



**Frequency
Synthesized
Handheld
Transceiver**

Instruction Manual

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TRV Motorsport, Inc.
MODEL: X100
Test #: 020918 FCCID#: QOR X100
Test to: FCC Parts 2 and 90 Page 1 of 13
X100BUserman1.doc 11/20/2002

Introduction

Thank you for purchasing our synthesized Handy Transceiver. Your unit has been manufactured and checked under the strictest possible quality control to ensure that each transceiver leaves the factory in perfect condition. If in the unlikely event you find any defects or have any problem, please contact your dealer, our branch or service center.

Please read this manual carefully to obtain maximum performance & extended service life from the unit.

Features

1. Very compact and rugged construction

The transceiver is housed entirely in a high-impact polycarbonate (PC) cabinet for professional grade ruggedness required in most applications. Rubber gasket seals around all external controls & connectors keep out dust, rain or spray, assuring years of reliable operation even in harsh environment.

2. Auto squelch with simple operation

The auto squelch circuit makes manual squelch adjustment unnecessary. A Monitor button is incorporated in case the received signal is weak.

3. Easy Programming

The channel frequencies, CTCSS(DCS) codes and other settings can be programmed in field by the dealer. The settings of one unit can be cloned to another unit by using the TCC-1 cloning cable (separately supplied) through the speaker/mic jack.

4. High / Low Power

The RF power can be switched between 0.5W for local communication, and 2W for distance communication, extending battery life and preventing interference upon other stations.

N.B. The RF power can be programmed by the dealer to restrict operation on low power only.

5. Scanning

Scanning can be selectable between normal scan mode or priority scan mode by the end user.

6. Time-out-timer/ Busy channel knock out/ Priority channel/Power save

All these features can be programmed and activated by the dealer.

7. VOX (voice activated transmission)

The transceiver can be set to operate in VOX mode such that the end user can free both hands for other application.

8. Display

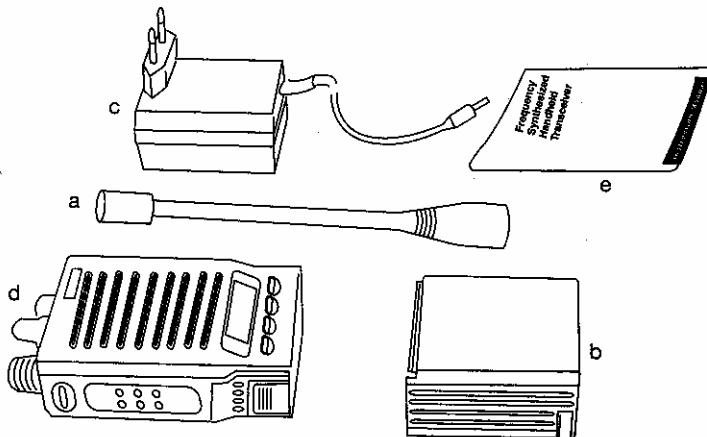
The LCD can be set to display either channel number or operating frequencies.

9. Low Battery Alert

When battery voltage falls, there will be visual and audio signal to alert the end user to recharge or replace battery.

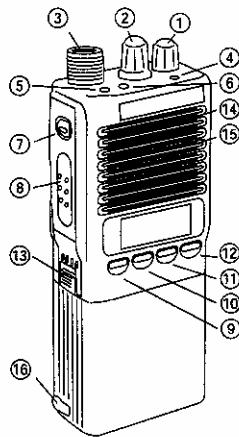
Standard Accessories

a. Helical Rubber Antenna	1
b. TNB-15 7.2V 1100mAh Ni-mH battery Pack	1
c. TCS-8 AC Wall Charger	1
d. Main unit (with belt clip installed)	1
e. User Manual	1



Precautions

1. Do not expose your transceiver unit to environment with extreme temperature, humidity or dust.
2. Do not touch the cores or trimmers on the PCB inside. They are aligned at optimum condition.
3. When the transceiver is left unused for a long period of time, it is advisable the Ni-mH battery pack to be removed from the main body.
4. The unit should be protected from excessive vibrations, mechanical impacts or strong electromagnetic field.



Controls & Connectors

1. VOL (Volume) Control

Turn clockwise to increase the sound volume. To switch off the unit, turn anti-clockwise until a CLICK sound is heard.

2. CH (Rotary Channel Selector) Control

The channel number can be increased or decreased by turning this control clockwise or anti-clockwise respectively. When the highest channel number is reached, further turning this knob will return to the lowest channel number or vice versa.

3. Antenna Connector

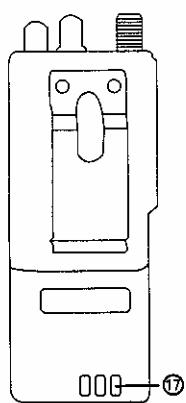
This TNC jack will accept the supplied helical rubber antenna or any other antenna designed to provide 50 ohm impedance. Besure to screw in the antenna securely to obtain best performance on reception or transmission.

4. Tx/Busy/Low Battery Indicator

The 2-colour LED lights in red when signal is being transmitted and in green when signal is being received. The LED will blink when the batteries become exhausted.

5. External Speaker Jack

Connect to the speaker plug of the optional hand speaker/microphone or hands free ear-microphone (TSM-1 or TSM-2). This jack accept a speaker or earphone with an 8 ohm impedance for using it as the external speaker. When a plug is inserted into this jack, the sound from the built-in speaker is cut off.



6. External microphone jack

Connect to the microphone plug of the optional hand speaker/microphone or hands free ear-microphone (TSM-1 or TSM-2).

7. Monitor button

Press down this button to monitor weak signal from remote area.

8. PTT (Push-To-Talk) Button

Press this button will set the transceiver in transmit mode.

9. Scan Button

Press this button once will set the transceiver in scanning mode. Press again and the transceiver will exit from scanning.

10. Lock Button

Press this button will cause the transceiver to switch between lock and free mode. The lock mode is used to avoid accidental operation.

11. Low/Vox Button

Press this button will cause the transceiver to operate between high and low RF power. This button, in combination with other buttons, is also used to set the transceiver to operate in VOX mode.

12. Light Button

Press this button to switch on and off the backlight of the LCD.

13. Battery Latch

Locks the Ni-mH battery pack. To remove the battery pack, slide the latch upward.

14. Speaker

15. Microphone

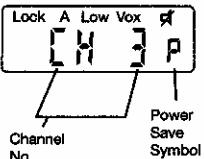
16. DC Jack

Connect to the plug of the supplied AC wall charger (TSC-8) to charge up the battery pack.

17. Desk Top Charger Receptacle

Contact with the terminal pins on the optional Intelligent Desk Top Rapid Charger (TQC-68) for fast charging of the battery pack.

The Monitor button, PTT button, Scan Button, Lock Button, Low/Vox Button and Light Button can be used in combinations to set certain functions, please refer to detail description under Function Setting.



Lock = Lock mode symbol
A = The captioned channel is included in the scan sequence
Low = RF power Low symbol
Vox = VOX mode symbol
P = The concerned channel is equipped with CTCSS or DCS code.

Operation

1. Battery Pack

Make sure that the VOL control is set at the OFF click-stop. Slide in the supplied Ni-mH battery pack along the track until the Battery Latch locks the battery pack in position.

Before operating the transceiver for the first time, charge the battery pack with the supplied AC wall charger for about twelve hours.

It is not necessary to remove the battery pack from the transceiver when charging, but its operation may be impaired (by noise) while charging the battery pack. Therefore we recommend having an extra battery pack on hand so that the transceiver can be used while the spare pack is being charged.

Fast charging of the battery pack can also be done using the Intelligent Desk Top Rapid Charger (TQC-68) which can be obtained as option.

2. Antenna

Screw in the supplied helical rubber antenna securely onto the antenna connector. Never operate the transceiver without an antenna connected as this may damage the RF amplifier circuit.

3. Volume Adjustment

Turn on the transceiver with the VOL control and gradually adjust the speaker sound to an appropriate level while pressing down the Monitor Button.

4. Channel Selection

Select the desired operating channel with the CH Control. If the display flashes, it indicates the concerned channel is not properly programmed and operation is not possible.

Each time the transceiver is switched on, it will stay in the same channel when it last operates before switching off.

5. Transmission and Reception/Busy Channel Knock Out

Hold the transceiver upright and press PTT Button. The unit enters into transmission mode and the Tx/Busy indicator will light up red. Talk into the built-in microphone. The appropriate distance between the front cover panel and your mouth is 2 to 5 cm.

Before transmitting, listen for others already using the same frequency channel. If the channel is busy, wait until it is clear. For channel programmed with CTCSS/DCS code, (as indicated by the symbol "A" in the LCD) watch for the Tx/Busy indicator, if it lights up green, it means the channel is occupied. This transceiver can be pre-programmed to have Busy Channel Knock Out function, it will inhibit the unit from transmitting once a channel is found busy.

6. Time-Out-Timer (TOT)

This transceiver can be pre-programmed with TOT function to avoid people from occupying the channel continuously. Whenever the unit is set in transmission mode for a period exceeding the preset value (20 seconds to 300 seconds), the transmitter will be cut off automatically. Five seconds (or maximum 75 seconds depending on programming) before cut off, a warning alarm will be heard. After cutting off, the unit can be set into transmission mode again by releasing and then pressing the PTT button.

7. Low Battery Warning

Whenever the battery pack becomes exhausted and need replacement or recharge, an alarm will be heard to alert the end user. Pressing the Monitor or PTT button will temporarily stop the alarm. However, if the battery is kept remain uncharged, each time the PTT button is pressed, the alarm will sound again and the Low Battery Indicator will blink simultaneously. Alternatively, each time the Monitor button is pressed, only the Low Battery Indicator will blink.

N.B. Use of other charger or dispose the battery in fire may cause explosion.

8. Scanning

Press Scan Button once, the transceiver will start to scan the channels included in the scan sequence (as indicated by the symbol "A" in the LCD). There are two types of Scanning :

a) Normal Scanning

Scanning will start sequentially from the operating channel to the next. When the last channel is reached, scanning will resume from the first channel again.

b) Priority Scanning

If a channel is set to be the priority channel, scanning will start from the operating channel, then the priority channel, the next channel in the scan sequence, the priority channel again and so on. When the last channel is reached, scanning will resume from the first channel.

e.g. CH 3 = operating channel CH 4 = priority channel

CH 3 → CH 4 → CH 5 → CH 4 → CH 6 → CH 4 → CH 7 → CH 4 → CH 8....

Whenever a signal is received on a certain channel, scanning will stop temporarily and the transceiver stays on that channel for a period of time (can be pre-programmed between 0.5sec to 7.5sec). During this time, if PTT or Monitor Button is pressed, the transceiver will exit from scanning mode and stay operate on that channel. Alternatively, if no button is pressed, scanning will resume to the next channel after the pre-programmed time is lapsed, no matter the signal continue to last or not.

During scanning, if no signal is received, pressing the Monitor Button will cause the transceiver to return to the operating channel where scanning starts and monitor the signal on that channel. Scanning will resume when Monitor Button is released.

During scanning, press Scan Button once will cause the transceiver to exit from scanning mode and return to the operating channel where scanning starts.

The channels to be included in the scan sequence can be set by the end-user if this function is allowed in pre-programming.

9. Lock Function and VOX Function

Press Lock Button once and the symbol “**Lock**” will appear in the LCD. During lock mode, the Monitor Button, Scan Button, Low/Vox Button and the CH control will all become inactive. Press this button again and the transceiver will exit from lock mode, the symbol “**Lock**” disappears from LCD.

During Lock mode, if Low/Vox Button and Monitor Button are pressed simultaneously, the transceiver will enter VOX mode, the symbol “**Vox**” appears in the LCD. Press these two buttons again simultaneously will cause the transceiver exits from VOX mode and the symbol “**Vox**” disappears from LCD. The VOX mode is only operational when there is a external hand speaker/microphone or hands free ear-microphone (TSM-1 or TSM-2) is connected to the speaker/mic jack.

10. RF Power Selection

Press Low/Vox Button once and the symbol “**Low**” appears in the LCD. The transceiver will operate with 0.5W RF power. Press this button again and the transceiver will operate with normal 2W RF power, the symbol “**Low**” disappears from LCD.

N.B. The transceiver can be pre-programmed to restrict operating with low RF power only on certain channels.

11. Display of Channel Frequency

During Lock mode (with symbol “**Lock**” appears in the LCD), if Scan Button and Low/VOX Button are pressed simultaneously, the operating channel frequency will be displayed in the LCD instead of channel number. Press these two buttons again simultaneously will return displaying the channel number.

12. Lighting the LCD

Press Light Button once, the LCD will be backlit. If there is no operation with any button, the backlight will be automatically switched off after 5 seconds.

When the backlight is on, press this button again will switch it off.

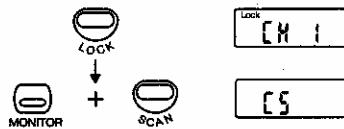
13. Power Save Function

If the transceiver is left standby without any operation for over 15 seconds, the unit will automatically enters power save mode. A symbol “**P**” will show blinking at the lower right corner of the LCD. Upon receiving a signal or pressing any button, the unit will resume normal operation mode.

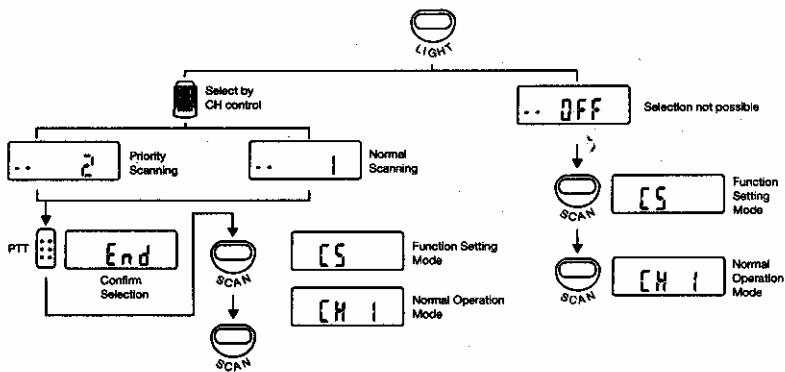
Function Setting

Setting of the various functions is possible only if this operation is allowed during pre-programming.

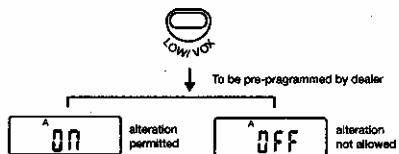
Enter Function Setting Mode



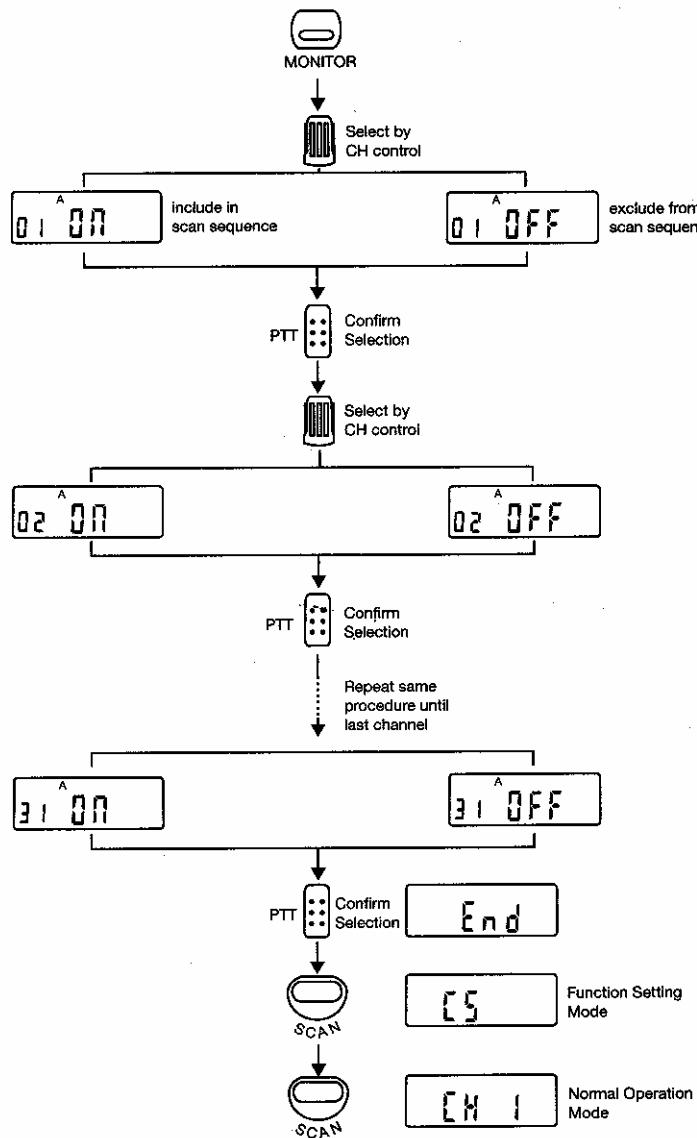
1. Selection of Scanning Type



2. Permission to alter channels in the scan sequence



3. Selection of channels in the scan sequence



GENERAL**VHF****UHF**

Frequency Range	Va : 138 ~ 160MHz Ve : 155 ~ 174MHz Vc : 245MHz	Ub : 400 ~ 430MHz Ue : 450 ~ 470MHz Uc : 470 ~ 520MHz
Mode of Operation	Simplex or semi-duplex	
Number of Channels	31 (optional 62)	
Frequency Stability	+/- 5ppm	
Operating Voltage	6 ~ 12VDC negative ground (7.2V nominal)	
Operating Temperature	-25 °C ~ +50 °C	
Type of Modulation	F3E	
Antenna Impedance	50ohm	
Dimension	58.5(W) x 142(H) x 33(D)mm	
Weight	400g including 7.2V battery pack	
Current Drain		
Transmit	800mA	1.6A
Receive	180mA	180mA
Standby	32mA	35mA
Frequency Spread	10MHz	20MHz

TRANSMITTER

RF Power Output	High : 2W at 7.2V/4.5W at 12V Low : 0.5W	High : 2W at 7.2V/4.0W at 12V Low : 0.5W
Spurious & Harmonic Emissions	-60dB	-60dB
Maximum Frequency Deviation	±5.0KHz+/±2.5KHz*	±5.0KHz+/±2.5KHz*
Audio Distortion	5%	5%
Adjacent Channel power	-60dB	-60dB

+ 25KHz channel spacing * 12.5KHz channel spacing

RECEIVER	VHF	UHF
Circuit Type	Double-Conversion Super heterodyne	Double-Conversion Super heterodyne
Intermediate Frequencies	21.4MHz & 455KHz	21.4MHz & 455KHz
Sensitivity	0.2 μ V (12dB SINAD)	0.2 μ V (12dB SINAD)
Adjacent channel Selectivity	65dB+/ 60dB*	60dB+/ 55dB*
Inter-modulation	65dB+/ 60dB*	60dB+/ 60dB*
Spurious Response Rejection	70dB+/ 70dB*	65dB+/ 65dB*
Audio Power Output at 10% Distortion	0.5W	0.5W
Audio Frequency Response Characteristics	within +2, -6dB of 6dB / Octave de-emphasis from 300 to 3000Hz	within +2, -6dB of 6dB / Octave de-emphasis from 300 to 3000Hz

+ 25KHz channel spacing * 12.5KHz channel spacing

OPTIONAL ACCESSORIES

7.2V 1100mAH Ni-mH Battery Pack	TNB-15
12V 1100mAH Ni-mH Battery Pack	TNB-16
AC Wall Charger for TNB-15	TSC-8
AC Wall Charger for TNB-16	TSC-9
Intelligent Desk Top Rapid Charger	TQC-68
CTCSS Tone Squelch Unit	TSQ-3
CTCSS/DCS Squelch Unit	TSQ-4
External Hand Speaker / Microphone	TSM-1
Hands Free Ear-Microphone	TSM-2
Soft Carrying Case for transceiver with TNB-15	TLC-15
Soft Carrying Case for transceiver with TNB-16	TLC-16
Cloning Cable	TCC-1

FCC Information

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES.
OPERATION IS SUBJECT TO THE CONDITION THAT THIS DEVICE DOES NOT
CAUSE HARMFUL INTERFERENCE.

MODIFICATIONS OR CHANGES NOT EXPRESSLY APPROVED BY THE
MANUFACTURER COULD VOID THE USER'S AUTHORITY TO OPERATE THE
EQUIPMENT.

IMPORTANT NOTE: To maintain compliance with the FCC's RF exposure guidelines, hold the transmitter and antenna at least 1 inch (2.5 centimeters) from your face and speak in a normal voice, with the antenna pointed up and away from the face. If you wear, the handset on your body while using the headset accessory, use only the manufacturers supplied belt clip for this product and ensure that the antenna is at least 1 inch (2.5 centimeters) from your body when transmitting. To provide the recipients of your transmission the best sound quality, hold the unit at least 5cm (2 inches) from the mouth, and place the antenna slightly off to one side.



Your radio generates radio frequency electromagnetic energy during transmission mode. The radio is designed for and classified as "Occupational Use Only" and must be used by individuals who are properly trained and aware of these hazards and the means in which to minimize such hazards. This radio is NOT intended for use by the "General Population" or in uncontrolled environments.



To ensure that your exposure to radio frequency electromagnetic energy is within the FCC allowable limits for occupational use, always follow these guidelines:

DO NOT operate the radio without a proper antenna attached, as this may damage the radio and increase your RF exposure. A proper antenna is supplied with the 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 the total radio use time (this is a maximum 50% duty cycle radio). Transmitting more than 50% can cause FCC RF exposure compliance requirements to be exceeded. Pressing the PTT switch enables the radio to transmit.

ALWAYS use ONLY authorized accessories with this radio. Use of unauthorized accessories can cause the FCC RF Exposure compliance requirements to be exceeded.