

XR-R1400

User Manual



XR Radio Yeonhwa M Tech Co., Ltd.

XR-R1400

XRradio Fixed Repeater XR-R1400

Quick Start Guide

This document provides basic operating instructions for XRradio XR-R1400 Repeaters.
For full operating instructions and further information see our website linked
www.xradio.co.kr.

1. SPECIFICATION

1.1 General

Frequency Range

XR-R1400 : 400 ~470 MHz

Frequency Stability

±1.0ppm (-30 to +60°C)

Programmable Channels

500Channels (Analog/Digital Mixing)

Zone

32 (1 Zone = Max 32 Channels)

Channel Spacing

12.5KHz/25KHz

Digital Vocoder

AMBE++

Dimensions

44mm (H)×432mm (W)×320mm (D)

Weight

7.7Kg

Power supply requirements

DC-13.6V±15%, AC-90-264V

Current Drain (Maximum)

Receive mode, rated audio out – 2A (Audio Max)

Transmit mode – 5A @ 10Watt, 11A@50Watt

Standby mode – 800mA

1.2 Receiver

Sensitivity

0.25uV (BER 5%)

Adjacent channel selectivity

60dB @12.5KHz / 70dB @ 25kHz

Spurious & Harmonic Rejection

Y90dB

Intermodulation

60dB @12.5KHz / 60dB @ 25kHz

Blocking

90dB

Audio Output Power

5Watt/4ohm load

Audio Response

+1, -3 dB from 6dB per octave de-emphasis Characteristic from 300 ~ 3000Hz

Input Impedance

50 ohms

1.3 Transmitter

RF Power Output

5~50Watt

Adjacent channel power

60dB @12.5KHz, 70dB @25KHz

Spurious & Harmonic

-36 dBm (< 1GHz) -30 dBm (> 1GHz)

Digital FSK Error

<2%

FM Modulation

8K0F3E @12.5kHz / 16K0F3E @25kHz

Audio Response

+1, -3dB from 6dB per octave pre-emphasis Characteristic from 300 ~ 3000Hz

Input Impedance

50ohms

2. Appearance of XR-R1400 Repeater



Figure 2-1) XR-R1400 Front Appearance Description

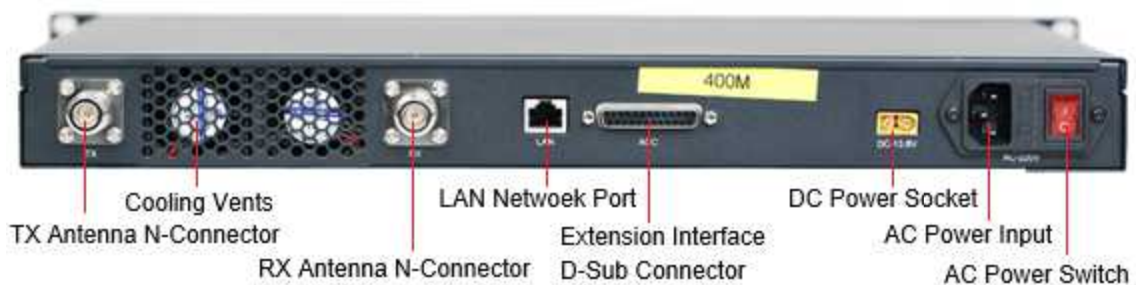


Figure 2-2) XR-R1400 Rear Appearance Description



Figure 2-3) Duplexer Rear Appearance Description



Figure 2-4) Duplex connection form with repeater

3. LCD Description of XR-R1400 repeater



Figure 4-1) Photographs of LED and buttons

3.1 LED Indicators

Indicator	LED	Description
TX1	Red	Red LED turns on when repeater sends to Slot1
TX2	Red	Red LED turns on when repeater sends to Slot2
RX1	Green	Green LED turns on when the repeater receives as Slot1
RX2	Green	Green LED turns on when the repeater receives as Slot2

3.2 Button Description

Button	Description
	Select ▲, ▼ buttons in menu mode.
	Select Volume and LCD Brightness with a button to switch between displaying device information and device name
	Press this button to select the menu. Select the ▲, ▼ button and press the P1 button to set the menu. In the Volume menu, adjust the volume with ◀, ▶ buttons. After selecting all menus, press the P1 button to save the set status.
	This button comes out of the menu status. Press P2 in standby mode to enter the Channel Settings menu.
	There is no function, and it is used as a programming function button.
	The button to turn on/off the power. Press for more than 5 seconds to turn on and off the power.

3.3 LCD display

The screen of this repeater is displayed as follows.

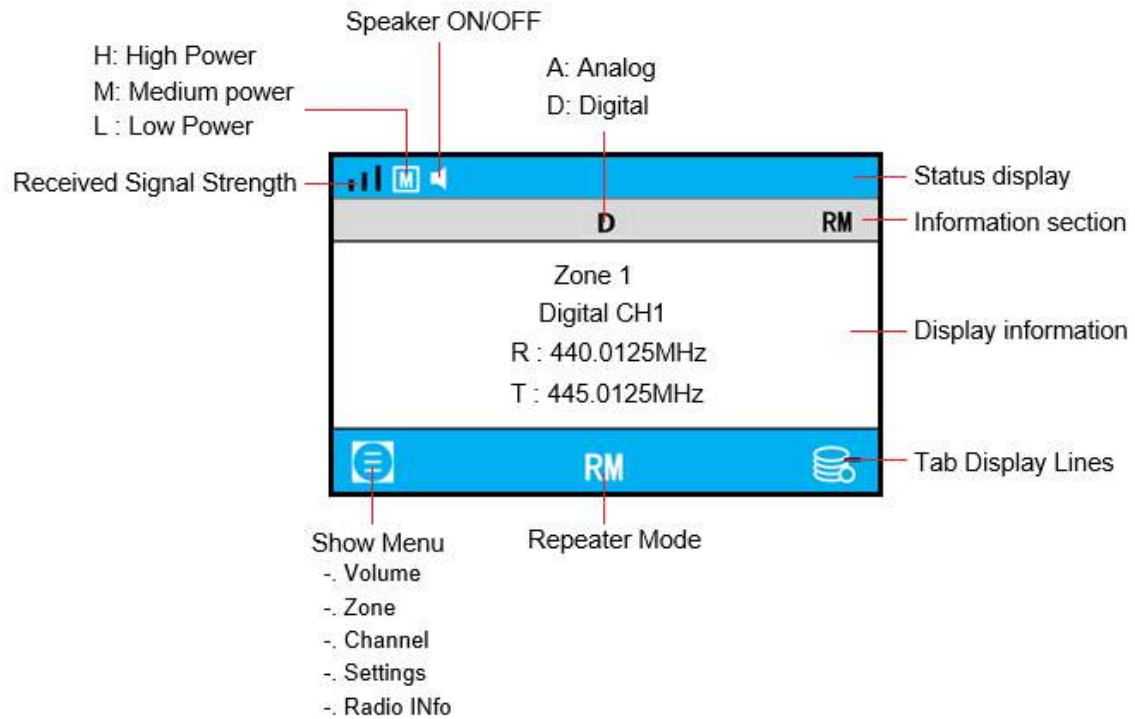


Figure 3-1) LCD display type

3.4 Main menu interface

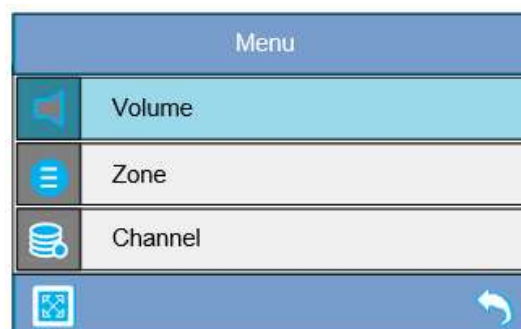


Figure 3-2) LCD Menu

After entering the main menu, please select the corresponding menu by pressing the arrow keys up and down.

Press P1 to enter the next submenu.

Press P2 to return to the previous menu.

3.5LCD Details on XR-R1400 repeaters

NO	Icon Name	Icon displayed	Identify the meaning of the content
1	Signal strength indicator		Signal strength indicates a strong signal with a large number of bars
2	Operation status	D	Digital Channel
		A	Analog Channel
3	Power intensity indicator		Low Power
			Medium Power
			High Power
4	Speaker identifier		Local monitoring enabled
			Local monitoring disabled
5	Transfer sign		Transfer in progress

4.Operation

4.1 Power on and off ()

- 1) Start: Connect the DC power cable or AC power cable and turn on the AC power switch.
- 2) Press the start button on the front panel for more than 5 seconds to turn on the repeater.
Press the start button of the front plate again for more than 5 seconds to turn it off.
- 3) While the 'START BUTTON' is turned on, even if the power is cut off by using an AC power switch on the back, when the power is restored, the front plate restores the turned-on state. This is because the repeater always maintains the state set by the front plate.

4.2 Channel selection

- 1) Press P2 to enter the channel menu in the standby interface.
- 2) Press the up and down keys ▼ or ▲ to switch channels.
- 3) Press P1 to confirm your selection.

4.3 Volume adjustment

- 1) Press P1 on the standby interface to enter the main menu.
- 2) Select the Sound Quantum menu to enter volume adjustment mode.
- 3) Pressing the left and right arrow keys can adjust the volume.

4.4 Monitoring mode

- 1) Enable this feature through CPS software.
- 2) Press P1 on the standby interface to enter the main menu.
- 3) Choose Settings - Listen Settings - Enable.

4.5 PTT allows calls

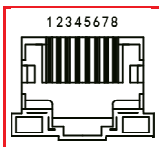
- 1) Enable to activate this feature through CPS software.
- 2) Press P1 on the standby interface to enter the main menu.
- 3) Choose Settings - PTT Call Settings - Allow.

4.6 PTT call

- 1) Connect your hand.
- 2) CPS software configuration enables PTT calls.
- 3) Hold down the PTT to activate the indicator light, then aim it at the microphone for 5-10 Cm to speak.
- 4) Release PTT, call ended.

5. Interface Connector

5.1 MIC-RJ45 Interface Definition

Pin NO	Pin Name	Description	Specification	I/O	Remark
1	DC+6.5V	Power supply	DC+6.5V, 500mA	O	
2	TXD	TX Data	3.3V TTL	O	
3	NC	-	-		
4	PTT	Microphone is sent when PTT is low	“L” Active”	I	
5	GND	Ground	ground	-	
6	MIC IN	Analog microphone input signal	Audio Input	I	
7	GND	Ground	Ground	-	
8	RXD	RX Data	3.3V TTL	I	

*

5.2ACC (D-SUB 25 Pin Connector) REAR D-RANGE CONNECTOR

Pin NO	Pin Name	Description	Specification	I/O	Remake
1	GND	Ground	Ground	-	
2	GND	Ground	Ground	-	
3	E-AFOUT	Analog Audio	0~5V	O	
4	DB25-IO1	PTT Input	“L” Active	I	
5	DB25-IO2	CPU I/O	3.3V TTL	I/O	
6	DB25-IO3	CPU I/O	3.3V TTL	I/O	
7	DB25-IO4	CPU I/O	3.3V TTL	I/O	
8	GND	Ground	Ground	I/O	
9	GND	Ground	Ground		
10	E-AFIN	Analog Audio input	Audio Input	I	
11	GND	Ground	Ground		
12	DB25-RX0	RX Serial Data	3.3V TTL	I	
13	BOOT-HIGH	Ports for Firmware Upgrade	“H” Active		
14	GND	Ground			
15	DC+6.5V	DC 6.5V Power	Dc+6.5v/500mA	-O	
16	DB25-TX0	TX Serial Data	3.3V TTL	O	
17	BOOT0				
18	DB25-RXD	Debug port, receiving computer AT command	3.3V TTL	I	
19	DB25-TXD	Debug port, sending computer AT command	3.3V TTL	o	
20	GND	Ground			
21	NC	Not connect			
22	NC	Not connect			
23	NC	Not connect			
24	NC	Not connect			
25	NC	Not connect			

6. The equipment can be installed in racks or cabinets.

The cabinets and racks provided by the user must have tracks and hole spacing, comply with the EIA General 48.3 cm (19 inches) specification, and meet the following minimum standards:

- Depth: 41.3 centimeters (16.25 inches)
- Width: 48.3 centimeters (19 inches)
- Height: 13.4 cm (5.25 inches)
- The two installation tracks are 5 centimeters (2 inches) from the front of the cabinet, with a 2.25-inch gap between the front installation holes (center to center).
- Only standard antennas and accessories can be installed.
- Operating temperature range: -20°C to +50°C.

This temperature is measured near the device. Example: If the device is installed in a cabinet, this temperature is the temperature measured inside the cabinet.

- Humidity: At 50°C (122°F), relative humidity does not exceed 95%.

6.1 Input power requirements

- This equipment is equipped with a DC power interface and a standard 3-core AC power interface (it's best not to use both power sources simultaneously).
- DC power interface, with operating range of DC 13.6V $\pm$ 15%, and a supply current of at least 15 A.
- Standard 3-core AC power interface, providing a standard 3-core wire for connecting power to an AC voltage source.
- This device must be installed next to an easily accessible AC power source.
- The outlet must be connected to an AC power source that can provide up to 280 W of power.
- It is recommended to connect AC power using a standard 3-wire ground outlet.
- Note: The DC power interface can only be used as input, not as output, and cannot charge or power batteries or other devices.
- Must protect RF transmission cables as well as AC and DC, Power cord, to prevent lightning strikes when lightning enters the site.
- Correct RF grounding. Such grounding involves grounding unnecessary radio frequency energy. An example of RF grounding is the use of shields to prevent harmful RF energy from communication devices and cables, or to minimize this emission.

6.2 Duplexer

- 1) Choosing a proper duplexer is crucial for communication performance.
- 2) Some systems not being used in high-frequency density environments may employ "suspension wave (band filtering)" duplexers.

- 3) The duplexer must be able to operate continuously at least 50 W. To achieve optimal communication performance, the insertion loss should be below 2 dB.
- 4) If the device is used in a high RF density location, it is recommended to use a "band-pass-block" duplexer.

6.3 RF antenna connection

- 1) RF feeder must be connected to the corresponding interfaces for reception and transmission, and the plug must be an N-type male connector.
- 2) For optimal communication performance, there must be sufficient isolation between antennas, or if an antenna is used, the duplexer must have adequate isolation between the TX and RX ports.

The isolation requirements for each frequency band are shown in the following table:

Band	Frequency Bandwidth	Isolation
UHF	400 ~ 470MHz	75 dB

6.4 Antenna Selection

- 1) Choosing a proper antenna is crucial for best communication performance.
- 2) An antenna with an impedance of 50 ohms and a power capacity of at least 50 watts must be selected. High-gain antennas can be used or the antenna can be lifted high to enhance communication coverage.
- 3) The frequency points used for the equipment must be approved by the local radio management department.
- 4) A feeder with a 50-ohm impedance matching and a power capacity of at least 50 watts must be used to connect the antenna to the duplexer. The feedline must be equipped with an interface that matches with both the duplexer interface and the antenna interface.

6.5 Check

- 1) Ensure that all RF feeds are securely connected.
- 2) Ensure that the power cord wiring is correct.
- 3) Boot to check the display status on the panel.
- 4) Use walkie-talkie communication tests.

In order for this equipment to operate continuously at high power for a long time, it must ensure a good ventilation and an auxiliary cooling equipment are functioning properly.

For assistance, please contact the supplier's technical support department.

FCC Statement:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device,

Pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This equipment complies with FCC radiation exposure limits set forth for a controlled environment. This equipment should be installed and operated with minimum distance 1.54m between the radiator and your body.

Note:

* 25 kHz channels not available in the US.

Availability is subject to individual country law and regulations.

Product Model: XR-R1400
IC: 184A-XRR1400

PMN: Repeater
HVIN: XR-R1400

ISED Statement:

-English: This device complies with Industry Canada license - exempt RSS standard(s). Operation is subject to the following two conditions:

(1)

This device may not cause interference, and (2) This device must accept

any interference, including interference that may cause undesired operation of the device.

The digital apparatus complies with Canadian CAN ICES - 3 (B)/
NMB -

3(B).

- French: Le présent appareil est conforme aux CNR d'Industrie
Canada

applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil
ne doit pas produire de brouillage,

et (2) l'utilisateur de l'appareil doit accepter tout

brouillage radioélectrique subi, même si le brouillage est susceptible
d'en compromettre le fonctionnement.

l'appareil numérique du ciem conforme canadien peut - 3 (b) / nmb

-

3 (b).

This equipment complies with Canada radiation exposure limits set
forth for a controlled environment.

Cet équipement est conforme aux limites d'exposition au rayonnement
établies par le Canada pour un environnement non contrôlé.

This equipment should be installed and operated with minimum
distance 1.57 m between the radiator & your body.

Cet équipement est conforme Canada limites d'exposition aux
radiations

dans un environnement contrôlé.

Cet équipement doit être installé et utilisé avec une distance minimale
de 1.57 m entre le radiateur et votre corps.

CANADA LICENSING INFORMATION

Before using this radio, read this booklet which contains important operating instructions. For information on product details, brochures, user manuals and approved accessories.

Compliance with RF Exposure Standards

National and international regulations require manufacturers to comply with the RF energy exposure limits for Fixed Land Mobile Radio before they can be marketed. Your Fixed Land Mobile Radio is designed, manufactured, and tested to comply with all applicable national and international regulations for human exposure to radio frequency electromagnetic energy. When Fixed Land Mobile Radio are used as a consequence of employment, applicable regulations may require users to be fully aware of and able to control their exposure to meet occupational requirements.

RF Energy Exposure Awareness and Control Information and Operational instructions for Occupational Use

NOTE: This radio is intended for use in occupational/controlled conditions where users are aware of their exposure and can exercise control over their exposure to meet the requirements in national and international regulations. This radio device is not authorized for general population, consumer use. For more information on what RF energy exposure is, and how to control your exposure to ensure compliance with established RF exposure limits, consult the following websites:

<https://www.fcc.gov/>

<http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11467.html>

<http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01904.html>

RF Exposure Compliance and Control Guidelines

This radio transmitter has been approved by FCC/ISED to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. It is up to the user to properly operate this radio transmitter to insure safe operation. Please adhere to the following: Use only the supplied or an approved antenna. Unauthorized antennas, modifications, or attachments could impair call quality, damage the radio, or result in violation of FCC/ISED regulations. "Do not use the radio with a damaged antenna. If a damaged antenna comes into contact with the skin, a minor burn may result. Please contact your local dealer for a replacement antenna." Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

External Antenna: Maximum Antenna Gain: 8dBi Antenna impedance: 50 Ohms

To control your exposure, and ensure compliance with the relevant RF exposure limits, always adhere to the following guidelines:

Do not remove any of the RF Exposure Labels if present from this device or its related accessories.

Attach these instructions to the device when you transfer it to other users.

Do not use this device if the operational requirements described herein are not met.

The License Application

1. Fill in the items as per the instructions. If you need additional space for any item, use the reverse side of the application.
2. Be sure to print legibly
3. Make a copy for your files.
4. Prepare a cheque or money made out to the "Receiver General for Canada", for an amount, which is on the following schedule, for each radio purchased. (License is renewed on April 1st each year, and issued for a period of 12 months).
5. Mail your completed application, along with your cheque or money order to the closest ISED District office, according to the list on pages. To obtain the latest Canadian License Application form, please go to <http://www.ic.gc.ca/ic/wp-pa.htm>

WARNING:

This product has been factory set to comply with the requirements of the US/Canada/European Union, and the user cannot program the product or manually enable the product to operate outside of the frequency bands regulated by the respective regulations. Users must comply with the laws of their region and must not use unofficial software or illegal techniques to enable the product to operate outside of the offending frequency bands. You will be penalized by law.

Informations sur les licences au Canada

Avant d'utiliser cette radio, veuillez lire ce livret qui contient d'importantes instructions de fonctionnement. Pour plus d'informations sur les détails du produit, les brochures, les manuels d'utilisation et les accessoires approuvés, veuillez consulter la documentation fournie.

Conformité aux normes d'exposition RF

Les réglementations nationales et internationales exigent que les fabricants respectent les limites d'exposition à l'énergie RF pour les radios mobiles terrestres fixes avant qu'elles ne puissent être commercialisées. Votre radio mobile terrestre fixe est conçue, fabriquée et testée afin de se conformer à toutes les réglementations nationales et internationales applicables concernant l'exposition humaine à l'énergie électromagnétique de radiofréquence. Lorsque les radios mobiles terrestres fixes sont utilisées dans le cadre professionnel, les réglementations applicables peuvent exiger que les utilisateurs soient pleinement conscients de leur exposition et capables de la contrôler afin de répondre aux exigences professionnelles.

Informations et instructions d'utilisation pour la sensibilisation et le contrôle de l'exposition RF en usage professionnel

REMARQUE : Cette radio est destinée à une utilisation en conditions professionnelles/contrôlées, où les utilisateurs sont conscients de leur exposition et peuvent la maîtriser afin de satisfaire aux exigences des réglementations nationales et internationales. Cet appareil radio n'est pas autorisé pour le grand public ou une utilisation grand consommateur.

Pour plus d'informations sur ce qu'est l'exposition à l'énergie RF et sur la manière de la contrôler afin d'assurer la conformité aux limites d'exposition établies, veuillez consulter les sites suivants :

- <https://www.fcc.gov/>
- <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11467.html>
- <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01904.html>

Directives de conformité et de contrôle de l'exposition RF

Cet émetteur radio a été approuvé par la FCC/ISED pour fonctionner avec les types d'antennes indiqués ci-dessous, avec le gain maximal admissible et l'impédance d'antenne requise pour chaque type d'antenne. Il appartient à l'utilisateur d'utiliser correctement cet émetteur radio afin d'assurer un fonctionnement sûr. Veuillez respecter les consignes suivantes :

- Utilisez uniquement l'antenne fournie ou une antenne approuvée.
- Les antennes non autorisées, les modifications ou les accessoires non conformes peuvent dégrader la qualité des communications, endommager la radio ou entraîner une violation des réglementations FCC/ISED. Ne pas utiliser la radio avec une antenne endommagée.

Si une antenne endommagée entre en contact avec la peau, une légère brûlure peut survenir. Veuillez contacter votre revendeur local pour obtenir une antenne de remplacement.

Les types d'antennes non inclus dans cette liste, ou présentant un gain supérieur au gain maximal indiqué pour ce type, sont strictement interdits avec cet appareil.

Antenne externe : Gain maximal : 8 dBi — Impédance : 50 Ohms

Pour contrôler votre exposition et assurer la conformité aux limites d'exposition RF :

- Ne retirez pas les étiquettes d'exposition RF présentes sur l'appareil ou ses accessoires.
- Joignez ces instructions à l'appareil lorsque vous le transférez à d'autres utilisateurs.
- N'utilisez pas cet appareil si les exigences de fonctionnement décrites dans ce document ne sont pas respectées.

Demande de licence

1. Remplissez les rubriques conformément aux instructions. Si vous avez besoin de plus d'espace, utilisez le verso du formulaire.
2. Écrivez lisiblement en lettres moulées.
3. Faites une copie pour vos dossiers.
4. Préparez un chèque ou un mandat libellé à l'ordre du « Receiver General for Canada » pour le montant correspondant, selon le barème indiqué, pour chaque radio achetée. (La licence est renouvelée le 1er avril de chaque année et est délivrée pour une période de 12 mois.)
5. Envoyez votre demande complétée, accompagnée de votre chèque ou mandat, au bureau de district d'ISED le plus proche (liste des bureaux dans les annexes). Pour obtenir le formulaire le plus récent de demande de licence canadienne, veuillez consulter :

http://www.ic.gc.ca/ic_wp-pa.htm

Avertissement

Ce produit a été configuré en usine afin de se conformer aux exigences des États-Unis, du Canada et de l'Union européenne. L'utilisateur ne peut pas programmer le produit ou activer manuellement son fonctionnement en dehors des bandes de fréquences réglementées par les autorités compétentes.

Les utilisateurs doivent se conformer aux lois de leur région et ne doivent pas utiliser de logiciels non officiels ou de techniques illégales pour activer le fonctionnement du produit en dehors des bandes autorisées. Toute infraction est passible de sanctions légales.

WARRANTY CARD

Thank you for purchasing XR-R1400 Series.

1. This product has passed strict quality control and testing process.
2. Warranty is one year from original date of purchase.
 - Failure of the product under normal operating conditions, during the warranty period may be repaired by YeonHwa M Tech Co.,Ltd or our authorized service organization free of charge.
3. For the following cases, some service fees will be charged.
 - When repair occurs after the warranty period has passed
 - When the product is damaged due to user's mishandling, abuse or improper operation.
 - When the product is damaged due to user's modification, attempted repair or otherwise access to sealed/non-user serviceable items.
 - When the product is damaged due to fires, pollution, earthquakes and any other natural or unnatural conditions, accidents, etc.
4. Product & personal information

Model No		XR-R1400
Serial No		
Purchase Date		
Purchaser	Name	
	Address	

※ When you purchasing, please fill out the product information.

YeonHwa M Tech Co.,Ltd

36 Jeonpa-Ro, 44Beon-Gil, Manan-Gu, Anyang-City, Gyeongg-Do, Korea

Tel: 82-31-444-7270