DBH50R

Version 7

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/

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 Air Bags
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 air bag deployment area and the air bag 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 b attery, 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 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 your body when transmitting, always fit the radio on the belt clip (supplied). Always ensure the radio and it's antenna are at 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.
- 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
760	761	762	763	764	765	766	767
770	771	772	773	774	775	776	777

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.

Radiocommunications (Citizen Band Radio Stations)

Class Licence 2002

No licence is required to own or operate this radio in Australia and New Zealand. The Radiocommunications (Citizen Band Radio Stations) Class Licence 2002 contains the technical parameters, operating requirements, conditions of licence and relevant standards for Citizen Band (CB) radios. CB radios must comply with the class licence for their use to be authorised under the class licence.

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.

◦ UNPACKING

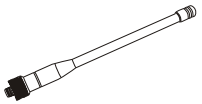
Carefully unpack the transceiver. We recommend you identify the items listed in the table before discarding the packing material. If any items are missing or have been damaged during shipment, please contact your local dealer immediately.

Supplied Accessories

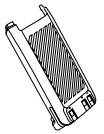
Item	Quantity
Antenna 477MHz	1
Li-ion Battery (1200 mAh)	1
Battery Charger	1
AC Adaptor	1
Belt Clip	1
Instruction Manual	1
Car Charger	1
Earphone	1
Hand Strap	1

◦ STANDARD ACCESSORIES/OPTIONAL ACCESSORIES

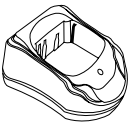
Standard Accessories



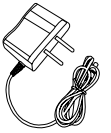
Antenna



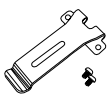
Li-ion Battery



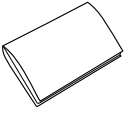
Charger



AC Adaptor



Belt Clip
(including screws)



Instruction
Manual

Car Charger

Earphone

Hand Strap

TRANSCEIVER

FIRST LEVEL MENU:SHORTCUT OPERATIONS
SECOND LEVEL MENU: CHANNEL OPERATIONS
THIRD LEVEL MENU:BACKGROUND OPERATIONS
BATTERY INFORMATION

Charging the Battery Pack

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. Change to a new 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

◦ BATTERY INFORMATION

casing from the battery pack. We bear no responsibility on any results caused by modifying the battery.

▼ The ambient temperature should be between 5℃ and 40℃ 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 interference with 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:

When keys, ornamental chain or other electric metals contact with the battery terminal, the battery may cause damage or injury. If the battery terminal short circuits it will generate a lot of heat, please be careful when you carry or use the battery, please put battery or radio into insulated container. Do not put it into metal container.

◦ BATTERY INFORMATION

You can charge the battery or transceiver separately.

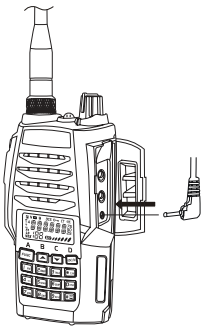
1. Plug the AC adaptor into the AC outlet, and then plug the cable of the AC adaptor into the DC jack located on the back of the Charger.
Charging indicator---Green

2. Plug the battery or transceiver into the charger.
A. Make sure that the battery is well connected with charging connectors.
B. Charging indicator---Red

3. Fully charged. Charging indicator--Green

Note:

It takes approximately 4 hours to fully charge the battery. But, the actual charging time depends on the dump battery. After fully charged, please remember to remove the battery or transceiver out of charger. Over charging will shorten the battery life and reduce its performance.



◦ Emergent Charging

Connect the transceiver directly with adaptor or car charger to charge.

Note:Please power off the transceiver before charging the transceiver in this way. Also, it takes longer time (totally 12hours) to fully charge the transceiver in this way.

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 low temperature and dry environment.
3. Keep it away from hot places and direct sunlight.

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

PREPARATION

Installing / Removing the Battery

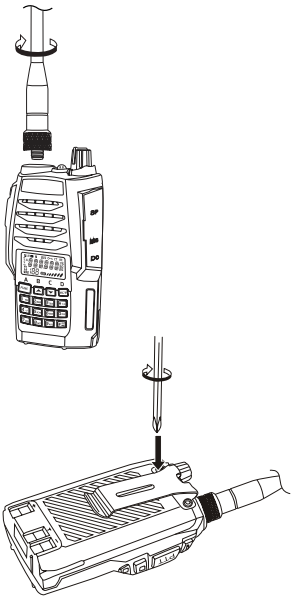
■ Installing the battery:
Match the battery pack with the corresponding guides on the back of the transceiver, and push it upwards till it is fully locked by the battery latch.

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

■ Removing the Antenna:
Turn the antenna anticlockwise to remove it.

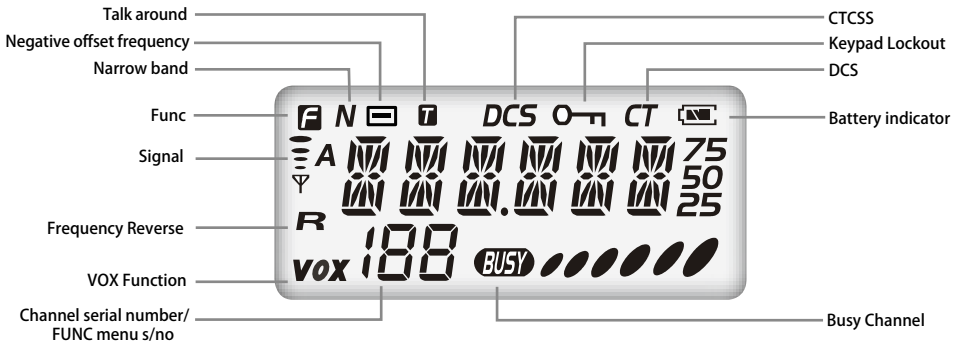
■ Removing the battery pack
Slide up the battery latch and remove the pack away from the transceiver.



■ Installing the Belt Clip
Installing the Belt Clip: Place the belt clip to the corresponding grooves on the back of the transceiver, and then screw it. clockwise

Getting Acquainted

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:

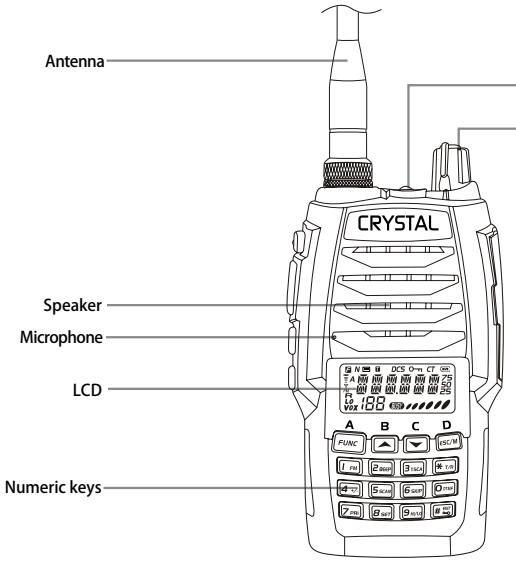
Battery capacity indicator(full)

Battery capacity remnant

No power,replace battery pack or charge battery

Real time display receiving signal strength/Power Indicator

Getting Acquainted



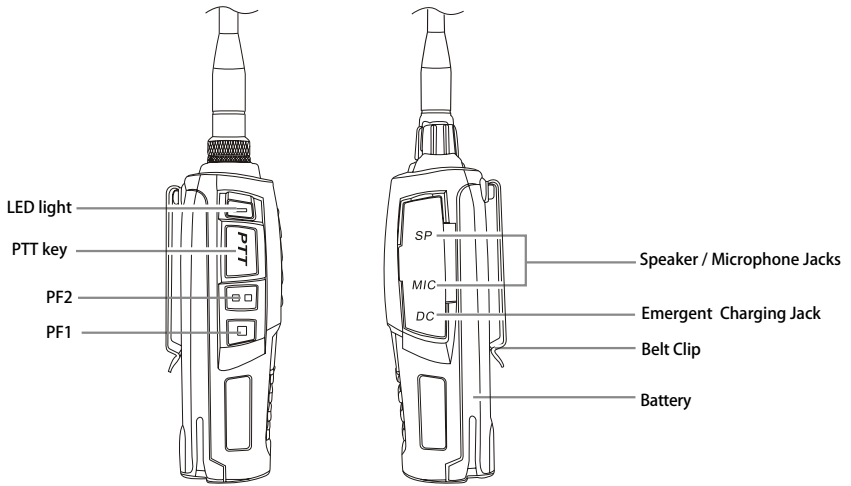
Under power-off state, please turn [POWER]/ [VOLUME] clockwise to turn on the transceiver.

Under power-on state, please turn [POWER]/ [VOLUME] anticlockwise to turn off the transceiver.

Adjusting Volume
Under power-on state, turn [POWER] / [VOLUME] to adjust volume.

press and hold side key PF2 to monitor current volume. (Refer to the function setup of side PF2 key)

Getting Acquainted



Channel Selection

When the radio is under Channel mode or FM channel, press ▲/▼ key to select desired channel. Press ▲ to go up through the channels and ▼ to go down through the channels.

Note:If there is blank channel between two channels, the radio will skip it and get to next channel.

◦ BASIC OPERATIONS

Channel input by keypad

Under channel mode and FM Channel mode, type number of 3 digits (001-128) to switch to the desired channel. If the input channel is not edited, transceiver would emit error prompt and back to current channel. For example, if you type 001, then it gets channel No.1.

FM scan function

When FM Radio is on, press ▲/▼ key to scan FM Channels. If a certain channel is detected, the frequency will be displayed on the LCD and you can listen to it.

Alarm

Under standby state, press and hold the Alarm key till hearing a "a tone" to start Alarm function. Reset the radio to switch off the function.

Note: This function should be enabled via software before use.

LED light

Under standby state, press Alarm key to switch on the LED light. Press it again to switch off.

Receiving

Once current channel is called, LCD will display the signal strength, and then you can hear if the other party is calling.

◦ BASIC OPERATIONS

NOTE:You may not receive the call 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 the same signaling, other calls can not be heard.

Transmitting

Be sure that the channel you want to use is not in busy state through monitoring for a while by pressing the programmed Squelch off [PF1] 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: Holding [PTT], red LED lighting, the transceiver is transmitting. Release the PTT to receive.

Battery Enquiry

Under standby state, pressing [PF2], LCD displays current battery voltage. Press this key again to clear the display.

◦ SHORTCUT OPERATIONS

Editing Channel

1. Under VFO frequency mode, enter the desired frequency and set other items. Afterwards, press [FUNC] key and then the left top of the LCD displays F icon. Hold the [ESC/M] key till the transceiver emits "DU" and LCD displays 1st channel to enter the Channel Setting Save mode.

2. Press [▲] / [▼] key to select the channel you want to update the settings.

3. Hold [ESC/M] key till the transceiver emits "a tone" to save the settings.

Deleting Channel

Under channel mode, select the channel that you want to delete. Then, press [FUNC] key to enter FUNC setting with F icon displayed on the LCD. Finally, hold the [ESC/M] key to delete the channel till the transceiver emits "a tone" and skip to other channel.

ON/Off FM Radio

Under standby state, press [FUNC] key to enter FUNC setting with F icon displayed on the LCD. Then, press [1 FM] key and the LCD will display "FM INI" and current FM frequency.
Namely, FM Radio is started. At this case, you can operate the FM radio freely.
Repeat above operations to turn off FM Radio.

◦ SHORTCUT OPERATIONS

On/Off Beep Prompt

Under standby state, press FUNC key to enter FUNC setting with F icon displayed on the LCD. Then, press 2BEEP button to activate and de-activate beep sound. Repeat the above operations to turn on it. We suggest turn on BEEP for fault detecting and prompt for not proper operation.

CTCSS/DCS Scan

Press FUNC key to enter FUNC setting with F icon displayed on top left of the LCD. Then, press 3TSCA key to enter CTCSS/DCS scan state. Namely, users can press ▲/▼ key to change scan direction. When matching signaling is detected, scan pauses for 15s before continuing scanning. Press any key except FUNC、*T/R、#ENT key to exit.

When the signaling of current channel is setup as CTCSS, the radio scans CTCSS only. Likewise, the radio scans DCS when the signaling is DCS.

Priority Scan

Under channel mode, after pressing FUNC key, the top left corner of LCD displays ✉ and then press 7 PRI key to enter priority scan. Under priority scan state, it tests priority channel once scanning per 10 channels. When the priority channel receives a matching signaling, transceiver will stop scanning until current signal disappear (Please refer to scan setup.).

NOTE: If you want to have this function available, you should set priority channel, otherwise, this operation will be only as general channel scan.

◦ SHORTCUT OPERATIONS

Channel Scan

Under relevant mode, after pressing [FUNC] key, the top left corner of LCD displays F icon and then press [5 SCAN] key to begin frequency scan or channel scan.

2. Channel Scan

When the radio is in channel mode, users can start this function to monitor signal of all channels. Press any number or [ESC/M] key to exit.

NOTE:

- ●When channel scanning, the skipped channel is not in the line of scan. Scan up as per channel no.. (Please refer to channel scan skip.)
- ●Channel scan can change scan direction by pressing [▽] key or [△] key. When finding a matching carrier wave and signaling, the transceiver will be stop for 15 seconds and then going on scan. (Please refer to scan setup).

Add/delete scan list

In channel mode, press [FUNC] key to enter FUNC setting. Then, press [6 SKIP] key to add current channel into scan list or delete current channel from the scan list.

1. When "A" is displayed on the LCD, it means that current channel is added into the scan list and will be scanned.

2. When "A" disappears, current channel is deleted from the scan list and wont be scanned.

◦ SHORTCUT OPERATIONS

DTMF Code Enquiry and Setup

After pressing [A FUNC] key , the top left corner of LCD displays ✉ and then press [0 DTMF] key to show the DTMF data of current groups (16 groups in total).

1. Press [B ▲] key or [C ▼] key to choose the desired group and DTMF data. If this group can edit DTMF data, it will display current group number and "__" .
2. When current group display "__" , pressing [A FUNC] key, the top left corner of LCD displays ✉ After pressing and holding [0 DTMF] key for 2 seconds, transceiver voices beeping of "DU" and then comes into DTMF edit state. Now you can enter the DTMF editing data you need by keypad.
3. After finishing setup, press side key [PF1] to make a sound of DTMF dialing, to save and exit.

Transmitting DTMF Signaling

Holding PTT key, users can transmit DTMF Signaling by entering DTMF data on the keypad.

Note: [FUNC] stands for "A" , [▲] for "B" , [▼] for "C" , [ESC/M] for "D" .

Frequency Reverse/Talk around On/off

After pressing [FUNC] key, the top left corner of LCD displays and then press [* T/A] key for 1 second to start frequency reverse or talk around. Repeat the above operations to exit. NOTE: If frequency reverse displayed in current channel, this operation will be enable and disable Frequency Reverse.
Or else, it is as enable and disable Talk Around.

When it displays "R" icon on screen, it means that Frequency Reverse is started on current channel. Now the transmitting frequency and receiving frequency are interchanged, namely, receiving frequency switches to transmitting frequency while transmitting frequency switches to receiving frequency. If CTCSS/ DCS signaling are set, it will also interchange.

When it display "T" icon on screen, it means that Talk Around function is started on current channel. Under these conditions, transceiver will transmit as receiving frequency. If CTCSS /DCS signaling is set, it will interchange decoding CTCSS /as encoding.

Keypad Lockout

In order to prevent wrong operation, you can make use of keypad lock function of this transceiver. Under standby state, after pressing FUNC key, the top left corner of LCD display and then press and hold #OUT 5 key for 2 seconds to start key lock function. Repeat the above operations to cancel key lock function.

NOTE: When keypad is locked, only PTT / PF1 / PF2 / FUNC key are available, other keys are unavailable.

CHANNEL OPERATIONS

Channel operation refers to temporarily change on current channel function. Once the radio is turned off or switched to another channel, the temporary change will be erased. Under frequency+channel mode, channel+Name Tag mode or VFO mode, the operating methods are as follows:

◦ CHANNEL OPERATIONS

1. After pressing [FUNC] key, the top left corner of LCD displays F icon and then press [8 SET] key to enter function menu.
2. Press [▲] / [▼] key to choose the desired function to be set.
3. Press [FUNC] key to enter into function menu setup.
4. Press [▲] key or [▼] key to choose the desired contents to be set.
5. Press [FUNC] to return to upward menu. Press [ESC/M]、[# SKIP MW] key to confirm and exit.

NOTE: When transceiver works at professional transceiver mode, operation as pressing [FUNC] key followed by [8 SET] key is not valid. Under frequency mode (VFO), once the radio is turned off or changed to new VFO frequency, the channel operations setting will be remained until next change.

CTCSS/DCS Decode Setup

If this function is enabled, you shield your radio from other transceivers of same frequency.

1. After pressing [FUNC] key, the top left corner of LCD displays F icon and then press [8 SET] key to enter into function menu.
2. Press [▲] / [▼] key to choose No.1 function item. It shows "R-CDC" on LCD
3. Press [FUNC] key to enter into function menu setup.
4. Press [1 P/R] key to choose CTCSS, DCS or OFF. When DCS signaling is selected, press [* T/D] key to choose DCS positive and inverse code.
5. Press [▲] keyor [▼] key to choose the desired CTCSS / DCS encodes signaling.

◦ CHANNEL OPERATIONS

6. CTCSS: 67Hz- 254.1Hz, 50 groups in total, Default: 67Hz.
7. DCS: 017N-765I, 232 groups in total. "N" stands for positive code, "I" Stands for reverse code.
8. Press [FUNC] key to back to previous menu. Press [ESC/M] key or [# LOCK] key to confirm and exit.

CTCSS/DCS Encode Setup

1. After pressing [FUNC] key, the top left corner of LCD displays F icon and then press [8 SET] key to enter into function menu.
2. Press [▲]/[▼] key to choose No.2 function item. It shows "T-CDC" on LCD.
3. Press [FUNC] key to enter into function menu setup.
4. Press [1 FM] key to choose CTSS, DCS or OFF. When DCS signaling is selected, press [* VOX] key to choose DCS positive or inverse code.

5. Press [▲] keyor [▼] key to choose the desired CTCSS / DCS encode signaling.
6. CTCSS: 67Hz- 254.1Hz, 50 groups in total
7. DCS: 017N-765I, 232 groups in total. "N" stands for positive code, "I" stands for inverse code.
8. Press [FUNC] key to return back to previous menu. Press [ESC/M] key or [# LOCK] key to confirm

CTCSS/DCS Encode/Decode Synchronous Setup

It means that users can synchronize the CTCSS/DCS decode and encode. Also, users can adjust them simultaneously.

◦ SHORTCUT OPERATIONS

1. After pressing [FUNC] key, the top left corner of LCD displays F icon and then press [9 SCT] key to enter into function menu.
2. Press [▲] / [▼] to choose No. 3 function item. It shows "C-CDC" on LCD.
3. Press [FUNC] to enter into function menu setup.
4. Press [1 FM] key to choose CTCSS, DCS or OFF. When DCS signaling is selected, press [* TXD] key to choose DCS positive or inverse code.
5. Press [▲] keyor [▼] key to choose the desired CTCSS / DCS encode signaling.
6. CTCSS: 67Hz- 254.1Hz, 50 groups in total
7. DCS: 017N-765I, 232 groups in total. "N" stands for positive code, "I" stands for reverse code.
8. Press [FUNC] key to back to previous menu, press [ESC/M] key or [# DTS] key to confirm and exit.

Repeater Function

Press function key and press [4 +/-] to activate and de-activate. This symbol will appear when switched on

◦ CHANNEL OPERATIONS

3. Press [FUNC] key to enter into function menu setup.
4. Press [▲] key or [▼] key to choose the offset frequency you want.
5. The frequency range is 00-70MHz.
6. Press [FUNC] key to back to previous menu and [ESC/M] key or [# ENT] key to confirm and exit.

Wide/narrow band setup

On the basis of national conditions, users can set channel spacing as 25K (wide band) or 12.5K (narrow band) to communicate.

1. After press [FUNC] key, the top left corner of LCD displays F icon and then press [8 SET] key to enter into channel function menu.

2. Press [▲]/[▼] key to select NO.5 function item. It shows" W/N" ;
3. Press [FUNC] key to enter into function menu setup
4. Press [▲] key or [▼] key to select desired band width.
W25K: wide band. **N12.5**: Narrow band.
5. Press [FUNC] key to back to previous menu, and [ESC/M] key or [# ENT] key to confirm and exit.

◦ CHANNEL OPERATIONS

Frequency Reverse/ Talk around option

1. After pressing [FUNC] key, the top left corner of LCD displays F icon and then press [SET] to enter into function menu.
2. Press [▲]/[▼] key to choose No.6 function item. It shows "REV/TA" on LCD.
3. Press [FUNC] key to enter into function menu setup.
4. Press [▲] key or [▼] key or key to choose the desired setup.

   REV: The frequency reverse function is selected.

   TA: The talk around function is selected.
6. Press [FUNC] key to back to previous menu and [ESC/M] key or [#] key to confirm and exit.

NOTE: After relevant function is selected on current channel, under standby mode, users can press [FUNC] key and then hold [*] key to start chosen function.

Busy Channel Lockout

BCLO is to disable transmitting while RX signal is received. Once the channel is busy and you press PTT, the radio will beep as warning and get back to receiving.

1. After pressing [FUNC] key, the top left corner of LCD displays F icon and then press [SET] key to enter into function menu.
2. Press [▲]/[▼] key to choose No.7 function item. It shows "BUSY" on LCD.
3. Press [FUNC] key to enter into function menu setup.

◦ CHANNEL OPERATIONS

4. Press [▲] key or [▼] key to choose the desired setup.

BCL: Enable BCL, carrier wave lockout, transmitting is prohibited when current channel receives a matching carrier wave;

BTL: Enable BTL, transmitting is prohibited when current channel receives a matching carrier wave with dis-matching CTCSS/DCS.

OFF: Busy Channel Lockout is turned off.

5. Press [FUNC] key to back to previous menu and [ESC/M] key or [# SQL] key to confirm and exit.

PTT ID Setup

1. After pressing [FUNC] key, the top left corner of LCD displays F icon and then press [8 SET] key to enter into function menu.

2. Press [▲]/[▼] key to choose No.8 function item. It shows "PTT-ID" on LCD.
3. Press [FUNC] key to enter into function menu setup.
4. Press [▲] key or [▼] key to choose the desired setup
   BOT: Start, press PTT key to send a series of DTMF code.
   EOT: End, release PTT key to send a series of DTMF code.
   BOTH: Start and End;
   OFF: PTT ID is turned off.
5. Press [FUNC] key to back to previous menu and [ESC/M] key or [# EXT] key to confirm and exit.

TX OFF

After starting this function, [PTT] key is unavailable. Current channel of transceiver is working under receiving mode.

1. After pressing [FUNC] key, the top left corner of LCD displays F icon. And then press [8 SET] key to enter into function menu.
2. Press [▲]/[▼] key to choose No.9 function item. It shows "TX-IHB" on LCD.
3. Press [FUNC] key to enter into function menu setup.
4. Press [▲] key or [▼] key to choose the desired setup.
   ON: TX Off is enabled.
   OFF: TX Off is disabled.
5. Press [FUNC] key to back to previous menu and [ESC/M] key or [# EXT] key to confirm.

BACKGROUND OPERATIONS

Under any mode, the background operations will be changed & stored as the latest value permanently, until next change, operations as followings:

1. With the radio turned off, press and hold [PF1] key and then turn on the transceiver. Keep pressing [PF1] key for 3 seconds to enter into background operations.
2. Press [▲]/[▼] key to choose the menu item you want to set.
3. Press [FUNC] key to enter menu setup.
4. Press [▲] key or [▼] key to choose the desired setup.
5. Press [FUNC] to back to previous menu and [ESC/M] key or [# SQL] key to confirm and exit.

TOT Timer Setup

The purpose of Time-out-timer is to restrict transceiver for continuous long-term transmission. When the continuous transmission time is beyond the due time, transceiver is forced to stop transmitting and make a sound of beeping.

1. With the radio turned off, press and hold [PF1] key and then turn on the transceiver. Keep pressing [PF1] key for 3 seconds to enter into background operations.
2. Press [▲]/[▼] key to choose No.1 function item. It shows "TOT" on LCD.
3. Press [FUNC] key to enter into function menu setup.
4. Press [▲] key or [▼] key or key to set desired TOT time;

15-600 seconds, 10 minutes of TOT is to be optional, per level interval of 15 seconds.

5. Press [FUNC] key to back to previous menu. Press [ESC/M] key or [# OUT] key to confirm and exit.

VOX Setup

When this function is enabled, you can begin transmitting by speaking, no needing to press the [PTT] key.If you want to make use of this function, you should insert the earpiece fitted with the transceiver.

1. With the radio turned off, press and hold [PF1] key and then turn on the transceiver. Keep pressing [PF1] key for 3 seconds to enter into background operations.
2. Press [▲]/[▼] key to choose No.2 function item. It shows "VOX" on LCD.
3. Press [FUNC] key to enter menu setup.
4. Press [▲] key or [▼] key to choose the desired VOX level.
5. Press [FUNC] to back to previous menu and [ESC/M] key or [# OUT] key to confirm and exit.

VOX Delay Setup

The fact that the transceiver sends the calling by VOX and instantly returns to receiving mode might result in residual information loss. To avoid this loss, you can set suitable delay time.

◦ BACKGROUND OPERATIONS

1. Press and hold [PF1] key till the transceiver emits "a tone", and then release it to enter into background operation.
2. Press [▲]/[▼] key to choose No.3 function item. It shows "VOXDEY" on LCD.
3. Press [FUNC] key to enter into function menu setup.
4. Press [▲] key or [▼] key to choose the desired setup.
   0.5S-5S, 10 levels of delay time in total to choose, per level interval of 0.5S.
5. Press [FUNC] to back to previous menu and [ESC/M] key or [#] key to confirm and exit.

VOX Beep Setup

After enabling this function, beginning transmitting by VOX, the transceiver will voice beeping.

1. Press and hold [PF1] key till the transceiver emits "a tone", and then release it to enter into background operation.
2. Press [▲]/[▼] key to choose No.4 function item. It shows "VOXTON" on LCD.
3. Press [FUNC] key to enter menu setup.
4. Press [▲] key or [▼] key to choose the desired setup.
   ON: VOX beeping is enabled.
   OFF: VOX beeping is disabled.
5. Press [FUNC] to back to previous menu and [ESC/M] key or [#] key or key to confirm and exit.

◦ BACKGROUND OPERATIONS

Frequency Step Size Setup

This function is valid only when the radio is in frequency mode. Frequency input and frequency scan are both restricted by stepping.

1. Press and hold [PF1] key till the transceiver emits "a tone", and then release it to enter into background operation.

2. Press [▲]/[▼] key to choose No.5 function item. It shows "STEP" on LCD.

3. Press [FUNC] key to enter into function menu setup.

4. Press [▲] key or [▼] key to choose the desired setup.

Stepping: 5k/ 6.25K/ 10K / 12.5K/ 15K/ 20K/ 25K 30K/ 50K

5. Press [FUNC] to back to previous menu and [ESC/M] key or [#] key to confirm and exit.

Squelch Level Setup

This function is used to setup the receiving signal intensity. If the receiving signal intensity reaches a certain level, you can hear the other party calling, otherwise transceiver will remain mute.

1. Press and hold [PF1] key till the transceiver emits "a tone", and then release it to enter into background operation.

2. Press [▲]/[▼] key to choose No.6 function item. It shows "SQL" on LCD.

3. Press [FUNC] key to enter into function menu setup.

4. Press [▲] key or [▼] key to choose the desired setup.

Off--9: 10 levels of squelch in total, "off" as min setup value (Normally open)

5. Press [FUNC] to back to previous menu and [ESC/M] key or [#] key to confirm and exit.

Battery save Setup

Users can start this function to extend the standby time.

1. Press and hold [PF1] key till the transceiver emits "a tone", and then release it to enter into background operation.
2. Press [▲]/[▼] key to choose No.7 function item. It shows "SAVE" on LCD.
3. Press [FUNC] key to enter into function menu setup.
4. Press [▲] key or [▼] key to choose the desired setup.

   ON: Battery saving is enabled.

   OFF: Battery saving is disabled.
5. Press [FUNC] to back to previous menu and [ESC/M] key or [#] key to confirm and exit.

LCD Backlight Setup

1. Press and hold [PF1] key till the transceiver emits "a tone", and then release it to enter into background operation.
2. Press [▲]/[▼] key to choose No.8 function item. It shows "LIGHT" on LCD.
3. Press [FUNC] key to enter into function menu setup.

4. Press [▲] key or [▼] key to choose the desired setup.
   AUTO: Automatic, after enabling the backlight, it lights for a while before quench automatically.
   OFF: Normally close
5. Press [FUNC] to back to previous menu and [ESC/M] key or [# EDIT] key to confirm and exit.

LCD Backlight Color Setup

There are three kinds of backlight color to be optional.

1. Press and hold [PF1] key till the transceiver emits "a tone", and then release it to enter into background operation.
2. Press [▲]/[▼] key to choose No.9 function item. It shows "COLOR" on LCD.
3. Press [FUNC] key to enter into function menu setup.
4. Press [▲] key or [▼] key to choose the desired setup.
   RED: red backlight
   ORG: orange backlight
   GREEN: green backlight
5. Press [FUNC] to back to previous menu and [ESC/M] key or [# EDIT] key to confirm and exit.

◦ BACKGROUND OPERATIONS

Scan Dwell Time Setup

There are three kinds of scan dwell time to be optional.

1. Press and hold [PF1] key till the transceiver emits "a tone", and then release it to enter into background operation.
2. Press [▲]/[▼] key to choose No.10 function item. It shows "SCANTM" on LCD.
3. Press [FUNC] key to enter into function menu setup.
4. Press [▲] key or [▼] key to choose the desired dwell time:
   - **5S**: Once the radio receives a matching signal, Scan mode will stop for 5 seconds and then continue scanning.
   - **10S**: Once the radio receives a matching signal, Scan mode will stop for 10s and then continue scanning.
5. Press [FUNC] to back to previous menu and [ESC/M] key or [# DTMF] key to confirm and exit.

Display Mode Setup

There are display modes as channel number display, channel frequency+ channel number display and channel name display, 3 modes in total for option.

1. Press and hold [PF1] key till the transceiver emits "a tone", and then release it to enter into background operation.
2. Press [▲]/[▼] key to choose No.11 function item. It shows "DSP" on LCD.

3. Press [FUNC] key to enter into function menu setup.

4. Press [▲] key or [▼] key to choose the desired setup.

FREQ: Frequency + Channel number (Amateur transceiver mode)
press ==key to switch into VFO mode.

CH: Channel number (Professional transceiver mode).

NAME: Channel name display. When a channel is not named, LCD displays current frequency and channel number. Otherwise, LCD displays channel name.

5. Press [FUNC] to back to previous menu and [ESC/M] key or [# ENT] key to confirm and exit.

◦TECHNICAL SPECIFICATIONS

	General
Frequency Range	UHF: 476.4250-477.4125MHz
Channel Capacity	80 channels
Phase-locked Step	5KHz, 6.25KHz
Operating Voltage	7.4 DC ±20%
Battery Life	More than 12 Hours (1200mAh), by 5-5-90 work cycle
Frequency Stability	±2.5ppm
Operating Temperature	-20~ +55℃
Size	195×56×30mm (with battery pack, no antenna)
Weight	185 g (with battery pack, no antenna)

Receiving Part	
	Narrow band
Sensitivity(12dB SINAD)	≤0.35μV
Adjacent Channel Selectivity	≥60dB
Intermodulation	≥60dB
Spurious Rejection	≥80dB

◦ TECHNICAL SPECIFICATIONS

Audio Response	6dB / per interval
Hum & Noise	⩾45dB
Audio Distortion	⩽5%
Audio Power Output	500mW (at 10%)

	Transmitting Part
Modulation	11KΦF3E
Adjacent Channel	⩾60dB
Hum & Noise	⩾40dB
Spurious Emission	⩽－36dB
Audio Response	6dB / per interval
Audio Distortion	⩽5%

◦TROUBLE SHOOTING GUIDE

Problem	Corrective Action
No power	A.The battery pack may be exhausting. Recharge or replace the battery pack. B.The battery pack may not be installed correctly. Remove the battery pack and install it again。 C.The power switch is broken; send it to local dealers to repair. 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.
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. B.The selected mode frequency is not in accord with local frequency when programming. 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. B. Different CTCSS / DCS please reset it. C. Out of communication range.
Can not power on or frequent power-off	Check whether the battery terminals are out of shape or broken.
The other party gets low or intermittent receiving sound	Check if the MIC is faulty (Otherwise, please contact your local dealers to repair it.)
Intermittent receiving with big noise.	A.Out of communication range or obstructed by tall buildings or in basement and so on. B.450 filter is broken, Please contact with local dealers to repair.
Loudspeaker become lower or with "ka ka" sound after using a certain time	Check whether the loudspeaker net is broken. Iron powder or dust 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 indicating lamp (green light) lightens but no sound	A.Low volume, please turn on clockwise. B.Loudspeaker is broken. (Please contact with local dealers to repair it.) C.Earphone jack is broken. (Please contact with local dealers to repair it.) D.Volume switch is broken. (Please contact with local dealers to repair it.)

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