



KEYTOP[®]

科拓股份

Keytop Forward Mounting Ultrasonic Sensor PGS Manual (V2. 7)

Xiamen Keytop Comm. & Tech. Co., Ltd
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Preface

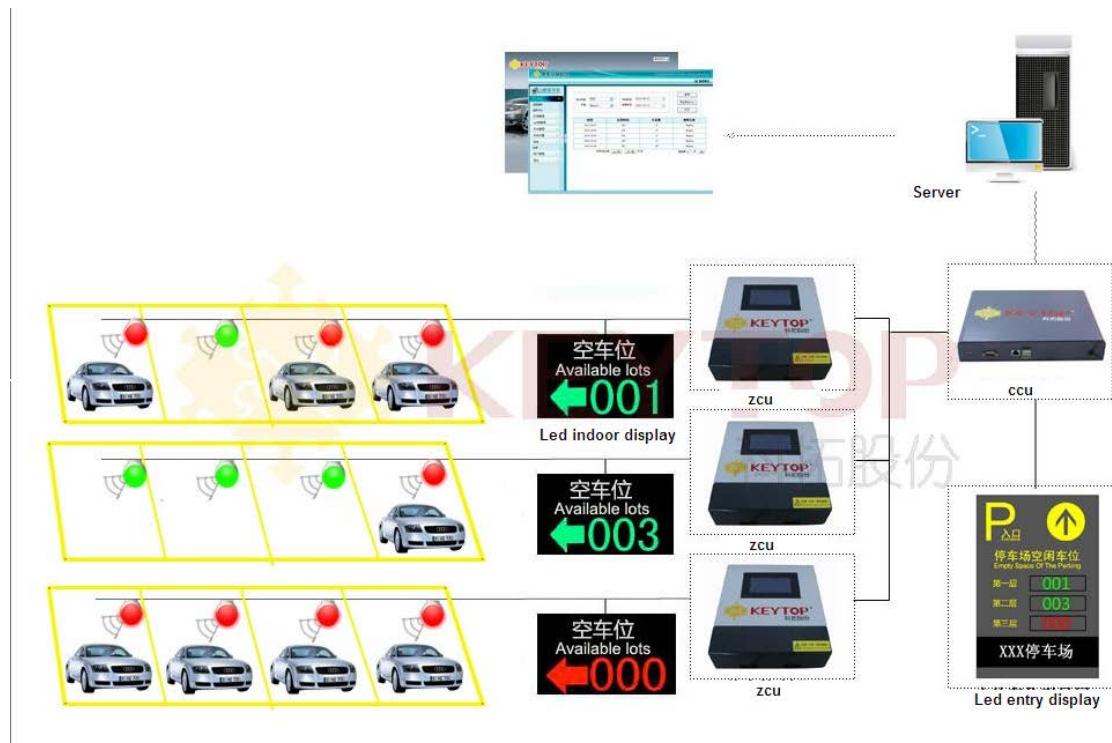
Keytop Parking Inc. is the first China provider of comprehensive solutions of intelligent parking including video based intelligent car park solutions and diversified parking guidance solutions, which comprise a set of niche targeting and complete solution architecture increasing the use rate of parking, improving the operator's economic benefit and traffic condition, also helping the drivers find parking spaces quickly. As the brand enterprise of top-selling parking guidance systems in China, the main products Keytop have are including parking guidance systems(wired and wireless) and vehicle tracking systems, etc.

As the pioneer of parking guidance field, Keytop since its establishment in 2006 has had an elite team with the spirit of flair of innovation, familiarity to technician, good management and vast experience. In the absorption of advanced technologies at home and abroad on the basis of adherence to the principle of "customers demand first", Keytop has formed our own professional product lines. Currently, Keytop products are widely used in more than 40 countries around the world, including Singapore Changi International Airport, Poland Krakow Airport, Taiwan Taoyuan Airport, Shenzhen Kingkey Financial Center, Beijing Qianmen Street Business District and Xiamen Administration Service Center, etc. Till 2011, Keytop has 400 successful cases (totally 290,000 parking spaces), which breaks the record of China intelligent parking guidance industry. Our star product "vehicle tracking system" is currently the only domestic video based car finding system and successfully practical used in many car parks, which has won good praise at home and abroad.

Keytop always adheres to "Professional Value and A Model of Service Excellence" business philosophy and is aspired to become a famous city intelligent static traffic system supplier at home and abroad base on its technical strength and by the spirit of continuous creation and striving to explore and excellence. It has successfully passed the certificate ISO9001:2008 and has close cooperations with real-estate projects located in Shenyang, Hefei, Wuhu, Zhengzhou, Quanzhou, Zhangzhou, Xiamen, etc.

1. Introduction of System

Collect real-time vehicle information of all parking spaces by ultrasonic sensor installed at the front of each parking space. The node controller connected to the sensor will collect the information of all the sensors it connected in terms of polling as well as compression code the data according to some rules then send back to the central controller. Central controller completes the data processing then send back the processed parking space data to every LED guide screen in the carport to display the information of available parking space, realizing the function of guiding vehicles enter available parking space. The system also provides a set of parking management software, users can inquire real-time parking space information and statistic data of year, month and day of the carport by computer terminal.



2. On-site Installation

2.1. Preparations

2.1.1. Equipments And Materials

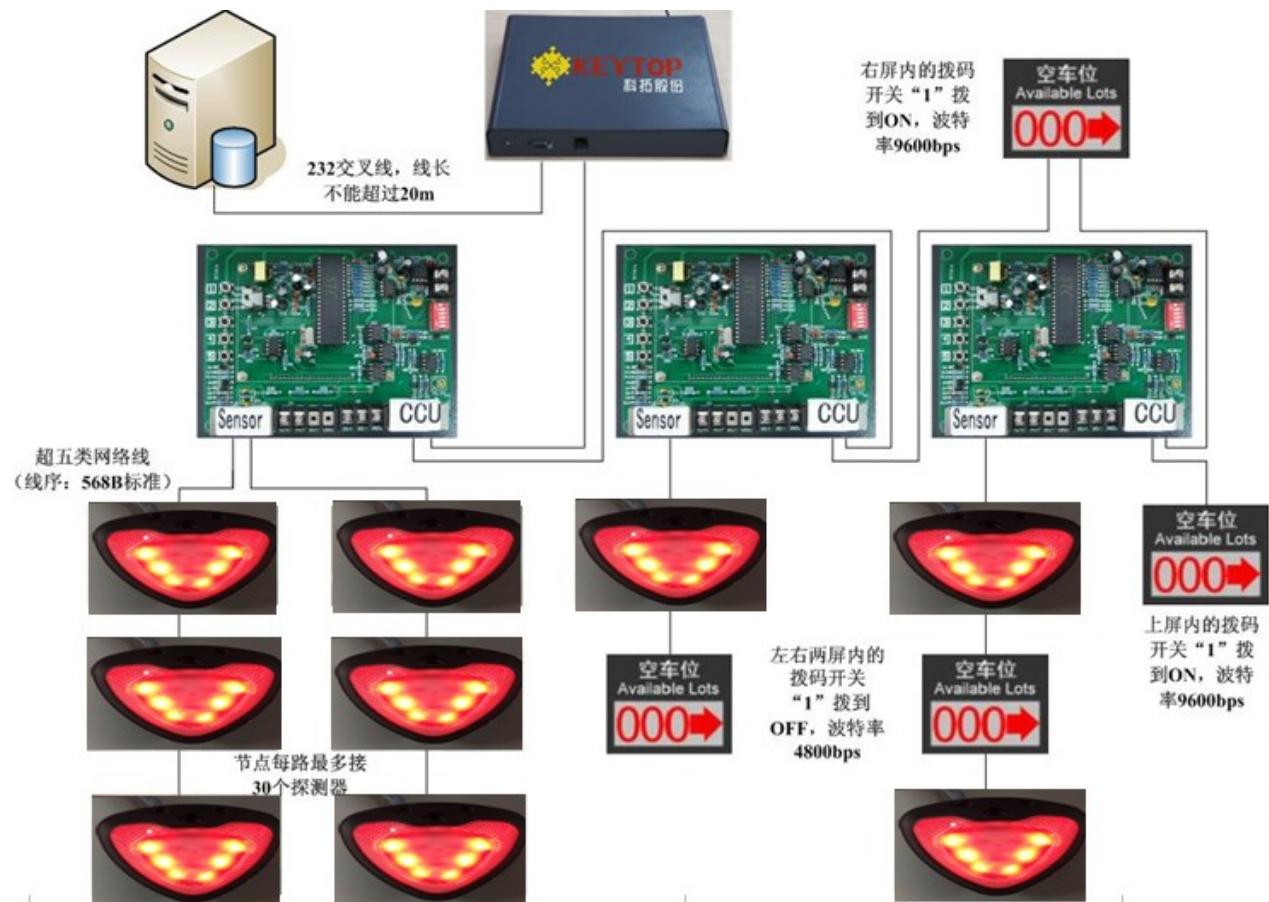
- Hardware: CCU, ZCU, LED display, forward mounting ultrasonic sensor
- Software: LED settings, ParkSystem, SQL2005, CAD, COM settings
- Materials: ①Parking Plans ②Manual

2.1.2.On-site Record

- Check engineering drawing regarding to on-site situations.If there are any obstacles(like anti-fire rolling curtain),the wiring route need be revised accordingly.Check mounting position of every device like ZCU,led display to determine 220v power supply mode(nearby or unified).
- Number all the devices on the drawing to be followed during installation.
- Estimate parking space width,led indicator wire length,passageway length to evaluate the total length of wire and other materials.
- Prepare wiring tools including screwdriver,wire cutter,wire crimper and wire stripper,etc..

Remark:If the ZCU can't be installed in the middle of the main bus of sensor,it is better install less than 40 sensors per ZCU because of voltage drop problem.

2.1.3.System Installation Wiring

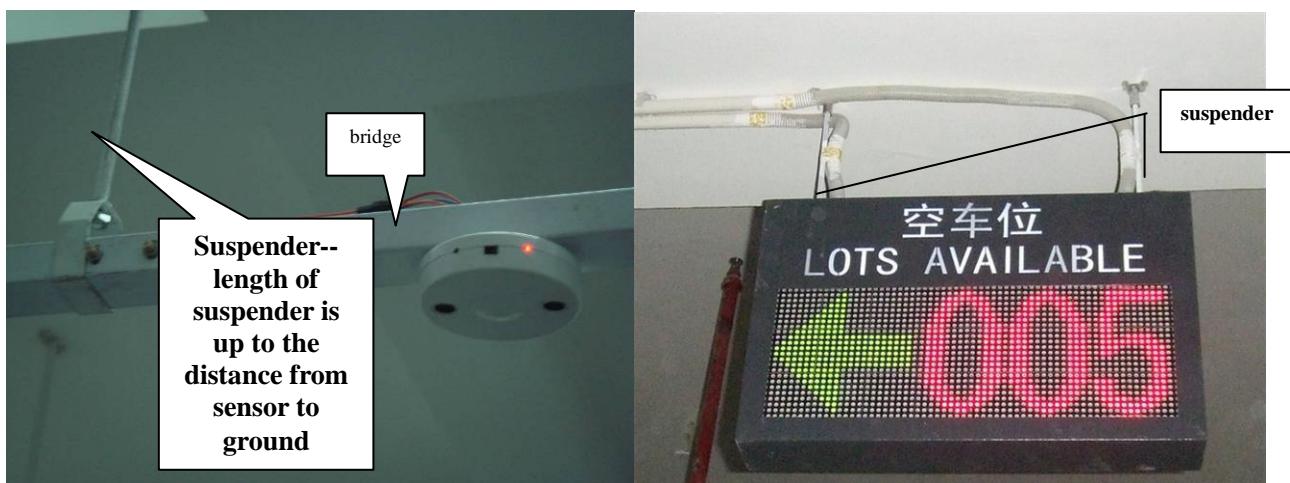


2.2.Tubing Installation

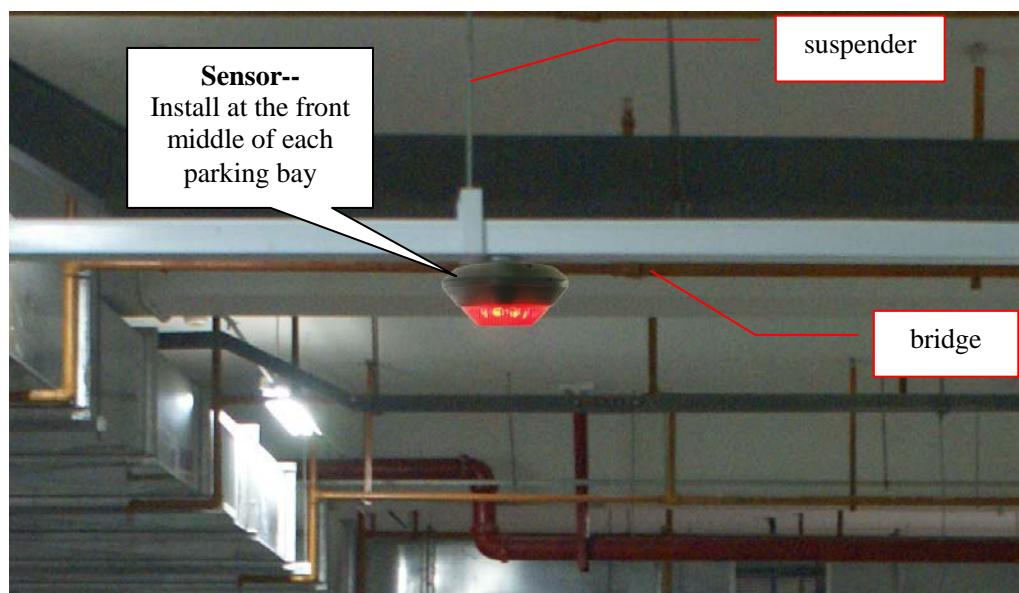
2.2.1.Suspender Installation

The suspender's diameter is 0.8cm, its length should be regarding to its distance from sensor or led display.

- Sensor Suspender Installation:its location should be fixed in the middle of every parking space by setscrew.
- Suspender Installation:the distance between sensor and ground should be closed to the fixed value 2m,2.5m,3m,3.5m. 2.5m or 3.0m which is recommended.
- Dig holes of display suspender:The display should be installed in the main crossings of car park and it should be convenient for drivers' view.The length of suspender is up to the installation height of display and the suspender quantity should be regarding to display size.

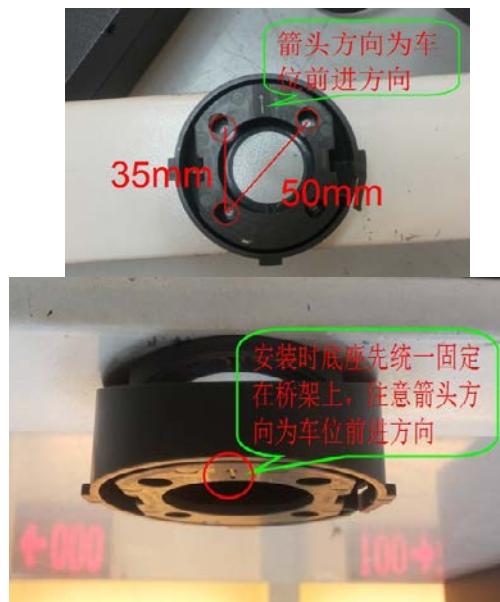


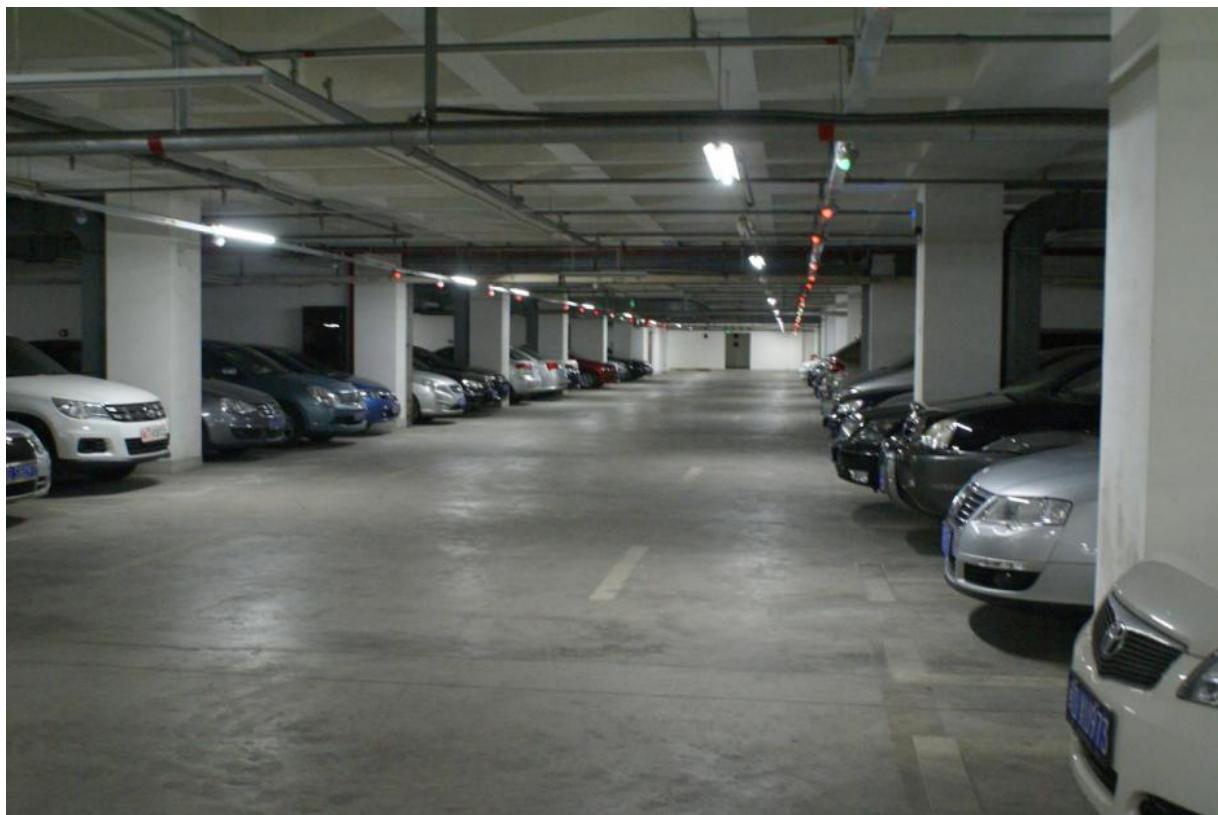
2.2.2.Bridge Installation



- Make Sure there are no blocks like water pipe under the bridge
- The bridge should pass right above parking space centre for the convenience of sensor's installation.

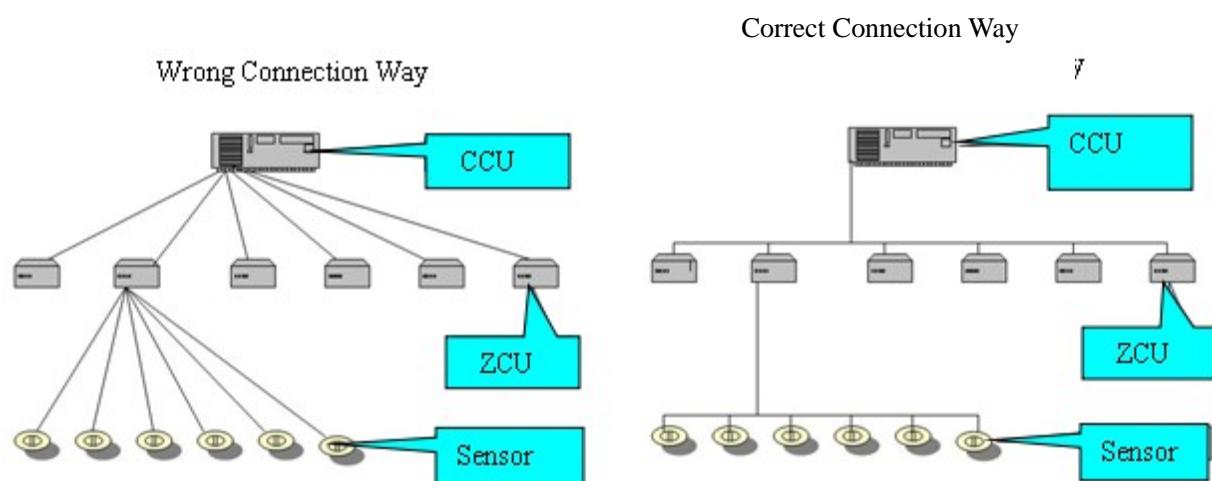
- The bridge should keep away from strong electromagnetism interference source like elector-motor equipment, daylight lamp, and so on.
- Install sensor on bridge:fix sensor holder by 4pcs (or 2 pcs) $\varphi 3*15$ mm screws on bridge.The diagonal distance between small detector holder holes which fixed by screw is 50mm.The distance between two holes is 35mm.Get round hole with 22mm diameters from the point of intersection of the two diagonals to pass 7P blue/white wire. (Refer to below picture).





2.3.Wiring

- Suggest to use STP or network cable.
- The wiring way is hand by hand or single main bus, but not star connection.



- If the power line is too long, the voltage will be not enough.
- Separate the wiring of weak current and strong current
- The short circuit of power supply and RS485 communication has to be avoided. Otherwise, it

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will cause instability of the system and it is hard for troubleshooting.

- The connections which are marked on the system structure can not omit.
- Parking bays on the same line under the same ZCU, pass one network cable from the first to last directly. Set aside a certain length of network cable at the head and end. When pressing crystal heads, press from the first to last at the same direction. Pull out a short network and cut it off, then press crystal head, press other crystal heads like this way. If the cables length of several standard parking bays are rather similar, then it can improve working efficiency if put on cables after crystal heads are done on the ground.

2.4. Devices Installation

2.4.1. Main Outdoor Entrance of Carport

Every entrance of carport should install entrance Led display to show parking space information in the carport. LED display is comprised by LED module, drive circuit, control circuit, frame and other components. It receives the statistic parking space information from CCU, displays the quantity of the available carport in the yard, suggest the drivers ready to admission and can be used 24hours a day. Internal procedures can be modified at any time based on the users' requirements, displaying the needed information.

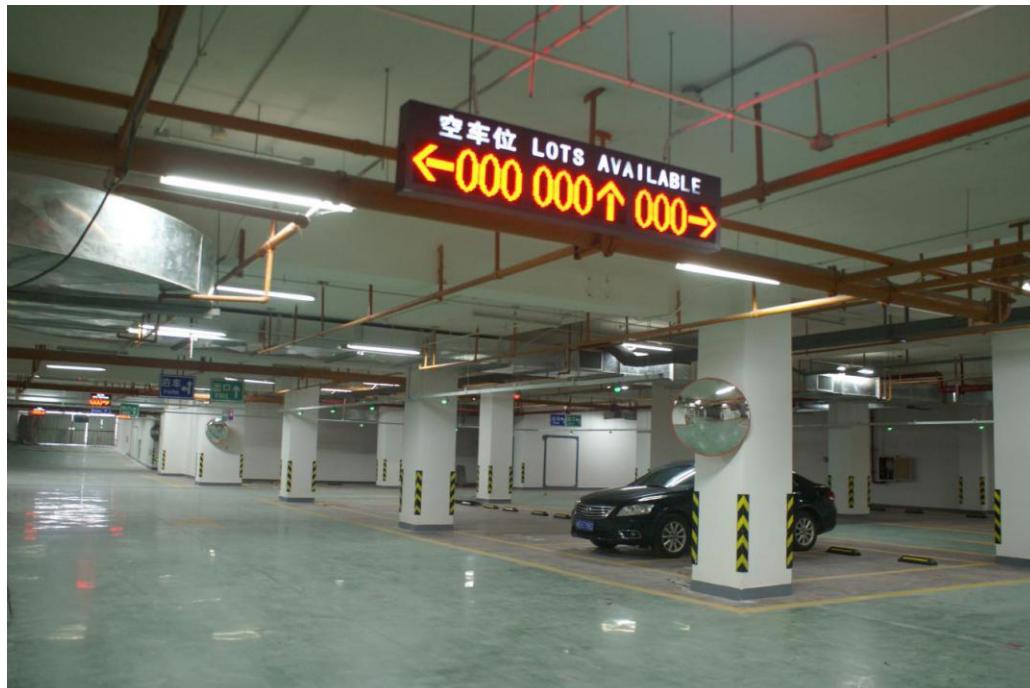


2.4.2. Main Crossings of Carport

Install indoor led displays at the main crossings of car park. The display contents are customized. LED display is comprised by LED module, drive circuit, control circuit, frame and other components. It receives the information from CCU, displays the the available lots of different directions.

- Three-direction LED display: they are always be placed in the turnings with three directions in the carpark. The location should be the place that the car owners can see clearly when they drive to the three-direction turnings.

Displayed content: displaying the total available lots of the regions the three direction forks separately lead to.



- Two-direction led display: They are generally placed in the fork with two directions in the carpark. The installation location should be the place that the owners can see clearly when they drive to the two-direction fork.

Displayed Content: Mainly displaying the remaining empty spaces in their respective regions.



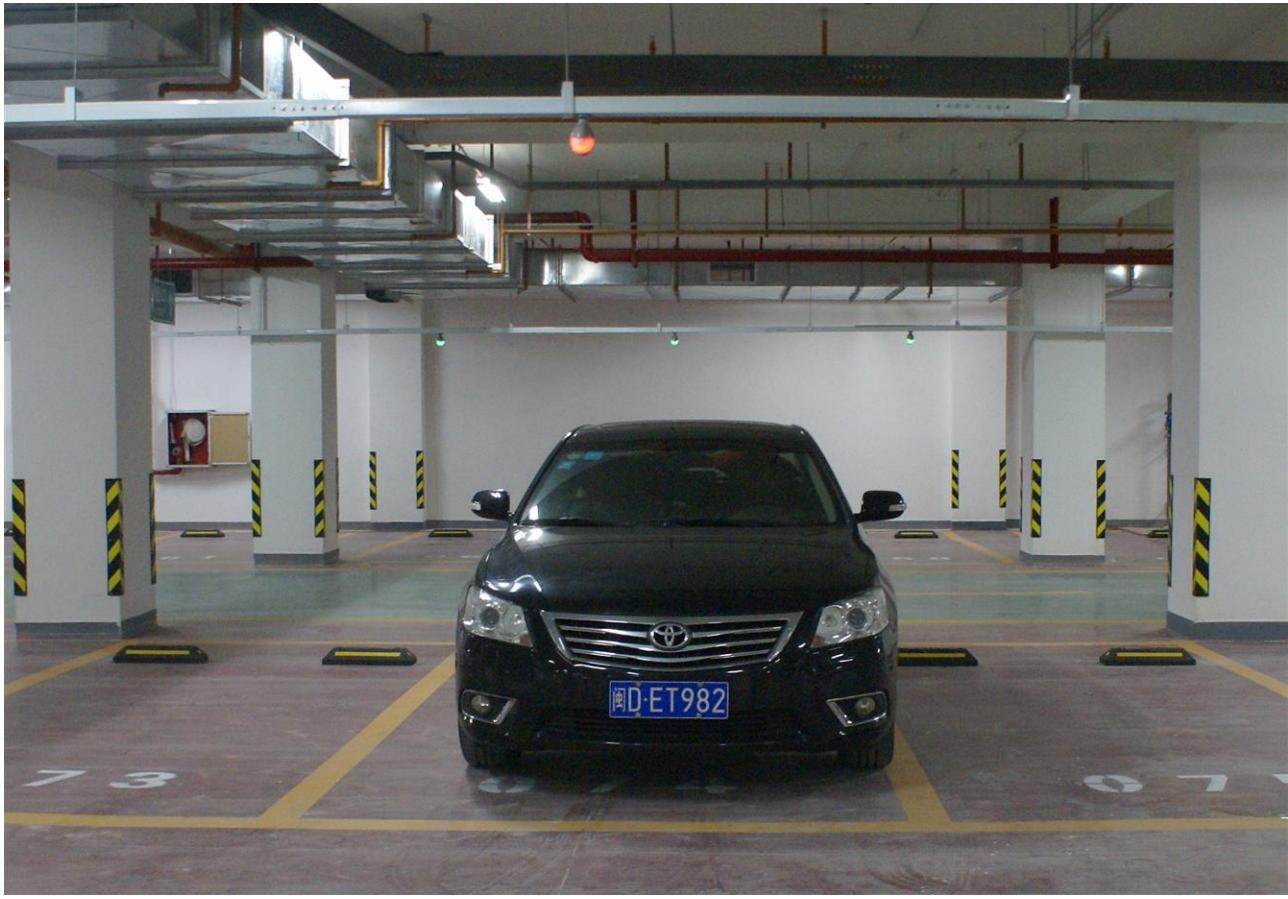
- One-direction LED display: They are generally placed on the carpark corner, the installation location should be the place that the drivers can see clearly when they drive to the corner.

Displayed Content: Mainly displaying the remaining empty spaces after turning the corner.



2.4.3.Every Parking Bay

Install forward mounting ultrasonic sensor at every parking bay.The sensor will detect real-time parking status of each bay,when it is occupied,it will be in red,if not,it will be in green.



Remark:Don't lock the cable together when fix sensor by screw.

2.4.4.Zone Control Unit

ZCU is the interlayer of three network bus. It places an important role on system security. It is responsible for scanning sensor status and transmitting the related data to CCU.

40 sensors in max. per ZCU is better because of voltage drop problem.

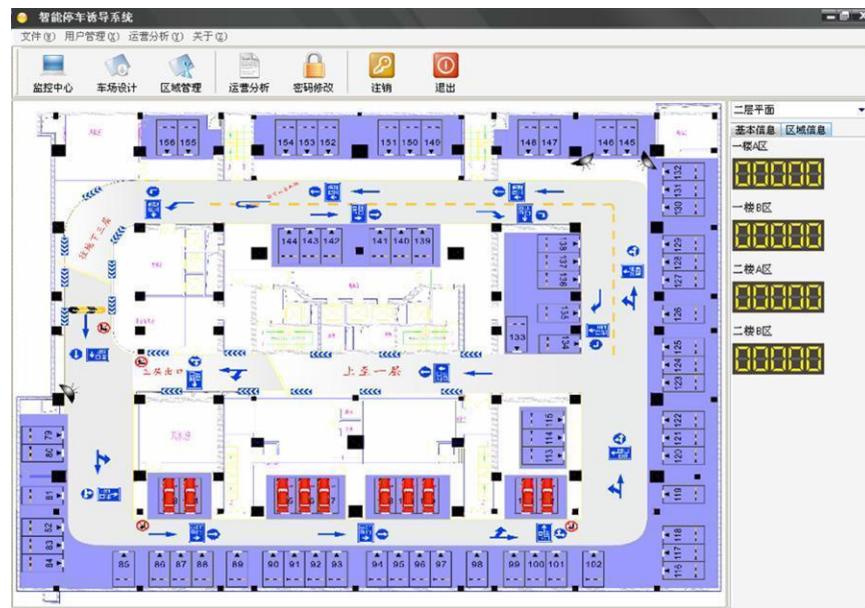
ZCU is to connect CCU and sensor. It helps solve the problems of the instability of long distance RS485 communication, Lan ZCU no. Spread, grouping management.

Normally, the ZCU is installed on post or wall and its distance to ground is $\geq 2.1M$.

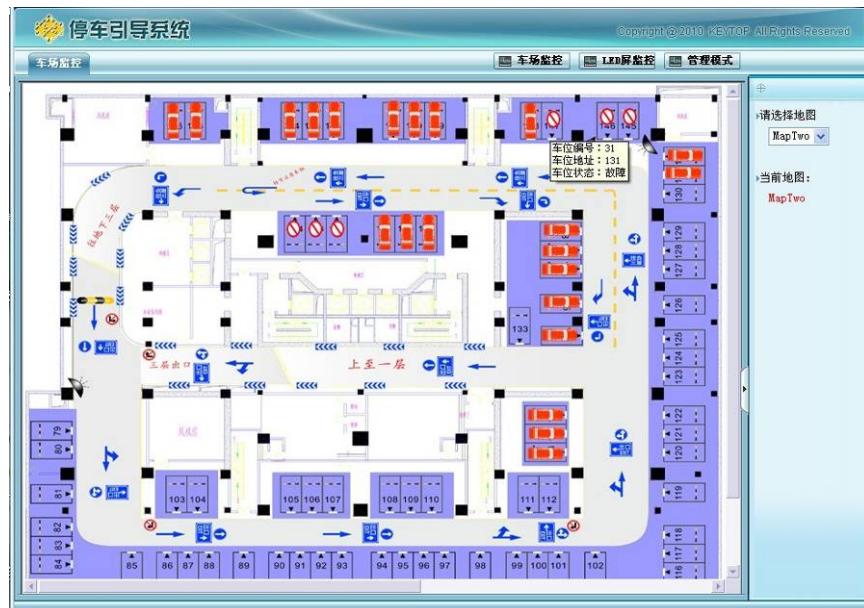


2.4.5.Central Control Room

Central control room is installed with central control unit(normal/advanced)and support offline operating.The system also work together with two versions' software(B/S and C/S).B/S is embedded with the advanced CCU supporting WEB visit.The normal CCU is matched to work with the C/S software.Both of them support multi-language.At present it supports simplified Chinese,traditional Chinese,English and Japanese,more languages could be added anytime according to client's requirements.



C/S software interface



B/S software interface

3.System Wiring

3.1.General Route Debugging

Debug ZCU and sensor's main bus of ZCU,then debug ZCU's main bus of CCU.

1. Before powering on,measure +24V,GND,A,B on sensor's main bus,check if two sets of them exist short circuit,or short circuit to KBG tube and bridge.
2. Set up detecting distance and communication address (addresses cannot be same under the same ZCU)of every sensor
3. After powering on,check whether the ZCU can search all sensors,if not,pls check whether addresses of sensors are correct or not, and cable ports of sensor is correctly plugged in.
4. Make sure every sensor detects distance normally,led indicators changes colors normally,485 communication indicators flash normally
5. Settings of display's address and baud velocity,addresses of display under the same ZCU cannot be repeated.Display under ZCU,sensor's main bus baud velocity should be 4800.Display under CCU,sensor's main bus baud velocity should be 9600.
6. Connect PC to CCU,and install database software,ParkSystem,LED settings on PC.Configure CCU by LED settings and fresh CCU.Two ways of configuring Led display:one is setting up these displays in decreasing orders from entrance to exit of the whole carport,another is zone settings.Power on CCU and ensure all LED displays show correctly.
7. In ParkSystem,set up carport floor plan and add cars.Floor plan will correctly shows parking status or handicapped status of each parking bay(pictures of the actual carport is provided by clients or BMP format pictures transformed from CAD plans)

Remark:LED settings and ParkData cannot be opened at the same time,if operate both,pls exit one of them first accordingly.

3.2.Central Control Unit(CCU)

CCU is the main core of the system,it is mainly responsible for PGS data collection and control,also updating led display data at the real time to realized parking guidance functions.One CCU could support 60 ZCU in max..

3.2.1.General-edition CCU



3.2.1.1.Techical Parameters

Working Temperature:	-40~+80°C
Input Voltage:	AC110-220V
Working Consumption:	2W
Communication Way:	1 RS-232 serial port (RS-232-PC), 1 port (RS-485-ZCU)
Communication Speed:	RS-232-PC: 57600bps; RS-485-ZCU: 9600bps
Communication Distance:	≤1000m
Size:	283.4x222x50.2MM

3.2.1.2.Operating Principle

The main function of normal CCU is to inquiry ZCU circularly and transmit the processed parking information data to PC or other equipment by RS232-C serial port, also update led display data by RS-485-ZCU.Refer to below picture:



3.2.1.3. Wring Connection

Please connect cables strictly regarding to the manual before power on.

Network cable(RS-485-ZCU):to connect ZCU or led display

3 lines' serial port line(RS-232-PC):to connect to PC serial port or support RS232 communication equipment

3.2.2. Advanced Central Control Unit (CCU)

Advanced CCU is embedded with B/S structure PGS monitor software which can be visited from WEB and its data is available for saving 2 years.

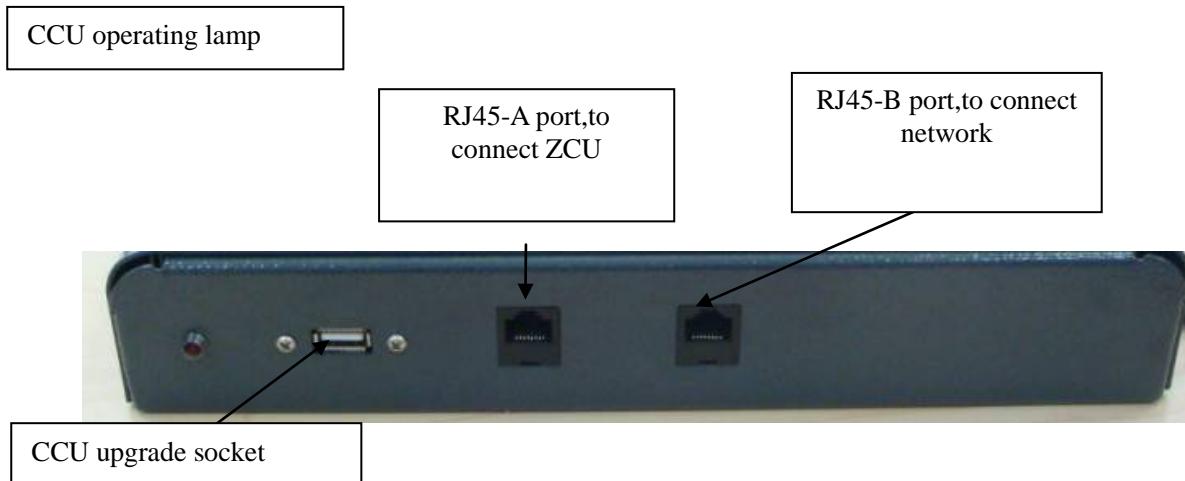


3.2.2.1. Technical Parameters

Working Temperature	-40~+80°C
Input Voltage	AC110-220V
Working Current	0.7A
Communication Way	TCP/IP, RJ45 network port(10/100M)
Power Rate	4.8W
Size	283.4x222x50.2MM

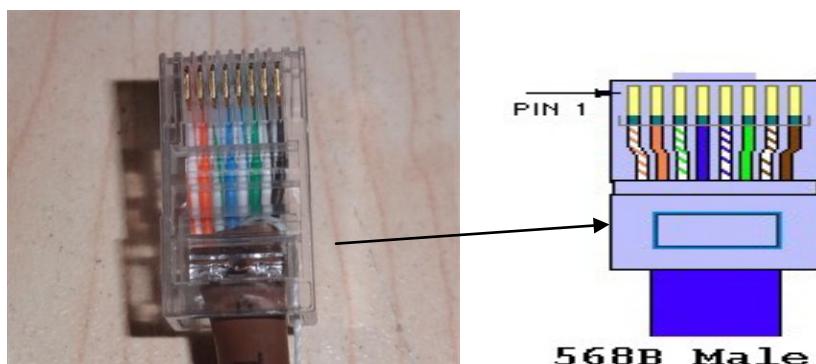
3.2.2.2.Working Principle

Main function of CCU is to scan and process parking information data of ZCU and update led display's real time parking information by RJ45-A.RJ45-B is to connect network,as below picture:



3.2.2.3.Wire Connection

The two network ports on CCU are to connect 8 cores RJ45 network cable



Network Cable: Cat5e, 0.50mm, pure copper

The wire connection order of RJ45 crystal plug:

Standard 568B:white/orange, orange, white/green, blue, white/blue, green, white/brown, brown (from left to right)

3.2.2.4.Maintenance And Troubleshooting

1、Advanced Central Control Unit(CCU)

1).If the red led indicator in the left is off,please check if the inside power supply is connected well.

2).If there is no communication between the network cables and ZCU,please check if the network cables

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are connected well. And check if the CCU has configured ZCU.

3.3.Zone Control Unit(ZCU)

As the main component of KEYTOP parking guidance system, ZCU scans sensors circularly by RS-485-B serial port. and pass the related parking information to CCU by RS-485-C. Also, it transmits control protocols from CCU to LED display by RS-485-B serial port.

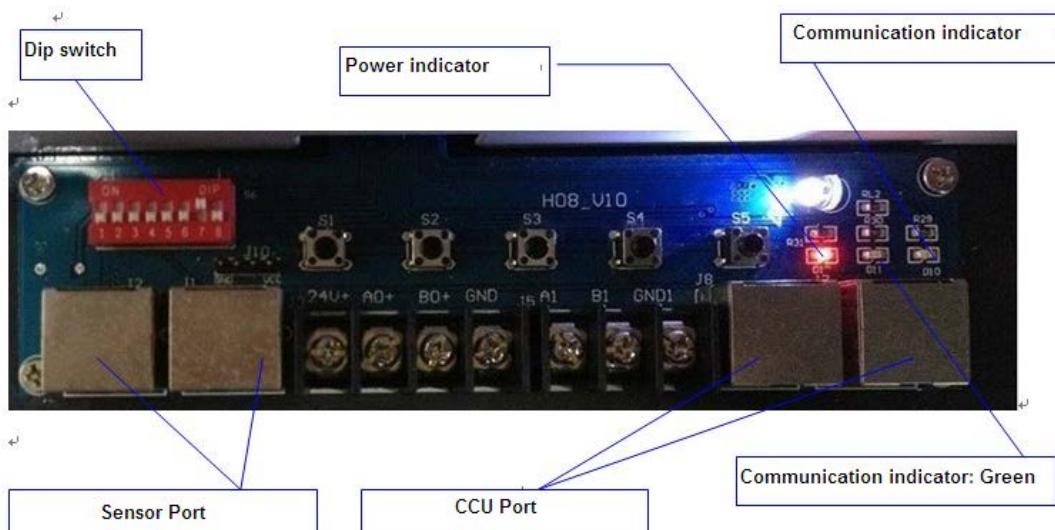


3.3.1.Techical Parameters

Input Voltage:	AC110-240V	Communication Way:	2 RS-485 serial ports (RS-485-B; RS-485-C)
Working Temperature :	-40 ~ +80°C	Speed Rate:	RS-485-B: 4800bps; RS-485-C: 9600bps
Working Power:	2W	Capacity:	40pcs at best (60pcs sensors at max.)
Size:			350*230*105MM

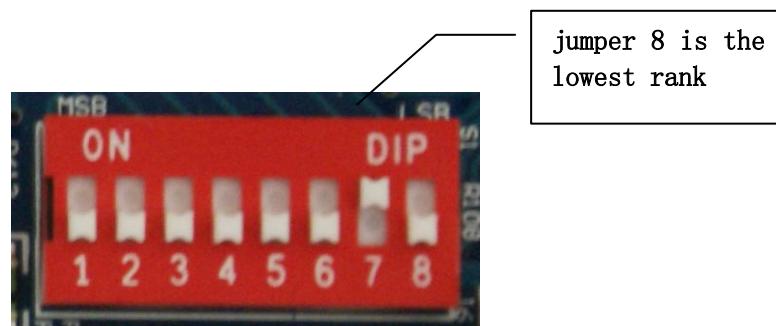
3.3.2.Wire Connections

Connect wires before using ZCU; power input is DC24V; ZCU port is to connect sensor or led display; CCU port is to connect CCU or led display.



DIP Switch(8 jumpers totally,1 for high,8 for low)is to set ZCU address.ON means 1,OFF means 0.E.G.,00001111 means its address is 15.Please refer to table 1 as below about DIP switch settings.

E.G.:ZCU address is 02,its DIP switch setting should be 00000010 as below:

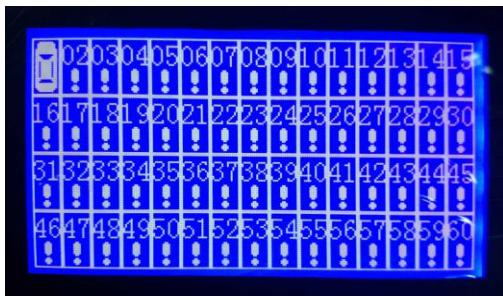


3.3.3.Button Functions

Press button S1 to change interfaces:

- ◆ Button S1:Change interfaces (devices version interface,sensor's interface,Led settings' interface of ZCU)
- ◆ Button S2: Plus
- ◆ Button S3: Minus
- ◆ Button S4: Change functions commands
- ◆ Button S5: Enter settings interface or back to parking bay status

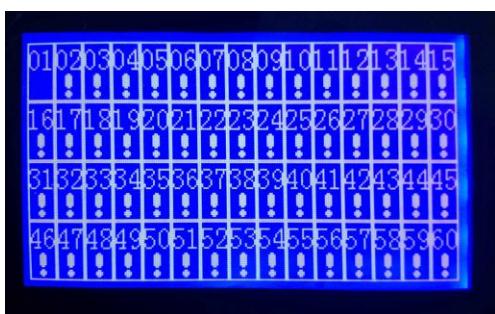




Pic.a Interface of Keytop logo

Pic.b sensor's interface

Pic.b shows that this ZCU has inquired 1 sensor, number 1 sensor has a car parked. "!" below numbers means the parking bay is vacant(as pic.c shows, number 1 is not cars parked), others are not connected or handicapped.



Pic.c Number 1 sensor is occupied



Pic.d Settings interface

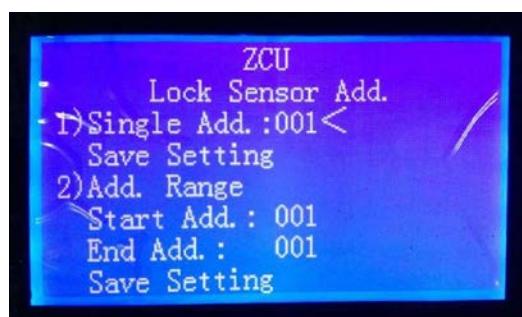
Long press button S5 and enter settings interface(as pic.d shows),press S4 to enter functions need to be set up

1、Set up installation height of sensor

Setting range:200~300,press S2 to add 1,S3 to minus 1,long press to continuous plus or minus.After setting,press S1 to enter next menu(as pic.k)

Set up single address:press S4 to single address,press S2 to add 1,S3 to minus 1.Long press to continuous plus or minus.After setting,press S4 to “OK”,then press S1 to make this setting work and show interface “command is being processed”(as pic.f).

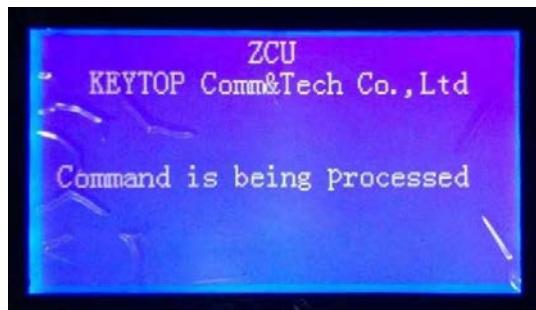
Addresses range setting:press S4 to the addresses need revising,press S2 to add,S3 to minus,after setting,press S4 to “OK”,then press S1 to make this setting work and show interface “command is being processed”(as pic.f).



Pic.k



Pic.e Lock Sensor Address



Pic.f

2、Setting of Sensor's Detection Interval

Detection interval can be set up as 0.5s、1s、1.5s、2s

Press S2 to add 0.5s,press S3 to minus 0.5s

3、Setting of Lock Sensor Address

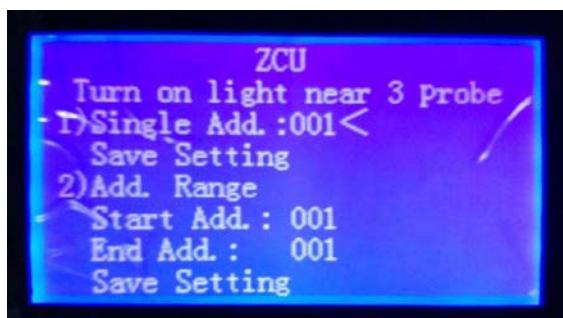
Press S1 to enter next menu(as pic.e)

Set up single address:press S4 to the function needs setting,press S2 to add 1,press S3 to minus 1.Long press to continuous add or minus.After setting,press S4 to"OK",then press S1 and show "command is being processed"(as pic.f)

Set up addresses range:range from 1~60.Press S2 to add 1,press S3 to minus 1.After setting,press S4 to "OK" ,then press S1 to show "command is being processed".(as pic.f)



pic.g



pic.h

4、Cancel Setting of Lock Sensor Address

Method of setting is same with "setting of lock sensor address"

5、Select Sensor Light

Press S5 back to settings interface(as pic.d),press S4 to "sensor light select",press S1 to enter next menu(as pic.g)

1) Turn On Light Near 3 Probe

Press S1 to enter next menu(as pic.h),press S2 to add 1,S3 to minus 1.After setting,press S4 to "OK",press S1 to show "command is being processed"(as pic.f)

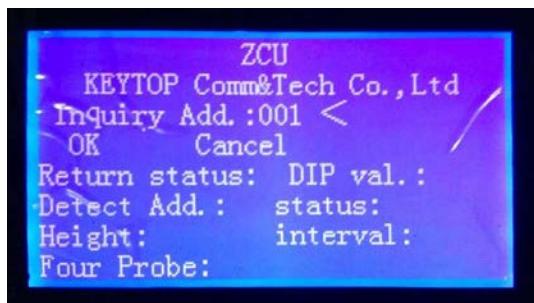
2) Turn On Light Near 1 Probe,2 Probe

Method of setting is same with "turn on light near 3 probe"

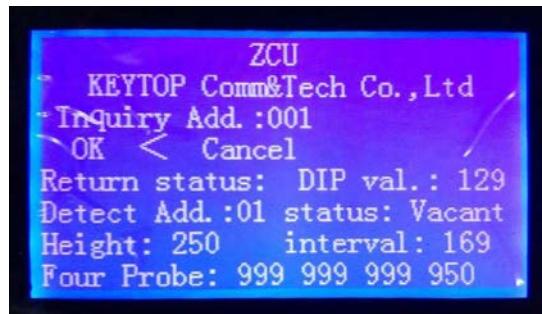
6、Check Sensor Status

7、Press S5 back to settings interface(as pic.d),press S4 to "check sensor status",press S1 to enter next menu(as

pic.i).Set up corresponding inquiry addresses,then it will show information of corresponding sensors.(as pic.j)



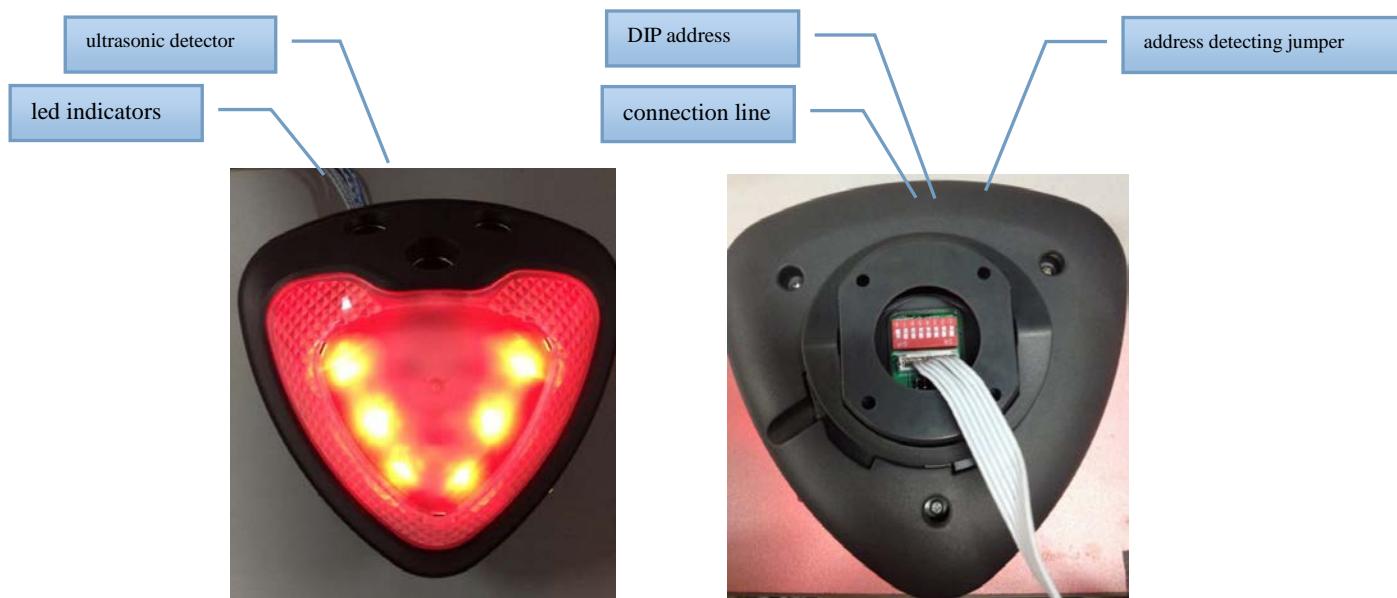
pic.i



pic.j

3.4. Forward Mounting Ultrasonic Sensor

Sensor is a key part of parking guidance system,it collects real-time parking information,controls display of led indicators,and transmits real-time parking information to ZCU by RS485 communication.It is composed by sensor body and sensor's decks.Main components on sensor body include:ultrasonic detector,power supply,485 network cable,led indicators.



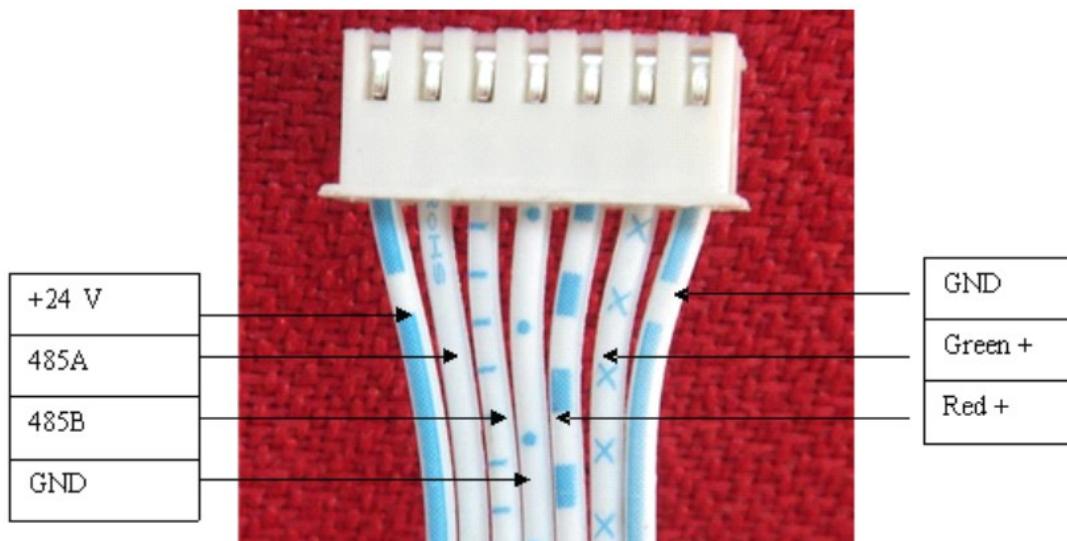
3.4.1. Technical Parameters

Working voltage: DC 24V	Size: 14*14*7cm
Working current:16mA(red indicator), 12mA(green indicator)	Communication way: RS-485, 4800bps, N, 8, 1
Max. Power: 0.4W	Communication distance: ≤1000m
Working temperature: -20~+80°C	Max. distance error: 0.1m
Installation height: 2.0~2.7m	
Max. distance to car: 2m	

3.4.2.Wiring Connections

From **picture** below,we can see forward mounting ultrasonic sensor has a seven-core wire.From left to right:

- Wire 1:connect to power supply+of DC12~24V
- Wire 2:485A network cable:to connect sensor or 485A of ZCU's port B
- Wire 3:485B network cable:to connect sensor or 485B of ZCU's port B
- Wire 4:connect to power supply-of DC12~24V
- Wire 5:to connect+5V of the red lamp of led indicator
- Wire 6:to connect+5V of the green lamp of led indicator
- Wire 7:connect to power supply of DC12~24V



3.4.3.Settings of Installation Height&Address

3.4.3.1Setting of Installation Height

Before installing forward mounting ultrasonic sensor, set up installation height(vertical distance from the bottom of detector to floor,max. error \leq 5cm) by the the jump line on sensor according to the actual situation of carport. Installation height ranges from 200cm to 270 cm.

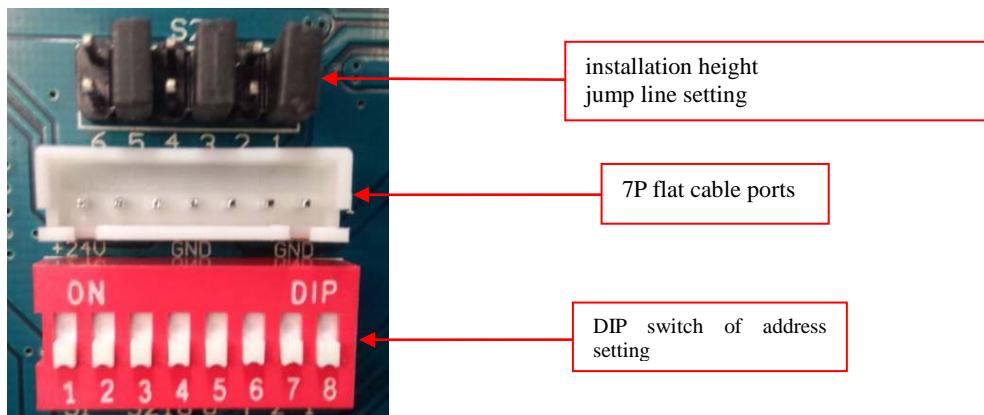


Table 1:Jump Line Setting of Installation Height

- 23 -

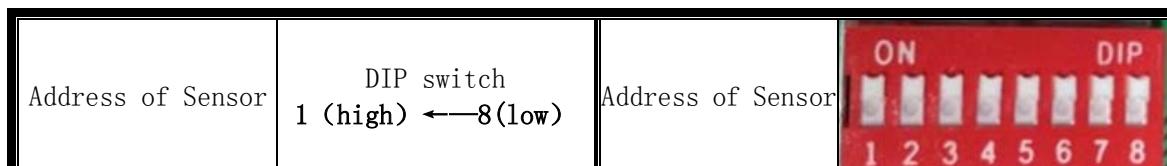
Rank	Status	Value	Installation Height (M)
1	4□□□■1	0001	2.00
2	4□□■□1	0010	2.05
3	4□□■■1	0011	2.10
4	4□■□□1	0100	2.15
5	4□■□■1	0101	2.20
6	4□■■□1	0110	2.25
7	4□■■■1	0111	2.30
8	4■□□□1	1000	2.35
9	4■□□■1	1001	2.40
10	4■□■□1	1010	2.45
11	4■□■■1	1011	2.50
12	4■■□□1	1100	2.55
13	4■■□■1	1101	2.60
14	4■■■□1	1110	2.65
15	4■■■■1	1111	2.70

Note: 1. Bottom of pins have marks from right to left 1,2,3,4
 2. □ Means this bay not connects to short circuit cap; ■ means this bay connects to short circuit cap
 3. Vertical distance from the bottom of detector to floor,max. error≤5cm.Eg:on-site installation height is 2.34m,then select□■■■,and connect to pins marked 1,2,3 by short circuit caps.

3. 4. 3. 2 Setting of Sensor's Address

Address of sensor is set up by DIP switch.DIP switch has totally 8 jumpers(switches).Jumper 1 for high position,jumper 8 for low position.Set jumper to 1 for ON,and 0 for OFF.Each ZCU can control 60 sensors at most.Sensor's address of serial No. 1 is 01,serial No.60 is 3C.**Refer to TABLE when setting addresses.**

DIP switch has 8 jumpers, jumper 1 for high position, jumper 8 for low position. Set jumper to ON for 1, namely “●” in table, set jumper to others for 0, namely “○” in table.



- 24 -

decimal	hexadecimal	1	3	4	5	6	7	8	decimal	hexadecimal	1	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	○	●	●	●	●	○	○

3.4.4.Sensor's Installation

Set up installation height and sensor's address before installation, and keep a record for future debugging and maintenance.

Two installation ways(take parking bay as reference subject)in front of parking bay and parking bay's side

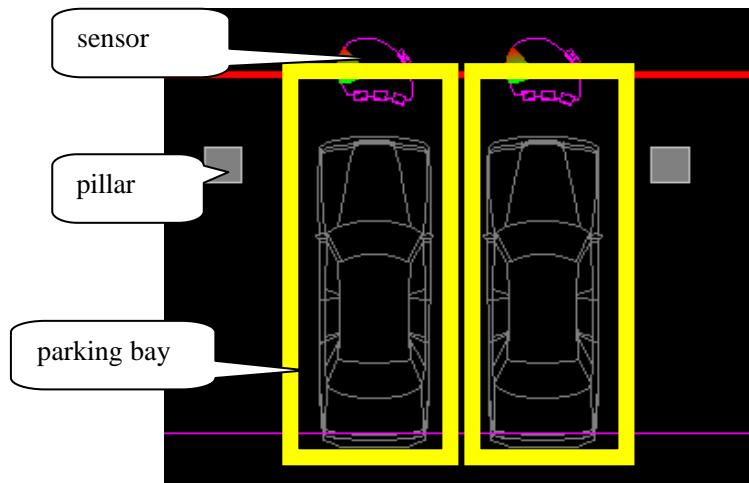
Way 1:install on the front of parking bay,above right middle of parking line near driveway,as pic.1 shows.

Note:If the position is sheltered by pillars,take it a bit far from parking bay,max. Distance≤50CM.

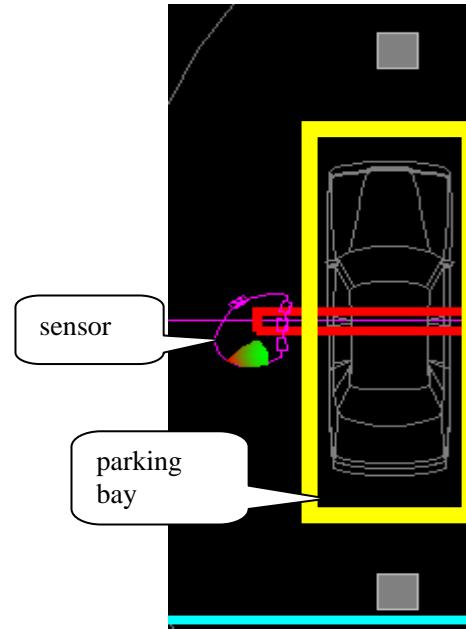
Way 2:install in the middle of parking bay's side,distance to bay's side line≤1m,as pic.2 shows.



Flat pin with serial No. 6 of sensor should connect to short circuit cap.



Pic.1 Vertical installation



Pic.2 Horizontal installation

3.4.4.1 Fasten Sensor's Decks



fasten small deck, one direction of two arrows should right opposite to parking bay (make sure ultrasonic detector would be opposite to parking bay after fastening)



After putting big and small decks together, direction of big deck's arrow must point to parking bay (ultrasonic detector should be opposite to parking bay after fastening)

3.4.4.2 Installation Height

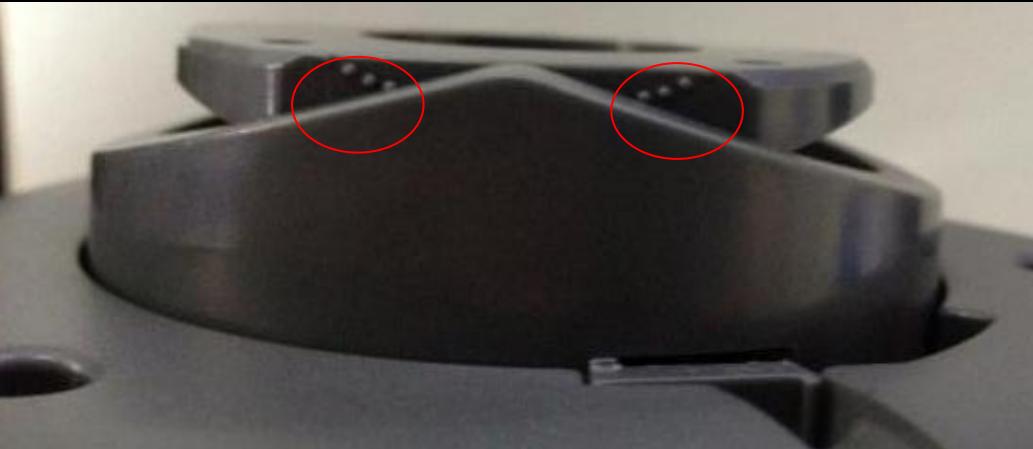
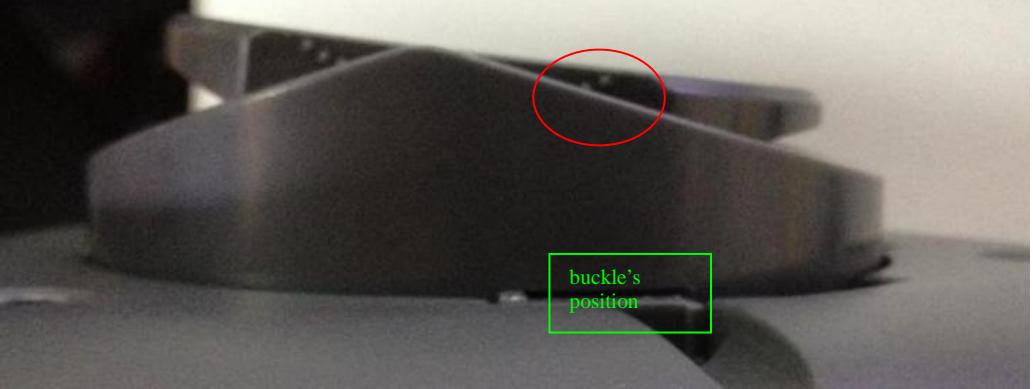
Range from 2.0m to 2.7m, according to the carport's height limitation. Installation angle of sensor should be adjusted accordingly under different installation heights.

3.4.4.3 Installation Distance

As for vertical parking bay, install at the position near parking line. If the position is sheltered by pillars, take it a bit far from parking bay, max. distance less than 50CM. As for horizontal parking bay, install at the position within the range from 0.5 to 1m, select according to actual situation.

3.4.4.4 Installation Angle

Make adjustments under different installation heights.

Installation Height	Angle Adjustment
200~230cm	 <p>two sides of small deck(two circles on pic. above) have 4 little spots(parallel to the top of small deck from vision angle)</p>
230~270cm	 <p>right side of small deck(circle on pic. above) has 3 little spots(parallel to the top of small deck from vision angle)</p>

Note: Above angle adjustments are just for reference, adjustment should be coordinated with actual situation.

Attention: Make sure no obstacles like iron wire or water pipe or hanging license plate or sunlight lamp in front of sensor.

3.4.5.Maintenance and Troubleshooting

- Sensor has no return value after commands sent.
 1. Check RS-485 wiring correct or not
 2. Check baud velocity is 4800,N,8,1 or not。 Transfer RS232 to RS485 when connecting with computer
 3. Check address setting and commands sent correct or not
- Led indicator cannot show normally when detecting the ground
 1. Check installation height setting of sensor correct or not
 2. Make sure no water pipe under sensor,no piled sundries on the ground,no water pipe or iron wire in front of sensor,all these could cause false detection
 4. Ultrasonic detector should be installed in the middle and right opposite to parking bay

3.5.LED Display

LED display is comprised by high intensity outdoor LED module, driving circuit, controlling circuit,frame and other parts. It receives the statistic information of the parking space from the central controller, displaying the amount of available parking spaces in real time and can be used 24 hours a day. Internal procedure can be revised at any time according to the users' demands, displaying other information.



3.5.1.Technical Parameters

1、Outdoor Led Display

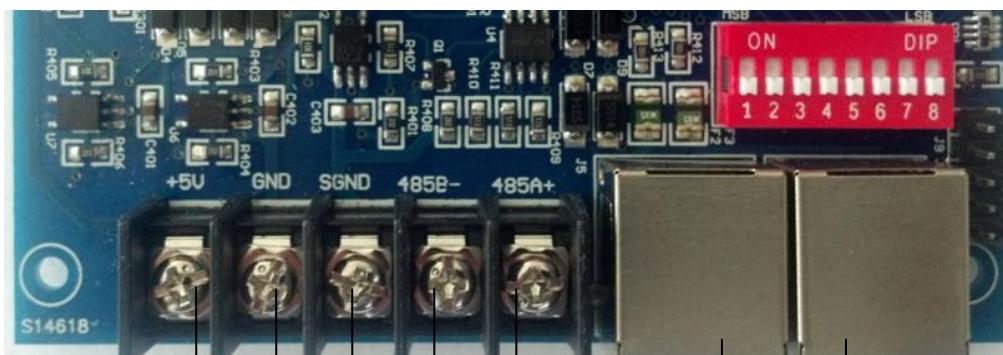
Input Voltage: 220VAC	Working Voltage: 5VDC
Power: <200W	Size: 2m*0.8m

2、 Indoor Led Display

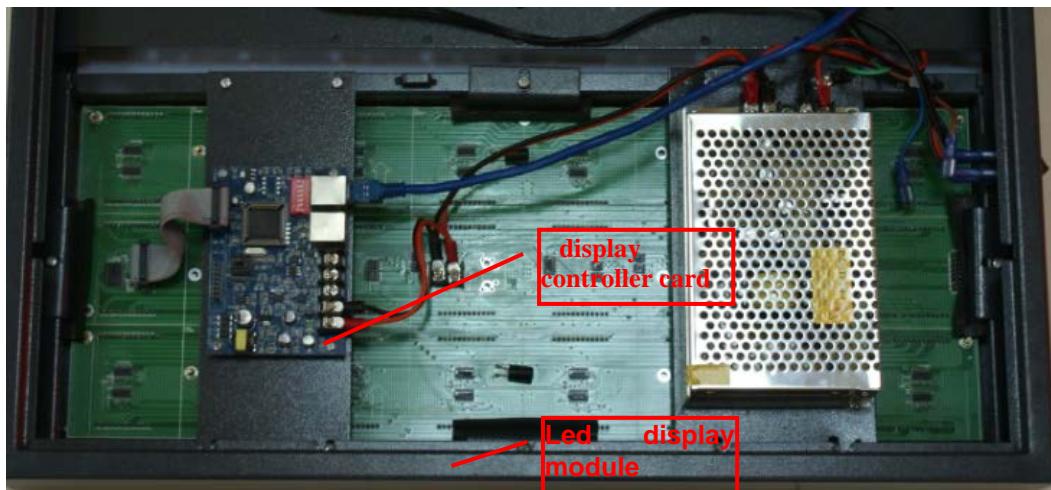
Working Voltage: AC 110~220V	Power Supply Rate: 50~60HZ
Working Temperature: -40~+80°C	Communication Way: RS-485
Baud Setting: 9600/4800bps, N, 8, 1	Communication Distance: ≤1000m

3.5.2.Wiring Connections

Led display can be connected into the system by common network cables or pressed 568B standard crystal head. Wire to ports as below:



1	2	3	4	5
power (DC+)	power (DC-)	GND	485-B	485-A



Connect LED Display Into System:

When the distance from LED display to system route is within 20m, LED display can be

regarded as a sensor and connect it into the system.

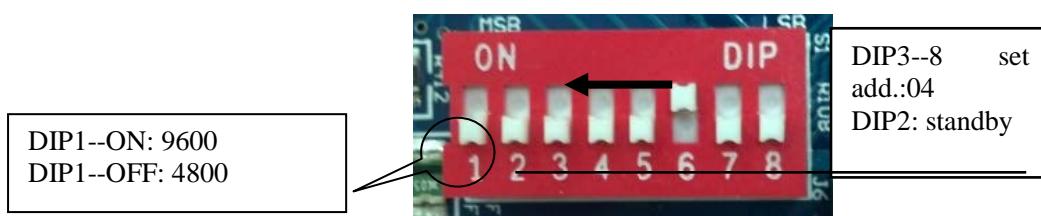
When the distance from LED display to system route is beyond 20m, especially when the outdoor LED display may be over 100m to system route, it's suggested that connect LED display to the end of the wiring(for example, a ZCU connects with 20 sensors, then we can use a network cable to connect LED display in series to the position of last sensor))

Remark:Once LED display is connected into the system, then we select any parking bay in the carport to this LED display through software, which has not direct relationship with the connection position of LED display.

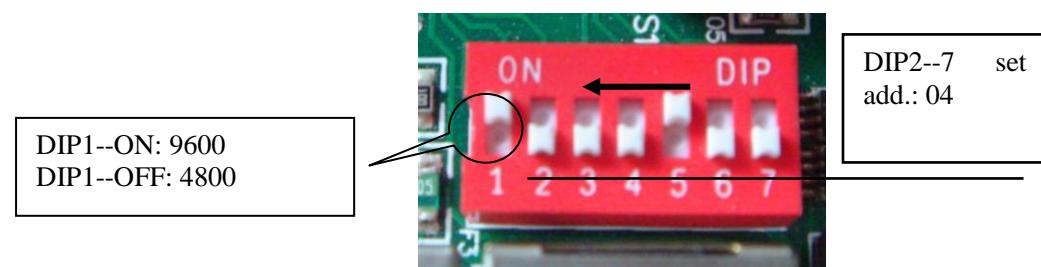
3.5.3.LED Display Address Settings

DIP Switch(total 7 ranks,1 is the highest rank) is to set led display address.O means 1,OFF means 0.Please refer Diagram 1-1.E.G.:display's address is 04,baud rate is 9600,then its DIP switch is1000100.

1、Model No.of Led Display Controller:LED-P31-V12



2、Model No.of Led Display Controller:LED-P31-V11



3、Instruction of LED Display's Address(Two-way or Three-way Display)

1) When the address of led display controller is 01(as pic.7-2),then the controller has 2 addresses(three-way display has 3 addresses).Among them:

Addresses of two-way led display(from right to left):01 and 02.

Addresses of three-way led display(from right to left):01,02 and 03.



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Address:02

01

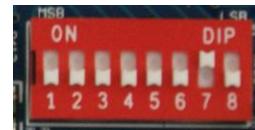
Address: 03

02

01

2) When the address of led display controller is 02(as pic.on right),then the controller has 2 addresses(three-way display has 3 addresses).Among them:

Addresses of two-way led display(from right to left):02 and 03.



Addresses of three-way led display(from right to left):02,03 and 04.



Address:03

02



Address:04

03

02

3.5.4.Maintenance and Troubleshooting

After you connect the power cable to the power supply,it should display **000→**.If Led display has been connected into the system and communicate well,then the data and direction of arrows will change according to setting information.

- If there is nothing been displayed,Check the power indicator has turn on RED(if not RED,please check the 5V power supply input).
- If it display correctly,but not completed,please re-plug the datawire.
- If it could NOT update the system data, please check the IP address,reset the IP address

3.5.5.Usage of LED Settings (Limit to general-edition CCU)



● hardware connection: connect CCU to PC by crosswire through serial port 232.

● Software installation: install LED settings software

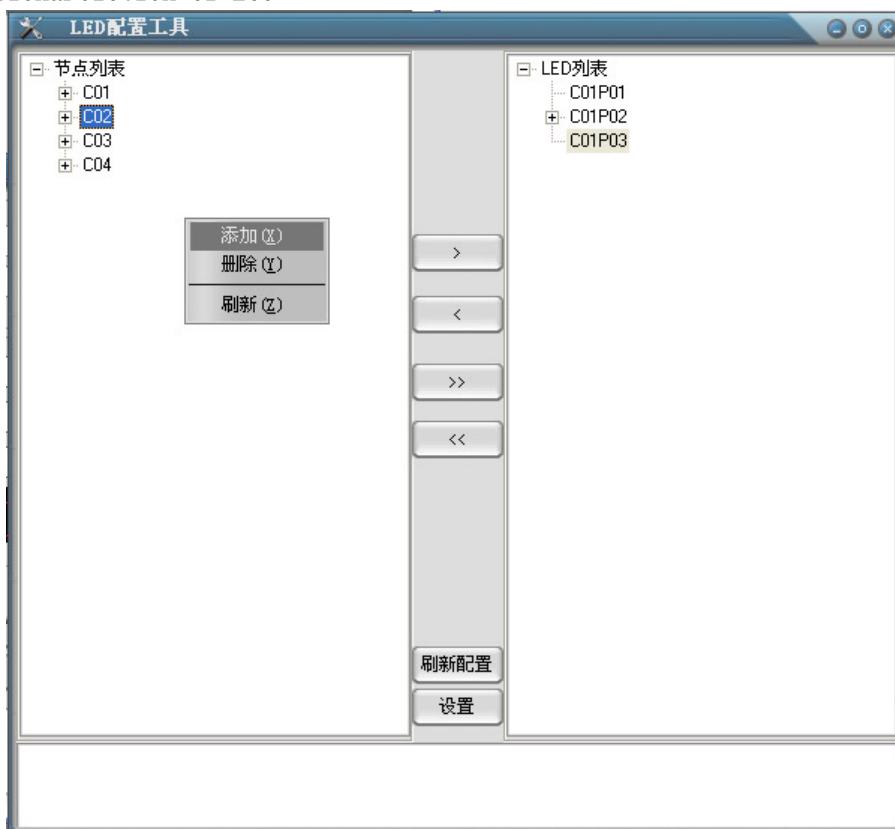
● Open LEDSetting.exe software, click: "setting":

baud rate: 57600 (fixed)

serial port (according to PC's serial port No. connected to CCU)



一、Addition&Deletion of ZCU



Right click "Menu" on the ZCU list and select "Add" or "Delete", add according to the on-site quantity (it should add from C01). ZCU default adds 60 sensors automatically (A01~A60, cannot be deleted).

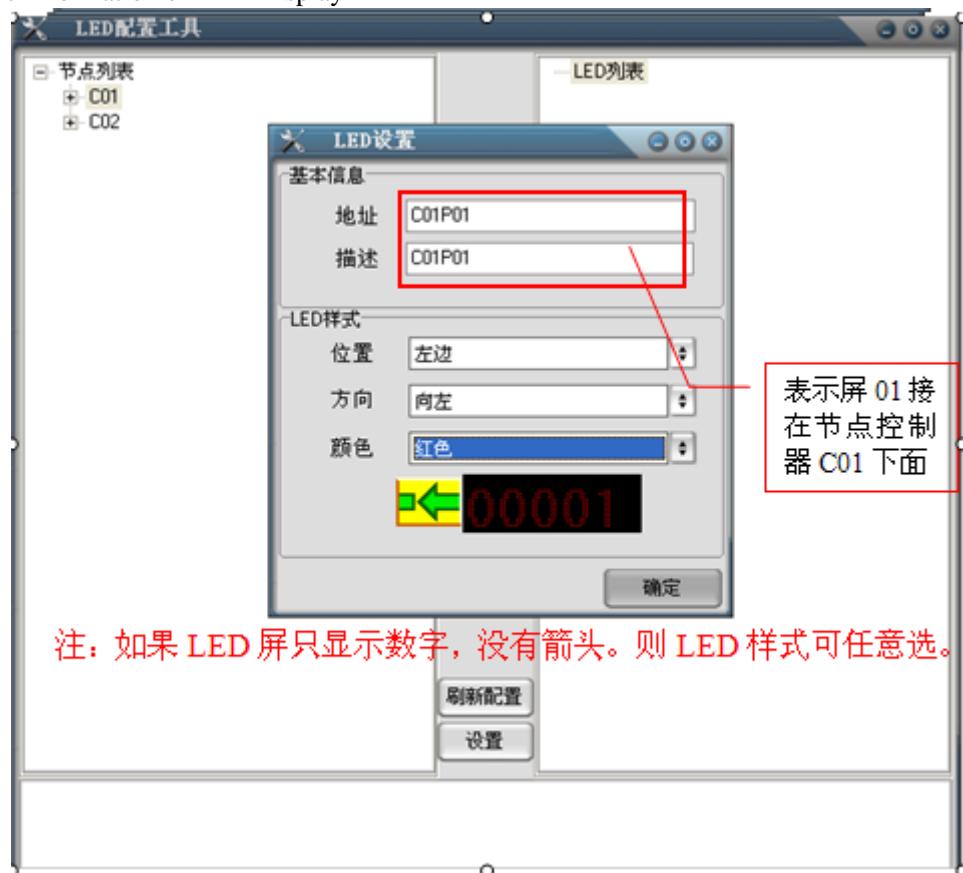
二、Addition&Deletion of LED Display

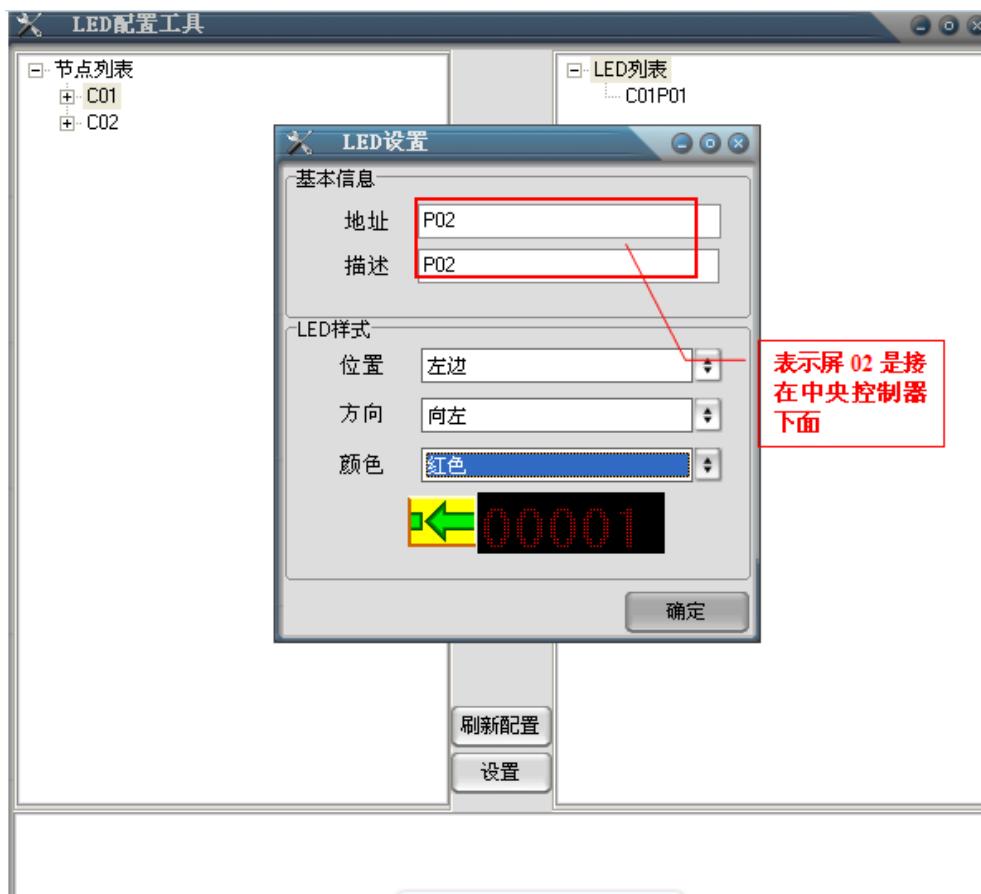
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1、Right click “Menu” on the Led list and select “Add”



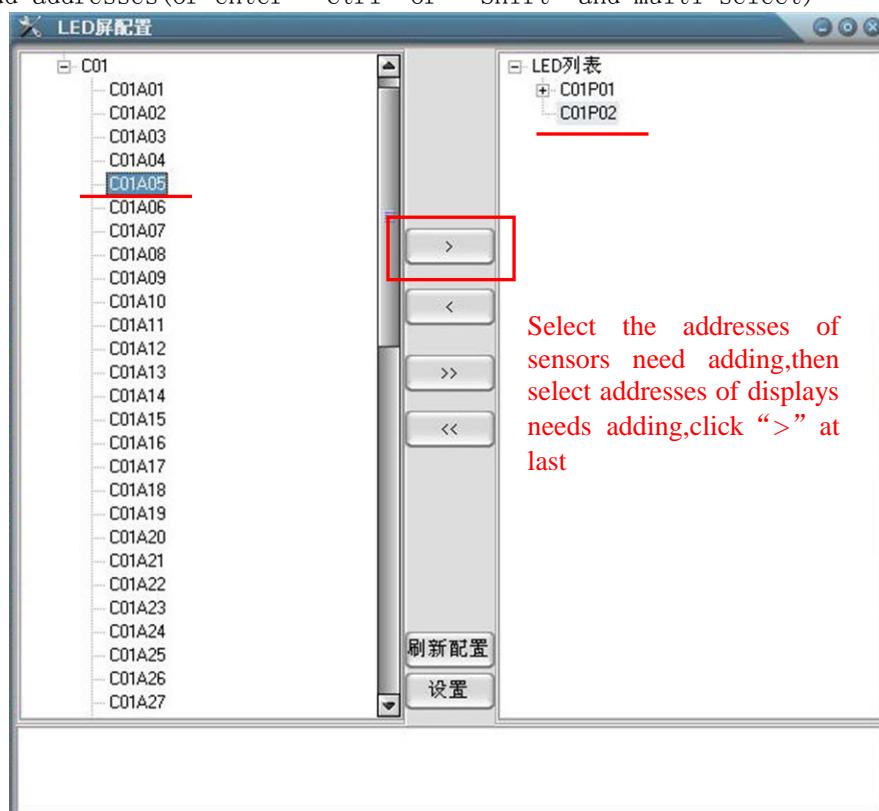
2、Input Basic Information of LED Display



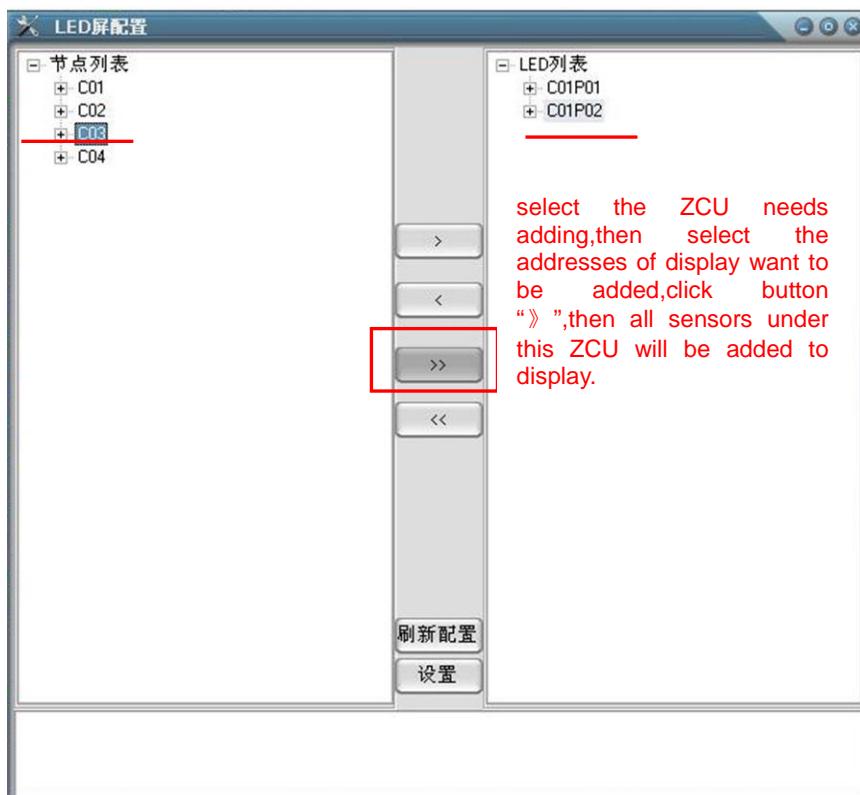


三、Add ZCU To Led Display

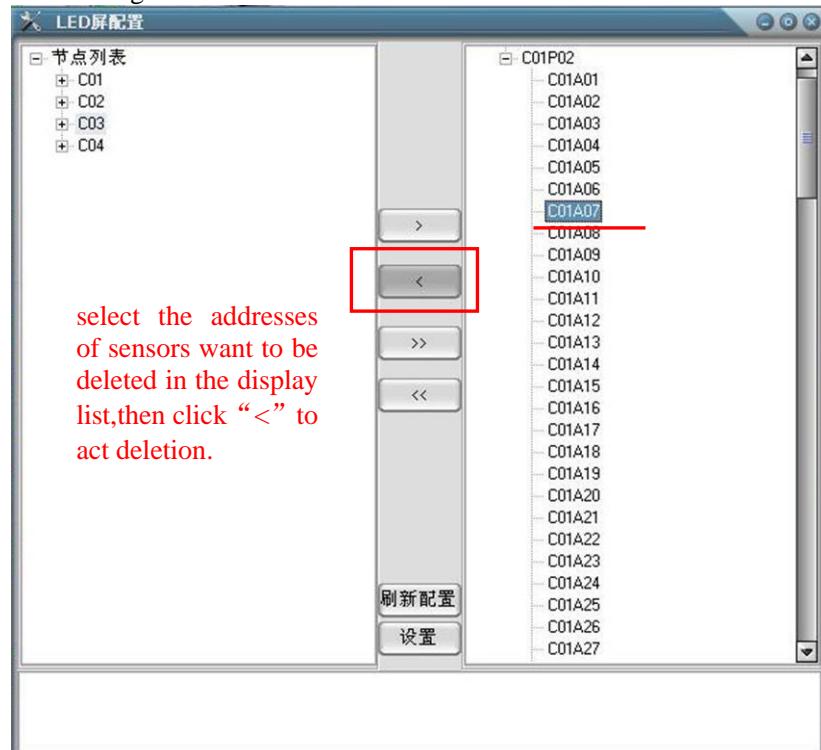
- Add addresses(or enter “Ctrl” or “Shift” and multi-select)



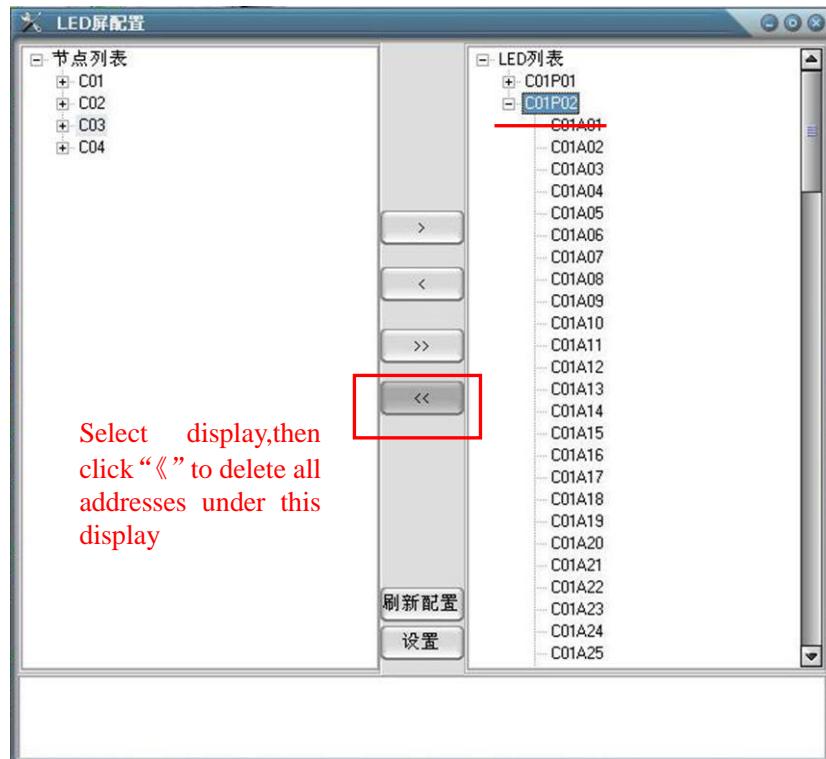
- Addition of The Whole ZCU(press Ctrl for multiple choice)



- Deletion of Single Address



- Deletion of Single Display



Set Up CCU

Click button "fresh", it will finish the LED settings

4. System Software

4.1.C/S Frame PGS Software

1) System Requirements

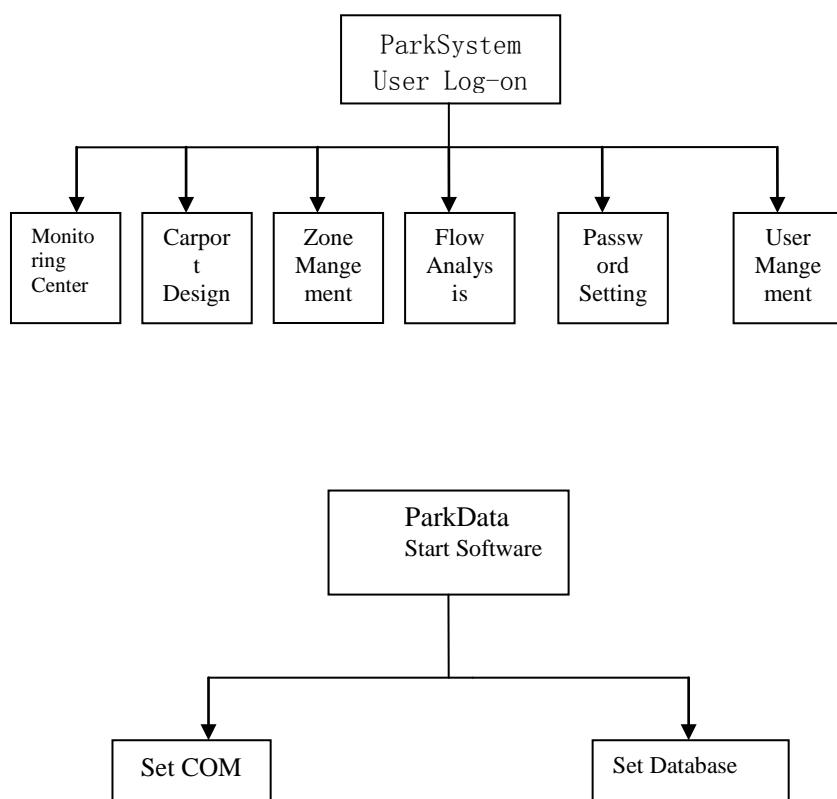
Software:

- ◆ Operating system: Windows 2000, Windows XP
- ◆ Database: SQL2000, SQL2005

Hardware:

- Memory: ≥1G
- Hard disk: 2G

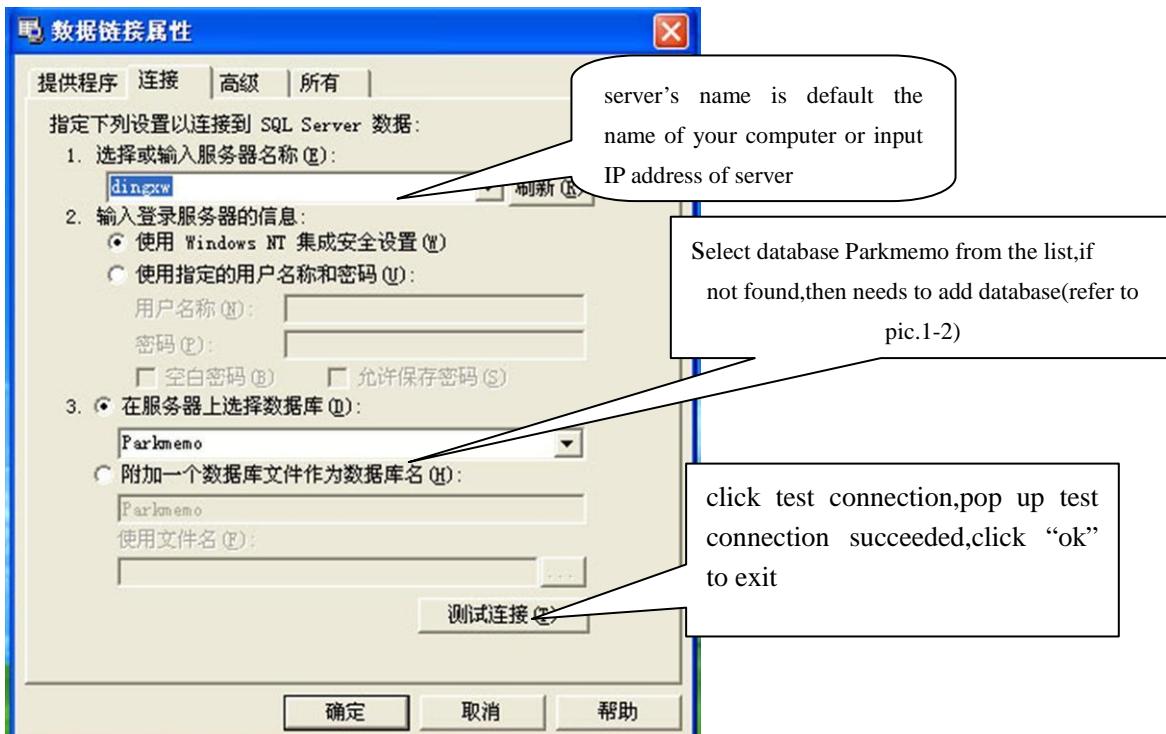
2) System Framework



3) Setting Instruction

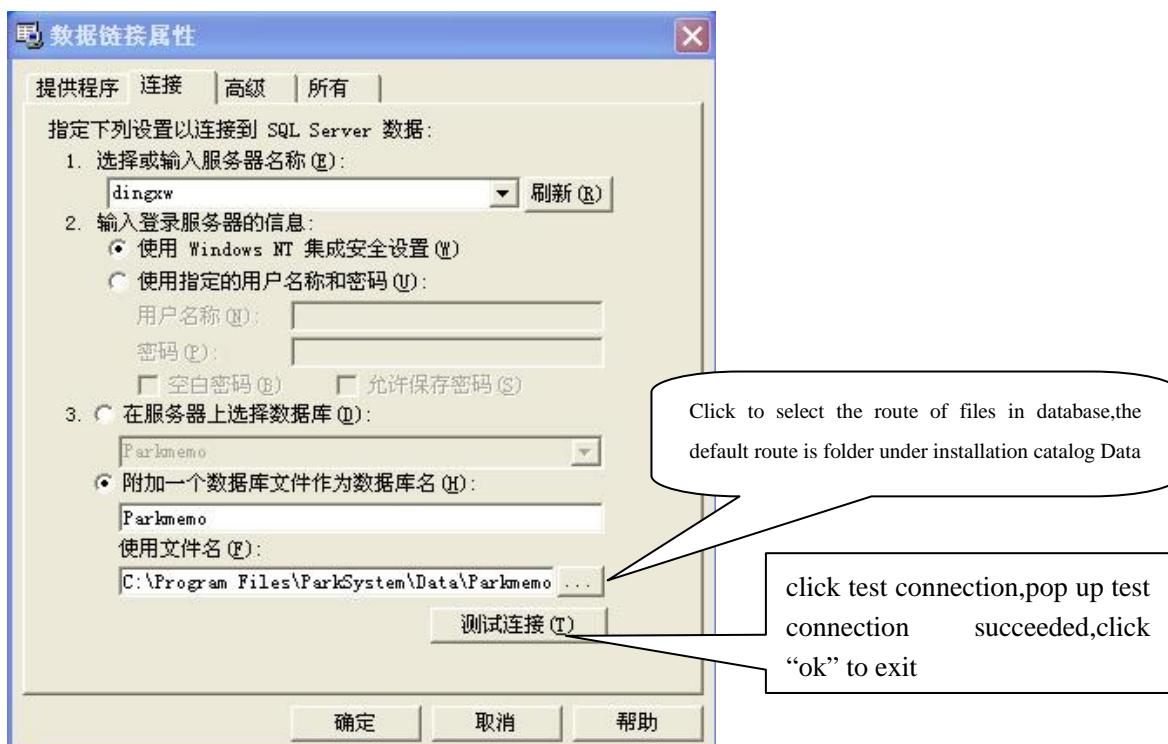


4) Set Up Parksyste(SQL needs configuration, Access doesn't need configuration)



5) Add Database

If the system doesn't have database Parkmemo, then it needs to add database by manual.



6) Set Up COM

After starting, the program will hide at the lower right corner of Taskbar.

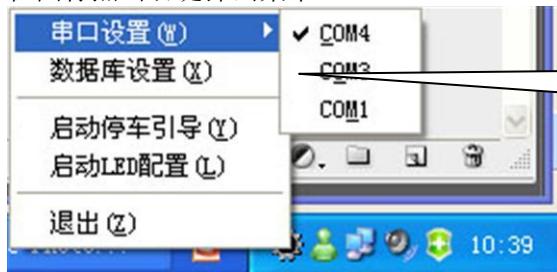


Black: not receive data

Blue: receive correct data (when receiving correct data, blue icon will flash)

Red: receive wrong data

在图标点击右键弹出菜单

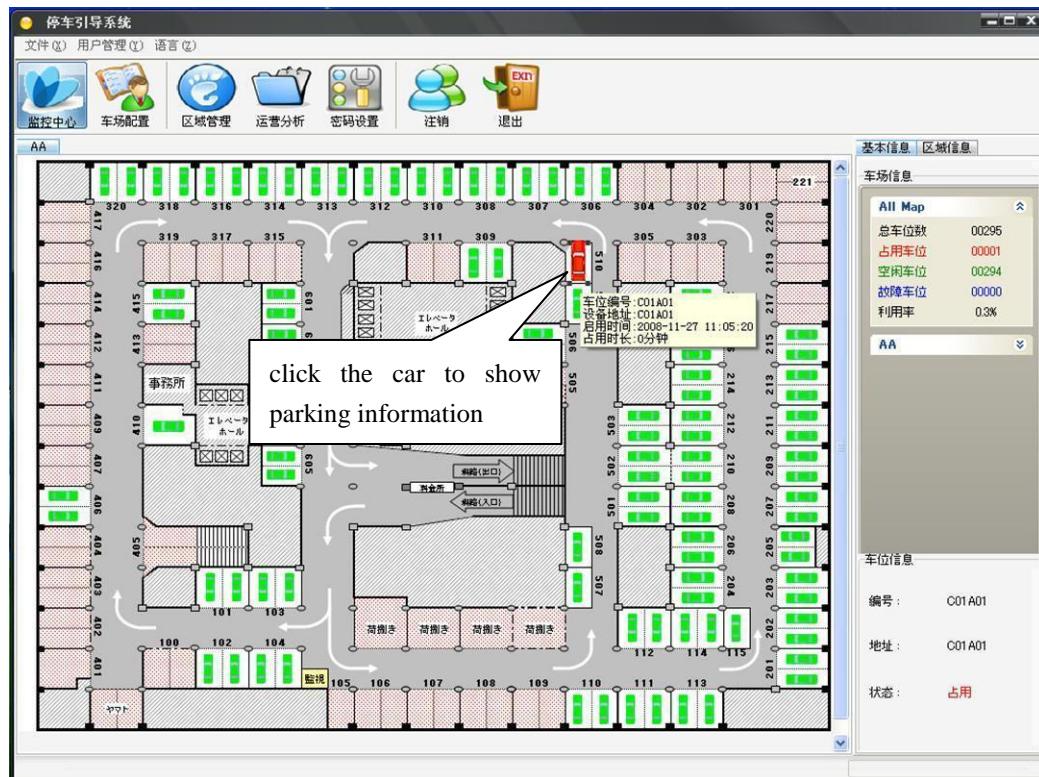


select corresponding COM

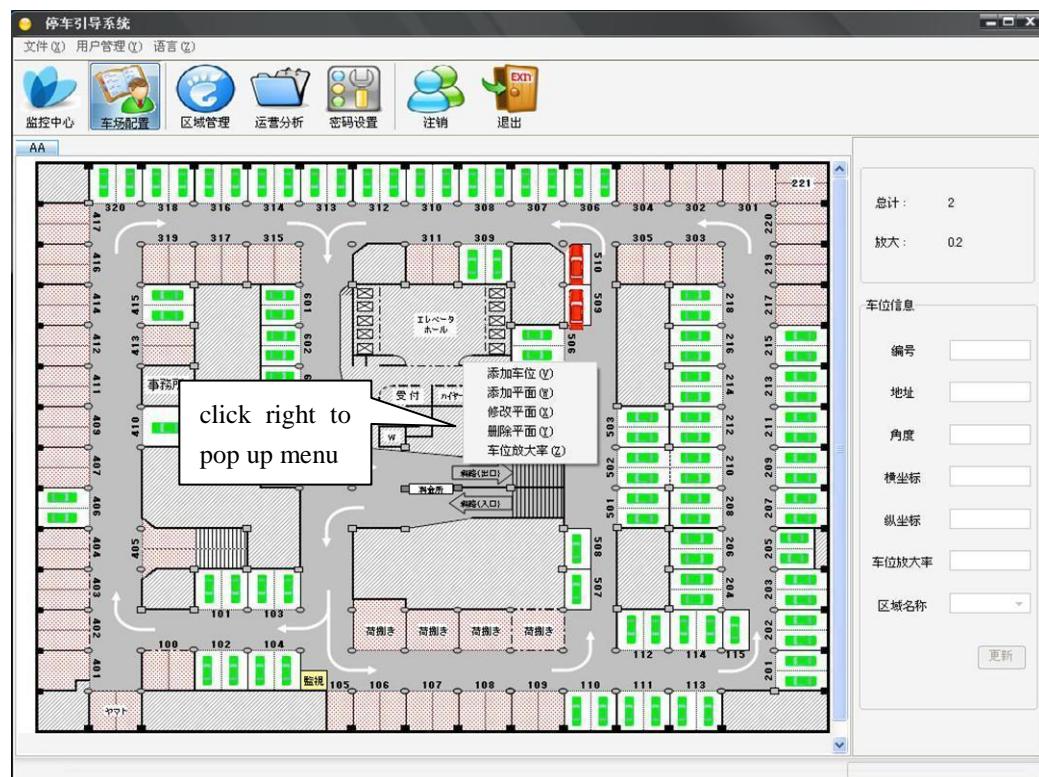
7) Parkdata



8) Monitoring Interface



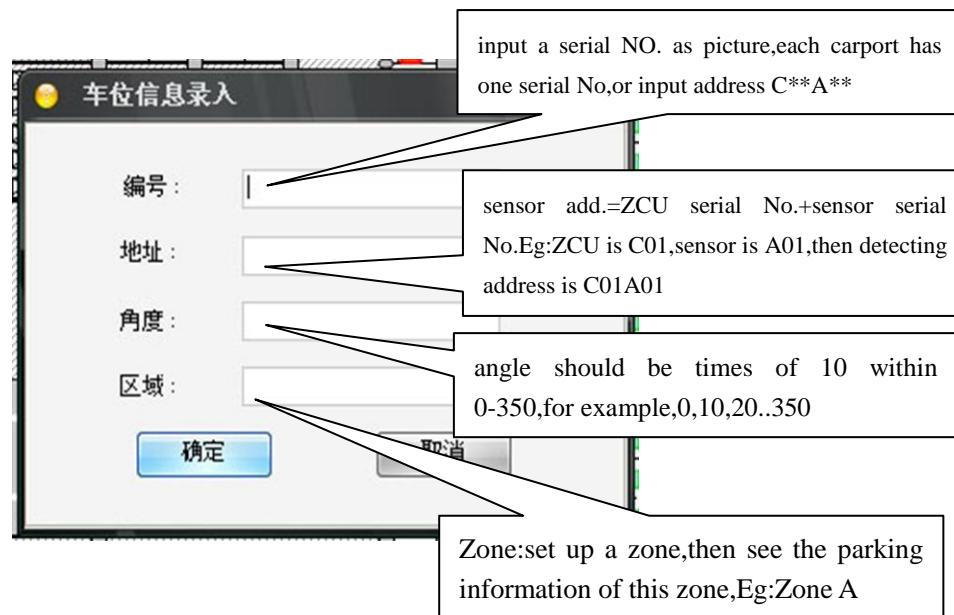
9) Carport Configuration



10) Operate Parking Bay

Add parking bays

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- Add Parking Plan



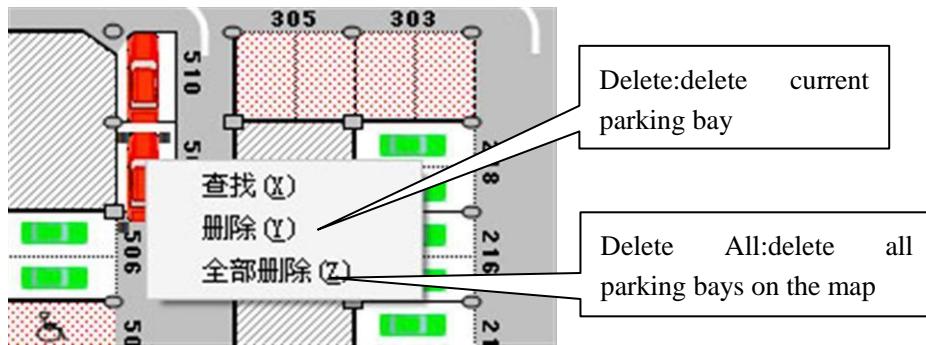
- Revise Parking Plan



- Amplification of Parking Bay



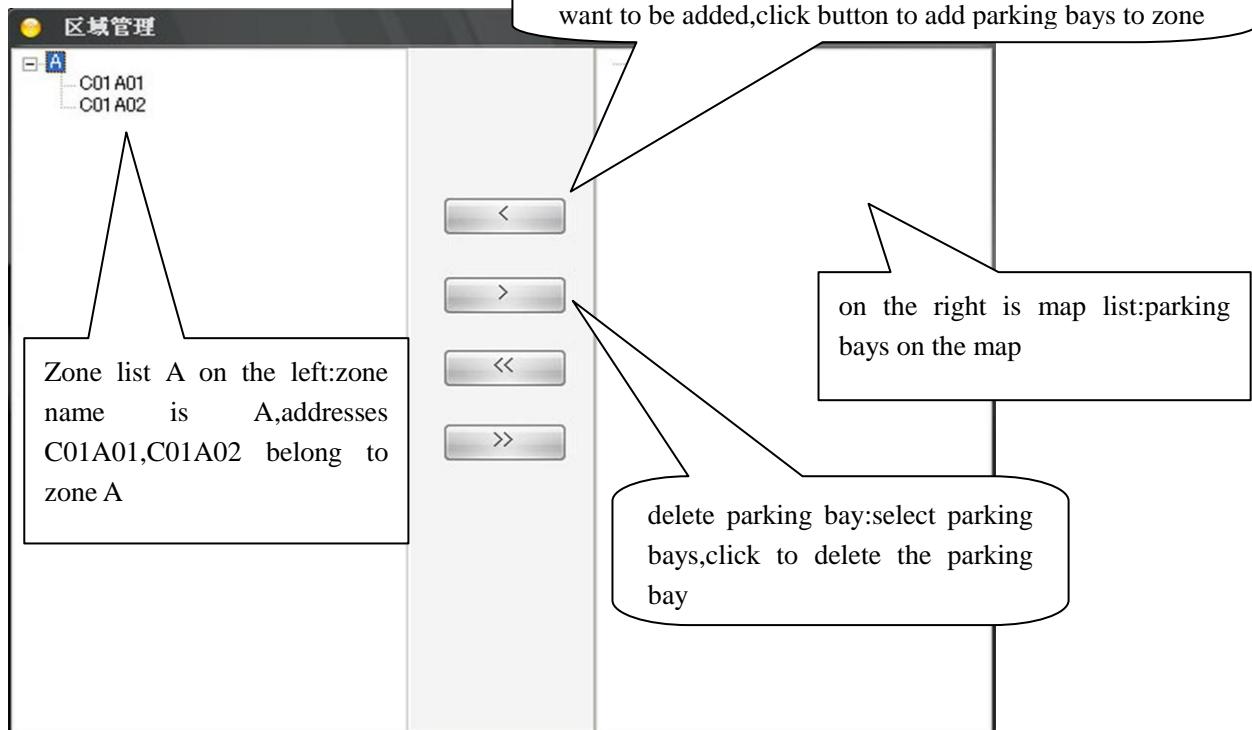
- Operate Parking Bay: Select car, click right, pop up menu



● Inquire



11) Zone Management



12) Operation Analysis

● Flow Line Chart

Two statistics ways:

- Flow statistics: number of cars enter the carport in a regulated period

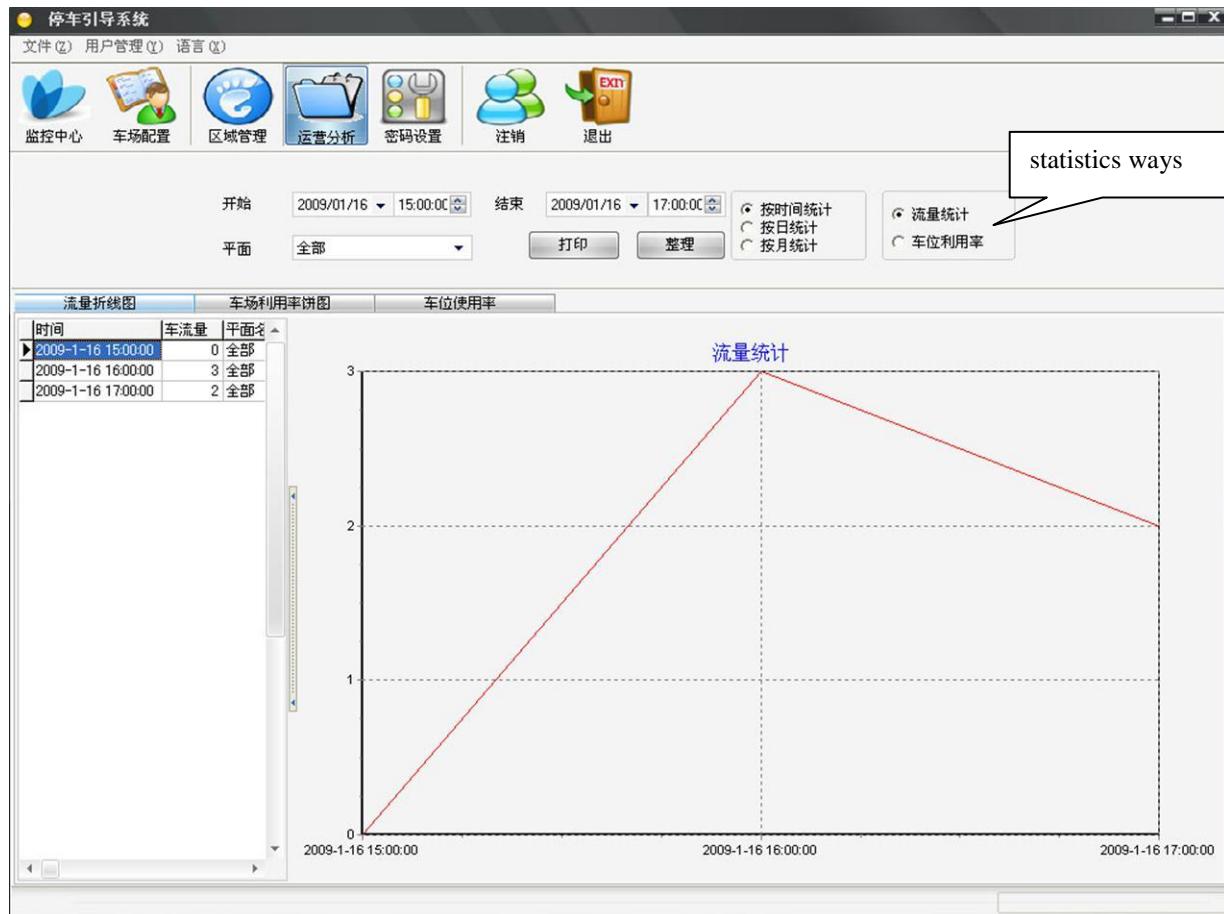
For example: if 3 cars park in carport from 12pm to 1pm, then the flow in this period is 3.

- Utilization statistics: add parking time of all cars in regulated period, then divide regulated period * total number of cars

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For example: 5 parking bays in the carport, cars park only during period of 12pm to 1pm, No.1 parking bay is occupied with 0.5 hours, No.2 parking bay not occupied, No.3 parking bay 0.6 hours, No.4 parking bay 1 hour, No.5 parking bay not occupied, then the utilization during 12pm to 1pm is $(0.5+0+0.6+1+0)/(1 \text{ hour} * 5 \text{ parking bays}) = 42\%$

Utilization of the whole day = $(0.5+0+0.6+1+0)/(24 \text{ hours} * 5 \text{ parking bays}) = 2.1\%$



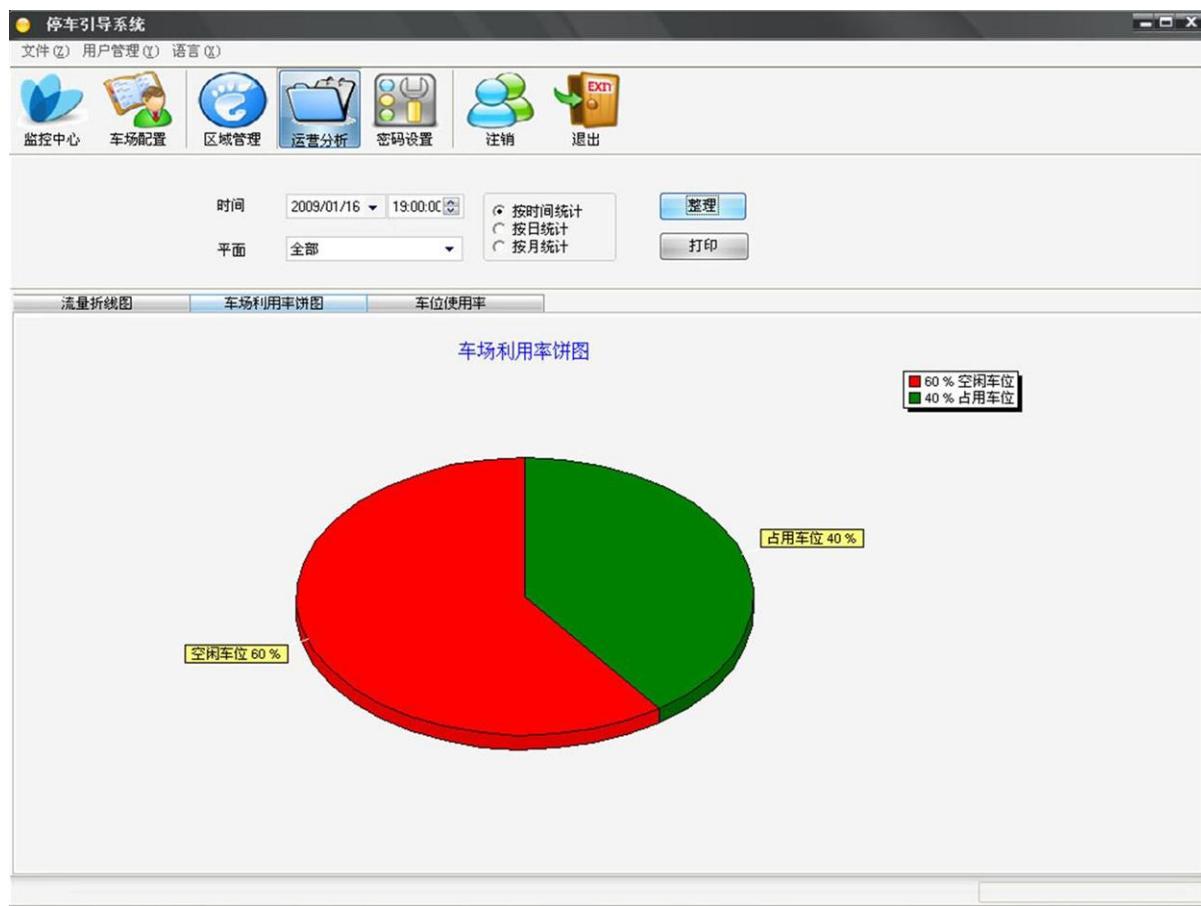
● Carport Utilization Pie Chart

Carport utilization = total occupied parking bays in regulated periods / total parking bays

For example: one carport has 5 parking bays, parking information during 12pm to 1pm is as below:

time	empty	occupied	total parking bays
12:01	4	1	5
12:30	3	2	5
12:33	2	3	5
12:45	5	0	5

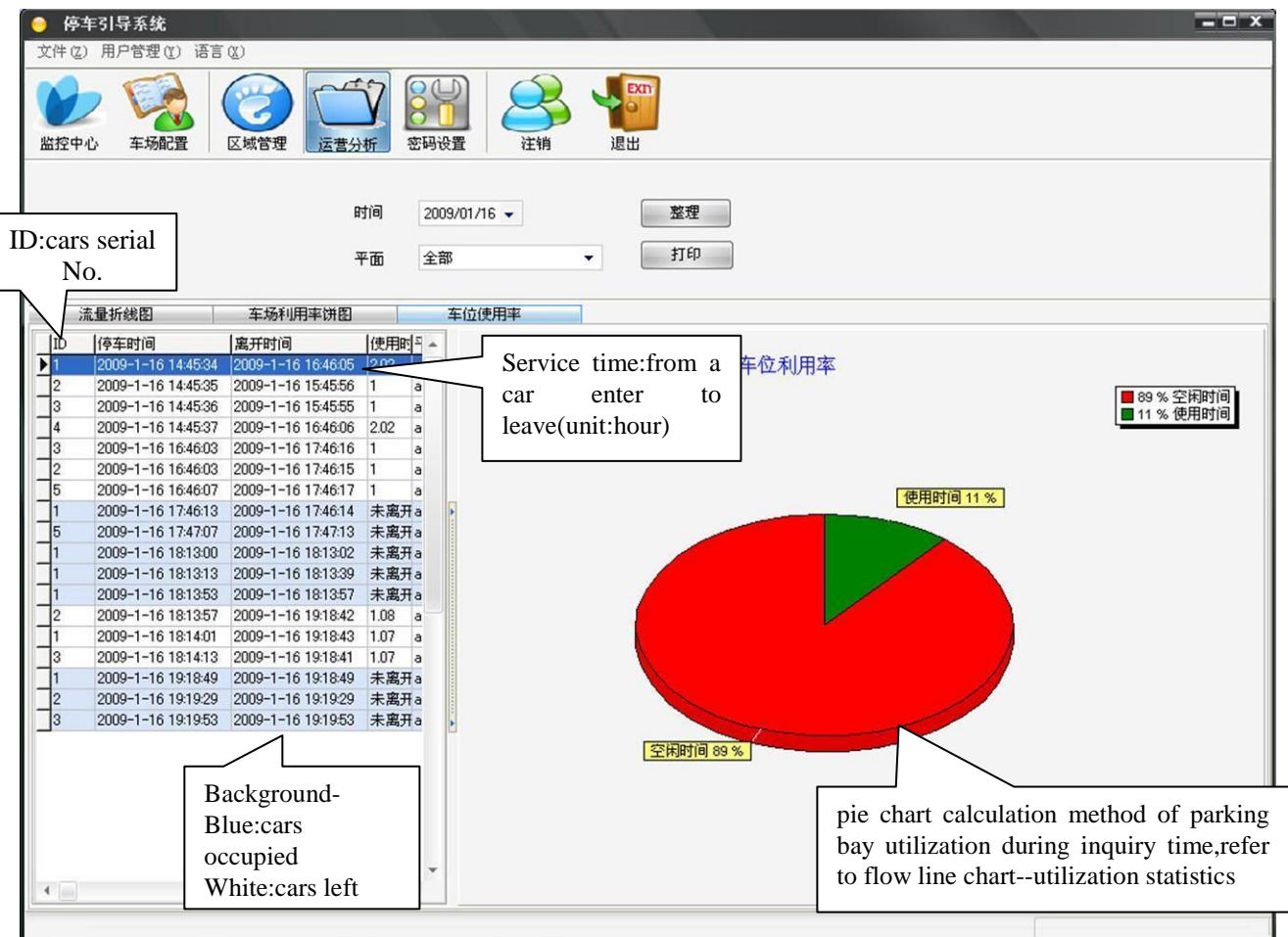
Then during 12pm to 1pm, empty rate = $(4+3+2+5)/(5+5+5+5) = 70\%$
 occupancy rate = $(1+2+3+0)/(5+5+5+5) = 30\%$



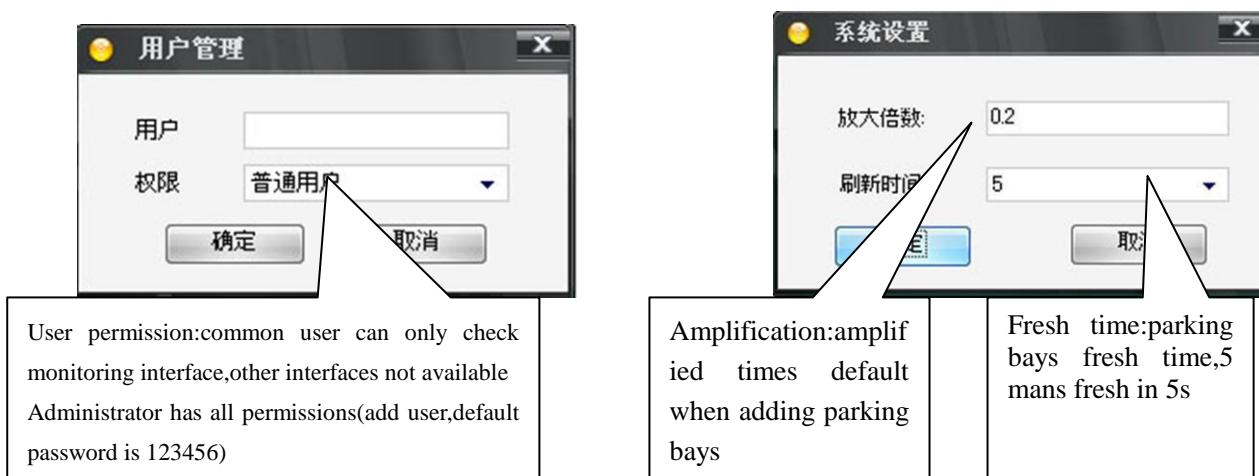
● Utilization of Parking Bay

Data on the left means parking situation(include cars enter and leave) on the inquiry day, ID means serial No. of parking bays

Pie chart on the right means the method of calculating utilized situation of whole carport is same as utilization of parking bay in flow line chart.

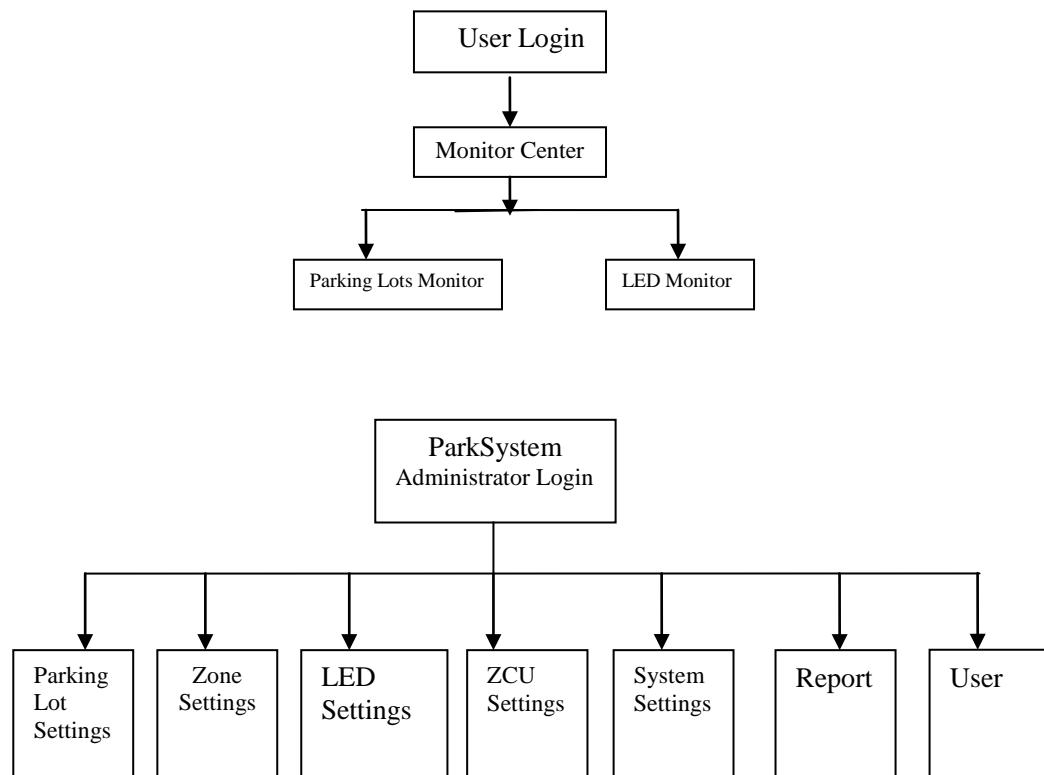


13) User Management



4.2.B/S Framework PGS Software

1. System Framework



2. Login

- Login Interface pls open by IE to login the interface <Http://192.168.0.23>



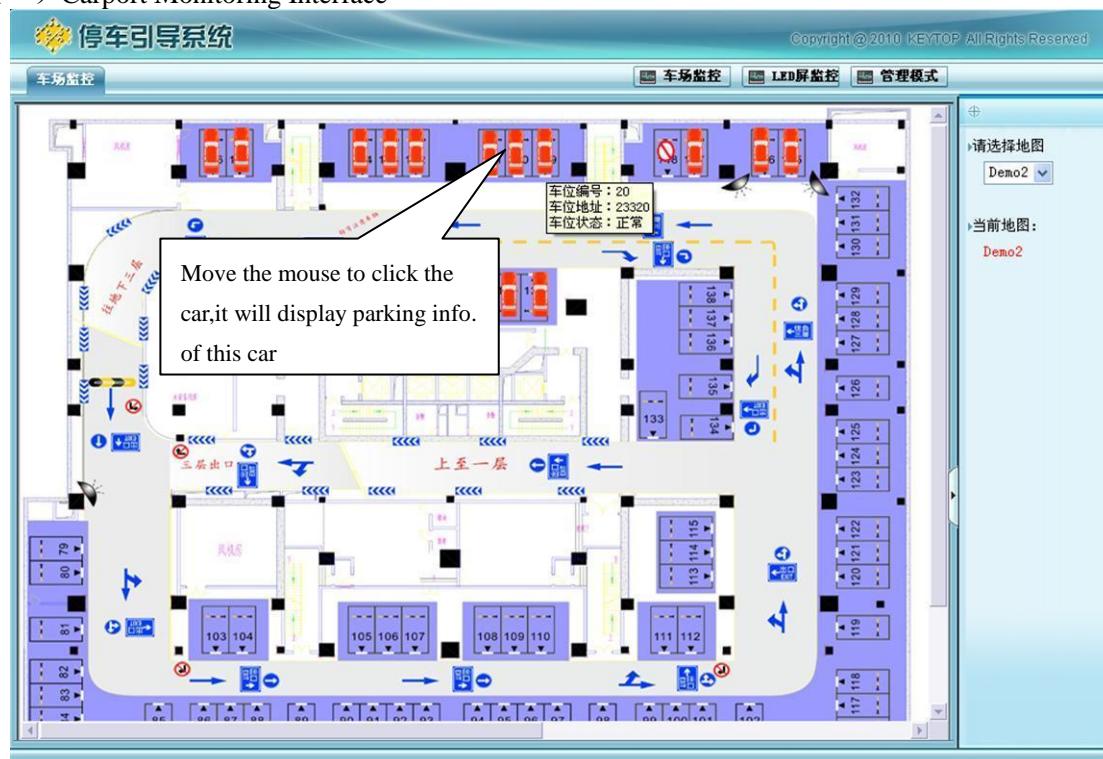
- Management Interface

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● Monitor Interface

(一) Carport Monitoring Interface



(二) Screen Monitoring Interface



- Carport Configuration

- a) Add Maps

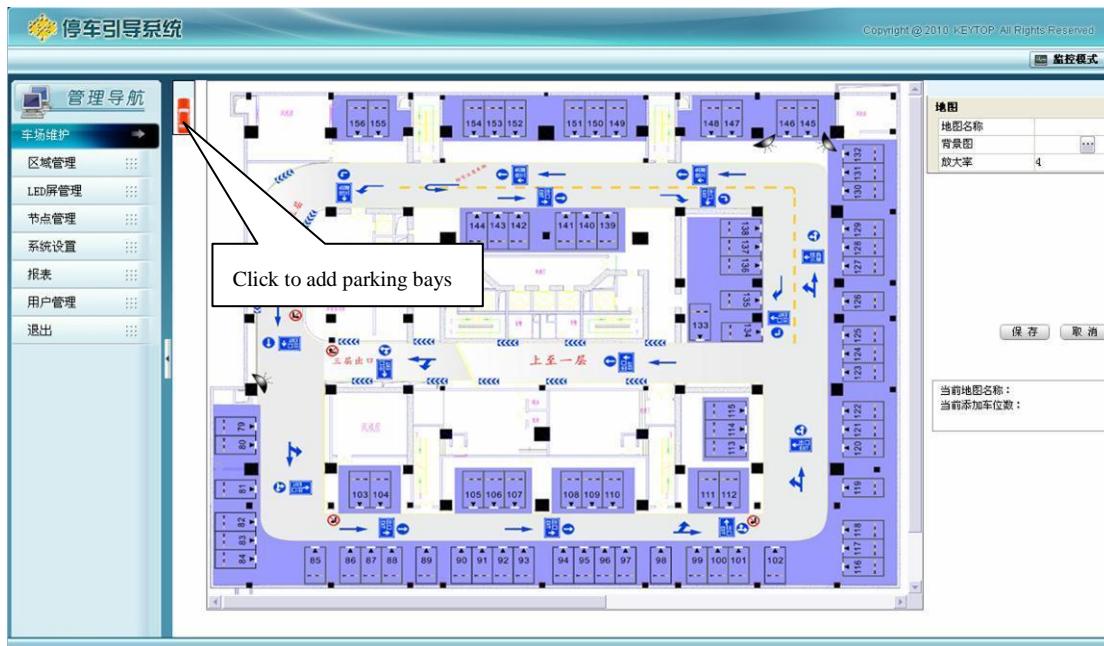
地图名称	修改	删除
Demo1		
Demo2		
1231		
12311		

共有4条记录 上一页 下一页 共1页 跳到第 页 GO

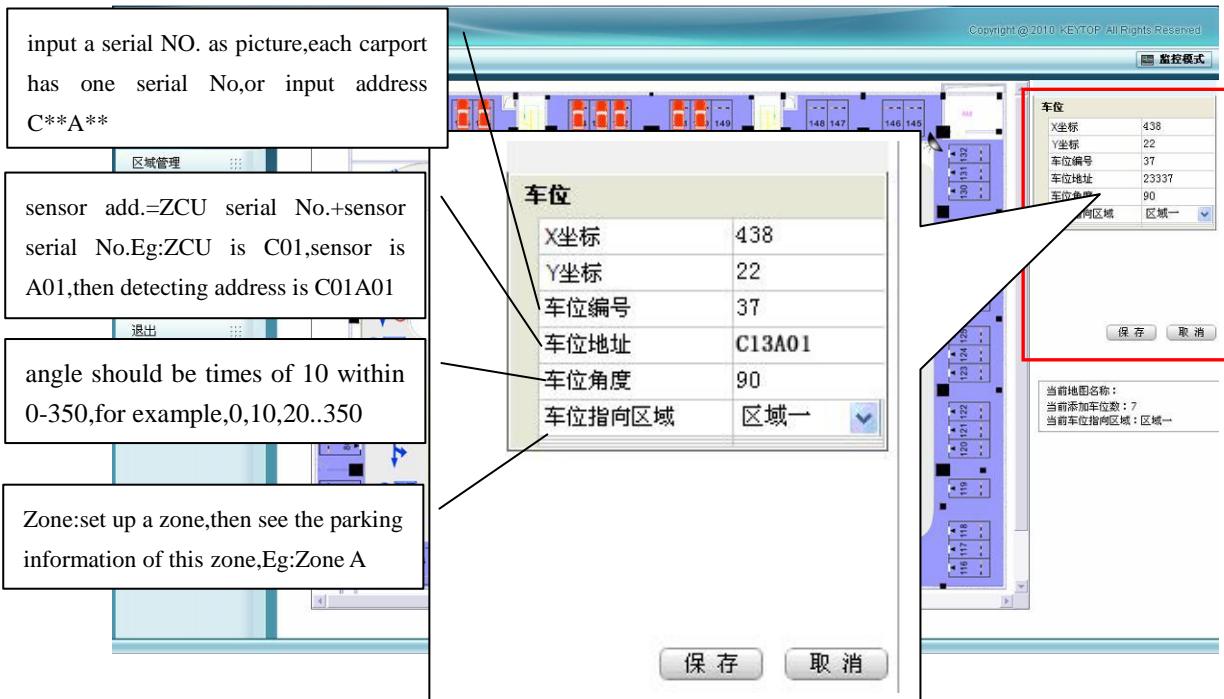
- b) Click  and select the image path in the map. After selecting the image, upload the map and click "ok"



- Zone Settings
- Add Parking Bays

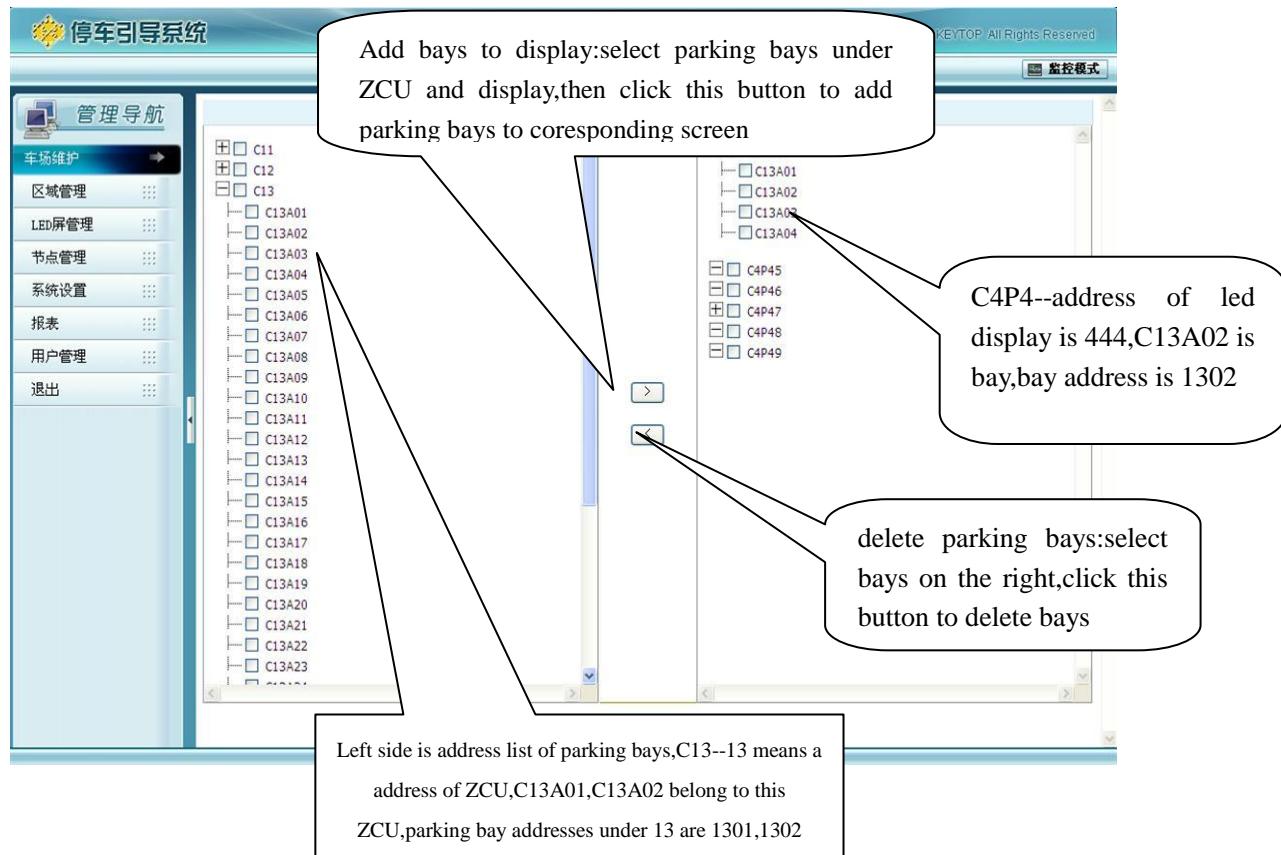


A car appears in the picture, drag the car by mouse to the corresponding place in the map and set the parking bay place, address, angle, zone, etc. (The default auto-generated number and parking bay address will be added 1 based on the last generated address, the parking bay address is ZCU address+Sensor address, the parking bay number and address is unique)



Pls click "SAVE" to store revised parameters of each car

- LED Settings
- Parking Bay VS Led Screen



● ZCU Settings

(一) ZCU settings can add,revise and delete ZCU.

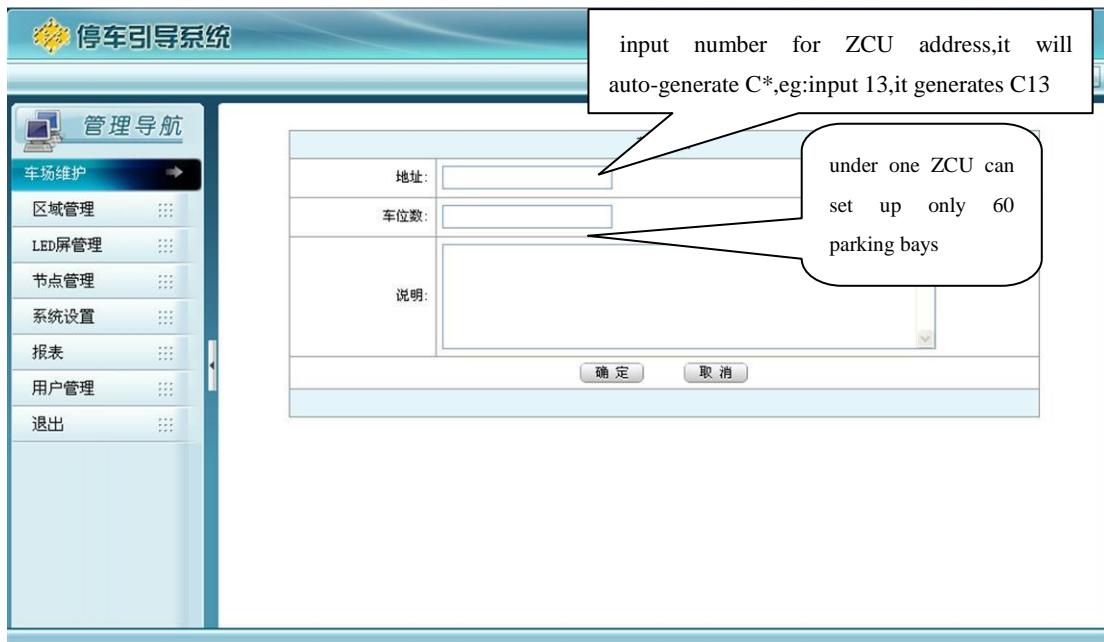


The screenshot shows the 'Parking Guidance System' software interface. The main window displays a table of ZCU settings:

地址	车位	说明	节点状态	修改	删除
C11	10	节点11	正常		
C12	60	节点12	故障		
C13	38	节点13	正常		
C14	30	节点14	正常		

At the top right of the main window, there is a button labeled 'add ZCU' with a green plus sign icon. Below the table, there are navigation buttons for '上一页' (Previous Page), '下一页' (Next Page), and a page selection input field '跳到第 [] 页' (Jump to page []).

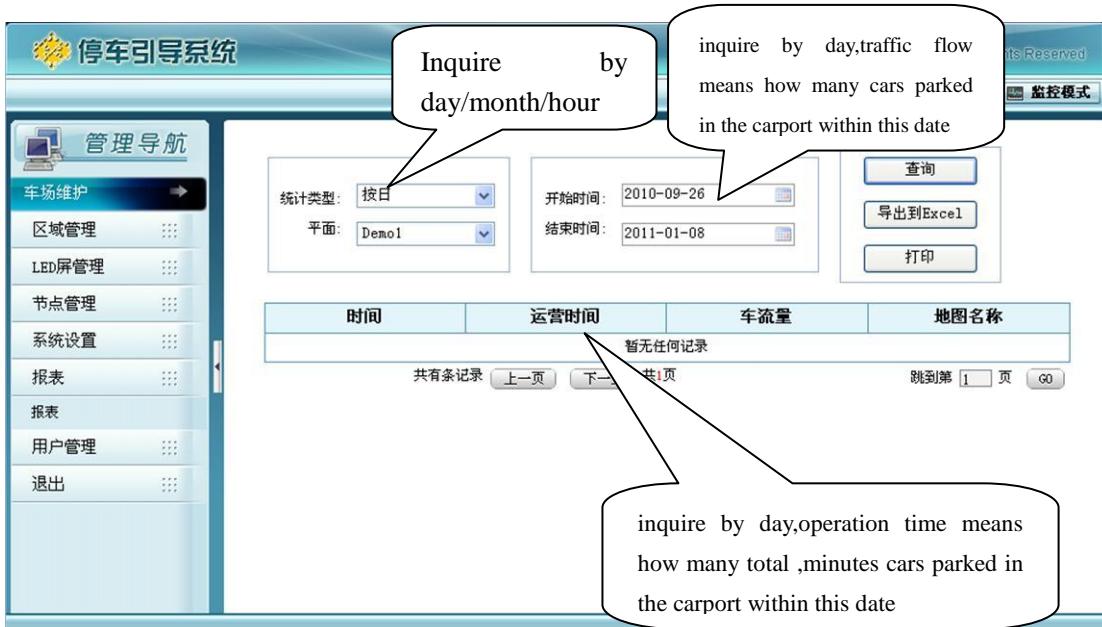
(二) ZCU Settings



● System Configuration



● Operation Analysis



● User Management



User management can add user,revise password,set up permissions.

5.Maintenance

5.1.Attentions of Daily Maintenance

- No operation of system devices by non-professional maintenance staff,in case of mistake operations and break-down.
- After configuration of system,pls restore files,in case of failure to recover from damage
- When changing break-down devices,cut off power supply first,otherwise signal line and power line may burn other devices
- When the system fails to work normally,pls check the power supply of each device,whether power supply is cut off by mistake

- When the installation height of sensor is lower than 2.2m, pls lock the address via DIP switch.

1. Attachment 1

Sensor Serial No.	Sensor Address	DIP Switch Status	Sensor Serial No.	Sensor Address	DIP Switch Status
1	01	0000001	31	1F	0011111
2	02	0000010	32	20	0100000
3	03	0000011	33	21	0100001
4	04	0000100	34	22	0100010
5	05	0000101	35	23	0100011
6	06	0000110	36	24	0100100
7	07	0000111	37	25	0100101
8	08	0001000	38	26	0100110
9	09	0001001	39	27	0100111
10	0A	0001010	40	28	0101000
11	0B	0001011	41	29	0101001
12	0C	0001100	42	2A	0101010
13	0D	0001101	43	2B	0101011
14	0E	0001110	44	2C	0101100
15	0F	0001111	45	2D	0101101
16	10	0010000	46	2E	0101110
17	11	0010001	47	2F	0101111
18	12	0010010	48	30	0110000
19	13	0010011	49	31	0110001
20	14	0010100	50	32	0110010
21	15	0010101	51	33	0110011
22	16	0010110	52	34	0110100
23	17	0010111	53	35	0110101
24	18	0011000	54	36	0110110
25	19	0011001	55	37	0110111
26	1A	0011010	56	38	0111000
27	1B	0011011	57	39	0111001
28	1C	0011100	58	3A	0111010
29	1D	0011101	59	3B	0111011
30	1E	0011110	60	3C	0111100