient reserves to start the vehicle. Avoid using the transceiver in these conditions.

■ ANTENNA CONNECTION

Before operating, install an efficient, well-tuned antenna. The success of your installation will depend on the type of antenna and its correct installation.

Use a 50Ω impedance antenna and low-loss coaxial feed-line that has a characteristic impedance of 50Ω, to match the transceiver input impedance. Coupling the antenna to the transceiver via feed-lines having an impedance other than 50Ω reduces the efficiency of the antenna system and can cause interference to nearby electronic equipment.

Transmitting without first connecting an antenna or other matched load may damage the transceiver. Always connect the antenna to the transceiver before transmitting.

NOTE All fixed stations should be equipped with a lightning arrester to reduce the risk of fire, electric shock, and transceiver damage.

ACCESSORIES CONNECTIONS

EXTERNAL SPEAKERS

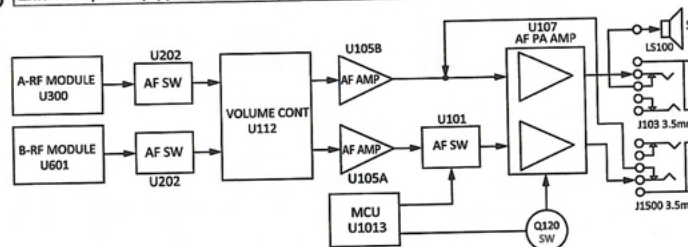
2 external speaker ports are available. Please refer to the chart below for the combination of external, internal and microphone speakers.

○ = Sound from external speaker

✕ = Can't sound from external speaker

	Main Channel	Sub Channel
External Speaker(Upper)	○	○
External Speaker(Lower)	✕	○
External Speaker(Upper and Lower) (Upper)		(Lower)

5

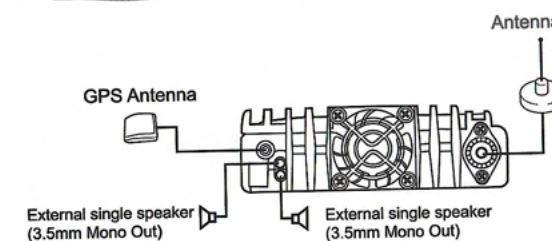
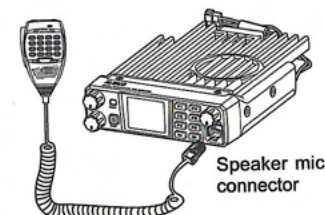


GPS ANTENNA

Connect provided GPS antenna to the SMA port as shown. The antenna should be tested to receive GPS signals properly before fix it to inside your vehicle with adhesive tape on the back side of the antenna. The tape is not reusable.

SPEAKER MIC

For voice communications, connect a provided Speaker mic into the socket on the front of the main unit. Turn the ring firmly on the plug until it locks. Attach the supplied Speaker mic hanger in an appropriate location using the screws included in the screw set.



NOTE After installing your antenna, ensure that you have the best possible SWR reading.

TO PROGRAM KEYS

There are 3 ways to assign functions to keys on the front panel and microphone.

Simple features such as switching output power level can be assigned as the following chart. Each key can be programmed 2 functions, and recall it by short or long press key operations. More complicated combination of operating parameters can be set by HOT key and Combination key functions using Utility.

To assign your favorite function to [P1], [P2], [P3], [P4], [P5], [P6] keys on the front panel and PA, PB, PC, PD keys on the mic, use PC utility software for easier and faster operation. Select "Public" => "Optional Setting" => "Key function" menu for setting.

To set them manually, press Menu(green)key, use CH knob or UP/DOWN keys on the mic to select Settings menu, press Menu key to select Radio Set, press the same key again to enter to the setting sub menu list. Turn CH knob or use UP/DOWN keys on the mic to select the menu #35 to #56, such as "P1 Short" and "PD Long". Press the same key again and use CH knob or UP/DOWN keys to select a function that you prefer, then press the Menu key to set. The key number and programmed function will be displayed on the screen. Use Exit(red)key to return to the previous menu to continue, or press PTT key to return to the operation mode.

DMR radio is primarily a commercial-use radio and concepts like VFO in amateur radio doesn't exist. For this reason, VFO/Memory switching function is not assigned to any key at default. It is recommended to assign VFO/memory(MR) function to one of P1 - P6 key.

HOT KEY FUNCTION

Hot key is a shortcut to recall a combination of operating settings instead of functions in the previous chart.

The combination of functions must be preprogrammed using PC in HOT key menu, and you can assign the keys in the same menu at the same time. Manual setting of combination is not available, but you can

change key assignment manually in Setting menu => Radio Set => select P1-P6, PA-PD => HOT KEY => select key of your preference.

COMBINATION (FUN) KEY FUNCTION

This is an additional Hot key function using the microphone alphanumeric keys.

You can assign functions and keys through the same Utility menu of Hot key, but select "FUN key +**" columns.

To operate, press MENU(green) key and hold until "Next please press dial key" is displayed, then press preassigned key to recall the programmed function.

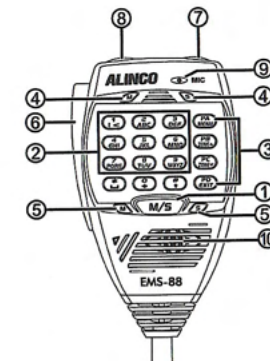
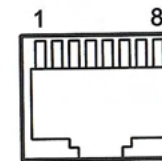
OFF	No Function
Volt	Check the current battery capacity voltage
Tx Power	Switch the power between high, middle, low and small power.
TalkAround	Switch between Talk Around and Repeater mode
Reverse	Turn on/off the frequency reverse function.
Call	In Analog mode, send the DTMF/5TONE/2TONE encode. This function is only valid in analog channels. Before use call function, set tones in advance.
VFO / MR	Switch between VFO mode and memory channel mode.
Scan	Scan on/off
AM/FM	AM/FM On/Off, Off => FM => AM mode A => AM mode B => Off
Alarm	Long press the key to start alarm, short press again to exit the alarm.
Record Switch	Enable/disable the recording function
Record	Start/stop recording. When stop recording, the radio will remind repeat or send the record. This function is only valid for digital channel.
SMS	In digital mode, press to enter into SMS messages

Dial	In Digital mode, press to enter Private ID function.
GPS Info	Check the GPS position information
Monitor	Monitor the weak signal or the signal with unmatched ID.
Main CH Switch	Choose channel A or channel B as the main channel
Hot Key 1~6	See next page for detail.
Work Alone	Turn on/off the work alone function.
Nuisance Delete	During scanning, press the key to skip the unwanted channel
Digi Monitor	In DMR mode, press the key to turn on/off digital monitor
Sub CH On/Off	Turn on/ off the sub channel
Priority Zone	Switch to Priority Zone
Program Scan	To start P.scan in VFO mode.Preprogramming Upper /lower freq. is necessary in advance by Utility. - Optional Setting - VFO scan.
Enhanced Sound	In digital channel, switch the microphone tone to normal or enhanced mode.
LastCall Reply	In digital channel, press the key to access the last call and press PTT to call back.
Switch ChType	Switch the channel type(Analog, Digital, Ana+Dgi, Dgi+Ana)
Ranging	When the radio receives a call and the suspension time is on, press the key programmed as " Ranging" to obtain the caller's position and distance. (Both party need GPS positioned, or will receive only GPS information)

Roaming	In standby, press the key programmed as "Roaming" to search and lock on the repeater with strongest signal. (Note: After lock on a repeater, the radio will return to last frequency only after channel or frequency is changed. The repeater frequency list must pre-programmed in Utility.)
CH Ranging	In standby, if the call contact type for a channel is "Single call" , press the key programmed as " Channel Ranging" to turn on this function. The radio will automatically start ranging function when turn to this channel.
Max VOL Set	In standby, press the key programmed as " Max Volume", will enable users to set the maximum RX volume.
Slot Set	Choose Slot for current channel, this function is only valid in repeater mode.
Aprs Type	Choose analog or digital Aprs Type for current channel.
Zone Select	In standby, press the programmed "Zone Select" key, it will allow you input the zone number and then press confirm key will switch to the zone.
A CH Mute	Mute the upper channel
B CH Mute	Mute the lower channel
Roaming Set	Enter into Roaming menu quickly
APRS Set	Enter into APRS menu quickly
Zone Up	Switch the zone upwardly
Zone Dn	Switch the zone downwardly
Exit	Exit the menu (only for A-D short press)
Menu	Enter into the menu (only for A-D short press)

Call	Analog	Should edit the analog quick call first, then choose analog in the hot key set. Press the key to transmit 2Tone/5Tone/DTMF to start the analog quick call.
	Digital	It allows to select a contact from the digital contact list, press the key to switch the channel to the contact temporary. It will switch back to the original contact after the group/personal call hold time.
Menu	SMS	Quick access to Messages in the menu
	New Msg	Quick access to New Msg in the Menu - Messages
	Hot Text	Quick access to Quick Text in the Menu - Messages
	Received SMS	Quick access to Inbox in the Menu - Messages
	Send SMS	Quick access to Out box in the Menu - Messages
	Contact list	Quick access to Contact list in the Menu - Contacts
	Manual dial	Quick access to Manual Dial in the Menu - Contacts
	Call Log	Quick access to Call Log in the Menu
	Dialed Calls	Quick access to Dialed Calls in the Menu - Call Log
	Received Calls	Quick access to Answered Calls in the Menu - Call Log
	Missed Calls	Quick access to Missed Calls in the Menu - Call Log
	Zone	Quick access to Zone in the Menu
	Radio set	Quick access to Radio Set in the Menu - Settings

SPEAKER MIC

Speaker mic connector
(Front view)

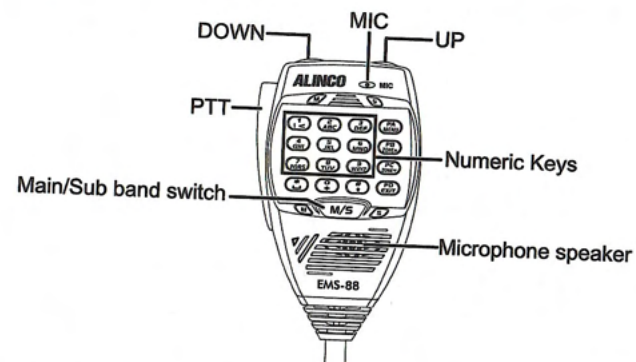
1. RX : Red
2. 5V : Brown
3. TX : Yellow
4. SP+ : Green
5. MIC GND : Black
6. MIC : MIC
7. SP- : Blue
8. GND : Grey

NO.	KEY	FUNCTION
1	M/S	Switches between Main and Sub bands.
2	Numeric keys	Used to input freq., tone values etc.
3	PA (MENU)	Programmed key [Set the programs in PC software]. The MENU key is set as default setting.
	PB (ZONE UP)	Programmed key [Set the programs in PC software]. The ZONE up key is set as default setting.
	PC (ZONE DOWN)	Programmed key [Set the programs in PC software]. The EXIT key is set as default setting. Key Lock / Unlock is set as default setting of holding key in advance.
	PD (EXIT)	Programmed key [Set the programs in PC software]. The EXIT key is set as default setting.
4	TX/RX Indicator (Main/Sub)	Illuminates red while transmitting, green while receiving signals. M lights on when: RX/TX Channel A. S lights on when: RX/TX Channel B.
5	Band Indicator	The indicator light on when select as Channel A or Channel B.
6	PTT	(Push to talk) Press and hold while transmitting.
7	UP	Increase frequency, channel number or setting value.
8	DOWN	Decrease frequency, channel number or setting value.
9	MIC	Speak here during transmission.
10	Speaker	Allows the voice come out from the speaker on microphone. ※ The sound comes from radio as a default.

Microphone Operation

4

■ MICROPHONE OPERATION



You can operate the transceiver by keypad or input desired frequency and channel through the EMS-88 microphone.

✕ SEND DTMF SIGNALING

Hold the [PTT] key; input the desired DTMF signaling by the numeric keys.

✕ MAIN/SUB BAND SWITCHING

At the default setting, both MAIN and SUB bands are displayed. To switch main / sub band, press the [M/S] or [P1] key to set the desired frequency or channel.

ALINCO

■ TURNING ON THE POWER

Press the power key until "Booting, please wait" is displayed. After several seconds of initialization, a beep sounds and turns on for the first time or after reset, date calibration appears on the screen. Disregard it by pressing MENU(green) key. When GPS signal is being received, it calibrates automatically. (Manual setting is also possible in Radio set mode).

■ TURNING OFF THE POWER

Turn off the transceiver by pressing and hold the power key for 2 seconds, and the LCD light is turned off.

■ ADJUSTING THE AUDIO OUTPUT (VOLUME)

Turn off by pressing and holding the power key for 2 seconds until the display turns off.

11 ■ MAIN BAND/SUB BAND SWITCH

Press the [M/S] key on microphone or programmed [Main Channel Switch] key to switch the main channel to the other channel if there is 2 channels shown on the display. The channel with bold characters is the main channel.

■ VFO/CHANNEL SWITCH

Press the programmed [VFO/MR] key to switch between VFO and channel display.

■ SET UP VFO FREQUENCY

Turn the radio to VFO mode and set it to the Main band by M/S key on the mic and make sure the numbers are displayed in bold. VFO frequency can only be set in the main band.

To enter the frequency in VFO, use numeric keys on the mic or turn the CH knob. To change the step, use Frequency step in the Other menu of the Utility or select the same function in the Settings - Radio Set menu.

■ SELECT A CHANNEL

Press the programmed [VFO/MR] key to select Channel mode.

Operation 1: Turn the channel switch to select a channel.

Operation 2: Input the channel numbers by the keyboard. For example, if you want switch to channel 99, input 0+0+9+9 a total of 4 digits, and it will switch to channel 99.

A channel can either be Analog or Digital.

For the analog channels the Push-To-Talk button is always available, and on the Digital Channels the parameters can be set up by individual channel to allow talk permit.

There are four possible settings that can be selected in the CPS channel:

- (1) Always Allow: The user can transmit all the time.
- (2) Channel Free: The radio can transmit only if the channel is free
- (3) Different Color Code: The radio can transmit if the channel is free, but the color code is mismatch.
- (4) Same Color Code: The radio can transmit only if the channel is free and the color code matches.

■ RECEIVING

When a signal is received on the channel that you selected, then the received signal can be heard.

The indicator lights green while transceiver is receiving in analog channel or lights cyan if it is receiving in digital channel.

■ TRANSMITTING (IN ANALOG MODE)

Select frequency / channel which allow to be transmitted using with M/S button. The bold characters are the main channel, and able to be transmitted.

1. Press the [PTT] key. The red TX indicator turns on while transmitting.
2. While holding down the [PTT] key, speak into the Mic at normal voice from the distance of 5cm.
3. Release the [PTT] key to receive.

■ EDIT MEMORY CHANNELS

Manual setting is possible in Settings-ChanSet-New Chan menu but use of the Utility is much easier and faster. Use Channel menu to program. You can create new, edit and delete channels and zones freely in Channel menu in the Utility. DR-MD520 offers a total of 250 Zones and up to 250 memory channels in each zone.

■ RECEIVING AND RESPONDING TO A DIGITAL CALL

When the radio is in the digital mode, it can receive and respond to a call with the same frequency/color code/ slot. When receiving a call:

- a. If the radio is programmed with callers DMR ID number in the digital contact list, when receiving a call, the radio will ring.
- b. The blue LED lights up.
- c. The left top corner of LCD shows the RSSI icon, and the LCD display will show DMR ID/name/city/state/country/call type and incoming icon based on what is in the contact list.
- d. When the call is ended, it will display "Call end", and you can press [PTT] to respond the call. Make sure to respond the call within the digital hold time, otherwise the radio will drop the connection after the digital hold time is expired.

■ MAKE A DIGITAL CALL

A. Talk to the preset TG/DMR ID in channel

Choose a programmed channel and press PTT to call.

B. Talk to a temporary TG/DMR ID not in the channel

Method 1: Select a temporary TG/DMR ID from the Talk Group list.

(1) Choose a programmed channel.

(2) Press [EXIT] key to enter the TG List, turn the channel switch or press the UP/DN key on microphone to choose a TG/DMR ID.

Method 2: Select a temporary TG/DMR ID from the keypad.

(1) Choose a programmed channel.

(2) Press [Menu] key to Talk Group, select Manual Dial.

(3) Input the ID number by keypad on microphone, press [#] key to switch group ID or Private DMR ID.

Press the [PTT] key to start the call, the red LED lights up, the receiver ID/name/city/state/country/call type and call out icon will be display on the LCD. Release [PTT] key to receive the reply.

NOTE The temporary call will be dropped when the digital hold time is expired and the radio will return to the preset TG/DMR ID in channel.

■ MONITOR

In standby, press the programmed [Monitor] key. When receiving matched carrier but the signaling / ID is unmatched or the signal is weak, this function allows monitor the weak signal and signal with unmatched ID. Press the key again to return to standby.

NOTE When in analog mode, if no signal, it will emit noise when press the Monitor Key. ** The Rx icon is seen when monitor is activated.

■ EMERGENCY ALARM

Press the programmed [Emergency Alarm] key to turn on alarm function, then press this key again to return.

Parameters are programmable in Alarm Setting menu of the Utility.

■ ACCESS ADVANCED FEATURES FOR PRIVATE CALL

Method 1: To Access a Private Call from Contact list

- a. Press the [MENU] key to enter the Talk Group, select a private call ID.
- b. Press Option to access the advanced features.

Method 2: Access from Manual Dial

- a. Press the [MENU] key to enter the Talk Group, select Manual Dial.
- b. Input the Private ID, press Option to access the advanced features.

■ SET UP ADVANCED FEATURES FOR PRIVATE CALL**(1) Call Alert**

Select Call Alert, it will send out a call alert, the target radio will sound a beep or vibrate when receiving the call alert, and it will return a success call or failed call message to the transmit radio.

(2) Remote Monitor

13 ****You have to check on the function in CPS=>Optional Setting=>Digital Func=>Remote Monitor first.**

Select Remote Monitor, and it will send out a signal for the target radio will turn on its microphone and transmit when receiving the signaling, it will send back the voice to the transmit radio. With this feature you can monitor the sound activity near the target radio remotely.

(3) Get GPS info

****You have to check on the function in CPS=>Optional Setting=>GPS/Ranging=>Get GPS positioning first.**

Select Get GPS info, and it will send out a signal to the target radio which will start the GPS positioning and send a message of its GPS position to the transmit radio.

(4) Check Radio

Select Check Radio, and it will send out a radio check to the target radio which will send back a message if it is available or not available to the transmit radio. With this feature, you can determine if another radio is active and powered on in the system.

(5) Kill

****You have to check on the function in CPS-Optional Setting-Digital Func- Digital Remote Stun&Kill first.**

Select Kill, and it will send out a kill signaling to the target radio which will be killed (No display, no operation) when receiving the signaling and it will send back a kill successful message to the transmit radio.

(6) Wake

****You have to check on the function in CPS-Optional Setting=>Digital Func=>Digital Remote Stun&Kill first.**

Select Wake, and it will send out a wake signaling to the killed radio and the target radio will return to standby when it receives this signaling and send back a Wake successful message to the transmit radio.

(7) Ranging

When caller and receiver both GPS positioned, if the caller turn on ranging function and the receiver is within communication range, Tx radio will detect the distance and direction between two radios at fixed interval, and then show the information on the display of Tx radio.

Press MENU key to display Main Menu. Select below menu by turning the CH knob or UP/DOWN keys on the mic.

■ TALK GROUP

TG List: Will display the talk group list which had been programmed in the PC software. This list is used as a look-up table to display the contact TG information when receiving a call.

New Contact: Allows to create a new TG.

Manual Dial: Input the group ID or private ID to access a TG quickly. Press [#] key to switch group ID or Private DMR ID.

Talker Alias: Allows Alias Tx Set / Alias Rx Display.

■ MESSAGES

New Msg: Create a new message and send to a contact.

InBox: Shows all the received messages, and allows forward or delete the message.

OutBox: Shows all the sent messages, and allows resend, forward or delete of the message.

Quick Text: Pre-saved messages, and allows to send, edit or delete the message.

Draft: Draft messages, and allows send, edit or deleting of the message.

■ CALL LOG

Last Call: The Last Call List show the last caller ID and time information. It allows you save the last caller as a new contact if it is not in your contact.

Sent: The Sent List shows sent messages until selected and deleted.

Answered: Shows all the answered calls, and allows deleting the call record or saving the ID as a new contact.

Missed: Shows all the missed calls, and allows deleting the call record or saving the ID as a new contact.

■ ZONE

1. Select a Zone

A Zone is a group of channels grouped together. The radio has 250 Zones. A Zone can have the maximum of 160 analog and/or digital channels.

Operation 1: Press PB or PC key directly to switch the zone, the LCD will display the selected zone number or name.

Operation 2:

Go to radio Menu=>Zone, select a zone from the zone list, radio will change to selected zone.

2. Add or delete a Zone

It allows you manually add or delete a zone in the zone menu directly.

■ SCAN

In the PC software=>Public=>Scan list, it allows to save 250 scan lists, and to program the required scan lists and write it into radio.

Switch the radio to channel mode, as the scan list is only valid in the channel mode.

1. Scan On/Off

Allows turn on or turn off scan manually.

2. Scan List

Allows create a new scan list or edit the existing scan list.

■ ROAMING

This function is only valid for digital channels.

Roaming enable users to search the roaming channel list by a programmed time interval and lock on the repeater with the strongest signal.

(1) One Time Roam

Allow you turn on the roaming manually. After the roaming is finished, it will return to the off state. ** *Manually Roaming is a onetime action only.*

(2) Roaming Zone

Select **Roam Zone**: select a Roaming Zone from the list to set it as active zone. You can also scroll down the list of Zones and select Add Channel to add a new channel to the current Roaming Zone and set the parameters.

Select **Add Channel**: Add a new roaming channel to the current zone.

New Roam Ch in Add Channel: Allows you modify the RX frequency/ TX frequency/CC/ TS/CH name for the roaming channel. Also allow you remove the roaming channel from the zone.

Edit Name: Edit the zone name.

Select Cur Zone: Select the roaming zone for current channel.

Delete Zone: Delete the roaming zone from the current channel.

(3) Auto Roaming settings

Set the fixed time waiting interval to begin automatic roaming when the repeater cannot be found, roaming will begin at the end of this time.

On/Off: Turn on or turn off the auto roaming function.

Fixed Time Set: The roaming will be started at preset fixed time or set to off.

Start Roaming:

Start always: Starts timed roaming

Check Link: The roaming will be started when the radio cannot find a repeater - "The repeater is out of range" icon will appear, then the radio will perform roaming one time, and return to roaming off automatically.

(4) Repeater Check

On/Off: Turn on this function will allow the radio to check the repeater status.

Interval Set: When the repeater is out of range, the radio will try reconnect to the repeater, this function allows to set the interval for reconnections.

(5) OutRange Note

When the repeater is out of range after the repeater check, the radio will remind out of range.

Note kind: It allows to set beep or sound to remind out of range.

Note Times: It allows to set the "out of range" display times on screen.

(6) Effect wait

During roaming, when the radio finds a repeater within range, it will stay at the repeater for a short time. This function allows to set the stay time on the repeater.

■ SETTINGS**1. Radio Set****(1) Beep**

Audio level of operation beep. Selectable from 8 levels and off.

(2) Speaker Mode

Mic Spk: Allows the voice come out from the speaker on microphone.

Radio Spk: Allows the voice come out from the speaker on radio.

Both: Allows the voice come out from both speakers on microphone and on radio.

(3) Mic Spk Set

When you allows the voice come out from the speaker on microphone, you have to set it is for A channel or B channel.

PATH MAIN: Only the voice from MAIN channel will come out.

PATH SUB: Only the voice from MAIN channel will come out

(4) Back Light

LCD backlight intensity is adjustable in 5 steps

(5) Ch. Name

CH name: The radio will work in channel mode and display the channel name, and then the programmed **VFO/ MR** key is not valid.

Frequency: The radio will work in VFO mode and display the frequency, which allows the programmed VFO/MR key to switch the VFO and Memory channels.

(6) Key Lock

Key lock options should be selected in the Utility in advance=>Optional Setting=>Key function.

- Knob Lock: to lock the knobs on radio, and [up]/[down] keys on microphone.
- Keypad Lock: to lock the keypad on microphone.
- Side Key Lock: to lock the P1-P6 keys on radio.
- Forced Key Lock: To prevent the key from unlocked. When this function is ON, the keys are not able to unlock manually. To key-lock, press and hold [*] key on the mic until Key locked appears on the screen.

Manual Lock: Long press the [*] key to lock the keypad. Press [MENU] key, then press the [*] key to unlock.

Auto Lock: Radio will auto lock the keypad when standby for a while. Press [MENU] key, then press the [*] key to unlock the keypad.

(7) Auto Power Off

Allow to set automatic power off when not used for a period of 10 minutes, 30minutes, 1 hour or 2 hours of inoperation.

Off: Turn off the function

(8) TX Timer

30S-240S: The TX will be limited in the set time. When this time is reached, the radio will stop transmission.

OFF: Turn off the TX time limit.

(9) Max Vol Level

Indoor: Very low volume, suitable for the indoor use.

Level 1-8: Set up the maximum volume level.

(10) Enhanced Sound(For digital mode only)

It will allow you set up the audio pitch.

Normal: Low pitch,for TX audio only.

Enhance: High pitch,for TX audio only.

Indoor: Improved both the TX and RX audio.

Outdoor: Improved both the TX and RX audio.

(11) Fan Open

PTT: The fan will turns when [PTT] is pressed.

Temperature: The fan will turns when the temperature is high.

Both: The fan will turns either [PTT] is pressed or the temperature is high.

(13) Menu Exit Time

5S-60S: When enter the menu, the radio will stay at the menu in the set time. When the time is reached, the radio will exit the menu.

(14) Start Display

Picture: The radio will display an ALINCO logo when powered on.

Character: The radio will display the characters set up in PC software when powered on.

Customer's Pic: The radio will display the picture uploaded by PC software. In the Utility=>Tool=>Boot Image, it will allow you upload a Power-on Picture. The file is .bin file.

(15) CHG Background

Default Picture: In standby, the radio will display default picture.

Customer's Pic: The radio will display the picture uploaded by PC software. In CPS=>Tool=>Standby BK Picture, it will allow you upload a standby background picture.

(16) CHG Font Color

White: In standby, the channel and other information will display color in white.

Black: In standby, the channel and other information will display color in black.

(17) CH Color A

Set color for the band A channel display.

(18) CH Color B

Set color for the band B channel display.

(19) Zone Color A

Set color for the band A zone display.

(20) Zone Color B

Set color for the band B zone display.

(21) Main Ch

Channel A: The upper displayed channel will be set to become the main channel.

Channel B: The lower displayed channel will be set to become the main channel.

(22) Sub Ch On/Off

Sub Channel On: Turns on the sub channel, and the radio will display both channel.

Sub Channel Off: Turns off the sub channel, and the radio will display the main channel only

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(23) SMS Notify

Different prompt options when receive a new message.

(24) Call Ring

Different prompt options when receive a new call.

(25) Freq Step

2.5K,5K,6.25K,10K,12.5K,20K,25K,30K,50K, total of 9 frequency steps.

(26) Ana SQ Level

Adjusts the squelch level to receive signal with different signal strength, and a total of 5 levels offered.

This function is only valid for analog channel.

(27) TBST Sel

TBST frequency is used to activate some dormant repeaters, 1000Hz, 1450Hz, 1750Hz, 2100Hz a total of 4 options are offered.

Hold pressing PTT key, at the same time press DN key on microphone to transmit the TBST tone.

(28) Scan Mode

SCM TO: When scanning and stopping for a signal, stays at the channel 5s before resuming the scan.

SCM CO: When scanning and stopping for signal, stays at the channel until the signal disappears, and resumes scan 2s later.

SCM SE: When scanning and stopping for a signal, will terminate the scan. This function is only valid for a VFO scan.

(29) Mic Level

Allows to adjust the Microphone gain, level 1 is the lowest, level and 5 is highest gain.

(30) DTMF Speed

Offers DTMF encode speed which will help the receiver decode successfully, 50~500ms are the options.

(31) AM/FM Radio

Off: AM or FM function is off.

FM Mode: Turn on FM radio.

AM Mode A: Turn on AM function, the AM channel will default at band A in display.

AM Mode B: Turn on AM function, the AM channel will default at band B in display.

(32) FM Radio Moni

Radio Mon On: When FM radio is used, you can still receive or transmit on the channel.

Radio Mon Off: When FM radio is used, the radio will not permit a transmission or reception.

(33) Start Up Pwd

The password shall be set up in CPS=>Optional Setting=>Power on=>Power=>on Password Char.

On: Set up the password for start up. You need to input the password to power on the radio.

Off: No password is required for the radio power on start up.

(34-35) AuRepeater A or B (For VFO A or B)

When turning on the Auto Repeater function, the TX frequency in VFO mode will be increased or decreased frequency on the channel A or channel B base on the set up offset frequency.

Refer to the Auto repeater menu in Public=>Optional Setting of the Utility.

(36-57) Key P1-P6,PA-PD

You can program these keys for different functions.(Refer to page 8-9)

(58) Weather Alarm

Turn on or off the weather alarm function.

(59) Weather Channel

When the Weather Alarm is on, the weather channel will work as sub channel. Once the weather alarm is received, the radio speaker will open and start the alarm.

(60) Repeater (Cross-band)

Turning on the cross-band repeater function will allow the radio to work as a small local repeater. The radio will TX on one channel, RX on the other channel.

Note: Cross-band Analog-Analog: Must be UHF-VHF, or VHF-UHF cross bands.

Cross-band Analog-Digital: Must be UHF-VHF, or VHF-UHF cross bands.

Cross-band Digital-Digital: UHF-VHF, or VHF-UHF cross bands, different times lot.

Cross-band Digital- Digital: Same UHF or same VHF bands, different times lot.

Cross-band Same frequency Digital-Digital: TX and RX are at same frequencies, but different times lots on VFO A and VFO B. Radio must also be in Double Slot operation.

**** Please Turn Off Digital Monitor when using the Cross-band repeat function****

Analog (A) to Analog (A) Cross band Repeater Setup

a. To set the channels or frequencies you will want to use with cross band operation, the radio must be set to display both the Main Channel (VFO A) and the Sub-Channel (VFO B).

b. Set the analog channel with simplex or repeater frequency.

c. Turning the Repeater function ON in the Radio Settings menu.

Analog (A) to Digital (D) or Digital (D) to Analog (A) Cross band Repeater Setup

a. To set the channels or frequencies you will want to use with cross band operation, the radio must be set to display both the Main Channel (VFO A) and the Sub-Channel (VFO B).

b. Set the analog channel with simplex or repeater frequency, and set the digital channel with simplex frequency only.

c. Turning the Repeater function ON in the Radio Settings menu.

Digital (D) to Digital (D) Cross band Repeater Setup

a. To set the channels or frequencies you will want to use with (D) to (D) cross band operation, the radio must be set to display both the Main Channel (VFO A) and the Sub-Channel (VFO B).

b. Enter the Simplex channel or Simplex frequency for VFO A and the Simplex channel or frequency for (VFO B).

c. Set the correct Color Code and set the two (VFO) channels to DIFFERENT Time Slots (TS)

d. Set the radio to Double Slot operation.

e. Turning the Repeater function ON in the Radio Settings menu.

****Allows the VFO A and VFO B at same frequency but different time slot, the radio will work as a digital single frequency repeater.**

(61) SMS Format

M-SMS: Allows SMS text communication with Motorola DMR radio.

H-SMS: Allows SMS text communication with Hytera DMR radio.

DMR Standard : SMS text format is compatible with general DMR radios.

(62) CTC ste

Squelch Tail Eliminate(STE) setting with CTCSS.

Select from 120 to 240 degree and 55Hz.

(63) No-Signal Ste

Normal Squelch Tail Eliminate(STE) setting(no signaling).

Select OFF, 55.2Hz or 259.2Hz.

(64) Hand Type

Set for different microphone use.

Uart-Det: For EMS-88 microphone use.

Volt-Det: For simple PTT microphone(no display) use.

(65) Time Zone

Set up the time zone of your location.

(66) Date Time

Time Set: Allows to set up the date and time manually. Use the channel switch to set the current year. Move to the month by pushing channel switch. Set the month, and push the channel switch to move forward each step. Once done, click the Menu key to save the date and time.

(19) GPS Check: When GPS is positioning successfully, enter this menu, select GPS check to do the date & time correction automatically.

2. Chan Set

Channel set menu Route: Main Menu=>Settings=>Chan Set. The channel set menu will change accordingly to the channel type. When the channel type is digital, it will automatical hide the analog menus.

※Chan Set (Digital Channel)

(1) New Chan

Allows creat a new channel and save current set up to the new channel.

a. Select "New Chan", then input new channel number and confirm.

b. Input channel name and confirm.

c. Select a zone and confirm. The new channel will be saved to the selected zone.

(2) Delete Chan

Allows to delete current channel.

a. Select "Delete Chan",the radio will remind " Delete? "

b. press confirm, the current channel will deleted.

Note: After delete one channel, the radio will move to next channel.

(3) Channel Type

A-Analog : Set up to analog channel.

D- Digital : Set up to digital channel

A+D TX A: Mixed analog, allow receive analog and digital signal, TX is analog.

D+A TX D: Mixed digital, allow receive analog and digital signal, TX is digital.

(4) TX Power

Set up the TX power for current channel.

(5) Offset

Press [UP]/[DOWN] to adjust offset frequency.

(6) Band Width

Only narrow band 12.5KHz for digital channel.

(7) RX Freq

Input the RX frequency by keypad, click the Menu key to save, press [P2] key to return.

(8) TX Freq

Input the TX frequency by keypad, click the Menu key to save, press [P2] key to return.

(9) Talk Around

Allows a Repeater Channel to be used as Simplex. When the TX radio and RX radio both are set up with Talk Around on, they can communicate directly without a repeater. The analog channel will use the RX frequency as TX/RX frequency, the RX CTCSS/DCS decode as TX CTCSS/DCS encode.

(10) Name

Allow reset the channel name, this function is only valid in channel mode.

(11) TX Allow

Always: Always allow transmit

Channel Free: Allow transmit when the channel is free

Different CC: Allow transmit when receive matched signal but different color code.

Same CC: Allow transmit when receive matched signal and same color code.

(12) TX Prohibit

TX ON: Will allow transmit on the current channel.

TX OFF: Will not allow transmit on the current channel.

(13) Radio ID

In Digital channel, it will show the DMR ID which must be programmed in the PC software=>Digital=>DMR ID list=>DMR ID. Allows edit and select an ID for the channel, each channel allows one ID.

In Analog channel, it will show the radio self ID which is programmed in PC software=>Analog=>Analog Address Book=>Number.

(14) Color Code

The digital channel should have the same color code for communication as defined by the repeater to be used; which can be programmed in the PC software or defined in the Menu.

(15) Time Slot

Set up Slot 1 or Slot 2 for the current channel.

(17) RX Group List

It will allow edit the RX Group List and assign a new RX Group List to the channel.

Select Cur List: Select the current RX Group List. Add Group: Add a TG to the current RX Group List.

Remove Group: Remove a TG from the current RX Group List.

(18) Work Alone

In the PC software=>Public=>Alarm settings=>Work Alone, you have to set up the response time, warn time and response method initially.

Turn on the work alone function for the current channel. When the radios predetermined time has been reached for the alone working time, the radio will beep a sound and show "**Work Alone Predict**". The user has to confirm by pushing the programmed work alone key to confirm continuing work alone, otherwise, the radio will start its alarm and send the alarm on the channel when reaching its preset response time

(19) CH Ranging

In standby, if the call contact type for a channel is "**Private call**", The radio will automatically start ranging function when turned to this channel. The other radio's location will be showed on screen at intervals.

(20) GPS Receive

Turn on GPS Coordinates, if both radio GPS is positioned, the radio will display the other radio's distance and position when radio is receiving.

(21) DMR Mode

Simplex: Enable to communicate by repeater frequencies directly with another radio with opposite TX/RX frequencies.

Repeater: Enable talk with other radio by repeat frequency through repeaters.

Double Slot: When TX/RX frequency is same, turn on this function to communicate by the slot set in simplex mode.

Note: If DMR mode not choosed Double Slot, the radio will work on Slot in repeat mode. if choose Double Slot, it is necessary to Double choose a slot by time slot setting.

(22) Tx Interrupt

This feature allows the supervisor to start the transmission while another person is talking. It allows supervisor to override the ongoing transmission brings other radios hear what the supervisor is saying, the radio that is transmitting at the time of this override will not hear the supervisor until he release keys his radio and then he will be able to hear the rest of the conversation.

※Chan Set (Available in Analog Channel only)

When the channel type is analog, it will automatically hide the digital menu. The below listed menus are for analog channel only, unlisted menus are the same as the digital channel, please refer to Chan Set (Digital Channel).

(4) TCDT

Set up the CTCSS/DCS code for the TX.

(5) RCDT

Set up the CTCSS/DCS code for the RX.

(6) RTCDT

Set up the CTCSS/DCS code for both TX and RX CTCSS code: 62.5Hz~254.1Hz, a total of 51 groups DCS code: 000N~777I, a total of 1024 groups.

(7) Optional Signal

21 | Allows the setup of DTMF/5TONE/2TONE encode and decode for the Analog channels.

(10) Squelch mode

When the analog channel is set up for both CTCSS/DCS decoding and optional signaling, you can set up the RX condition in this menu.

SQ: You can hear the call once the channel receive matched carrier.

CDT: You can hear the call when receive matched CTCSS/DCS signal.

TONE: You can hear the call when receives a matched signaling.

C&T: You can hear the call when receives a matched CTCSS/DCS and matched signaling.

C|T: You can hear the call when receives a matched CTCSS/DCS or.

(11) Band Width

Choose wide band or narrow band for the analog channel.

(12) Reverse

When this function is enabled, the RX frequency, TX frequency and CTCSS/DCS encode/decode will be reversed.

(13) Compander

Enable this function to reduce background noise and enhance audio clarity, especially in long range communication.

(19) Busy Lock

Always: Always allows transmissions

RL: Will not allow transmit when receiving matched carrier but unmatched CTCSS/DCS.

BU: Will not allow transmit when receiving matched carrier.

(21) OWN ID

The ID number should be set up in PC software=>Analog=>Analog Address Book. When the analog channel set up with optional signal, you can check the radio ID number in this menu.

(22) DTMF Enc

Edit the DTMF ID in Menu or with the PC programming software.

Set a DTMF ID as the default call ID for the current channel.

Press the PTT key to transmit the selected DTMF ID.

(23-24) 2Tone Enc/Dec

Edit the 2Tone in the PC programming software before it can be selected.

Set a 2Tone as the default call ID for the current channel. Press the [PTT] key to transmit the selected 2Tone.

(25) 5Tone Enc

Edit the 5Tone in the PC programming software before it can be selected.

Set a 5Tone as the default call ID for the current channel. Press the [PTT] key to transmit the selected 5Tone.

(26) 5TONE BOT

Set ON to send the 5Tone encode ID when press the [PTT] key.

(27) 5TONE EOT

Set ON to send the 5Tone encode ID when release the [PTT] key.

(29) APRS Receive

Turn on this function to enable the radio receiving the analog APRS

information in current channel. Make sure your channel setting Frequency, CTCSS/DCS match to the transmit radio's setting.

The radio will display the callsign, coordinates, direction, distance, digipeater paths, etc., when receive the analog APRS from the other radios.

Radio Menu=>APRS=>Ana APRS Info, allows to check the receive analog APRS logs.

CPS=>Public=>APRS=>Analog APRS=>Receive Allow set to "On", and input the Callsign and SSID you want to receive. The radio will only receive and display the analog APRS information of the filter callsign, instead of display all analog APRS.

3. Device Info

Show the Radio ID, Radio name, model name, frequency range, firmware version and hardware version, radio data version, latest production date, picture version, language version, sct version and BT module version.

RECORD

The voice record is designed for security use purpose. Each call will be saved as a separated recording file with DMR ID and time details. The standard voice 10hours record allows in digital channel only. The optional 500 hours voice record allow in both digital and analog channels.

1. Record Switch

Select on or off to turn on or off the recording.

2. Record List

Select a Record list to enter the Record file. Click on a Record file to see the Detailed Information. It allows different options.

(1) Record Play, it will play one record at a time, you can turn the channel switch to choose another recording without return to previous menu.

(2) Loop Playback, it will play all records in circle.

(3) Record Send, it allows you choose a TG or private ID from TG list or manually, and transmit the record.

3. Record Delete

This function allows you delete all the recordings.

4. Recording Manually

In the PC software, Public=>Optional Setting=>Key function, program a key as Record.

a. Press the programmed Record key, and the radio will start the recording, and speak into the microphone.

b. Select Record Play, and the radio will play the record

c. Select Record Send, and the radio will display Contact list or Manual Dial.

d. Select Contact list to choose a contact, and press select to send the Record.

e. Select Manual Dial, input the DMR ID, press  key to switch group ID or private ID, press select to send the Record.

■ GPS POSITIONING FUNCTION

1. GPS On/Off

Turn the GPS on or off manually.

2. GPS Info

Method 1: Check GPS info from Menu

Press [MENU] key to enter Main Menu, select "GPS", then select "GPS Info".

Method 2: Check GPS info from programmed key

In the PC software, Public=>Optional Setting=>Key function, program a key as "GPS Info", then press the programmed key to check the GPS info.

NOTE: If the GPS is not positioning, it will display "No Fixed Position", and the GPS icon shows a grey color. Move the radio to an open window or outdoors, and it will take a few minutes to connect to the GPS Satellites.

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3. Send GPS Information

a. When the GPS is positioning successfully, the GPS icon shows a red color. Follow the above step to check the GPS info, press edit key to Text edit.

b. Press Confirm, and it will display Send or Save. If you select Save, the GPS info will be saved as a draft message.

c. Choose Send and it will display Contact list or Manual Dial.

d. Select Contact list to choose a contact, press select to send the GPS info. or

e. Select Manual Dial, input the DMR ID, press [F] key to switch group ID or private ID, press [MENU] to send the GPS info.

■ APRS LOCATION REPORTING

APRS menu is not in menu list when GPS is off, you have to turn on GPS first if you want to use APRS menu.

(1) Upload Type

None: No APRS.

Sel A Aprs: Select analog APRS. Sel D Aprs: Select Digital APRS.

(2) Ana APRS

PTT Upload: Set the PTT transmit method.

- Off: Not transmit APRS.

- Tx Start: Transmit analog APRS when press the PTT.

- TX End: Transmit analog APRS when release the PTT.

Upload Power: Set the transmit power.

Upload frequency: Set the transmit frequency.

Signal Path: Set the signal path to transmit the APRS.

Upload text: Set the text to be shown on aprs.fi.

(3) Ana APRS Info

The received analog APRS information will be saved in radio for look back use. Click on "Ana APRS Info" will show the received APRS information.

Click on "Delete All" will clear the information.

(4) Digi APRS

PTT Upload: Set the PTT transmit method.

- Off: Not transmit APRS.

- On: Transmit DMR APRS when release the PTT.

Report Channel: Please set the 8 report channels in CPS=>APRS=>Digi page first. Allow user to select a channel to transmit the DMR APRS.

Upload Slot: Allow user to select a slot to transmit the DMR APRS.

- Report Slot: It uses the slot of current channel

- Slot 1: Use slot 1

- Slot 2: Use slot 2

Upload ID: Allow user to set an APRS TG as the destination.

(5) Digi APRS Info

The received APRS information will be saved in radio for look back use. Click on "**Digi APRS Info**" will show the received APRS information.

Click on "**Delete All**" will clear the information.

(6) Intervals Set

This function allows you to set the analog APRS or DMR APRS auto transmit at fixed times.

(7) Upload Beacon

GPS Beacon: The APRS will transmit the GPS data, only if the GPS is set to on first, then GPS must also successfully lock on the satellites.

Fixed Beacon: The fixed beacon location information should be set in CPS firstly. The APRS will transmit the fixed beacon data. Someone can transmit the fixed beacon without setting the GPS on.

Note: More setup are available by PC software only. CPS=>Tools=>Options=>APRS, you have to check on the APRS box first to get APRS menu add to the left Digital menu.

(APRS is a registered trademark of Bob Bruninga, WB4APR)

DIGITAL MONITOR

(1) DigiMoni Switch

off: Turn off Digital Monitor

Single Slot: Monitor the current TS

Double Slot: Monitor TS1 and TS2

(2) DigiMoni Cc

Any Cc: Monitor any color code

Same Cc: Monitor the same color code

(3) DigiMoni Id

Any Id: Monitor any TG

Same Id: Monitor the same TG

(4) Slot Hold

Off: Turn off the slot hold

On: Turn on the slot hold

Recommend to turn on slot hold when monitor double slot TS1 and TS2, when the signal is disappear in one slot, instead of switching to the other slot at once, the radio will hold on some seconds and wait for the audio drop.

1. How to Respond and Save a call in Digital Monitor Mode

During Digital Monitor, when receive a call with unmatched ID, press [*] key, the screen will display "**Monitor Response Setup Successfully**", press [PTT] key will reponse to the call.

Press [#] key, the radio will remind you choose a Zone, you can choose a zone and save the new channel to the Zone.

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Electrical and electronic equipment and batteries should be recycled at a facility capable of handling these items. Contact your local authority for details of disposal rules.

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