

# **Sunroof Remote Control**

## **Service Manual**

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## **FCC NOTE**

: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.

**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**

**THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE**

**CAUSED UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH**

**MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.**

## 1. Outline and configuration of the equipment

### 1) Outline

RUNT-C310T uses wireless channel of low power of 315MHz frequency range, and are used for transmission of programmed data and address. This portable transmitter can be used for the operation of the sunroof of a car.

### 2) Configuration

The electric configuration of the RUNT-310T consists of RF module, encoder, and antennae. ABS material is used for the casing for better endurance to the external shock.

## 2. Specifications

### 1) Specifications

- A. Dimensions : 38(W) x 74(D) x 15(H) m/m
- B. Weight : 85g

### 2) Electrical specifications

- A. Frequency: 315MHz
- B. Output: 5mW max.
- C. Voltage rating: 12V DC
- D. Oscillation: X-TAL
- E. Modulation: AM
- F. Electric wave form: A2D
- G. Communication: One-way
- H. Operation temperature: -20°C ~ +70°C
- I. Antennae details

Amplifier/ Active circuit	n.a.	Directional characteristics	Non-directional
Antenna	Helical antenna	Polarization characteristics	Vertical
Antenna length	20 ±2 m/m	Connection	Fixing on PCB
Antenna gain	0dBi	Manufacture/Model	Keumyoung ENC / TX-311

### **3. Operation**

#### **1) Button and lamp**

##### **A. Two Buttons**

-OPEN: is used for opening the sunroof.

-CLOSE: is used for closing the sunroof.

B. Lamp: shows the status of the power and operation.

#### **2) Operation**

Push the button, then the lamp is lit and the operation is displayed. According to the function of the button, the coded data address is transmitted through the antenna.

### **4. Circuit**

#### **1) General description of the equipment**

CSR-1000T working at 311,125 MHz is a transmitter of 13 bit data consisting of 6 addresses and 6 data bit, 1 synchronization bit. Its electrical configuration consists of the Helical antenna, power control, amplifier, oscillator, and logic system. Signals transmitted from the logic system go through the oscillator, and are amplified at the amplifier and radiated from the Helical antenna.

#### **2) Detail description**

##### **A. Antenna**

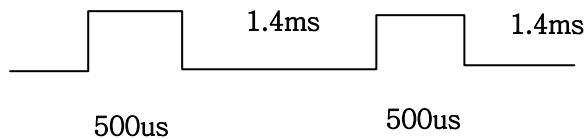
The Helical antenna, which is generally used for the low power radio equipments, is designed after consideration of the effects on the human body, and for the maximum gain.

##### **B. Encoder system**

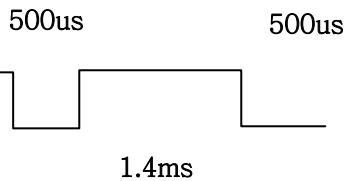
When the SW1, and SW2 buttons are pushed, address data which are programmed from the U1 are generated from the pin 6. The generated data are transported through the modulation system of R6, R7, Q9, R2.

- the definition of 1 bit (Tolerance  $\pm 15$ )

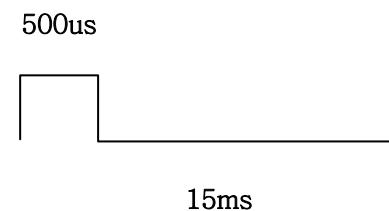
“0” bit



“1” bit



“SYNC” bit



### C. Oscillator circuit

The oscillator system consists of the IC U2, X1, C7, VC1, and the oscillation frequency of the X1 is the 32 multiple channel 9.720625 MHz.

### D. AF Amplifier

The signals tuned from the oscillator system are amplified by the amplifier in the IC U2, go through the impedance matching, transported to the antenna and transmitted.

## 5. User’s Manual’s contents

- Name (Model no.): AUNT-C310T
- Certification no.:
- Applicant’s name: Runt Co., Ltd.
- Manufacture date: March 2, 2006-03-2
- Manufacturer/Country: Runt Co., Ltd./Korea