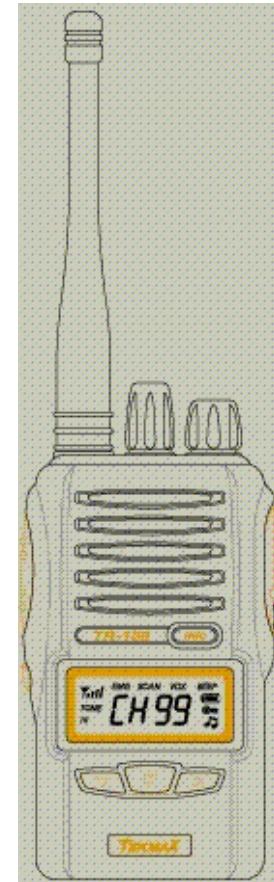


# **TR-450H**

## **USER MANUAL**



**TR-450H**

**TEKMAX TELCOM CO., LTD.**

Thank you for choosing Tekmax Telecom for your professional portable radio applications. This transceiver is convenient for you to use and designed to maximize its efficiency for everyone.

TEKMAX TELECOM TR series transceiver will meet and surpass your every day working demand by its quality and functionality combined with the latest technology.

#### **Manual is for:**

TR-450H :UHF FM TRANSCEIVER

#### **Notice :**

- o Operating unlicensed radio transceivers is prohibited by law in the areas under government control.
- o Illegal operation can be punished by fine or imprisonment.
- o Call for service to the qualified Tekmax technicians only.

#### **Safety : Users should understand hazards common to the operation of transceivers.**

### **Safety Information**

#### **1) Warning**

- o **Do not** hold the radio in such a manner that the antenna is next to, or touching, exposed parts of the body, while transmitting.
- o **Do not** let children to operate transmitter ? equipped radio equipment.

#### **2) ⓘ Caution**

- ① **Do not** operate the radio near unshielded electrical blasting caps or in an explosive atmosphere unless it is a type especially designed and qualified for such use.
- ① **Do not** press and hold the transmit switch(P-T-T) when not actually wishing to transmit.
- ① **Never** use the radio in an aircraft
- ① **Never** use the radio near to sensitive medical equipment or in areas where instructed not to do so, e.g. Petrol filling stations
- ① When used in a vehicle, do not mount the radio unit on or near the Airbag or Airbag activating device.
- ① The use of an accessory not recommended or supplied by Tekmax Telecom may cause damage to equipment or injury to personnel, and will invalidate

warranty.

- ① When using any of the charging accessories, the mains socket-outlet must be installed near the equipment.
- ① The outlet must not be obstructed and must be easily accessible at all times.
- ① **Never** attempt to disassemble, modify or repair the unit unless the work is carried out by a Tekmax Telecom approved Dealer.  
Incorrect assembly, modification or repair may cause irreparable damage to your unit and will invalidate warranty.  
For service or repair always return your radio to an authorized Tekmax Telecom Dealer.

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- 1. GENERAL FEATURES**
- 2. PACKAGE**
- 3. CONTROLS AND OPERATING BASICS**
- 4. SPECIFICATIONS**
- 5. WARRANTY**
- 6. DECLARATION OF CONFORMITY**

## 1. GENERAL FEATURES

- 1) Ultra compact and light
- 2) Frequency programmable
- 3) 128 channels
- 4) CTCSS / DCS
- 5) Output control on the transceiver
- 6) VOX built-in
- 7) Rechargeable & Separable Li-ion battery
- 8) Battery charging indicator
- 9) Display Icons on LCD
- 10) Emergency alert
- 11) Comply to IP-54 & Mil-std 810F
- 12) CE/FCC approval

### 1. Usage of the equipment

This FM handheld radio transceiver is designed to communicate between users through RF carrier by pressing the PTT button to talk and releasing the PTT button to receive a voice. And this equipment is widely used everywhere both in-door and out-door communication purpose

### 2. FCC Regulations

Your FM Handheld Transceiver generates RF electromagnetic energy during transmit mode. This radio is designed for and classified as Controlled Exposure/Occupation Environment, meaning it must be used only during the course of employment by individuals aware of hazards and the ways to minimize such hazards. This radio is NOT intended for use by the General Population/ Uncontrolled Environment.

This radio complies with FCC RF radiation exposure limits set forth for a controlled environment. This radio should be installed and operated with a minimum distance of 2.5cm between the radio and your body. Therefore, to ensure that your exposure to RF electromagnetic energy is within the FCC allowable limits for occupational use, always follow below information.

- Do not operate the radio without a proper antenna as this may damage the radio and may also cause you to exceed FCC RF exposure limits. A proper antenna is the antenna supplied with this radio by the manufacturer or an antenna specifically authorized by the manufacturer for use with this radio.

- Do not transmit for more than 50% of total radio use time(50% duty cycle). Transmitting more than 50% of the time can cause FCC RF exposure compliance requirements to be exceeded.
- Always use TEKMAX supplied accessories (antennas, batteries, belt clips, speaker/MIC, etc.). Use of unauthorized accessories can cause the FCC RF exposure compliance requirements to be exceeded.
- Always keep the radio at least 15cm away from the face when transmitting and only use the belt-clip when attaching the radio to your belt, etc., to ensure FCC RF exposure compliance requirement are not exceeded.

This radio complies with FCC RF exposure limits for occupational use only.

### 3) CE Regulations

Hereby, TEKMAX TELECOM, declares that this equipment complies with the essential requirements and other relevant provisions of Directive 1999/5/EC.

This equipment is marked with the **CE 0984**  symbol and can be used throughout the European community.

This indicates compliance with the R&TTE Directive 1999/5/EC and meets the relevant parts of following technical specifications:

This equipment can be used for both Indoor and outdoor voice communication purpose. And the maximum power 5W

for the 136-174MHz frequency band ranges.

Each channel frequencies is to be PC Programmable and the channel frequencies are allocated by individual government authorities independently.

 **Caution** : Exposure to Radio Frequency Radiation  
To comply with RF exposure compliance requirements, for mobile configurations, a separation distance of **at least 25 cm** must be maintained between the antenna of this device and all persons.

**EN300 086 v1.1.1(Radio Spectrum)**

**EN301 489-5 v1.3.1(EMC)**

**EN60950-1 & EN50360(SAFETY)**

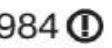
### 2) LABEL



This radio complies with FCC RF exposure limits for Occupational Use Only

### 2. CE Approval

The TEKMAX(TR series) transceiver meets the following essential requirements.

RF:EN 300 086-2, EMC:EN 301 489-5, Safety:EN 60950, EN60065. **CE 0984** 

## 2. PACKAGE

Unpack the transceiver carefully. We recommend you to check the following items in the table before discarding the packing materials. In case of absence or damage of items during shipment, inform the carrier immediately.

### o Accessories

Supplied Accessories	Optional Accessories
Transceiver	1EA
Battery	1EA
Adapter	1EA
Charger	1EA
Belt Clip	1EA
User Manual	1EA



Transceiver



Battery with Belt Clip



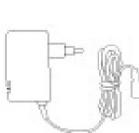
Charger



Microphone



Antenna



Adapter



User Manual



Speaker MIC

### o Preparation before use

#### Installing Antenna

Screw the antenna into the connector clockwise until secured, do not over tighten.

#### ① Caution

- **Never** hold by the antenna when carrying the transceiver.
- Transmitting without an antenna may damage the transceiver.

#### Installing Belt clip

Insert belt clip into the groove of battery pack.

Push it downward until TICK sound heard.

To separate it from the pack, pull the LOCK knob by your finger nail and push it upward.

#### Installing & removing battery pack

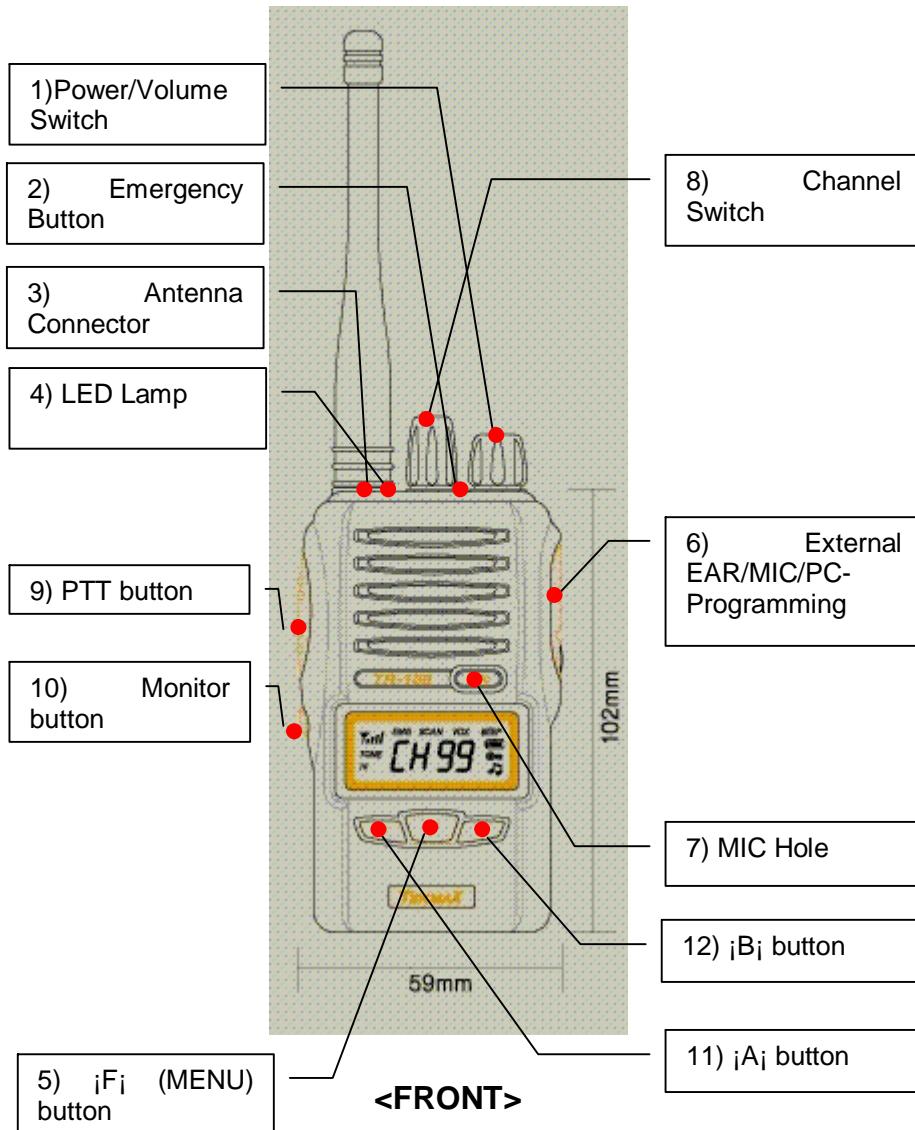
Insert the 3 latches on the bottom of battery pack into the 3 receptor holes on the bottom of radio body.

Push the top of the battery pack toward the radio body until a CLICK sound is heard.

To separate the battery pack from the radio, push the 2 side knobs downward simultaneously and pull the battery pack away from the body of the radio.

### 3. CONTROLS & OPERATING BASICS

#### o Controls & Description



< BACK >

**1) Power/Volume Switch :** Turn it clockwise to switch ON the transceiver and rotate it to adjust the volume.

To switch OFF the transceiver, turn it counter-clockwise fully until a CLICK is heard, do not over wind the switch beyond the CLICK.

**2) Emergency Button :** Press this key when you are faced with emergency.

**3) Antenna Connector:** Connect the supplied antenna here.

**4) LED Lamp :**

RED	ON	Transmitting
GREEN	ON	Receiving, Monitoring
RED/GREEN	ON	DTMF Transmitting

**5) *i* F1 (menu) button :** To enter menu setting mode, press this button. To enter the Selective Call mode, hold down this button for more than 3 seconds.

**6) External EAR/MIC/PC-Programming:** Open the cap and connect the external EAR/MIC to use Microphone, Earphone and PC-programming.

**7) MIC Hole**

**8) Channel Switch :** Turn this clockwise or counter clockwise to select the channels or change the setting of functions.

**9) PTT(Push To Talk) button :** Press this button to transmit, release it to receive.

**10) Monitor button :** Press this button to remove squelch or tone squelch.

**11) *i* Ai Button:** Press it quickly to switch over transmitting output(High-Low), press it longer time for channel-scanning.

**12) *i* Bi Button :** Press it quickly to save the setting of functions, press it longer time for key-lock,

**13) Hand Strap Hole**

**14) Belt Clip Lock-Unlock**

**15) Battery Lock Knob**

## LCD display & Icon



Display	Details
	Indicates the signal strength while receiving / transmitting
	Appears when tone is set up
	Indicates intensity of transmit output power
	Appears when buttons are locked
	Indicates beep sound icon when a key pressed.
	Emergency
	VOX
	Time-Out Timer
	Battery level indication
	Channel
	Indicates the receiving of Selective Call.

## Operating Basics

### 1. Power On/Off

- 1) Turn the Power switch clockwise to turn the radio power ON and turn the switch counter clockwise to turn the radio power OFF.
- 2) If you turn on the radio power, all the icons will be displayed on the LCD with backlight in orange with beep sound.
- 3) The latest saved channel is displayed on LCD.

### 2. Transmitting

- 1) Select the desired channel by turning the Channel Switch.
- 2) Hold down the PTT button for duration of TALK and speak in to the MIC.(Keep the radio 3~4cm away from your mouth for clear voice communication.)
- 3) The LED lights red and antenna bar icon is displayed on the LCD according to the output power of being transmitted.
- 4) Release the PTT button to receive.

(NOTE)

- 1) When DTMF tone is set up as ON mode, DTMF tone activates when you press the PTT button and the voice is transmitted to the receiving radios after DTMF tone.
- 2) When BCLO is set up as ON mode, PTT does not work while receiving.
- 3) When TOT is set up as ON mode by PC programming, If the programmed transmitting time is over, it turns to the

receiving mode automatically. At this time, release the PTT button and then press it again for re-transmitting.

### **3. Receiving**

- 1) Select the desired channel to receive by Channel Switch.
- 2) The LED lights green while receiving.
- 3) If the sub-tone (CTCSS/DCS) of the incoming call doesn't match your sub-tone, you cannot hear the voice.
- 4) The LED lights green and the strength of receiving signal is displayed on the LCD.

#### **(Note)**

If you need to receive all the signals, press the M(Monitor) button (M). Noise is heard and if you press it for about 3 seconds, monitoring function will be kept with beep sound. If you press the M(monitoring) button once more, monitoring function will be released.

### **4. Changing channels**

Select the desired channel using the Channel Switch.

### **5. Key Lock**

This function prevents users from changing the channel inadvertently.

- 1) Press **|B|** button for more than 3 seconds to lock,
- 2) Key lock icon appears on the LCD when the keys are locked and press it for more than 3 seconds to unlock keys, it disappears on the LCD when the keys unlocked.

### **6. Selective Call mode**

You can send a call individually to the registered IDs programmed by PC.

- 1) Press **|F|** button for more than 3 seconds to enter selective call mode.
- 2) Select the desired channel using Channel Switch (C001~C999)
- 3) Press **|F|** button short to transmit and calling sound is generated.
- 4) The caller's ID is displayed on the receiver's LCD and press the PTT button to talk.
- 5) To escape from the CALL mode, press the **|B|** button.

### **USER SELECTABLE MENUS**

**(These are Tekmax dealer programmable)**

- 1) Press **|F|** button to enter MENU and press it one by one to move to the desired MENU.
- 2) Change the settings using Channel Switch.
- 3) Press **|B|** button to save the settings.

## MENU SETTINGS

Press **|F1|** button to enter menu setting mode, then you can set the following functions. If you do not select any menu for over 15 seconds, it will turn back to the stand by mode for receiving signal. Some of these functions may be programmed out by your Tekmax dealer and as such not available to you through your menu setting mode.

MENU		
VOX	ON	LE01
		LE02
		LE03
		LE04
		LE05
OFF		
BEEP	ON	bt01
		bt02
		bt03
		OFF
DTMF	dtON	
	dtOF	
BCLO (BUSY CHANNEL LOCK-OUT)	bLON	
	bLOF	
TA(TALK AROUND)	tAON	
	tAOF	

### 1. VOX

Internal Voice Operated Transmit allows you to talk without pressing the PTT button. Voice transmission automatically activates by your voice when VOX is on.

#### VOX ON

- 1) Press **|F1|** button to find VOX icon.
- 2) Select On using Channel Switch.
- 3) Press **|F1|** button again and **|LEXX|** appears on the LCD.
- 4) Select the voice level(LE01~LE05) using Channel Switch.
- 5) Press **|B1|** button to save the setting.

#### VOX OFF

- 1) Press **|F1|** button to find VOX icon.
- 2) Select Off using Channel Switch.
- 3) Press **|B1|** button to save the setting.

#### (Note)

LE01 : Very sensitive to voice level

LE03 : Standard level

LE05 : Not sensitive to voice level

※ If you need to go to the next menu, press **|F1|** button. Otherwise, save the current setting using **|B1|** button to return to the initial screen.

## 2. BEEP melody

You can select the levels of beep tone being activated when you press a button.

### BEEP ON

- 1) Press **|F1|** button to find BEEP icon.
- 2) Select On using Channel Switch.
- 3) Press **|F1|** button again and **|BtXX|** appears on the LCD.
- 4) Select the BEEP melody type (Bt01~Bt03) using Channel Switch.
- 5) Press **|B1|** button to save the setting.

### BEEP OFF

- 1) Press **|F1|** button to find BEEP icon.
- 2) Select Off using Channel Switch.
- 3) Press **|B1|** button to save the setting.

## 3. DTMF

If you set this function at ON mode, your specific DTMF tones are generated when you press the PTT button. By detecting specific DTMF, the base station can monitor radio users.

- 1) Press **|F1|** button to find DtON/OFF icon.
- 2) Select ON/Off using Channel Switch.
- 3) Press **|B1|** button to save the setting.

## 4. BCLO(Busy Channel Lock-Out)

If you set its function at **|ON|** mode, it prevents you from

interfering with other parties who may be using the same channel you selected.

- 1) Press **|F1|** button to find bLON/OFF icon.
- 2) Select ON/Off using Channel Switch.
- 3) Press **|B1|** button to save the setting.

## 5. TA(Talk Around)

You may experience an occasional communication interruption being caused by a power failure or problems in the repeater system. When such a case occurred, you can continue communication by using the Talk-Around feature. If you set this feature at ON mode, Talk-Around allows you to communicate directly with other transceivers without passing through the repeater. However, the communication range without the aid of repeater system will be limited to the transceiver's individual coverage.

- 1) Press **|F1|** button to find tAON/OFF icon.
- 2) Select ON/Off using Channel Switch.
- 3) Press **|B1|** button to save the setting.

## 6. Channel Scanning

If you enter the channel scan mode, you can monitor the other channels.

- 1) Press the **|A1|** button for more than 3 seconds for Channel Scanning.
- 2) Press the **|B1|** button to stop scanning.

## Additional Functions

### 1. Emergency Call

When you are placed under an emergency situation, press the Emergency button(Orange button on the top) over 1 second.

### 2. Low Battery Warning

When the remaining battery capacity falls below a certain level, the Battery icon will blink with a warning sound. In this case, it is recommended that you either change or recharge the battery pack as early as possible.

### 3. TOT(Time-Out Timer)

This feature limits the continuous transmission time on a channel. If the TOT function is programmed by PC, the transmission is automatically terminated according to the programmed TOT and return to the stand by mode.

### \* Lone worker

This feature is PC programmable by your Tekmax Dealer. The lone worker feature will ensure that any person at risk and alone will have to regularly reset their radio's lone worker operational time by pressing the PTT with a preset pre-alarm period (normally 10 to 60 seconds). If the person at risk or alone does not press the PTT during the pre-alarm period, the radio will send an emergency toned call indentifying the radio number to other radio net users.

## 4. CTCSS / DCS TONE Frequency Table

### o CTCSS Table

No	Frequency	No	Frequency	No	Frequency
		13	103.5	26	162.2
1	67.0	14	107.2	27	167.9
2	71.9	15	110.9	28	173.8
3	74.4	16	114.8	29	179.9
4	77.0	17	118.8	30	186.2
5	79.7	18	123.0	31	192.8
6	82.5	19	127.3	32	203.5
7	85.4	20	131.8	33	210.7
8	88.5	21	136.5	34	218.1
9	91.5	22	141.3	35	225.7
10	94.8	23	146.2	36	233.6
11	97.4	24	151.4	37	241.8
12	100	25	156.7	38	250.3

o DCS Table

No	Code	No	Code	No	Code	No	Code
1	023	22	143	43	315	64	532
2	025	23	152	44	331	65	546
3	026	24	155	45	343	66	565
4	031	25	156	46	345	67	606
5	032	26	162	47	351	68	612
6	043	27	165	48	364	69	624
7	047	28	172	49	365	70	627
8	051	29	174	50	371	71	631
9	054	30	205	51	411	72	632
10	065	31	223	52	412	73	654
11	071	32	226	53	413	74	662
12	072	33	24	54	423	75	664
13	073	34	244	55	431	76	703
14	074	35	245	56	432	77	712
15	114	36	251	57	445	78	723
16	115	37	261	58	464	79	731
17	116	38	263	59	465	80	732
18	125	39	265	60	46	81	734
19	131	40	271	61	503	82	743
20	132	41	306	62	506	83	754
21	134	42	311	63	516		

4. Specifications

Model	UHF TR-450
GENERAL	
Frequency Range	400~430(L) 440~470(H)
Number of Channels	128 CH
Temperature Range	-20 ~ +60
Operation Voltage	7.4V DC
Battery life	8 hours
Size	59mmx102mmx32mm (Including battery)
Weight	250 g (w/ Battery, Antenna, Belt clip)
Transmitter	
Channel Bandwidth	12.5KHz / 25KHz
Modulation Type	8K50F3E / 16K0F3E
Output	1W / 5W      1W / 4W
Frequency Stability	0.00025%
Spurious emission	- 65dBc
Hum & Noise	< -45dB
Max Deviation	2.5KHz at 12.5KHz / 5KHz at 25KHz
Audio Distortion	< 5% at 1KHz 60% deviation
Audio Response	+1 ~ -3dB
Receiver	
Sensitivity	< 0.25uV
Selectivity	< -65dB
Inter-Modulation Rejection	< -60dB
Squelch Sensitivity	< 0.2uV
Audio Distortion	< 5% at 1KHz 60% deviation
Audio Output	< 500mW

## 5. Warranty

Tekmax Telecom Co., Ltd. Warrants that each Tekmax products is free from defects in both material and workmanship, and that Tekmax will repair or replace, at Tekmax's sole option any parts which are determined by Tekmax to be defective in material or workmanship. This Limited Warranty will cover the period from the date of delivery to the original purchaser from our initial distributor/dealer for a term of 12 months.

However, in any events, the Limited warranty will not exceed 13 months from the date of bill of landing. This Limited Warranty does not cover any defects which result from misuse, improper repairs, unauthorized alteration or modification of circuital/mechanical parts or liquid damage etc which adversely affects the performance and/or durability of the radio.

## 6. DECLARATION OF CONFORMITY

Hereby, Tekmax Telecom declares that this equipment complies with the essential requirements and other relevant provisions of Directive 1999/5/EC.

This indicates compliance with the R&TTE Directive 1999/5/EC and meets the relevant parts of following technical specifications :

**EN300 086 v1.1.1(Radio Spectrum)**

**EN301 489-5 v1.3.1(EMC)**

**EN60950-1(SAFETY)**

**EN50360**

Marking by the symbol  indicates that usage restrictions apply.

This equipment is intended for use in -

Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom, Iceland, Liechtenstein, Norway, Switzerland, Bulgaria, Romania, Turkey & USA

**CE 0984** 

This equipment is marked with the symbol and can be used throughout the European community.