TX-110

PMR446 TRANSCEIVER
INSTRUCTION MANUAL

tti

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Thank you for purchasing this radio.

All our products are built to offer excellent value by combining advanced features, great design and manufacturing quality.

To ensure you are familiar with the operation and features of your radio, and in order to obtain the best performance, please read this manual carefully before operation.

CONTENTS

ENGLISH

ENGLISH

IMPORTANT - READ ALL INSTRUCTIONS carefully and completely before operating your radio and retain this manual for future reference.

NEVER charge Alkaline batteries.

NEVER connect the radio to a power source other than the supplied battery. This may damage your product.

NEVER operate your radio with the antenna less than 5cm from exposed parts of the body.

NEVER use the radio in or near a mining facility or other area which uses remotely triggered explosives or an area labelled "Blasting Area".

NEVER use or charge your radio in a potentially explosive atmosphere.

DO NOT place your radio in front of a vehicle airbag.

DO NOT operate your radio on board an aircraft.

DO NOT use your radio with a damaged antenna.

DO NOT attempt to modify your radio in any way.

ALWAYS charge your radio at normal room temperature.

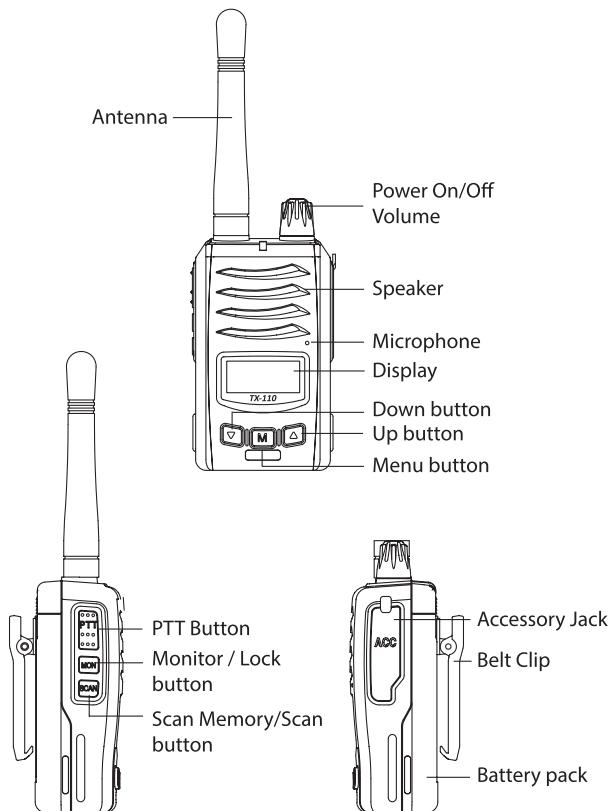**ALWAYS** switch off your radio where notices restrict the use of two-way radio or mobile telephones.

ALWAYS replace the accessory jack cover (if applicable) when the jack is not in use.

ONLY use TTI approved rechargeable batteries with the supplied charger.

AVOID exposing your radio to water. It can widthstand spray water and some rain, but has no higher waterproof class.

AVOIDE storing or charging your radio in direct sunlight.

AVOIDE storing or using your radio where temperatures are below -20℃ or above +60℃.

ENGLISH

Antenna

Power On/Off Volume

Speaker

Microphone

Display

Down button

Up button

Menu button

TX-110

PTT Button

Monitor / Lock button

Scan Memory/Scan button

Accessory Jack

Belt Clip

Battery pack

2. Equipment and Accessories Supplied

1. TX-110 Radio with Antenna	2 units
2. Li-Ion Rechargeable Battery	2 cells
3. Dual Charging Cradle	1 unit
4. Power Adaptor	1 unit
5. Belt clip	2 units
6. Battery Cassette	2 units

3. Fitting the Battery pack & Installation of the batteries

Removal

1. Ensure that your radio is switched off.
2. Press down on the battery release catch and seperate the battery pack from the radio.

Fitting

1. Align the bottom of the battery pack with the securing slots at the back of the radio.
2. Press the top of the battery into the back of the radio until it "clicks" home.

Battery installation

1. Press up on the battery release catch and remove the battery pack cover.
   Carefully handle the wire inside of the battery pack.
2. Insert three AAA batteries (positive (+) end toward the bottom beginning at left side and alternating positive terminals as shown.)
3. Align the top of the battery cover with the securing slots and press the bottom on the battery cover into the battery pack until it "clicks" home.

Removal

Fitting

Battery Installation

Positive Terminals
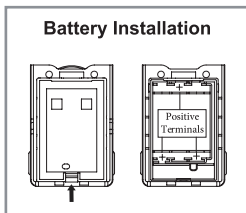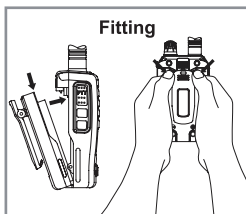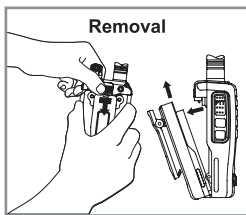
4. Battery Charging

To charge your radio, carefully follow these instructions.

1. Connect the power adaptor to the mains power supply and connect the adaptor charger jack to the charging cradle.

2. Disconnect any radio accessories and ensure the radio is switched off.

3. Insert the radio into the charging cradle until it "Clicks" home.

   The charger LED will glow red and charging will start. If the charger LED blinks red or green or the charger LED does not light, re-insert the radio into the charging cradle.

4. The battery charging time is about 4~5 hours. When the battery is fully charged the green LED (full) will be turned on.

LED ·····

Power Adaptor
- Input : 230VAC
- Output : 5VDC 0.5Ah
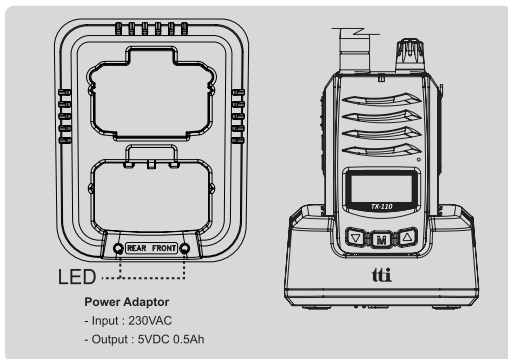
5. Radio Controls

1. Power On / Off / Volume Control

Turn the knob clockwise to switch on and increase the volume and counter-clockwise to decrease the volume and switch off the radio. The radio will emit a confirmation tone when it switches on.

2. Push-To-Talk (PTT) Button

Press and hold this button to speak (transmit) and release the button to hear (receive) messages. You can only communicate with other radios when the channel and privacy code are the same as that of yours. The red LED lights during the PTT press.

Note : The green or orange LED lights during receive. The green lights on the basic channels and the orange lights on the channel with privacy codes.

3. Monitor / Lock Button

Monitor   Momentarily press this button to activate the monitor function. To deactivate this function, momentarily press this button again.

Lock   Press and hold this button to activate the keypad lock.

4. Scan Memory and Scan Button

Scan Memory   As factory default your radio has all channels memorized for channel scanning. To delete a certain channel stay on the channel and press the function button momentarily. The scan icon will disappear on the LCD and the channel is now deleted from the scanning list.

Scan   Press and hold this button to activate the scan.

5. Down Button

Pressing this button will decrease the channel number. In some modes this button is used to adjust the function setting.
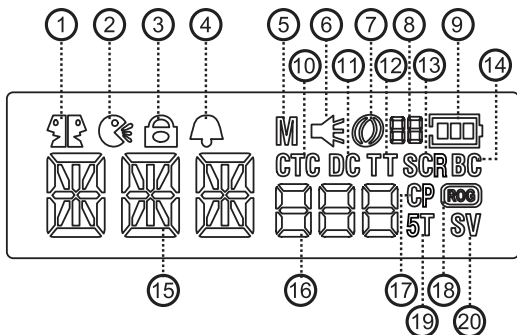
6. Menu (Mode) Button

Press and hold for about 2 seconds to enter the menu mode. Then briefly press to step down through the menus.

7. Up Button

Pressing this button will increase the channel number. In some modes this button is used to adjust the function setting.

6. LCD Display

No.	Description	No.	Description
1	Dual Watch	11	DCS
2	VOX	12	Time-out Timer
3	Lock	13	Scrambler
4	Key Tone	14	Busy Channel Lock-out
5	Scan Memory	15	Channel
6	Monitor	16	Tone code
7	Scan	17	Compander
8	Battery Balance Status	18	Roger Beep
9	Battery Level	19	5 Tone
10	CTCSS	20	Power Save
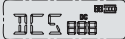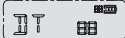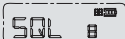
The menu mode allows you to set-up and edit the basic functions.

To access this menu mode, press and hold the menu button.

Each press of this button steps the radio sequentially through the different functions.

The radio display indicates the current functions. The current setting and associated icon display. Use the up or down button to change the value of any selected menu.

Press the PTT button or wait for about 5 seconds to confirm the change.

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Display	Function	Setting
CTC	Change Privacy Tone Code (CTCSS)	1 to 73 , oF
DCS	Change Digital Privacy Tone Code (DCS)	1 to 208 , oF
DT	DTMF Tone On / Off	on , oF
CP	Compander On / Off	on , oF
SCR	Scramble On / Off	on , oF
VOX	VOX Activation and Level Selection	1 , 2 , 3 , 4 , oF
SQL	Squelch Level Selection	1 , 2 , 3 , 4 , 5 , oF
ROG	Roger Beep On / Off	on , oF
BP	Key Tone On / Off	on , oF
CAL	Call (Page) Tone Selection	oF , 1 , 2 , 3 , 4 , 5
BL	Backlight On / Off	on , oF
DW	Dual Watch Activation & Channel Selection	1 to 8 , oF
MIC	Microphone Gain	HI , Lo

8. Basic Radio Operation

The PMR-446 Radio service which this radio uses shares channels on a 'take turns' basis. This means that other users and groups may be using any channel and privacy code combination.

To communicate with other PMR-446 radios, all units must be switched to the same frequency and privacy code.

If the combination you have chosen is already in use, please make an alternative selection.

1. Switch on your radio.

2. Check and if necessary change the channel or frequency and privacy code settings.

3. To speak, hold the radio upright, about 10cm from your mouth and press the PTT. Speak slowly and clearly towards the radio.
   Release the PTT when you finish speaking.

You will hear messages from other radios that are within range and have the same channel and privacy code setting.

The appropriate icon will appear in the radio display when you receive or transmit a message.

9. Radio Features Explained

Privacy Codes (CTCSS and DCS Tone Codes)

This radio is fitted with 73 Analogue Privacy codes (also known as CTCSS, sub-codes or sub-channels) and 208 Digital Privacy codes (also known as DCS codes). Only one type of Privacy code can be used on each channel.

Selecting a Digital Privacy code will override any Analogue Privacy code settings. If the other unit(s) do not have privacy codes ensure your units privacy codes (analogue and digital) are set to 'Off'.

Please note that privacy codes do not prevent other radio users from hearing your conversation. They simply allow you to ignore messages that are using a different privacy code.

Selecting an Analogue Privacy Code

To change the Analogue Privacy Code, press the MODE (Menu) button until the CTCSS icon and privacy code number flash. Use the UP or DOWN button to select the desired code. Press the PTT or MODE button or wait for 5 seconds to store your choice. The CTCSS icon will appear when an Analogue Privacy Code is selected.

Selecting a Digital Privacy Code

To change the Digital Privacy Code, press the MODE (Menu) button until the DCS icon and privacy code number flash. Use the UP or DOWN button to select the desired code. Press the PTT or MODE button or wait for 5 seconds to store your choice. The DCS icon will appear when an Analogue Privacy Code is selected.

Once a CTCSS or DCS code has been selected, you can conveniently deactivate or re-activate the tone function. The tone function can only be activated if a tone code has been selected.

DTMF Tone
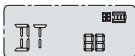
The DTMF tone is a kind of combinations of short tones. The DTMF tone can preamble to the message upon every press of the PTT button.

Selecting this allows the other party never to miss your initial message that might arrive before the audio of the other party's is open to receive. This can be activated or de-activated.

Compander

If the compander is activated, your radio will eliminate the background noise and generate clearer sound by cutting off the high and low frequencies. The users who prefer the unrefined sound are recommended to use the radio with this compander unactiated. To change the setting, press the MODE button until the Compander icon and current setting display. Use the UP or DOWN button to chane the setting. Press the PTT or MODE button or wait for 5 seconds to store your choice.

The Compander icon will appear when Compander is active.

Scrambler

Your radio incorporates a voice scrambler using band inversion method.

The scrambler is compatible with many a scrambler used by other manufacturers, allowing you to enjoy scrambled communications with radios. This can be activated or deactivated.

To select the 5 tone, press the MODE (Menu) button until the current 5 tone settings appears. Use the UP or DOWN button to change the setting. Press the PTT or MODE button or wait for 5 seconds to store your choice.

VOX (Handsfree) Mode
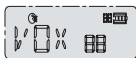
When Hands Free (VOX) Mode is selected, the radio will automatically transmit when the microphone detects your voice (or other noise). It can be used with the internal microphone or suitable audio accessory (available separately). To avoid accidental operation and reduce the effect of background noise, there are 3 microphone sensitivity settings and off.

To select the VOX sensitivity level, press the MODE button until the VOX icon and current setting. Use the UP or DOWN button to change the sensitivity level (3 is the most sensitive). Press the PTT or MODE button or wait for 5 seconds to store your choice.

Squelch Level Adjustment

This function allows you to adjust the squelch level of your radio. To change the squelch level, press the MODE (Menu) button until the squelch mode displays.

The current squelch setting will flash. Use the UP or DOWN button to change the setting. Press the PTT or MODE button or wait for 5 seconds to store your choice.

There are 5 squelch levels. Level 1 is the most sensitive (open) and level 5 is the least sensitive (closed). Auto is the optimum factory setting and 'Off' is fully opened with constant static noise.

Roger Beep

The Roger Beep is a short tone that is automatically added to the end of your transmissions to tell other users that you have finished speaking. You can activate or deactivate the Roger Beep as required.

To change the Roger Beep setting, press the MODE (Menu) button until the Roger Beep icon and current setting displays. Use the UP or DOWN button to change the setting. Press the PTT or MODE button or wait for 5 seconds to store your choice.

The Roger Beep icon will appear when Roger Beep is activate.

Key Tone

If the Key Beep is activated, your radio will emit a confirmation tone whenever you use the keypad.

You can activate or deactivate the Key Beep as required.

To change the Key Beep setting, press the MODE (Menu) button until the Key Beep icon appears. Use the UP or DOWN button to change the setting. Press the PTT or MODE button or wait for 5 seconds to store your choice.

The Key Beep icon will appear when Key Beep is active.

Call Tone

To alert other users to your message and gain their attention, you can send a Call Alert melody by pressing the PTT button twice in quick succession. There are five different call alert tones and off.

To change the Call Alert melody, press the MODE (Menu) button until the Call icon displays. Use the UP or DOWN button to change the setting. Press the PTT or MODE button or wait for 5 seconds to store your choice.

LCD Backlighting
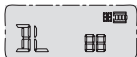
This is adjustable. On indicates that the backlighting is active for PC programmed duration from every press of keys or knobs.

If Off is selected, the LCD backlighting is always off.

Dual Watch Mode

Dual Watch mode allows you to monitor two channels ; a primary channel and the dual watch channel. When a signal is received on either channel the unit will pause for 5 seconds before resuming the Dual Watch. To activate the Dual Watch mode, first select a radio channel as the primary channel.

To select the Dual Watch channel, press the MODE (Menu) button until the Dual Watch icon and current setting appear. Use the UP or DOWN button to select the desired Dual Watch channel. Press the PTT or MODE button or wait for 5 seconds to store your choice and activate the Dual Watch.

The radio display will alternate between the primary and dual watch channels and the dual watch icon will appear.

To deactivate the Dual Watch, press and hold the SCAN button.

If you press the PTT button whilst receiving a signal in Dual Watch mode, the radio will transmit on the current displayed channel. If you press the PTT button when no signal is present, the radio will transmit on the primary channel.

Microphone Gain Adjustment

Microphone Gain Adjustment is adjust the intake audio sound level to the radio. The high level is the normal condition that should be used in ordinary circumstances and the low level should be used in some noisy places where you need to lower the surrounding noises. To select the Microphone Gain level, press the MODE (Menu) button until the current Microphone Gain setting appears. Use the UP or DOWN button to change the setting. Press the PTT or MODE button or wait for 5 seconds to store your choice.

10. Radio Cloning

Wireless Cloning

1. Put together the master radio and the slave radios(s).
   (within about 20cm)
2. Turn on the master radio pressing PTT button and MODE (M) button
   simultaneously. The radio LED blinks green.
3. Turn on the slave radio(s) pressing PTT button and MODE (M) button
   simultaneously.
4. Press PTT button on the master radio until the slave radio(s) blinks among
   green, orange and red.
5. When the blinking stops, turn off your radio(s) and turn on again.

Wired Cloning

The cloning process using a cloning cable is basically same as that using the
wireless cloning. You could use this wired cloning around noisy circumstances
that could give interferences.

1. Connect two radios (the master and the slave) using a cloning cable.
2. Just follow the above process No. 2 through 5.
3. Disconnect the cloning cable from the radios.

11. Radio ID Editing

An up to 3 digit Radio ID can be programmed when the radio is switched on.
You can customise this radio ID to identify your radio.
To enter the Radio ID edit mode, switch on the radio whilst pressing the Menu
button.

1. The first digit is blinking.
2. Use the UP or DOWN button to change the character.
3. Press the Menu button to select the next digit.
4. Repeat the step 2 and the step 3.
5. Press PTT to finish editing.

12. Troubleshooting

If you experience problems with your TX-110, first check the battery power level as low batteries can cause problems such as poor transmission, weak reception and reduced sound quality.

Then check the manual and radio display to ensure that a function (such as VOX or Lock) has not been acivated by accident.

In case of further difficulty, please consult your dealer or visit our website at www.ttikorea.co.kr

13. CE Declaration

CE version of the TX-110 which displays the CE symbol on the product label complies with the essential requirements of the Radio Equipment Directive (RED) 2014/53/EU.

This radio can be used without license and charges in : Austria, Belgium, Cyprus, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and U.K.

14. Safety Requirements

For charging the rechargeable batteries, only a CE approved AC adaptor complying with the following specifications must be used :

INPUT : 230VAC 50Hz
OUTPUT : 5VDC 500mAh

ENGLISH

1) Operating Frequencies (frequency shown in MHz):

Channel	Frequency	Channel	Frequency
1	446.00625	5	446.05625
2	446.01875	6	446.06875
3	446.03125	7	446.08125
4	446.04375	8	446.09375

2) Channel Spacing: 12.5KHz
3) Power Source: 3 x Li-Ion Battery
4) Privacy Codes (CTCSS Tone Codes) Table (in Hz):

No.	Frequency(Hz)	No.	Frequency(Hz)	No.	Frequency(Hz)	No.	Frequency(Hz)
01	67.0	21	136.5	41	183.5	61	110.7
02	71.9	22	141.3	42	189.9	62	120.0
03	74.4	23	146.2	43	196.6	63	131.1
04	77.0	24	151.4	44	199.5	64	141.1
05	79.7	25	156.7	45	206.5	65	150.7
06	82.5	26	162.2	46	229.1	66	160.8
07	85.4	27	167.9	47	254.1	67	171.4
08	88.5	28	173.8	48	165.5	68	181.4
09	91.5	29	179.9	49	171.3	69	190.6
10	94.8	30	186.2	50	177.3	70	201.3
11	97.4	31	192.8	51	60.7	71	211.6
12	100.0	32	203.5	52	62.5	72	221.5
13	103.5	33	210.7	53	64.7	73	230.3
14	107.2	34	218.1	54	40.8		
15	110.9	35	225.7	55	51.0		
16	114.8	36	233.6	56	61.0		
17	118.8	37	241.8	57	71.2		
18	123.0	38	250.3	58	80.8		
19	127.3	39	69.3	59	91.1		
20	131.8	40	159.8	60	101.3		

5) Digital Privacy Codes Table (DCS Tone Codes):

No	Code	No	Code	No	Code	No	Code	No	Code	No	Code
001	23	036	251	071	631	106	I025	141	I261	176	I632
002	25	037	261	072	632	107	I026	142	I263	177	I654
003	26	038	263	073	654	108	I031	143	I265	178	I662
004	31	039	265	074	662	109	I032	144	I271	179	I664
005	32	040	271	075	664	110	I043	145	I306	180	I703
006	43	041	306	076	703	111	I047	146	I311	181	I712
007	47	042	311	077	712	112	I051	147	I315	182	I723
008	51	043	315	078	723	113	I054	148	I331	183	I731
009	54	044	331	079	731	114	I065	149	I343	184	I732
010	65	045	343	080	732	115	I071	150	I346	185	I734
011	71	046	346	081	734	116	I072	151	I351	186	I743
012	72	047	351	082	743	117	I073	152	I364	187	I754
013	73	048	364	083	754	118	I074	153	I365	188	I053
014	74	049	365	084	53	119	I114	154	I371	189	I122
015	114	050	371	085	122	120	I115	155	I411	190	I036
016	115	051	411	086	36	121	I116	156	I412	191	I145
017	116	052	412	087	145	122	I125	157	I413	192	I212
018	125	053	413	088	212	123	I131	158	I423	193	I225
019	131	054	423	089	225	124	I132	159	I431	194	I246
020	132	055	431	090	246	125	I134	160	I432	195	I252
021	134	056	432	091	252	126	I143	161	I445	196	I255
022	143	057	445	092	255	127	I152	162	I464	197	I266
023	152	058	464	093	266	128	I155	163	I465	198	I274
024	155	059	465	094	274	129	I156	164	I466	199	I325
025	156	060	466	095	325	130	I162	165	I503	200	I332
026	162	061	503	096	332	131	I165	166	I506	201	I356
027	165	062	506	097	356	132	I172	167	I516	202	I446
028	172	063	516	098	446	133	I174	168	I532	203	I452
029	174	064	532	099	452	134	I205	169	I546	204	I454
030	205	065	546	100	454	135	I223	170	I565	205	I455
031	223	066	565	101	455	136	I226	171	I606	206	I462
032	226	067	606	102	462	137	I243	172	I612	207	I523
033	243	068	612	103	523	138	I244	173	I624	208	I526
034	244	069	624	104	526	139	I245	174	I627		
035	245	070	627	105	I023	140	I251	175	I631		

TTI products are manufactured by TTI Tech Co., Ltd.
Tel: +82-2-574 3055, *Website: www.ttikorea.co.kr*   *REV.00*

15. Technical Specifications

We, TTI Tech Co., Ltd. (B-912, Indeokwon IT vally, 40 Imi-ro, Uiwang-si, Gyeonggi-do, Korea, 16006) declare on our sole responsibility that this equipment complies with the essential requirements , and that any applicable Essential Test Suite measurements have been performed.

Kind of equipment ： PRIVATE MOBILE RADIO 446

Type-designation ： TX-110

Version (where applicable) ：

This compliance is based on conformity with the following harmonised standards specifications or documents :

EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013
IEC 62209-2:2010; EN 62209-2:2010; EN50566:2013
Draft ETSI EN 301 489-1 V2.2.0 2017-03
Draft ETSI EN 301 489--5 V2.2.0 2017-03
ETSI EN 300 296 V2.1.1

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Seoul, Sep. 29, 2017 / Place and date of issue

J. S. Lee / Senior Manager

J.S. Lee

Signature