

# ***Wireless Parking Guidance System Manual***

**The China brand enterprise of top-selling parking guidance systems**

***KEYTOP Parking INC.***

# Catalogue

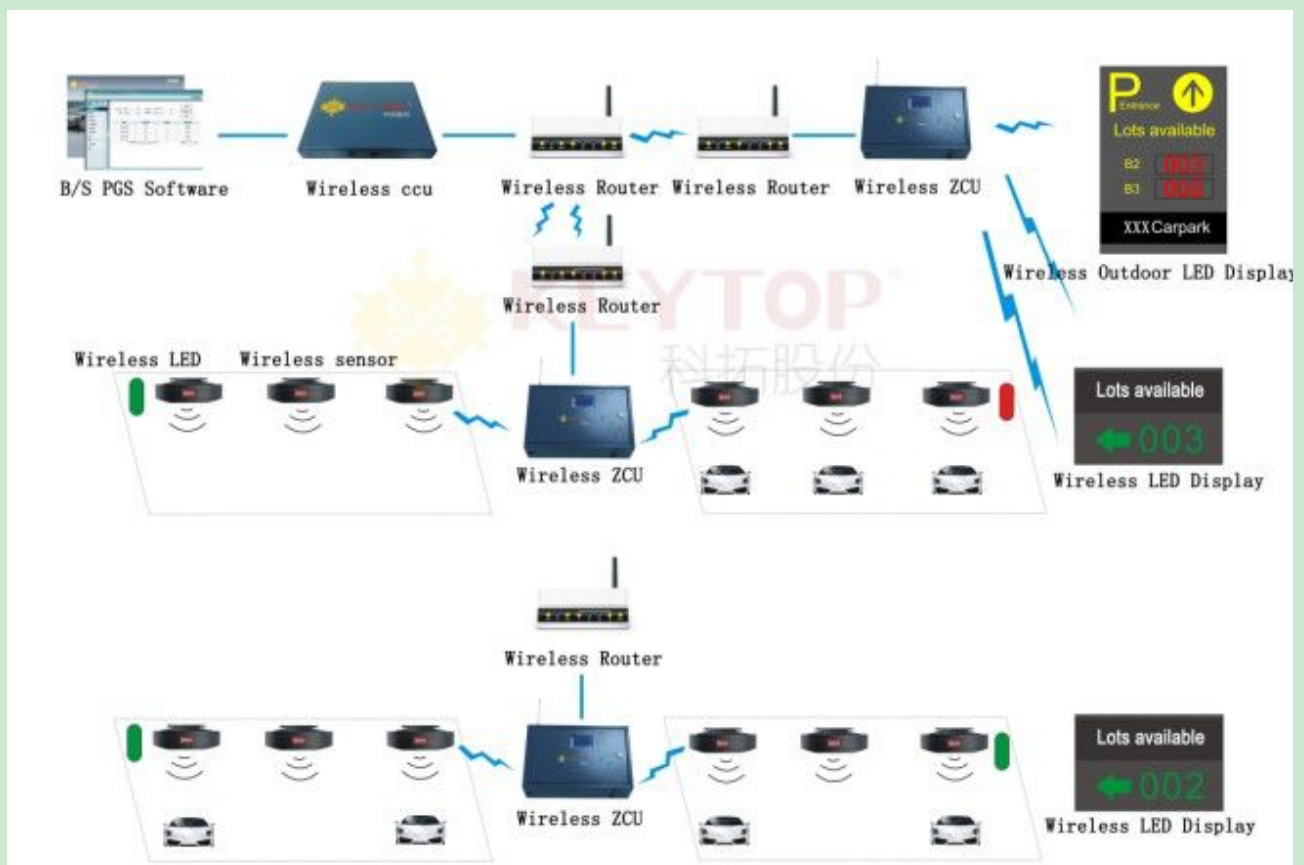
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## 1 Principle of Wireless Parking Guidance System

Wireless ultrasonic detector detects the status of parking lot, then sends real-time parking lot information to the corresponding wireless detector ZCUs by wireless RF signal. Through WIFI, wireless ZCU sends the collected parking information to wireless routers connected to CCU. After collecting information of the whole carport, CCU updates parking lot data in time. Wireless routers send these data to corresponding LED displays by LED display ZCU. In this way, wireless parking guidance system realizes the function of guiding vehicles to empty parking spaces.

Remark: it's better to use separated ZCU for the LED display to ensure the system's working stabilities, so the system has detector ZCU and display ZCU.

## 2 Diagram of Wireless Parking Guidance System



### 3 Devices Instructions

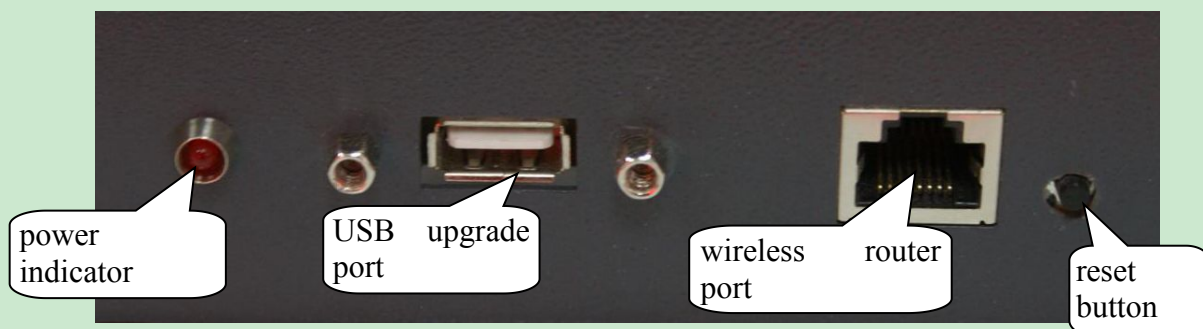
#### 3.1 Central Control Unit(CCU)



##### 3.1.1 Parameters of CCU

supply voltage:	110V/220V AC	working voltage:	5VDC
power dissipation:	5.8W	communication way:	TCP/IP
operating system:	WINDOWS XP-E	size:	28.5*22*5CM

##### 3.1.2 Introduction of CCU Port



- **USB upgrade port:** insert upgrading U disk to USB port, get power on to CCU, then CCU procedure will upgrade automatically.
- **Wireless router port:** CCU is connected to wireless router. To visit CCU by computer, please

link network cable to wireless router's LAN port. When only one node controller is connected and communication distance less than 100 meters, wireless router port can directly communicate to CCU port.

### 3.1.3 Configuration of CCU

To make LED display show correct information, it needs to configure the CCU. Otherwise, LED display will only show initial content of powering-on(000+arrow).

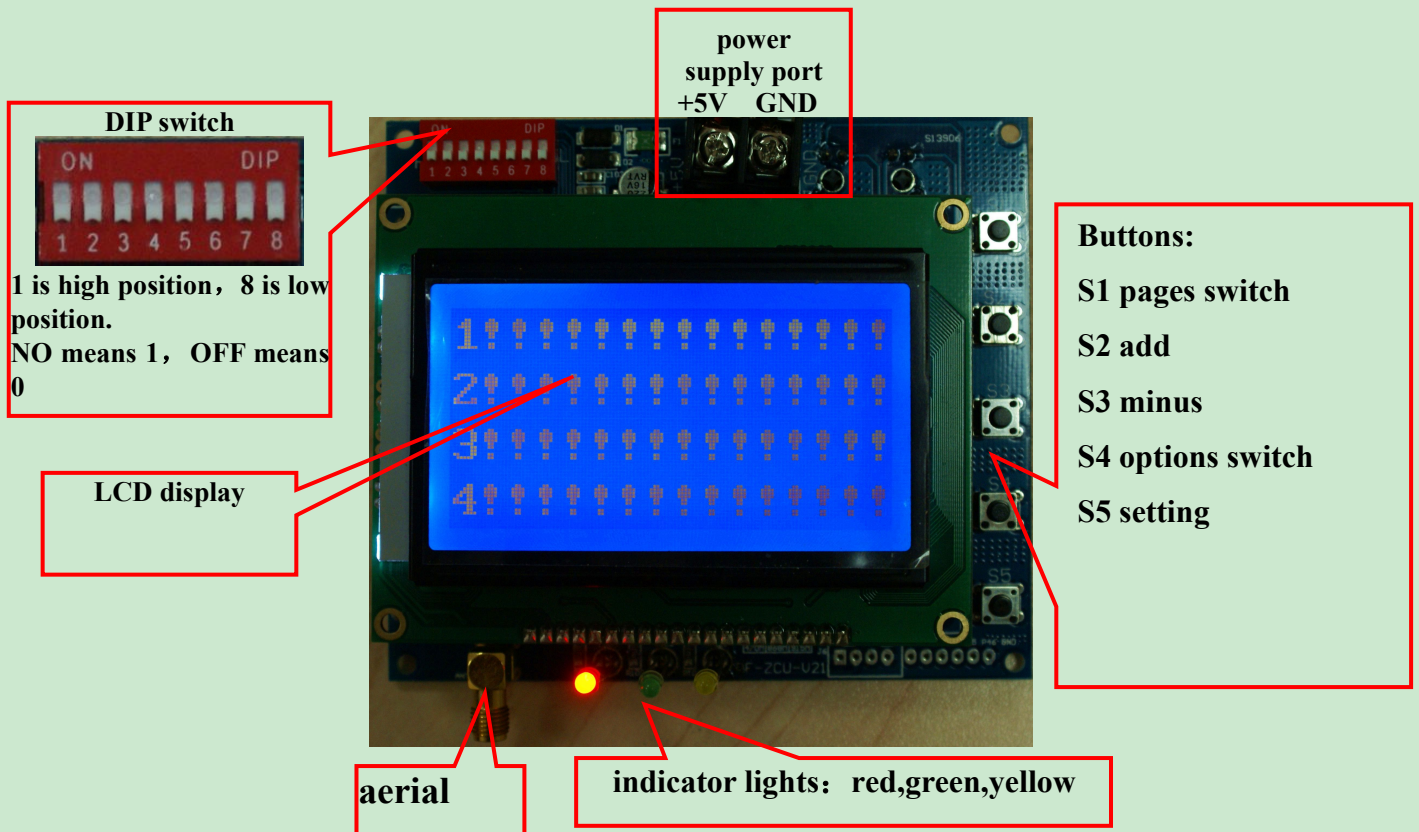
## 3.2 Wireless Detector ZCU



### 3.2.1 Parameters of Wireless ZCU

supply voltage:	110V/220V AC	working voltage:	5V DC
power dissipation:	3W	working temperature:	-40~80℃
communication way:	1. communicate with wireless detector by 915MHz, transmitting power: 0dBm, covering range: 30m radius. Can be linked with 120 detector at most. 2. communicate with CCU by TCP/IP, can be linked by network cable or WIFI.		
size:	265mm*180mm*70mm(length*width*height)		

### 3.2.2 Introduction of ZCU Control Panel



**ZCU Control Panel**

- **DIP Switch (total 8 jumpers, 1 is high, 8 is low)**

Switch digits (pic.b)	1	2	3	4	5	6	7	8
Switch value (ON-effective)	128	64	32	16	8	4	2	1

For **example**, set ZCU address 5.

5=4+1, set serial No. 6 and No.8 to ON, address setting finished, ZCU address will be 5 after repowering on.

- **supply power port:** VCC---+5V; GND---ground;
- **LED indicator:**
  - **red:** power supply lamp;
  - **green:** detector's communication lamp,when detector sends data to detector ZCU,the green lamp will flash.
  - **yellow :** CCU communication lamp.The lamp doesn't light up when failing to connect CCU.In the process of connecting CCU,lamp will flash one time each 2 seconds.The lamp stays lighting up when successfully linked to CCU.When CCU sends data to ZCU,yellow lamp will flash quickly.
- **Buttons' functions:**

ZCU has 5 buttons,from up to down is:

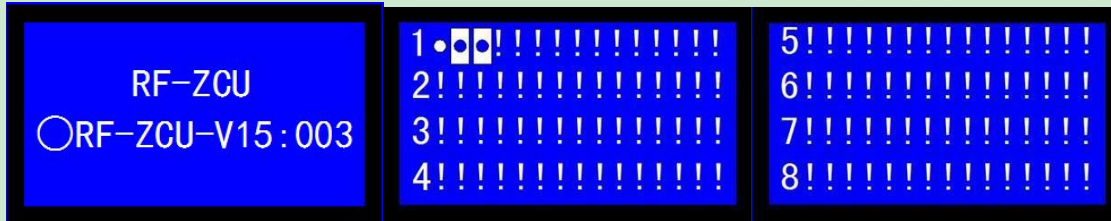
(S1)pages switch button,(S2)add button,(S3)minus button,(S4)options switch button,(S5)setting button

  - **S1-pages switch button :** In non-setting condition,press this button can switch pages of different parking status.In setting condition,press this button to enter submenu of cursor“<”.
  - **S2-add button :** In non-setting condition,press this button can inquire network port's configuration.In setting condition,press this button to act PLUS operation of corresponding numbers of cursor.
  - **S3-minus button :** In setting condition,press this button to act MINUS operation of corresponding numbers of cursor.
  - **S4-options switch button :** In setting condition,long press this button can swift cursor to different setting options.
  - **S5-setting button :** In non-setting condition,long press this button until yellow lamp and green lamp flash 3 times at the same time,it means entering the setting condition.In setting process,press this button can go back to main setting menu.After setting,long press this button until yellow and green lamps flash 3 times at the same time,which means exiting setting condition.

### 3.2.3 Setting Instruction

1.When powering on,press button S1 can switch 3 interfaces as showed in Pic.1-2:





(a) device version&address (b) 1~60 detector's status (c) 61~120 detector's status

Pic. 1-2

(a)"**Detector ZCU**"means name of device,"**RF-ZCU-V04**"means version of software,"**003**"means the address of detector ZCU is 3;(b)(c)means the ZCU is connected with 3 detectors,"**●**" means parking space under address 1 is vacant,"**■**"means parking space under address 2 、 3 are occupied,addresses 4--120 "**!**" means non-exist or breakdown.

2. Press button S2:enter inquire interface of network port setting,as showed in Pic.1-3



Pic.1-3 network port setting

**First line:**ZCU--PORT:9999, means port No. of ZCU is 9999;

**Second line:**IP:192.168.7.3, means IP address of node is 192.168.7.3, IP address namely is ZCU address and doesn't need to be set up manually;

**Third line:**CCU--PORT: 7777, means port No. Of CCU is 7777;

**Fourth line:**IP:192.168.7.253, means CCU address is 192.168.7.253;

3.Long press button S5: enter setting interface as showed in Pic.1-4



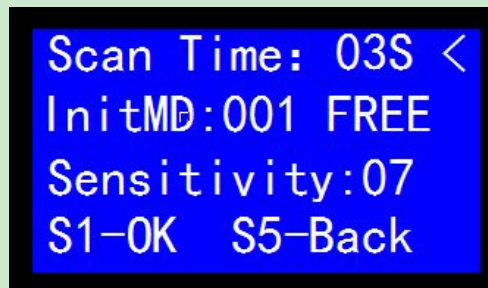


Pic.1-4 main menu

- **UD setting** Set parameters of ultrasonic detector
- **LED indicator setting** Set parameters of LED indicator
- **Network port setting** Set parameters of network port

Press S4 to switch cursor “<” to options needed to be revised, then press S1 to enter corresponding options.

- **Submenu setting of UD, as showed in Pic.1-5:**



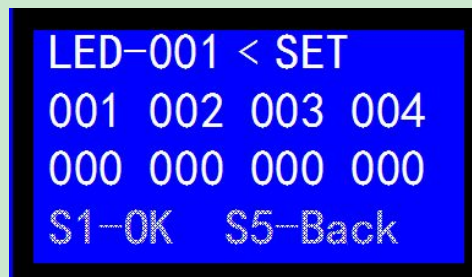
Pic.1-5 setting menu of UD

**Scan time:** set interval time for detector's scanning, effective setting range is 03s~60s.

Press button S2 to add value, press button S3 to minus value, press S1 to send setting commands of detector's scan time (10 minutes needed for resending all detectors' commands to ZCU), press button S5 to go back previous menu.

**Initialization/flexibility test/filter times:** only available with wireless magnetic sensor

- **Submenu setting of LED indicator as showed in Pic.1-6**



### Pic.1-6 LED indicator VS Ultrasonic Detector

LED-000 SET      choose the address of LED indicator to be set

000 000 000 000

000 000 000 000      one wireless LED indicator can set 8 detectors' addresses at most

When UD detects parking spaces are all occupied, then wireless LED indicator will turn RED.

When UD detects more than 1 empty parking space, wireless LED indicator will turn GREEN.

Press button S4 to switch options, button S2 to add values, single click will add 1 value, long press S2 will instantly add values; press button S3 to minus value, single click minus 1 value, long press will instantly minus values; after setting, press button S1 to send LED indicator's setting information, press S5 to go back previous menu.

#### ➤ Submenu setting of network port as showed in Pic.1-7:



Pic.1-7 setting interface of network port

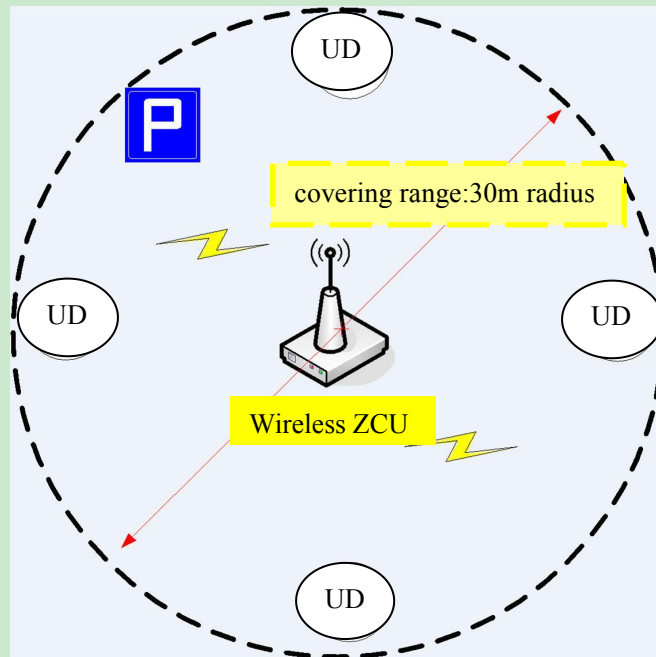
- **Getway(Network segment): 001**      network segment connected with node is 001;
- **CCU address: 235**      CCU address connected with node is 235;
- **CCU port: 7766**      CCU port connected with node is 7766;

Press button S4 to switch options, button S2 to add values, single click will add 1 value, long press S2 will instantly add values; press button S3 to minus value, single click minus 1 value, long press will instantly minus values; after setting, press button S1 to verify network port's setting information, press S5 to go back previous menu. Setting finished, repower on ZCU to make port setting work.

Long press S5 to exit setting condition, go back to interface of detector's status.

### 3.2.4 Installation of Wireless Detector ZCU

As showed in following digram,covering range of wireless ZCU is 30 meters.Thus installed position of ZCU should be chosen according to parking spaces distribution.Aerial should be fasten out of ZCU box at the height around 2.5 meters,without any large obstacles around and far away from magnetic and iron objects.



### 3.3 Wireless Display ZCU



#### 3.3.1 Parameters of Wireless Display ZCU

supply voltage:	110V/220V AC	working voltage:	5V DC
power dissipation:	3W	working temperature:	-40~80℃
communication way:	communicate with wireless LED display through 915MHz, transmitting power:0dBm, covering range:200m radius in vast space; communicate with CCU by TCP/IP, can linked by network cable or WIFI.		
size:	265mm*180mm*70mm (length*width*height)		

### 3.3.2 Address Setting of Wireless Display ZCU

- **DIP switch** (totally 8 jumpers, 1 is high, 8 is low) :used for setting address of ZCU.ON means 1,OFF means 0.Eg.:address of 00000011 is 3 (remarks: address of wireless display ZCU shouldn't be repeated with that of wireless detector ZCU;
- **Power supply port:** VCC: +5V; GND--to ground;
  - **LED indicator :** red lamp is power supply indicator;green lamp is commands indicator of sending display,when transmit display's commands,it will flash one time;yellow lamp is CCU communication lamp.The lamp doesn't light up when failing to connect CCU.In the process of connecting CCU,lamp will flash one time each 2 seconds.The lamp stays lighting up when successfully linked to CCU.When CCU sends data to nodes,yellow lamp will flash quickly.
- **Buttons' functions:**

ZCU has 5 buttons,form up to down is:

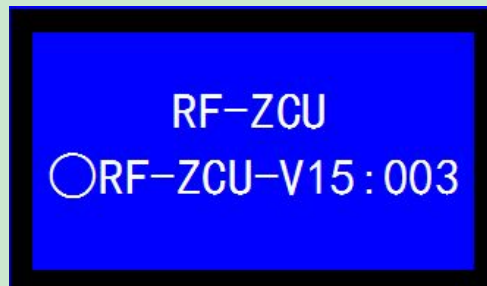
(S1)pages switch button,(S2)add button,(S3)minus button,(S4)options switch button,(S5)setting button

  - **S1-pages switch button :** In non-setting condition,press this button can switch pages of different parking status.In setting condition,press this button to enter submenu of cursor“<”.
  - **S2-add button :** In non-setting condition,press this button can inquire network port's configuration.In setting condition,press this button to act PLUS operation of corresponding numbers of cursor.
  - **S3-minus button :** In setting condition,press this button to act MINUS operation of corresponding numbers of cursor.

- **S4-options switch button:** In setting condition,long press this button can swift cursor to different setting options.
- **S5-setting button:** In non-setting condition,long press this button until yellow lamp and green lamp flash 3 times at the same time,it means entering the setting condition.In setting process,press this button can go back to main setting menu.After setting,long press this button until yellow and green lamps flash 3 times at the same time,which means exiting setting condition.

### 3.3.3 Setting Instruction

1. When powering on,interface appears as Pic.1-9



Pic.1-9 device version&address

“wireless display ZCU”means name of device; ‘RF-ZCU-V15’ in the line of “○RF-ZCU-V15:003”means software version, ‘003’means the address of wireless node is 3;

2. Press button S2: enter inquire interface of network port setting,as showed in Pic.1-10:



Pic.1-10 inquire interface of network port setting

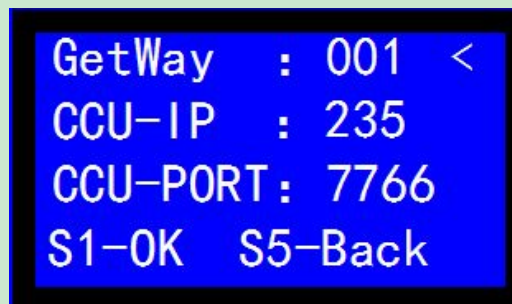
First line, ZCU--PORT:9999, means port No.of node is 9999; second line, IP:192.168.7.3, means IP address of node192.168.7.3, the IP address namely is node address,which needn't set up manually; third line, CCU--PORT: 7777, means CCU port No. is 7777; fourth line, IP:192.168.7.253, means IP address of CCU is 192.168.7.253;

3. Long press button S5: enter setting interface,as showed in Pic.1-11:



Pic.1-11 setting interface

press button S1:enter setting of network port and submenu setting of network port ,as showed in Pic.1-12



Pic.1-12 setting interface of network port

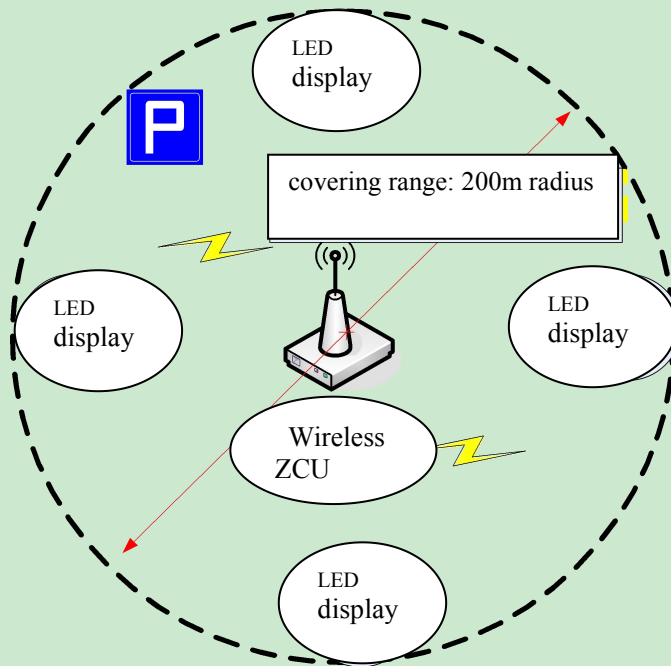
- **GetWay(Network segment): 001** network segment connected with node is 001;
- **CCU address: 235** CCU address connected with node is 235;
- **CCU port: 7766** CCU port connected with node is 7766;

Press button S4 to switch options,button S2 to add values,single click will add 1 value,long press S2 will instantly add values;press button S3 to minus value,single click minus 1 value,long press will instantly minus values; after setting,press button S1 to verify network port's setting information,press S5 to go back previous menu.Setting finished,repower on nodes to make port setting work.

Long press S5 to exit setting condition,go back to interface of detector's status.

### 3.3.4 Installation of Wireless Display ZCU

As showed in following digram,covering range of wireless display node controller is 200 meters.Thus installed position of ZCU should be chosen according to wireless LED displays' distribution.Aerial should be fasten out of node controller box at the height around 2.5 meters,without any large obstacles around and far away from magnetic and iron objects.



### 3.4 Wireless Ultrasonic Detector

#### 3.4.1 Appearance of Wireless Ultrasonic Detector

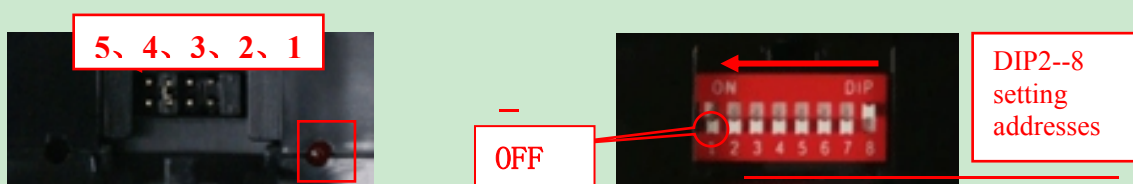


#### 3.4.2 Parameters of Wireless Ultrasonic Detector



supply voltage:	1.5V	average power dissipation:	90uW
power supply shelf:	> 5 years	working current:	60uA
power dissipation:	0dBm	communicate distance:	about 30m
shell material:	ABS(anti-flaming,anti-corrosion)	communication way:	915MHz
maximum detecting distance:	4m	working temperature:	-40℃~+80℃
size: 100mm*100mm			
lithium iron column battery :	FR6/AA	power supply mode:	double battery parallel operation
rated capacity of single battery:	2900mAh	rated voltage :	1.5V
working temperature:	-40℃~ +80℃	annual discharge rate:	<1%
storage time:	>10 years	battery size:	diameter:14mm;height:50mm

### 3.4.3 Address and Detecting Distance of Wireless Ultrasonic Detector



(a) jumper cap

(b) DIP switch

1~5 jumper caps near red LED indicator is named as 1, from right to left in Pic.a are: 1~5

No.1: power switch, jumper cap must be put on when using.

No.2: test usage. Put on jumper cap, when UD detects parking space is occupied, LED indicator will light up. Otherwise, LED indicator will darken.

No.3~5: setting of detecting distance.: Put on No.3 jumper cap, then detecting distance is set up for 0.5m; put on No.4 jumper cap, then detecting distance is set up for 1m; put on No.5 jumper cap, then detecting distance is set up for 2m. Pic.(a) setting for 1m. Address setting of UD is divided into two steps as follows:

### 3.4.4 Settings of Nodes Under Ultrasonic Detectors

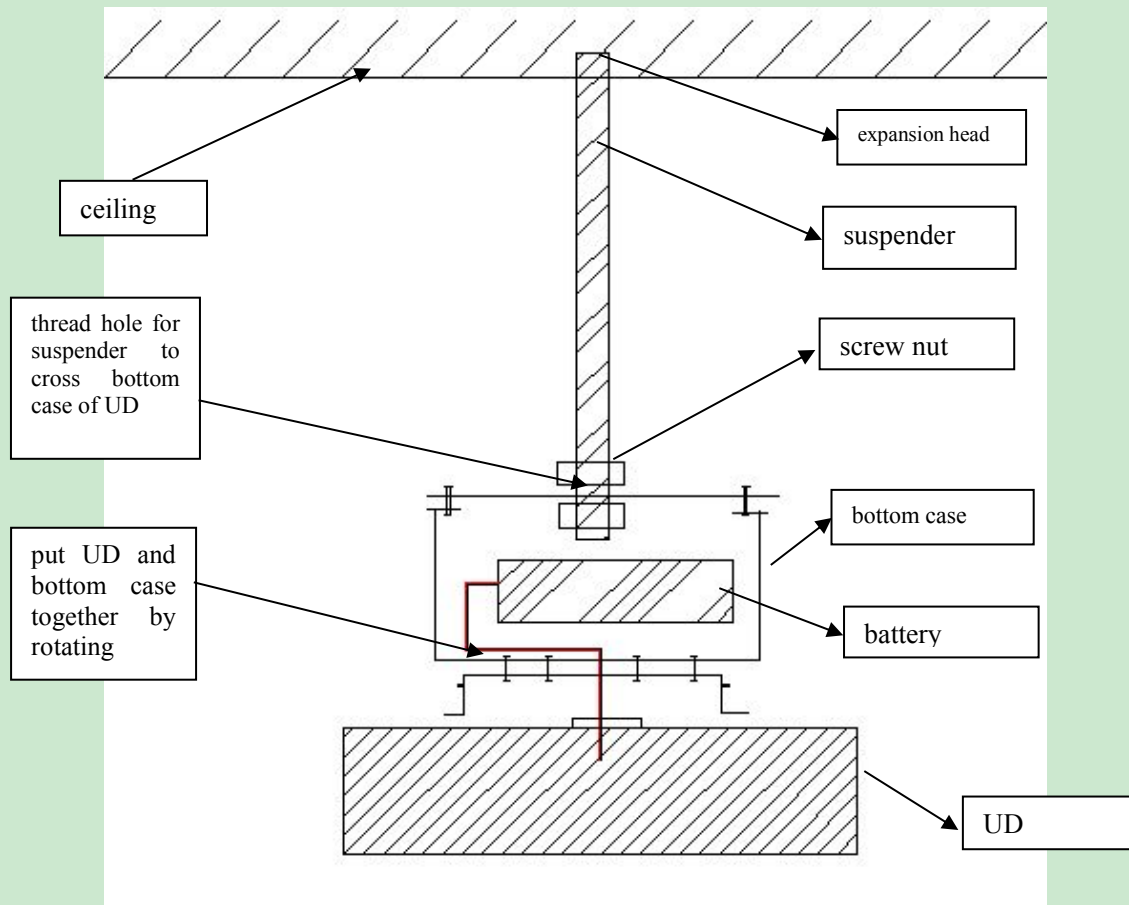
Firstly fetch jumper caps of No.3、4、5, then address set for DIP switch namely is node address, power on detector for 2 seconds, and put address into detector.

### 3.4.5 Address Settings of Detectors (Address showed on ZCU)

Firstly cut power out of detectors, set addresses according to actual installation heights, thus address of DIP switch namely is address of detectors, then power on detectors to work.

### 3.4.6 Installation of Wireless Ultrasonic Detector

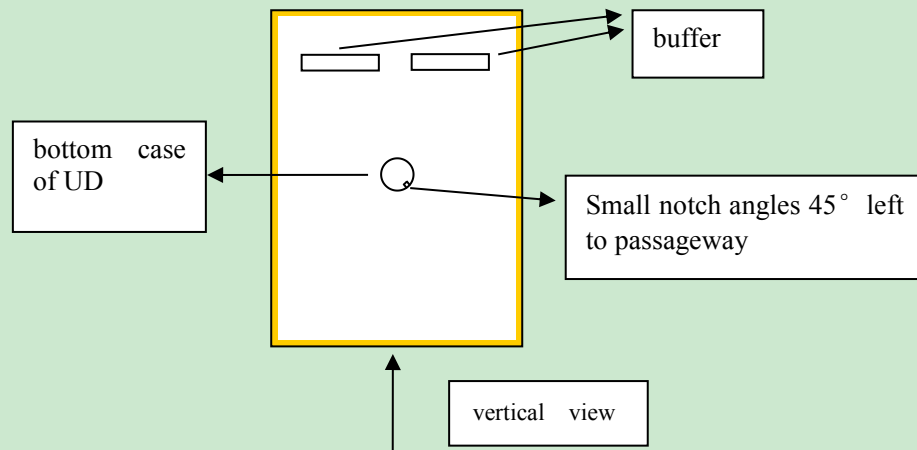




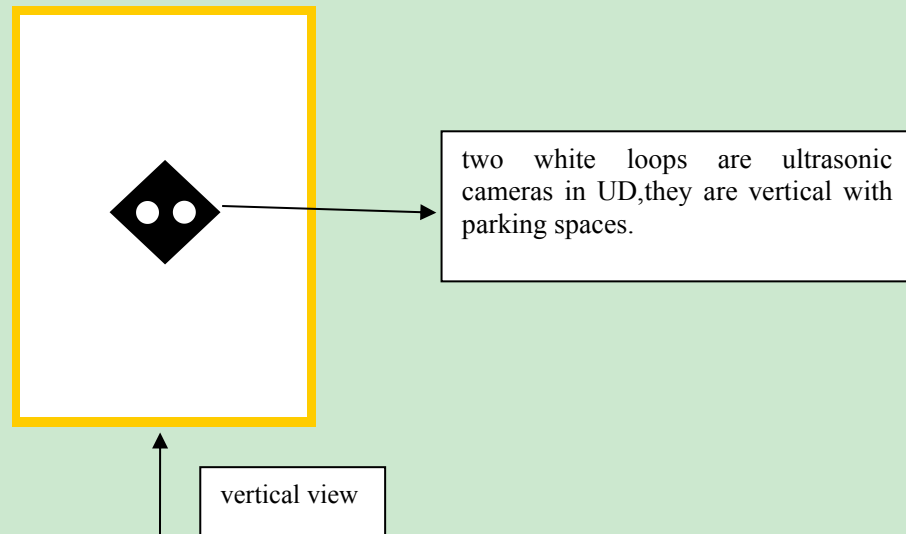
**Suspender installation:** diameter of suspender is 0.8cm,length is set according to the height of UD from ground.Therefore,UD's height will be around 2m,2.5m,3m,3.5m,etc.Installation height of 2.5m is recommended.

● **Installation steps:**

- Suspender installation:fasten suspender onto ceiling by expansion head,right in the middle of parking space.
- Installation of UD's bottom case: fasten bottom case onto suspender by screw nut,make sure the direction of bottom case is as showed below,



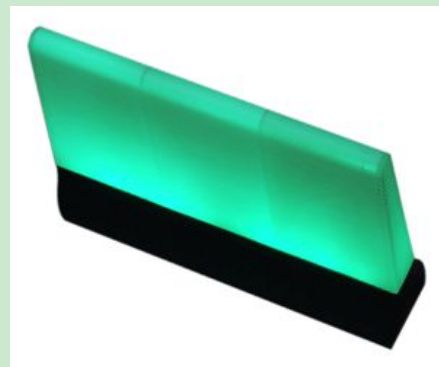
- UD installation, press big hole of detector's groove to bottom case and rotate them in anticlockwise direction. Fasten detector to bottom case and ensure that two cameras in detector are vertical with parking space after installation, as showed below,



### 3.5 Wireless LED Indicator



(c) RED-occupied

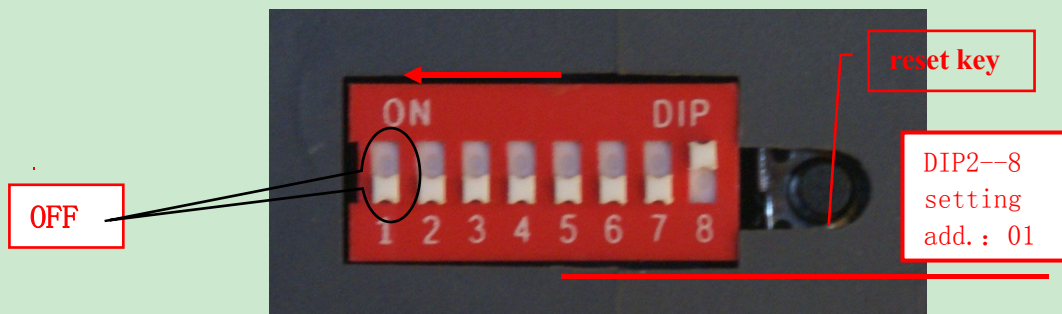


(d) GREEN-empty

#### 3.5.1 Parameters of Wireless LED Indicator

supply voltage:	110V/220V AC	transmitting power:	0dBm
power dissipation:	1W	working temperature:	-40~80℃
communication way:	1.communicate with Wireless Zone Control Unit(Wireless ZCU) by 915MHz,showing parking status by color changes of RED and GREEN.Powering on,its color is RED. 2.communication distance:30m		
size:	20mm*4.5mm*17mm(length*width*height)		

### 3.5.2 Address Setting of LED Indicator



(e)DIP switch of LED indicator

Set DIP -1 to ON,DIP-2~8 for setting addresses of nodes connected with LED indicator.Power on LED indicator,green and red lights will flash alternatively and light off,it means address setting of LED indicator is finished.

Under the condition of constant powering,set DIP-1 to OFF.Press ‘reset’key after setting addresses of DIP-2~8.LED indicator will light off and turn to RED,which means the address namely is that of LED indicator.The address of Pic.(e) is 02.

Due to the traits of mechanical parking spaces and installation method of detector,sometimes the quantities of LED indicator and detectors do not always stay the same.For example,one LED indictor is equipped with 6 detectors,LED indicator will turn RED as long as 5 detectors have detected the parking spaces are occupied.Under such conditions,the quantity of LED indicator will be 1 less than that of detector.Setting in this way:

DIP address setting: 0x79、0x7a、0x7b、0x7c、0x7d、0x7e、0x7f

Corresponding deduction value: 1、2、3、4、5、6、0

Press ‘reset’key,times that green and red indicators lights up together namely is the deduction value.

### 3.6 Wireless LED Display



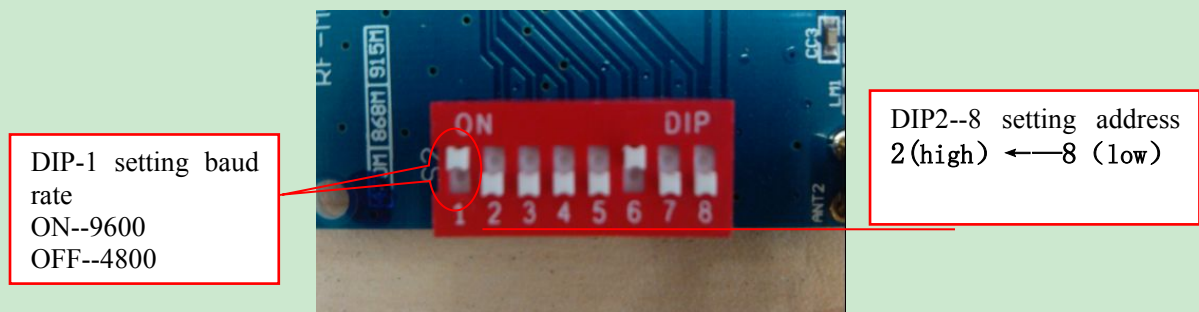
### 3.6.1 Parameters of Wireless LED Display

supply voltage:	110V/220V AC	working voltage:	5VDC
power dissipation:	related to the size of LED display	communication way:	915MHz
working temperature:	-40℃~+80℃	size:	customized

### 3.6.2 Address Setting of Wireless Transmitting Module

DIP switch(totally 8 jumpers,1 is high) is to set address of wireless display nodes.ON is 1,OFF is 0.Set DIP1 to ON,baud rate is 9600,set to OFF,baud rate is 4800.DIP-2~8 are addresses.

Eg.:set wireless display node's address be 04,baud rate 9600,then DIP is 10000100,as showed below,

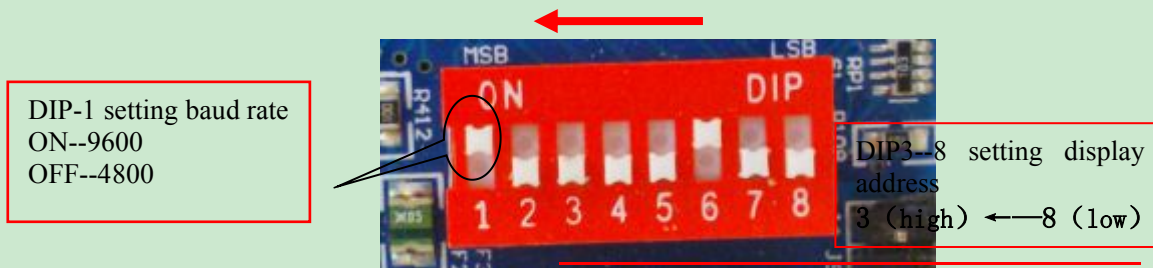


### 3.6.3 Address Setting of LED Display Controller Card

DIP switch(totally 8 jumpers,1 is high) is to set address of wireless display.ON is 1,OFF is 0.Set DIP1 to ON,baud rate is 9600,set to OFF,baud rate is 4800.DIP2 doesn't applied.Others are addresses.See attachment 9-1.

For example,to set display address be 04,baud rate 9600,then DIP will be 10000100,as showed below,



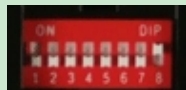


**REMARKS:** baud rate of display controller card should be conformed to that of wireless transmitting module.

## Addendum 1-1 Ultrasonic Detector Address Settings

DIP switch of ultrasonic detector has 8 ranks, one is the highest rank, 8 is the lowest rank.

“ON” means “1”, the corresponding mark in below diagram is “●”; “OFF” means “0” the corresponding mark in below diagram is “○”.

Detector Addr.		DIP Switch 2 (high) ←—8 (low)							Detector Addr.								
Decimal System	Hexadecimal	2	3	4	5	6	7	8	Decimal System	Hexadecimal	2	3	4	5	6	7	8
1	01	○	○	○	○	○	○	●	16	10	○	○	●	○	○	○	○
2	02	○	○	○	○	○	●	○	17	11	○	○	●	○	○	○	●
3	03	○	○	○	○	○	●	●	18	12	○	○	●	○	○	●	○
4	04	○	○	○	○	●	○	○	19	13	○	○	●	○	○	●	●
5	05	○	○	○	○	●	○	●	20	14	○	○	●	○	●	○	○
6	06	○	○	○	○	●	●	○	21	15	○	○	●	○	●	○	●
7	07	○	○	○	○	●	●	●	22	16	○	○	●	○	●	●	○
8	08	○	○	○	●	○	○	○	23	17	○	○	●	○	●	●	●
9	09	○	○	○	●	○	○	●	24	18	○	○	●	●	○	○	○
10	0A	○	○	○	●	○	●	○	25	19	○	○	●	●	○	○	●
11	0B	○	○	○	●	○	●	●	26	1A	○	○	●	●	○	●	○
12	0C	○	○	○	●	●	○	○	27	1B	○	○	●	●	○	●	●
13	0D	○	○	○	●	●	○	●	28	1C	○	○	●	●	●	○	○
14	0E	○	○	○	●	●	●	○	29	1D	○	○	●	●	●	○	●
15	0F	○	○	○	●	●	●	●	30	1E	○	○	●	●	●	●	○
31	1F	○	○	●	●	●	●	●	46	2E	○	●	○	●	●	●	○
32	20	○	●	○	○	○	○	○	47	2F	○	●	○	●	●	●	●
33	21	○	●	○	○	○	○	●	48	30	○	●	●	○	○	○	○
34	22	○	●	○	○	○	●	○	49	31	○	●	●	○	○	○	●
35	23	○	●	○	○	○	●	●	50	32	○	●	●	○	○	●	○
36	24	○	●	○	○	●	○	○	51	33	○	●	●	○	○	●	●
37	25	○	●	○	○	●	○	●	52	34	○	●	●	○	●	○	○
38	26	○	●	○	○	●	●	○	53	35	○	●	●	○	●	○	●
39	27	○	●	○	○	●	●	●	54	36	○	●	●	○	●	●	○
40	28	○	●	○	●	○	○	○	55	37	○	●	●	○	●	●	●
41	29	○	●	○	●	○	○	●	56	38	○	●	●	●	○	○	○
42	2A	○	●	○	●	○	●	○	57	39	○	●	●	●	○	○	●
43	2B	○	●	○	●	○	●	●	58	3A	○	●	●	●	○	●	○
44	2C	○	●	○	●	●	○	○	59	3B	○	●	●	●	○	●	●
45	2D	○	●	○	●	●	○	●	60	3C	○	●	●	●	●	○	○

Remark:The address setting of ZCU and led display can refer to this diagram.ZCU DIP switch:1 (high rank) ←8 (low rank) ;Display DIP switch 2 (high rank) ←8 (low rank) ,1 is to set baud rate,ON-9600,OFF-4800

**FCC Caution:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

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.

**FCC RF Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be collocated or operating in conjunction with any other antenna or transmitter.

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

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

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.