
# Operating Instructions

## DBH50M -80 Channel 5 watt UHF Hand held CB radio

# THANK YOU!

Thank you for purchasing a Crystal transceiver. Crystal transceivers will provide you with a reliable, clear and efficient communication service.
The transceiver introduces an innovative DSP (Digital Signal Processing) baseband processing system to achieve high-fidelity voice processing and encryption. It boasts stability, great reliability, nice timbre and long distance communication as well as fashionable design and smooth exterior lines. The DBH50M is a cost-effective and multi-functional professional transceiver, made to meet your professional needs.

NOTE:

This product has an IP67 waterproof rating. Protected against dust and the immersion of water between 15cm and 1 metre.

# SAFETY INFORMATION FOR USER

Crystal transceivers are designed with advanced technology. Please observe the following precautions to prevent personal injury and ensure the safe usage of the transceiver.

1. Keep the transceiver and accessories away from children.
2. Please do not try to open or modify the transceiver without permission; non-professionals process may also cause damage.
3. Please use assorted battery and charger to avoid damage.
4. Please use assorted antenna to ensure the communication distance.
5. Please do not expose the transceiver to long periods of direct sunlight, nor place it close to heat appliances.
6. Please do not put the transceiver in excessively dusty or humid areas.
7. Do not use harsh chemicals, cleaning solvents to clean the transceiver.
8. Do not transmit without antenna.
9. When using this transceiver, we recommend transmitting for 1 minute then receiving for 4 minutes. Continuous transmitting for long time or working in high power will heat the back of the transceiver.
10. Do not place the transceivers hot back close to any plastic surface.
11. If any abnormal odor or smoke is detected coming from the transceiver, turn off the power and take off the battery pack and its case. Then contact your local Crystal dealer.

ATTENTION: All tips above apply to accessories supplied your Crystal transceiver. If any device does not work normally, please contact your Crystal dealer.
If you use any accessories made by other companies Crystal does not guarantee the safety of operability the transceiver.

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# UNPACKING

Carefully unpack the transceiver. We recommend you to identify the items listed in the following table before discarding the packing material. If any items are missing or have been damaged during shipment, please contact dealers immediately.

## Supplied Accessories

| Item | Number | Quantity |
|---|---|---|
| Antenna | QA11U(411-481MHz) | 1 |
| Li-ion Battery Pack | QB-26L | 1 |
| Battery Charger | QBC-26L | 1 |
| AC adaptor | QPS-11 | 1 |
| Car Charger | CPL11 | 1 |
| Belt Clip | BC11 | 1 |
| Earphone | HS13 | 1 |
| Instruction Manual | | 1 |

# STANDARD ACCESSORIES/OPTIONAL ACCESSORIES

## Standard Accessories

Antenna
QA11U (411-481MHz)

Li-ion Battery Pack
QB-26L(1500mAh)

Charger
QBC-26L

AC Adaptor
(12V/500mA) QPS-11

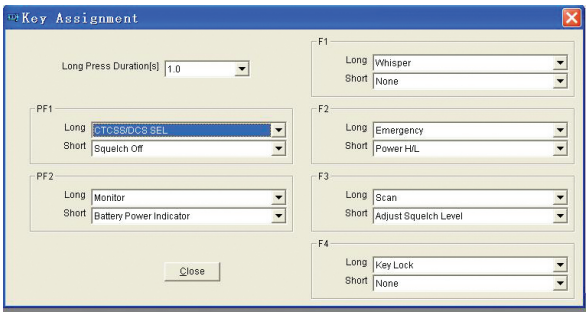
Belt Clip
BC11

Earphone
HS13

Car Charger
CPL11

# ASSIGNING & CHANGING FUNCTIONALITY KEYS

To assign and change function keys other than default (see picture below), USB programming (DBH50USB) cable is required. Additional free downloadable software is required to assign & change key functions. Downloadable software is available from this link.
**http://tdj.com.au/firmware/Crystal/DBH50M/**
Software is Windows compatible only.




## Optional Accessory

USB Programming
Cable (DBH50USB)

# BATTERY INFORMATION

## Charging Operation

The battery pack is not charged at the factory; please charge it before use.

Charging the battery pack for the first time after purchase or extended storage (more than 2 months) may not bring the battery pack to its normal operating capacity. After fully charging/ discharging cycle for two or three times, the operating capacity will reach its best performance. The battery pack life is over when its operating time decreases even though it is fully and correctly charged. Replace the battery pack.

## Charger Applied

Please use the specific charger appointed by our company. Other models may cause explosion and personal injury. After installing the battery pack, if the radio displays low battery with red flashing lamp or voice prompt, please charge the battery.

## NOTES

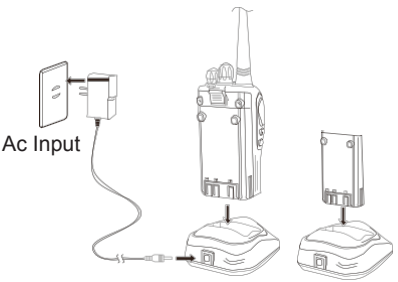
- ▼Do not short the battery terminals or throw the battery into fire. Never attempt to remove the casing from the battery pack, we show no responsibility on any results caused by modifying freely without permission of our factory.
- ▼The ambient temperature should be between 5℃and 41℃while charging is in progress. Charging outside this range may not fully charge the battery.
- ▼Always switch OFF the transceiver equipped with a battery pack before charging. Otherwise, it will interfere with correct charging.
- ▼To avoid interfering the charging, please do not cut off the power or take out the battery during charging.

▼Do not recharge the battery pack if it is already fully charged. This may shorten the life of the battery pack or damage the battery pack.
▼Do not charge the battery or transceiver if it is damp. Dry it before charging to avoid danger.

WARNING:
Avoid metal objects making contact with the battery terminal, this may cause damage to the battery or user

## How to Charge

1. Plug the AC adaptor into the AC outlet, and then plug the cable of the AC adaptor into the DC jack located on the back of the Charger. The Indicator lights orange (1s) and then goes out----waits to charge.
2. Plug the battery or transceiver into the charger. Make sure that the battery terminals are in contact with charging terminals well. The Indicator turns into twinkling red-----Pre-charging begins.
3. After pre-charging for about 5 minutes, the indicator will stop flashing----charging begins.




4. It takes approximately 4 hours to fully charge the battery. When the lamp lights green, the charging is finished. Remove the battery or the transceiver equipped with battery from socket.

## BATTERY INFORMATION

NOTE: when charging a power–on transceiver equipped with battery, the indicating lamp will not turn into green to show the fully charged status. Only when the transceiver is switched off, can the lamp indicate normally. The transceiver consumes energy when it is power–on, and the charger can not detect the voltage when the battery has been fully charged. So the charger will charge battery in constant voltage and fail to indicate correctly whether the battery has been charged fully.

5. Charging Process

| Charging Status | Indicator Status |
|---|---|
| Standby (Self-examine lights orange 1second when power on) | None |
| Pre-charging (Pre-charging stage) | Red light twinkles for about 5 minutes |
| Charging (Charge in a constant current) | Lights red for about 4 hours |
| Fully charged (Charge in a constant voltage) | Lights green |

6. LED Indicator:

| STATUS | Self-Examine When Power on | No Battery | Pre-charging | Charge Normally | Fully Charged | Trouble |
|---|---|---|---|---|---|---|
| LED | Orange (for 1 second) | None | Red Light flashes for 5 Minutes | Red | Green | Red flashing for a long time |

NOTE: Trouble means battery heating, battery short-circuit or charger short-circuit.

## Normal Charging Tips

1. **Self- Examination:** When charging, orange light flashes for 1 second and goes out, which means the charger has passed its self-examination and it can charge the battery normally. If the light remains orange or the red light flashes, it means the charger can not pass its self-examination or charge the battery.
2. **Trickle Pre-Charging:** If red light flashes when battery is inserted into the charger, it means the remnant voltage is low and the charger is trickle-charging the battery (Pre-Charging Status). The charger will automatically turn into normal charging when the battery reaches a certain electric quantity, And if the red light stops flashing, it means the remnant voltage meets a certain electric quantity, the charger will charge the battery normally.

NOTE:
Trickle charging (Pre−Charging Status) time can not beyond 30 minutes. If the indicating lamp still flashes after 30-minute trickle charging, it means that the charger cannot charge the battery. Please check whether the battery or charger is damaged.

## How to Store the Battery

1. If the battery needs to be stored, keep it in status of 50% discharged.
2. It should be kept in a low temperature and dry environment.
3. Keep it away from hot places and direct sunlight.

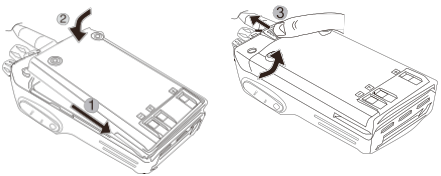
## BATTERY INFORMATION

WARNING:

▼Do not short circuit battery terminals.
▼Never attempt to remove the casing from the battery pack.
▼Never assemble the battery in dangerous surroundings, sparks may cause explosion.
▼Do not put the battery in hot environment or throw it into fire, it may explode.

## Installing / Removing the Battery

1. Match the three grooves of the battery pack with the corresponding guides on the back of the transceiver, and then push it.
2. Press the battery pack until the release latch on the top of the transceiver locks. After hearing a “click” sound, the battery has been locked.
3. To remove the battery pack, slide up the release latch and remove the pack away from the transceiver.



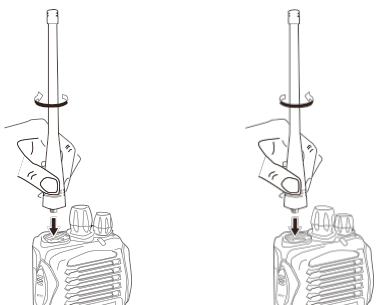

## Installing / Removing the Antenna

■ Installing the Antenna:

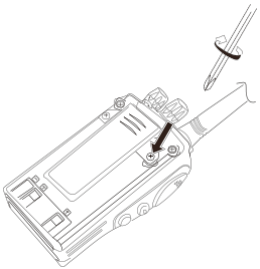
Screw the antenna into the connector on the top of the transceiver by holding the antenna at its base and turning it clockwise until secure.

■ Removing the Antenna:

Turn the antenna anticlockwise to remove it.



## Installing / Removing the Belt Clip



■ Installing the Belt Clip:

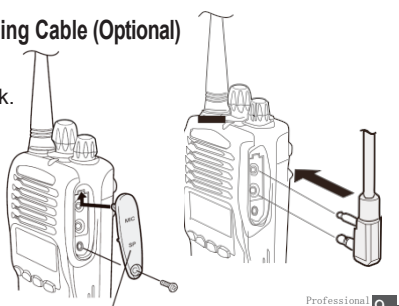
Place the belt clip to the corresponding grooves on the back of the transceiver, and then clockwise screw it.

■ Removing the Belt Clip:

Anticlockwise turn the screws to remove the belt clip.

## Installing the Additional Speaker/ Hand Microphone/ Programming Cable (Optional)

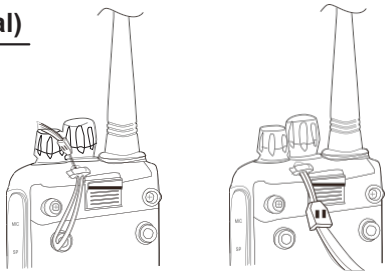
Unveil the MIC-SP jack cover and then insert the Speaker/Microphone/Programming Cable plug into MIC-SP jack.



NOTE:
1.To keep transceiver waterproof, must cover the MIC-SP jack by standard jack cover.
2. The transceiver is not completely waterproof while using the Speaker/Microphone.

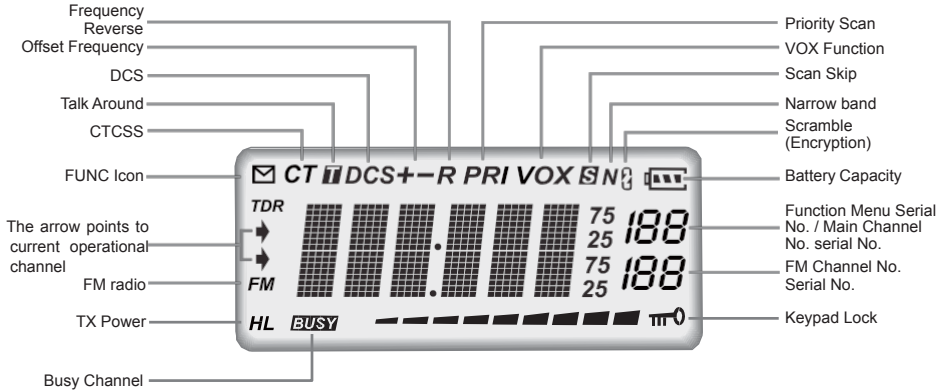
## Installing/ Removing the Hand Strap (Optional)

Slide the loop of the hand strap through the eyelet on the upper rear of the transceiver; then pull the entire hand strap through the loop to secure the hand strap in place and lastly tighten the hand strap.



## LCD Display

On LCD display screen, you will see various icons which stand for the selected functions and sometimes you may forget the meaning of them. Here you will find the following table extremely useful.




NOTE:

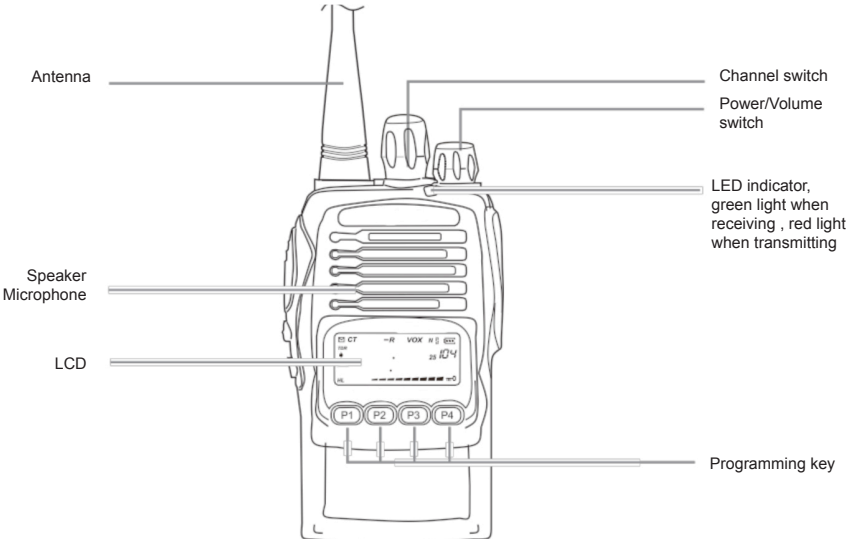
Battery capacity indicator(full)

Battery capacity remnant

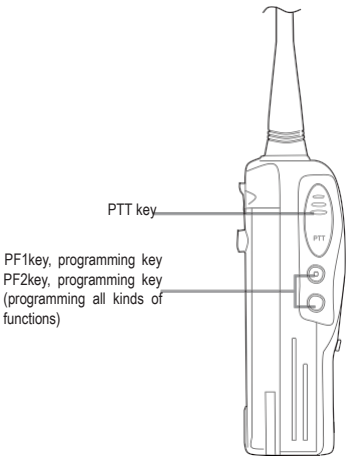
No power,replace battery pack or charge battery

Real time display receiving signal strength/Power Indicator

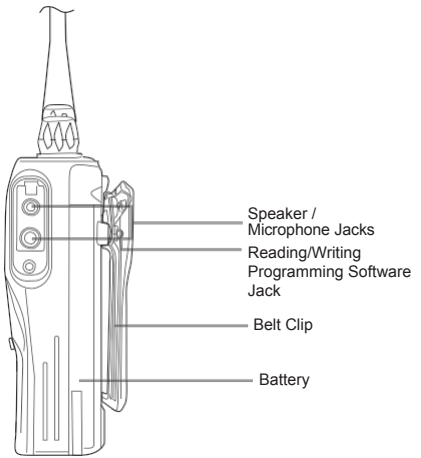
## Front Panel


Antenna
Channel switch
Power/Volume switch
LED indicator, green light when receiving , red light when transmitting
Speaker Microphone
LCD
Programming key
P1
P2
P3
P4

## Side Panel




**Left Panel**




**Right Panel**

## Switch on / off Transceiver

**Switch on Transceiver:** Under power-off state, turn POWER / VOLUME clockwise till hearing "**Click**" to switch on the transceiver. The transceiver will announce "**Power on**" when power-on.

**Switch off Transceiver:** Under power-off state, turn POWER / VOLUME anticlockwise till hearing "**Click**" to switch off the transceiver.

## Adjusting Volume

Under power-on state, turn POWER / VOLUME switch to adjust the volume. Turn clockwise to increase the volume, and anticlockwise to decrease the volume. You can press the programmed key of momentary squelch off [PF1] / [PF2] to monitor current volume.

NOTE: You can firstly press the programmed key of momentary squelch off [PF1] / [PF2] to monitor the background noise and meanwhile turn POWER / VOLUME to adjust the volume. Under the communicating state, you can adjust volume as per your need more accurately.

## Channels Selection

Under standby, turn channel selector knob to choose the desired channel, Turn clockwise to increase the channel, anticlockwise to decrease the channel.

NOTE: This transceiver has 128 channels for use, if there is a null channel between 2channels, when manually select channel, transceiver will skip null channel, enter into next channel directly.

# BASIC OPERATIONS

## Receiving

You can hear the transmitting party's calling when the channel you are operating is called and the LED light turns green.

NOTE:
You may not receive the calling if you set a high squelch off level of the transceiver.
If current channel has been programmed with signaling, you can only hear the call from a same signaling, other calls cannot be heard.

## Transmitting

Before transmitting, make sure that the channel you want to use is not in busy state through monitoring for a while by pressing the programmed Momentary Squelch off [**PF1**] / [**PF2**] key. Under these conditions, press the [**PTT**] key and speak into microphone. Please keep around 2.5-5cm distance between microphone and your lip. And please speak in normal tone to make the receiver obtain best tone quality.

NOTE:
Press PTT key, LED indicator shows red light, means transmitting now, release PTT key to receive signals.

# ADVANCED OPERATIONS

The [**PF1**]、[**PF2**]、P1、P2、P3 and P4 keys are programmable. They can realize the following functions by programming software. See page 2 for more information

NOTE: The keys can be programmed of long press and short press , if program of short press, the function will be activated when press the programmed key , if program of long press, the function will be activated when press and hold the key for programmed time.

## Call

Under standby, press the programmed key to transmit the pre-stored and selected DTMF signaling.

## Alarm

Press the programmed key of Alarm to activate Alarm function, the transceiver will sound alarm beep, meanwhile, it starts transmitting and sends the alarm beep to companions or systems. Re-power on to exit alarm.

NOTE: Alarm function shall be setup in the Emerge information of programmed software.

## Monitor

Under standby, press the programmed key of monitor, the transceiver emits "**DU**" beep and enters into monitor state. CTCSS/DCS decode will be ignored in monitor state, transceiver can monitor signal of the other party as long as receiving the matched carrier wave.

Press this key again, transceiver emits "**DU DU**" beep and exits the monitor state.

## Squelch off

Under standby, press the programmed key of Squelch off, the squelch circuit is not mute, background noise can be heard. Press this key again, transceiver emits "**DU DU**" beep, the squelch circuit becomes mute. By using this function you can monitor the weaker signal which is hard to receive.

## Scan

Scan function can be used for monitoring every channel of current group.

Under standby, press the programmed scan key, transceiver enters into scan state. It scans channels in scan list one by one. When one channel receives a matching signal, the transceiver will temporarily stay in this channel till the signal disappears. Press the scan key again, transceiver exits scan, working channel will be switched to pre-programmed return channel.

NOTE: Scan function shall be setup in the Scan information of programming software.

## Squelch Levels Setup

This function is used for setup the receiving signal intensity. The other party calling can be heard when the receiving signal intensity reaches a certain level, otherwise transceiver will remain mute.

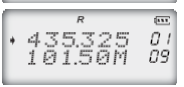
Under standby, press the programmed key of Squelch Levels Setup, LCD displays Squelch level "SQL XX", rotate channel switch to choose desired level.

Total 10 squelch levels, 0-9, 0 is lowest, 9 is highest.


## Frequency Reverse

Under standby, press the programmed key of Frequency Reverse, LCD displays "REV ON" and enters into Frequency Reverse state, press key again or wait 1second, radio will return back to standby state, LCD displays "***R***" icon.


When frequency Reverse function is on, the current channel RX frequency will be switched to TX frequency, the CTCSS or DCS signal which has been setup will be also switched. Repeat the above operation, the transceiver exits reverse functions with LCD displays "REV OFF" , when return back to standby state, "***R*** " icon disappears.




NOTE: Under Frequency reverse state, transceiver cannot communicate with other transceivers through repeater.

## Talk Around


Under standby, press the programmed key of Talk Around, screen displays "TALK ON" and enter into Talk Around state, press key again or wait 1 second, radio will return back to standby state, screen displays "**T**" icon.

Under Talk Around, transceiver will transmit at receiving frequency, the setting mute code (CTCSS/DCS) will use decode signal for encode transmitting. Repeat the above operation, transceiver exits Talk Around when screen displays "TALK OFF", when return back to standby state, "**T**" icon disappear.

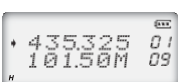
NOTES: Under Talk Around, the transceiver cannot communicate with other transceiver through repeater.

## Keypad Lock


In order to prevent wrong operation, you can make use of key lock function.

Under standby, press the programmed key of Key Lock, screen displays "🔒" icon, key lock function is enable. Repeat the above operations, transceiver exits key lock function when "🔒" icon disappear.

## TX Power Switch




Under standby, press the programmed key of "TX Power Switch", user can choose desired power in current channel.

When screen displays "**H**" icon, it means high power is chosen, current channel

transmits at high power .

when screen display " ***L***" icon, it means lower power is chosen, current channel transmits low power.

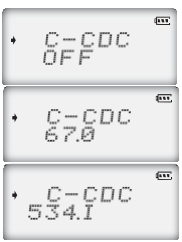
when screen not display "***H***" or "***L***" icon, it means middle power is chosen, current channel transmits middle power.


## Instantaneously Squelch off

Under standby, press and hold the programmed key of Instantaneously Squelch off, transceiver emits "**DU**" beep and the squelch circuit is not mute, background noise can be heard. Release this key, transceiver emits "**DU DU**" and the squelch circuit is mute. By using this function you can monitor weak signal which is hard to receive.

## CTCSS/DCS Encode/Decode

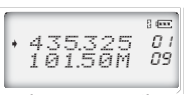
Under standby, press the programmed key of CTCSS/DCS encode/decode, screen displays "**C-CDC**" and enter into CTCSS/DCS setting, rotate channel switch to choose desired CTCSS/DCS code, press this key repeatedly to switch CTCSS/DCS or OFF. Press PTT key to exit.



will start transmitting. Under this state, hold this key will send out Pilot frequency.

NOTES: Pilot frequency of this transceiver is 1750HZ,2100HZ,1000HZ and 1450HZ,user can select needed Pilot frequency in programming software.

## Scramble (Encryption)




This special audio process can offer a more confidential communication. It makes other transceiver of same frequency receive disordered noises only.

Under standby, press the programmed Scramble key, transceiver emits "**DU**" beep, screen displays "" icon and enables Scramble function. Repeat the above operation, transceiver emits "**DU DU**" beep, "" icon disappears, disable Scramble function.

## Voice Compander



Enable this function to reduce background noise and improve audio clarity, which is especially helpful for long distance communication.

Under standby, press programmed key of Voice compander, screen displays "**COMP ON**", compander function is enabled, press any other key or wait 1second, radio will return back to standby state. Repeat above operation, compander function is disabled when screen displays "**COMP OFF**"

## Whisper

When this function is enabled, other parties can hear a higher voice as long as you speak in a lower voice.

Under standby, press programmed key of whisper, screen displays "**WHISPE ON**", whisper function is enabled, press any other key or wait 1 second, transceiver will return back to standby state. Repeat above operation, whisper function is disabled when screen displays " **WHISPE OFF**".



## Voice Prompt Setup

Under standby, press programmed key of Voice, transceiver screen displays "**VOICE**", rotated channel switch to choose desired prompt voice. There is 3 options, Chinese Voice prompt (CHN), English Voice prompt (ENG) and Turn off voice prompt (OFF). Press any other key to return back standby state.

NOTES: Press VOICE key repeatedly, also can select needed prompt voice.




## VOX level setup

This function is used for setup VOX transmit volume, volume is higher when lever is higher.

Under standby, press programmed key of VOX level, screen displays "**VOX**", rotate channel switch to select need VOX level.

Total 3 levels, 1-3, and off. When VOX function is on, screen displays "**VOX**" icon.


NOTES: Press the programmed key of VOX repeatedly, also can choose desired VOX level.

## VOX Delay Setup


If transceiver returns to receiving mode instantly after VOX transmitting, it may cause signal missing, to avoid this problem, user can set a suitable delay time.

Under standby, press programmed key of VOX delay, screen displays "**VOXDEY**", rotate channel switch to choose desired delay time. Total has 11 levels of delay time for optional, 1.5-5seconds. Press any other key to return standby state.

NOTES: Press this key repeatedly, also can select needed delay time.

## Battery Capacity Enquiry


Under standby, press programmed key of "Battery Capacity Enquiry",transceiver emits"**DU**" beep, screen displays current battery capacity. Press this key again, transceiver emits "**DUDU**" beep and return back to standby state.

## DIirect CH1 / Direct CH2

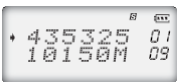
Under standby, press programmed key of direct channel, transceiver emits "**DU**" beep and enter into DIRECT CH1/ DIRECT CH2, screen displays frequency of direct channels, user can do communication. Press this key again, transceiver emits "DI" beep and return back to original channel.

## FM radio

Under standby, press programmed key of FM radio, transceiver emits "DI" beep and switch into FM radio, screen displays ***FM*** icon, rotate channel switch to choose desired FM channel. Press this key again, FM icon disappears, transceiver returns back to standby state.


## Add/delete scan list

Under standby, rotate channel switch to choose desired channel, press programmed key of add/delete scan list to add or delete chose channel from scan list. When screen displays "***S***" icon, current channel will not be scanned.




## Offset Frequency

Offset is the difference between receiver and transmit frequency of a radio channel. Most commonly refers to the separation between the input frequency and the output frequency of a repeater or other types of full duplex system.

## Resume Factory Default

Once transceiver works abnormally for wrong operations or wrong programming, user can start this function to resume all functions and channels as Factory Default.

Turn off transceiver, press [PF1] and P4 key together to switch on transceiver, holding the two keys for more than 1second, transceiver emits "**DU**" beep and resume Factory Default.

## LCD Backlight

**Auto:** Backlight is auto on when process transceiver, otherwise backlight is off.

# TROUBLE SHOOTING GUIDE

| General | |
|---|---|
| Frequency Range | VHF: 136-174MHz<br>UHF: 400-470MHz<br>PMR446(Exp: 411-471MHz) |
| Channel Capacity | 128 channels |
| Channel Spacing | 25KHz (Wide Band)<br>21KHz(Middle Band)<br>12.5KHz (Narrow Band) |
| Phase-locked Step | 5KHz, 6.25KHz |
| Operating Voltage | 7.4V DC ±20% |
| Battery Life | More than 14 Hours (1500mAh), by 5-5-91 work cycle |
| Frequency Stability | ±2.5ppm |
| Operating Temperature | -21℃~ +55℃ |
| Size | 241×56×31mm (with battery pack, antenna) |
| Weight | 241 g (with battery pack, antenna) |

| Receiving Part(ETSI EN 300 086 Standard Test) | | |
|---|---|---|
| | Wide band | Narrow band |
| Sensitivity(12dB | ≤0.25μV | ≤0.35μV |
| Adjacent Channel Selectivity | ≥70dB | ≥60dB |
| Intermodulation | ≥65dB | ≥60dB |
| Spurious Rejection | ≥70dB | ≥70dB |
| Audio Response | +1~-3dB(1.3~3KHz) | +1~-3dB(1.3~2.55KHz) |
| Hum & Noise | ≥51dB | ⩾45dB |
| Audio Distortion | ≤5% | |
| Audio Power Output | 1000mW/10% | |

| Transmitting Part(ETSI EN 300 086 Standard Test) | | |
|---|---|---|
| | Wide band | Narrow band |
| Power Output | 5W/2W/0.5W | |
| Modulation | 16KΦF3E | 11KΦF3E |
| Adjacent Channel Power | ≥70dB | ≥65B |
| Hum & Noise | ≥40dB | ≥36dB |
| Spurious Emission | ≤-36dB | ≤-36dB |
| Audio Response | +1~-3dB (1.3~3KHz) | +1~-3dB (1.3~2.25KHz) |

## TROUBLE SHOOTING GUIDE

| Problem | Corrective Action |
|---|---|
| No Power | A. The battery pack may be exhausting. Recharge or replace the battery pack.<br>B. The battery pack may not be installed correctly. Remove the battery pack and install it again.<br>C. The power switch is broken; send it to local dealers to repair.<br>D. Battery touch is broken; send it to local dealers to repair. |
| Battery power dies shortly after correctly charging. | The battery pack life is finished. Replace the battery pack with a new one. |
| Transceiver cannot scan | The channels are not in scan list. (Professionals set it.) |
| All band noisy after programmed or green light always lightens | Turn on squelch when programmed. Non-professionals are advised not to adjust this function. |
| No sound after using microphone for a while | Earphone jack is broken. (Please contact with local dealers to repair it.) |
| Communication distance becomes short, and it is low sensitivity | A. Check whether the antenna is in good condition and the antenna base do not come adrift.<br>B. Users select wrong frequency type which is not in accord with this transceiver when programming.<br>C. Whether it has set in low power output. (Please contact with local dealers to repair it.) |

## TROUBLE SHOOTING GUIDE

| | |
|---|---|
| Cannot talk to or hear other members in your group | A. Different frequency or channel, please change it.<br>B. Different CTCSS / DCS please reset it.<br>C. Out of communication range. |
| Can not power on or frequent power-off | Check whether the battery touch is out of sharp or broken. |
| The receiver gets low or intermittent voice from the caller | Check weather the MIC is stoppage. (Otherwise, please contact with local dealers to repair it.) |
| Unstable communication with loud background noise | Out of communication range or obstruct by tall buildings or in basement and so on. |
| Loudspeaker become lower or with “ka ka” sound after using a certain time | Check whether the loudspeaker net is broken. Iron powder or sundries is in the loudspeaker. (Please contact with local dealers to repair it.) |
| Receive voice from the other party but can not transmit | Check [PTT] key. (Please contact with local dealers to repair it.) |
| Receiving Indicator (green light) lightens but no sound | A. Low volume, please turn on clockwise.<br>B. Loudspeaker is broken. (Please contact with local dealers to repair it.)<br>C. Earphone jack is broken. (Please contact with local dealers to repair it.)<br>D. Volume switch is broken. (Please contact with local dealers to repair it.) |

## TECHNICAL ASSISTANCE

If you need assistance setting up or using your CRYSTAL product now or in the future, call CRYSTAL Support.
Australia
TEL: 03 – 8587 8898
FAX: 03 – 8587 8866
Mon-Fri 9am – 5pm AEST
Please retain this user guide for future reference.
Safety Information and Warnings
For updates on CRYSTALM products go to our website

http://tdj.com.au/firmware/Crystal/

**Important information**
Use of the citizen band radio service is licensed in Australia by the ACMA Radio communications (Citizens Band Radio Stations) Class Licence and in New Zealand by the Ministry of Economic Development (MED) General User Radio Licence (GURL) for Citizens Band Radio, and operation is subject to conditions contained in those licences.

In Australia, except in an emergency, a CB transmitter shall not be operated on UHF emergency channels 5 and 35 and no voice transmissions are permitted on data (telemetry/telecommand) channels 22 and 23. Also advice that equipment meeting this Standard will inhibit voice operation on channels 22 and 23.
In the event that additional telemetry/telecommand channels are approved by the ACMA, these channels shall be added to those currently listed where voice transmission is inhibited.

**NOTE:** In Australia, channel 11 is the customary calling channel for establishing communication and channel 40 is the customary road vehicle channel.
Always listen on a channel (or observe the receive signal level meter) to ensure it is not already being used before transmitting.
CTCSS, DCS, TSQ and SELCALL will not operate on these channels. Please follow these guidelines for channel use in Australia:

Channels 61, 62 and 63 are for future use and TX is inhibited on these channels. General communication is accepted on all other channels with these guidelines:

Channel 40 - road channel (Australia).
Channels 01-08 (and 31-38), and Channels 41-48 (and 71-78) are repeater channels.
**NOTE:** Important information - 80 Channel UHF-CB channel expansion To provide all users additional channel capacity within the UHF-CB Band. The ACMA will change the majority of the current wideband 40 channel use to narrowband channel use. This allows for additional channels to be added, up to 80 Channels. This simply means that the new narrowband radio you have purchased will have more channels than older radios. Please refer to the guidelines above and the channel chart for further channel information. A list of currently authorised channels can also be obtained from the ACMA website in Australia and the MBIE website in New Zealand. Interference / Poor Audio When a new narrowband radio receives a signal from an older wideband radio the speech may sound loud. Narrowband radios operating on CH41 - CH80 may encounter interference from a nearby wideband radios transmitting on high power on an adjacent channel (frequency). When an older wideband radio receives a signal from a new narrowband radio the speech may sound quiet - the wideband radio user simply adjusts their radio volume for best performance. The above situations are not a fault of the radio but a symptom of mixed wideband and narrowband radios in current use. It is expected that as older wideband radios are phased out this issue will be eliminated.

**Information on Safe Operation**

Read This Information Before Using Your CRYSTAL Radio. The operation of your UHF radio in Australia is subject to conditions in the following license: In Australia the ACMA Radio communications (Citizen Band Radio Stations) and in New Zealand by MED the General User Radio License for Citizen Band Radio. Safety and general use whilst in a vehicle check the State and Federal laws and regulations regarding the use of two-way radios in the area where you drive, and always obey them.

**Radio Antenna**

Do not use any radio that has a damaged antenna. If a damaged antenna comes in contact with the skin, a minor burn may result. Unauthorized antennas, modifications, or attachments could damage the radio and violate compliance. Do NOT change or modify the antenna. Do NOT hold the antenna when the radio is “IN USE.” Holding the antenna reduces range and may cause bodily harm.

**For vehicles fitted with Airbags**

Do not place your radio in the area over an air bag or in the air bag deployment area. Air bags inflate with great force. If a radio is placed in the airbags deployment area and the airbag inflates, the radio may be propelled with great force and cause serious injury to the occupants of the vehicle.

**Batteries**

All batteries can cause property damage and/or bodily injury such as burns if conductive material such as jewellery, keys, or beaded chains touches exposed terminals. The material may complete an electrical circuit (short circuit) and become quite hot. Exercise care in handling any charged battery, particularly when placing it inside a pocket, purse, or other container with metal objects. Do not replace or charge batteries in a potentially explosive atmosphere. Contact sparking may occur while installing or removing batteries and cause an explosion.

**Potentially Explosive Atmospheres**

Turn your radio OFF when in any area with a potentially explosive atmosphere. Sparks in such areas Could cause an explosion or fire resulting in injury or even death. NOTE: Areas with potentially Explosive atmospheres are often, but not always clearly marked. They include fueling areas such as below deck on boats; fuel or chemical transfer or storage facilities; areas where the air contains chemicals or particles, such as grain, dust, or metal powders; and any other area where you would normally be advised to turn off your vehicle engine.

**Blasting Caps and Areas**

To avoid possible interference with blasting operations, turn your radio OFF near electrical blasting caps or in a “blasting area” or in areas posted: “Turn off the two way radio.” Obey all signs and instructions.

**Exposure to Radio Frequency Energy**

Your CRYSTAL two-way radio complies with Australian Communications Authority Radio communications (Electromagnetic Radiation-Human Exposure) Standard, 2003. To assure optimal radio performance and make sure human exposure to radio frequency electromagnetic energy is within the guidelines set out in the above standards always adhere to the following procedures.

**Transmit and Receive Procedure**

Your two-way radio contains a transmitter and a receiver. To control your exposure and ensure compliance with the general population/uncontrolled environment exposure limits, always adhere to the following procedure: Transmit no more than 50% of the time.

• To receive calls, release the PTT button

• To transmit (talk), press the Push to Talk (PTT) button

Transmitting 50% of the time, or less, is important because the radio generates measurable RF energy exposure only when transmitting (in terms of measuring standards compliance). Always hold the radio approximately 5cm in front of your mouth with the antenna pointing away from your head.

**Electromagnetic Interference/Compatibility**
Nearly every electronic device is susceptible to electromagnetic interference (EMI). To avoid the possibility of electromagnetic interference and/or compatibility conflicts, turn off your radio in any location where posted notices instruct you to do so such as health care facilities.

**Radio Operation and EME Exposure**
Unauthorized antennas, modifications, or attachments could damage the radio and violate compliance. Do NOT hold the radio antenna when the radio is “IN USE.” Holding the antenna reduces the effective range. Do not use the radio if the antenna is damaged. If a damaged antenna makes contact with your skin, a minor burn can result. If you wear a radio on least 5cm from your body when transmitting.

**Aircraft**
When instructed to do so, turn off your radio when onboard an aircraft. Any use of a radio must be in accordance with applicable regulations per airline crew instructions.

**Medical Devices – Pacemakers**
The Advanced Medical Technology Association recommends that a minimum separation of 6 inches (15cm) be maintained between a handheld wireless radio and a pacemaker. These recommendations are consistent with the independent research by and recommendations of the U.S. Food and Drug Administration.
People with pacemakers should:
‡ ALWAYS keep the radio more than 15cm from their pacemaker when the radio is turned ON.
• Do not carry the radio in the breast pocket
• Use the ear opposite the pacemaker to minimize the potential for interference
• Turn the radio OFF immediately if there is any reason to suspect that interference is taking place.

**Medical Devices - Hearing Aids**
Some radios may interfere with some hearing aids. In the event of such interference, you may want to consult your hearing aid manufacturer to discuss alternatives.

**Other Medical Devices**
If you use any other personal medical device, consult the manufacturer of your device to determine if it is adequately shielded from RF energy. Your physician may be able to assist you in obtaining this information.

# Duplex operation via Repeaters

This feature allows to use local repeater stations that are designed to automatically re-transmit your broadcast over a large area thus giving you increased range.

Repeaters stations are privately operated radio systems installed throughout Australia.

For example, if you wish to access a repeater station in your area which operates on

channel 2 you only need to set the Duplex access on this Channel.
So, if you are in the range of a local repeater which transmits on channel 2, after setting your radio to allow access of the repeater on that channel, you will select channel 2 as normal, but during transmit operation your radio will automatically transmit to the repeater on channel 32.

| Receive Channel | 1 | 2 | 3 | 4 | 5* | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Transmit channel | 31 | 32 | 33 | 34 | 35* | 36 | 37 | 38 |
| Receive Channel | 41 | 42 | 43 | **44** | 45 | 46 | 47 | 48 |
| Transmit channel | 71 | **72** | 73 | 74 | 75 | 76 | **77** | 78 |

- Channel 5 is emergency channel only

50 groups CTCSS Tone Frequency(Hz)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 67.0 | 79.7 | 94.8 | 110.9 | 131.8 | 156.7 | 171.3 | 186.2 | 203.5 | 229.1 |
| 69.3 | 82.5 | 97.4 | 114.8 | 136.5 | 159.8 | 173.8 | 189.9 | 206.5 | 233.6 |
| 71.9 | 85.4 | 100.0 | 118.8 | 141.3 | 162.2 | 177.3 | 192.8 | 210.7 | 241.8 |
| 74.4 | 88.5 | 103.5 | 123.0 | 146.2 | 165.5 | 179.9 | 196.6 | 218.1 | 250.3 |
| 77.0 | 91.5 | 107.2 | 127.3 | 151.4 | 167.9 | 183.5 | 199.5 | 225.7 | 254.1 |

1024 groups DCS Code.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 000 | 001 | 002 | 003 | 004 | 005 | 006 | 007 |
| 010 | 011 | 012 | 013 | 014 | 015 | 016 | 017 |
| 020 | 021 | 022 | 023 | 024 | 025 | 026 | 027 |
| 030 | 031 | 032 | 033 | 034 | 035 | 036 | 037 |
| 040 | 041 | 042 | 043 | 044 | 045 | 046 | 047 |
| 050 | 051 | 052 | 053 | 054 | 055 | 056 | 057 |
| 060 | 061 | 062 | 063 | 064 | 065 | 066 | 067 |
| 070 | 071 | 072 | 073 | 074 | 075 | 076 | 077 |
| 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 |
| 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 |
| 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 |
| 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 |
| 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 |
| 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 |
| 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 |
| 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 |
| 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 |
| 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 |
| 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 |
| 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 |
| 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 |
| 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 |
| 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 |
| 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 |
| 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 |
| 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 |
| 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 |
| 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 |
| 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 |
| 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 |
| 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 |
| 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 |
| 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 |
| 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 |
| 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 |
| 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 |
| 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 |
| 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 |
| 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 |
| 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 |
| 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 |
| 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 |
| 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 |
| 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 |
| 540 | 541 | 542 | 543 | 544 | 545 | 546 | 547 |
| 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 |
| 560 | 561 | 562 | 563 | 564 | 565 | 566 | 567 |
| 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 |
| 600 | 601 | 602 | 603 | 604 | 605 | 606 | 607 |
| 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 |
| 620 | 621 | 622 | 623 | 624 | 625 | 626 | 627 |
| 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 |
| 640 | 641 | 642 | 643 | 644 | 645 | 646 | 647 |
| 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 |
| 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 |
| 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 |
| 700 | 701 | 702 | 703 | 704 | 705 | 706 | 707 |
| 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 |
| 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 |
| 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 |
| 740 | 741 | 742 | 743 | 744 | 745 | 746 | 747 |
| 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 |

**Transmitting Range**

The talk range will depend on your surroundings and environment it will be affected by obstructions such as hills or buildings.

Don't try to use two radio units which are less than 1.5m (5 feet) apart. Otherwise, you may experience interference. Talk range depends on the terrain. It will be affected by concrete structures, heavy foliage and by operating radios indoors or in vehicles.
Channel 5 and 35 (paired for Duplex repeaters) are reserved as emergency channels and should be used only in an emergency. CTCSS and DCS will not operate on channels 5 and 35.
A list of currently authorised channels can be obtained from the ACMA website in Australia and the MED website in New Zealand. Channel 11 is a calling channel generally used to call others and channel 40 is the customary road vehicle channel.
Once contact is established on the calling channel, both stations should move to another unused "SIMPLEX" channel to allow others to use the calling channel.
Channels 22 and 23 are for Telemetry and Telecommand use, voice communications are not allowed on these channels by law. Channel 9 and above are the best choices for general use in Simplex mode.

**Radio communications (Citizen Band Radio Stations)**
**Class License 2002**

No license is required to own or operate this radio in Australia and New Zealand. The Radio communications (Citizen Band Radio Stations) Class License 2002 contains the technical parameters, operating requirements, conditions of license and relevant standards for Citizen Band (CB) radios. CB radios must comply with the class license for their use to be authorized under the class license. UHF channels and frequencies. IMPORTANT NOTE: The operation of your UHF radio in Australia and New Zealand is subject to conditions in the following licenses: In Australia the ACMA Radio communications (Citizen Band Radio Stations) and in New Zealand by MED the General User Radio License for Citizen Band Radio


## CRYSTAL MOBILE WARRANTY AGAINST DEFECTS

This warranty against manufacturing defects is given by TDJ Australia Pty Ltd ACN 006 385 191). Our contact details are set out in clause 2.7.

**1. Consumer guarantee**

1.1 Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major (description according to Australian Consumer Laws) failure and compensation for any other reasonably foreseeable (description according to Australian Consumer Laws) loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to meet manufacturers specifications and the failure does not amount to a major failure.

1.2 To the extent we are able, we exclude all other conditions, warranties and obligations which would otherwise be implied.

## 2. Warranty against defects

2.1 This Warranty is in addition to and does not limit, exclude or restrict your rights under the Competition and Consumer Act 2010 (Australia) or any other mandatory protection laws that may apply. Consumer guarantees are a set of rules that apply to goods and services purchased by consumers under the Australian Consumer Law (ACL).

These rules set out the circumstances under which a business is required to provide a consumer with a remedy.

The consumer guarantees automatically apply regardless of any voluntary or extended warranty given by a seller or manufacturer of goods and services, or if such a warranty has expired.

2.2 We warrant our goods to be free from defects in materials and workmanship for the warranty period from the date of original sale (or another period we agree to in writing). Subject to our obligations under clause 1.2, we will at our option, either repair or replace goods which we are satisfied do not meet manufacturers specifications. We warrant any replacement parts for the remainder of the period of warranty for the goods into which they are incorporated.

2.3 To the extent permitted by law, our sole liability for breach of a condition, warranty or other obligation implied by law is limited (a) in the case of goods we supply, to any one of the following as we decide - (i) the replacement of the goods or the supply of equivalent goods; (ii) the repair of the goods; (iii) the cost of repairing the goods or of acquiring equivalent goods; (b) in the case of services we supply, to any one of the following as we decide – (i) the supplying of the services again; (ii) the cost of having the services supplied again.

2.4 For repairs outside the warranty period, we warrant our repairs to be free from defects in materials and workmanship for three months from the date of the original repair. We agree to repair or replace (at our option) any materials or workmanship which we are satisfied do not meet manufacturers specifications.

2.5 We warrant that we will perform services with reasonable care and skill and agree to investigate any complaint regarding our services made in good faith. If we are satisfied that the complaint is justified, and as our sole liability to you under this warranty (to the extent permitted at law), we agree to supply those services again at no extra charge to you.

2.6 To make a warranty claim you must before the end of the applicable warranty period, at your own cost, return the goods you allege do not meet manufacturers specifications, provide written details of the alleged defect, and give us an original or copy of the purchase receipt, sales invoice or some other evidence showing details of the transaction.

2.7 Send your claim to: TDJ Australia PTY LTD. 78 Mills Road, Braeside Melbourne Victoria 3195, Australia,
TEL: 03 8587 8898 FAX: 03 8587 8866
Email: tdj-service-team@tdj.com.au

2.8 If we determine that your goods do not meet manufacturers specifications, we will pay for the cost of returning the repaired or replaced goods to you. If we find your goods meet manufacturers specifications and no major defect is found, we will contact you to arrange the return of the goods at your expense.

**3. What this warranty does not cover**

3.1 This warranty will not apply in relation to: (a) goods modified or altered in any way; (b) defects and damage caused by use with non Standard Communications products; (c) repairs performed other than by our authorized service team; (d) defects or damage resulting from misuse, accident, impact or neglect; (e) goods improperly installed or used in a manner contrary to the relevant instruction manual; or (f) goods where the serial number has been removed or made illegal.

**4. Warranty period**

4.1 We provide the following warranty on Crystal Mobile products. No repair or replacement during the warranty period will renew or extend the warranty period past the period from original date of purchase.

This products warranty period is 3 years from date of purchase