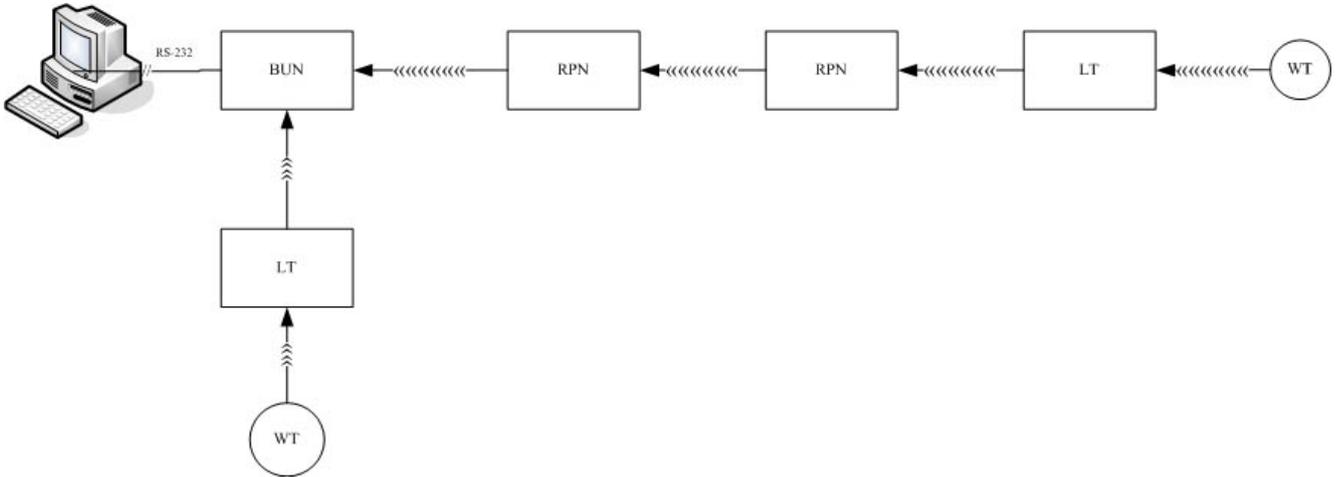


INSTALLATION GUIDE

26-APR.-2005

● SYSTEM CONFIGURATION



Locator (LT-49): It is used for receiving 433 MZH device signal and transmit it in 912 MHZ to Repeater (RPN-99) or Base Unit (BUN-152).

Repeater (RPN-99): It is used to relay whatever signal received with same Group number and System ID in 912 MHZ.

Base Unit (BUN-152): To receive the signals from LT-49 and RPN-99 in 912 MHZ.

● SYSTEM CAPABILITY:

- Each system can have maximum of 4096 LT-49 and 4096 RPN-99.
- Each Locator and Repeater has its own ID Code set by a 12-pin Dip Switch.
- The frequency hopping technology is adopted in the communication between Locator, Repeater and BUN-152.
- There are three groups of hopping frequency bands are available. Each group contains 25 channels:

GROUP 1: 906.26 ~ 914.90 MHZ, 25 channels

GROUP 2: 906.38 ~ 915.02 MHZ, 25 channels

GROUP 3: 906.50 ~ 915.14 MHZ, 25 channels

BUN-152

● Front View of BUN-152:



LED:

- When the Power is ON, the LED will stay on. It flashes momentarily when either RPN-99 or LT-49's signal has been received.

ANTENNA connector (TNC connector):

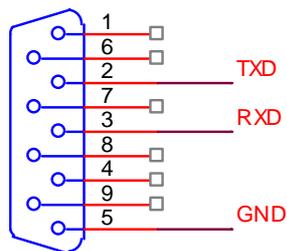
- It has two connectors for Antenna. During the installation, be sure to put both Antennas upwards and then screw it towards the TNC connector.

● Rear View:



DC JACK: For connecting to 12V 500mA Power Adaptor

RS-232 CONNECTOR: Connects the RS-232 cable to PC.



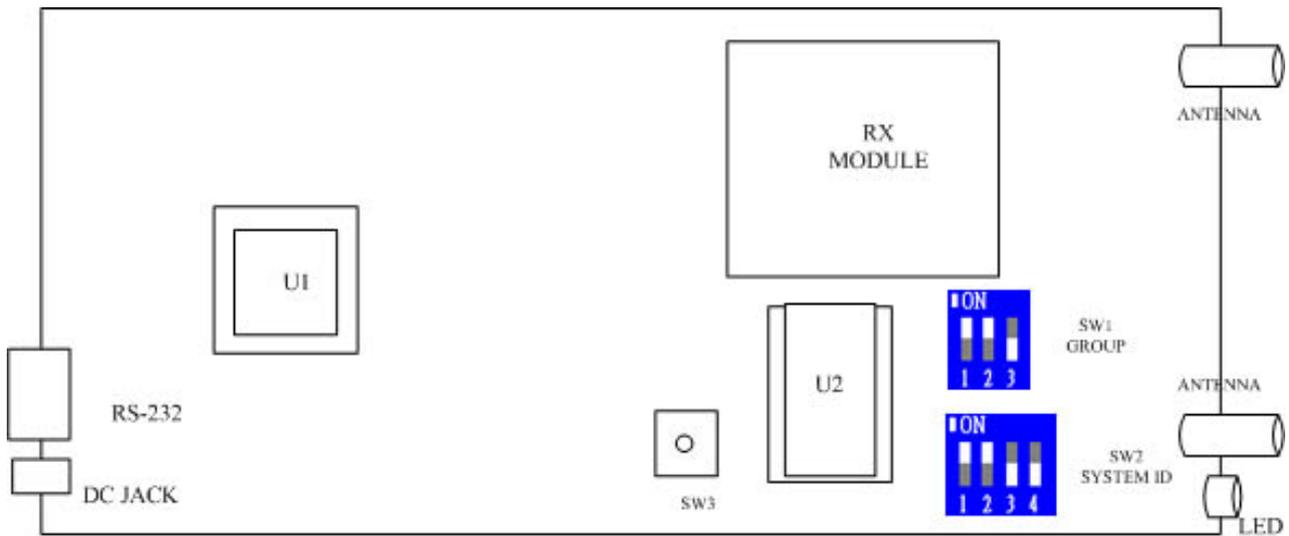
Pin2: TXD

Pin3: RXD

Pin5: GOUND

Pin 1,4,5,6,7,8,9 : No Connection.

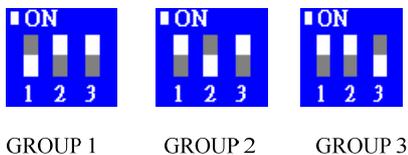
● Interior View:



SW1: It is used for setting the number of Groups. There are 3 Groups for use with its own frequency band.

SW1: The SW1 switch block contains 3 dip switches. Slide the SW1 up (On position) with SW2 & SW3 down (Off position), to select Group1 frequency band. Likewise, slide SW2 or SW3 up (On) with others, down (Off), Group2 or Group3 is selected accordingly.

SW1	SW2	SW3	Group
On	Off	Off	Group1
Off	On	Off	Group2
Off	Off	On	Group3



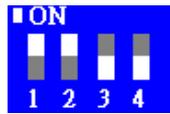
GROUP 1 frequency: 906.26 ~ 914.90 MHz, 25 channels with spacing of 360KHZ between each channel.

GROUP 2 frequency: 906.38 ~ 915.02 MHz, with spacing of 360KHZ between each channel.

GROUP 3 frequency: 906.50 ~ 915.14 MHz, with spacing of 360KHZ between each channel.

SW2: For setting the system ID code, there are total of 16 SYSTEM ID combinations for use from 0 to 15.

<EXAMPLE>



System ID = 3

<NOTE>

- ☞ Remember to set BUN-152's "Group" and "System ID" identical with RPN-99 and LT-49's setting in order for them to communicate between each other.

RPN-99

● Front View of RPN-99:

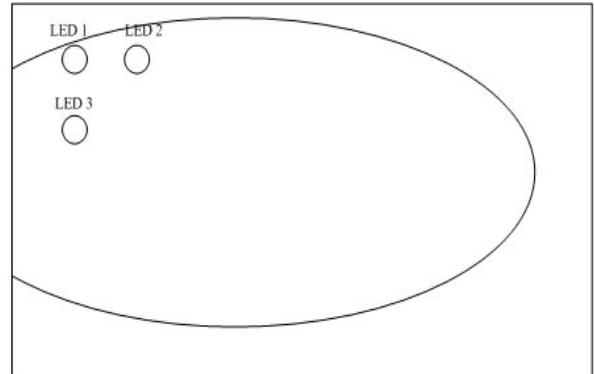
LED 1: It is a dual-color LED, Green and Red.

When the AC Power is ON, the Green LED will stay on. If no AC Power is connected and only Battery is used for main power source, then, the Green LED will flash continuously.

If the Low Battery is detected, the Red LED will stay on to warn the user for changing Power source.

LED 2: The Red LED will flash once when the RPN-99 receives a signal from other RPN-99 or LT-49.

LED 3: The Red LED will flash once when the RPN-99 transmits its signal.



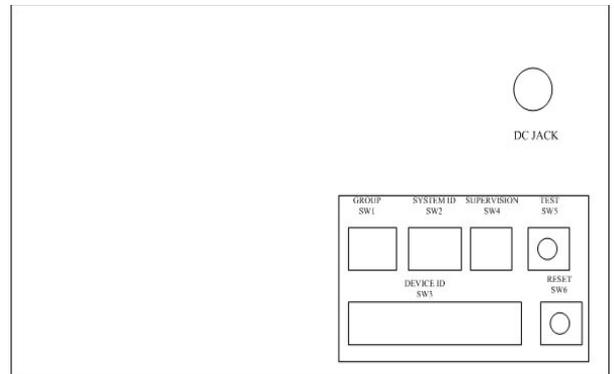
● Rear View (with Lid removed):

DC JACK: For connecting DC 12V 800 mA Power Adaptor.

SW1 : For setting the Group number, please refer to the section "BUN-152". Make sure each unit in a system should have the same Group number.

SW2 : For setting the system ID code, please refer to the section "BUN-152". Make sure each unit in a system should have the same system ID.

SW 3 : A 12-pin dip switch block to set the "Unit ID Number".



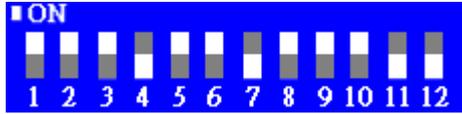
Each RPN-99 should be assigned an unique ID Number; so that the BUN-152 can distinguish the signal received is from which RPN-99.

There are a total of $2^{12} = 4096$ combinations for a maximum of 4096 RPN-99's to be used in one system.

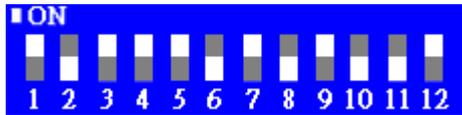
<EXAMPLE>

The following examples show you how the “Unit ID” is set (B represents for Binary, H for Hex and the last numbers represents for Decimal):

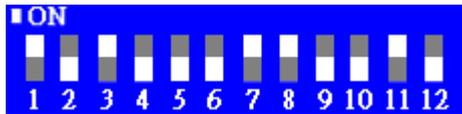
UP=1 , DOWN =0



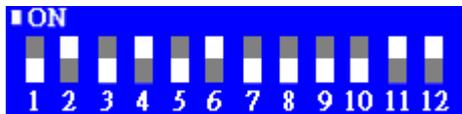
UNIT ID=000100100011B=0123H = 291



UNIT ID=010001010110B=0456H = 1110



UNIT ID=010111001101B=05CDH = 1485



UNIT ID=101010111100B=0ABCH = 2748

SW4: A 3-pin dip switch block to set the “supervision period”. 8 options are available as shown in table below:

SW1	SW2	SW3	Supervision Period
Off	Off	Off	Disable
Off	Off	On	1 hour
Off	On	Off	2 hours
Off	On	On	3 hours
On	Off	Off	4 hours
On	Off	On	8 hours
On	On	Off	10 hours
On	On	On	12 hours

<EXAMPLE>

If a 2-hour supervision period is set (SW1-off, SW2-On, SW3-off), the RPN-99 will send the “supervision” signal every 2 hours.

SW 5 : TEST button.

When it is pressed, RPN-99 will automatically sends out a Test signal. It can be used for Range Test.

SW 6: RESET button.

Pressing the button, the RPN-99 will do a power-on Reset and send a “power-on check-in” signal.

● **Power Supply**

- A DC 12V, 800mA (minimum) power adaptor is used to power the RPN-99.
- In addition, there is a 1,600mAh x 8 Ni-mh rechargeable battery is used as a back-up power.
- When the battery is fully charged, it can provide back-up time of 15 hours. It takes approximately 36 hours to fully charge the battery.

● **Mounting the RPN-99**

- The RPN-99 comes with a mounting bracket.
- To mount the RPN-99,
- Using the two holes in the mounting bracket as a template, drill two holes on the place of desired installation and insert the plastic dowels into these holes.
- Screw the bracket onto the site of installation, through the dowels.
- Then hang the RPN-99 on the bracket.

● **Tamper protection**

- The RPN-99 also features “Tamper protection” after hanging on the mounting bracket, any attempt to remove it from the mounting bracket will trigger the tamper switch and the RPN-99 will transmit the “Tamper active” signal accordingly.

● **Queue Buffer**

- The RPN-99 has a Queue Buffer to store up to 12 signals to be transmitted.
- During transmission, the RPN-99 takes the data from the Queue Buffer one-by-one following First-in-First-out algorithm.
- If a signal received already exists in the Queue Buffer, this signal will be ignored.

- When the Queue Buffer is full, any signal received will be ignored.
- The data being transmitted will be put into another “Time-out Buffer” and a 10-sec timer will start counting. If a signal received is already in the “Time-out Buffer”, this signal will also be ignored.

● **Changing the Dip Switch setting**

- The RPN-99 reads the Dip Switch setting only during power-on. Therefore, be sure to set the appropriate “Group Number”, “System ID” & “Unit ID” before power it on.
- If it is necessary to change the Dip Switch setting after power on, remember to press the “Reset” button to do the power on Reset, otherwise the change will be ignored.

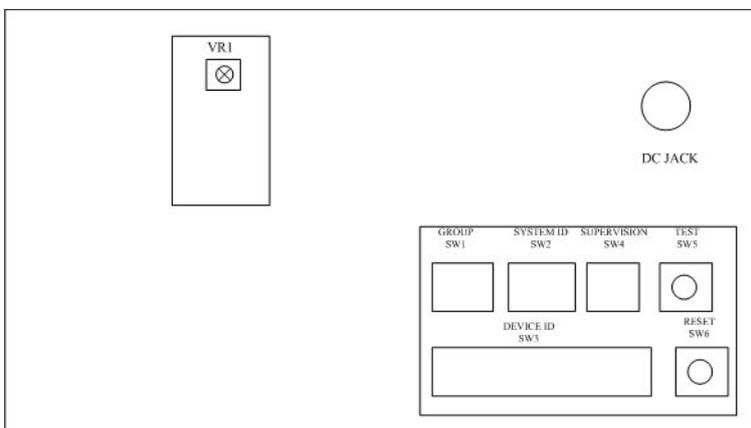
LT-49

The LT-49 shares all the functions of RPN-99 with an added feature of “Receiver Range Adjustment” to allow you to adjust the 433MHZ Receiver sensitivity to an appropriate level to suit the variant application to locate the 433MHZ transmitter Device.

- **Receiver Range Adjustment**

In the middle of rear side of LT-49, you can see a rectangle compartment cover. Open the cover, you will find a “UR” (variable Resistor) inside.

- **Rear View (with Lid removed):**



Turn the “UR” counter-clockwise will decrease the Receiver sensitivity and hence shorten the range.

Turn the “UR” clockwise will increase the Receiver sensitivity and hence lengthen the range.

Installation Note

- No learning process is needed at all. Just plug the power, the system is ready to use.
- Please make sure that the distance between BUN-152, RPN-99 and LT-49 is greater than 5 meters. If the distance is not long enough, the signal reception may interfere with each other.
- Since BUN-152, RPN-99 and LT-49 have super long communication capability, it is possible that the coverage of each unit may be overlapped. The BUN-152 may receive duplicated signal send from different RPN-99's. Therefore, the PC software should have the capability to filter out the duplicated signals.
- After the RPN-99 transmit the received signal, if it received the same signal within 10 seconds, the second signal will be ignored.
- If the LED 2 (RX LED) of RPN-99 flashes without the LED 3 (TX LED) flashing, it means
 - a) The signal received is a duplicated signal in 10 seconds time-windows.
 - b) The system ID code is incorrect.
- To have the best receiving performance on the BUN-152, both antennas should be installed upwards.

Specification Radio Frequency

1) BUN-152/RPN-99/LT-49 (900M Channels):

Frequency Hopping: Each group has a total of 25 channels.

There are 3 groups in total. Its frequency is as followed:

Group1: 906.26 ~ 914.90MHZ

Group2: 906.38 ~ 915.02MHZ

Group3: 906.50 ~ 915.14MHZ

Modulation: FM

Frequency deviation: 11.7KHZ

Data speed: 9.6K

Sensitivity: -102dBm

Band Width: 20KHZ

Channel separation: 360KHZ

Output Power: 28dBm

Frequency Tolerance: +/- 3ppm

Antenna: Dual antenna for receiver to avoid signal fading and dark spot separate antenna for transmitter.

Communication method: full Duplex, Transmission and receiving are able to be carried on simultaneously.

Range: Over 3 KM in open space.

2) 433.92MHZ Channel

Frequency: 433.92MHZ +/- 100KHZ

Modulation: AM (100%)

Sensitivity: -117dBm

Distance of Receiving range: 6 ~ 100 Meter (adjustable)

Communication method: Full duplex.

Federal Communication Commission Interference Statement

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 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.

FCC Caution: To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.