ESLtags

Warehouse Electronic Shelf Label

Solutions

Electronic shelf tags

www.electronicshelftags.com / info@electronicshelftags.com

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1. Warehouse ESL Solution Background

With the improvement of productivity, each enterprise warehouse has a large number of goods and spare parts stored, and the backward warehouse management can't be matched with the advanced productivity nowadays. Therefore, we provide excellent warehouse logistics electronic shelf label management system to help them solve the backward storage management.

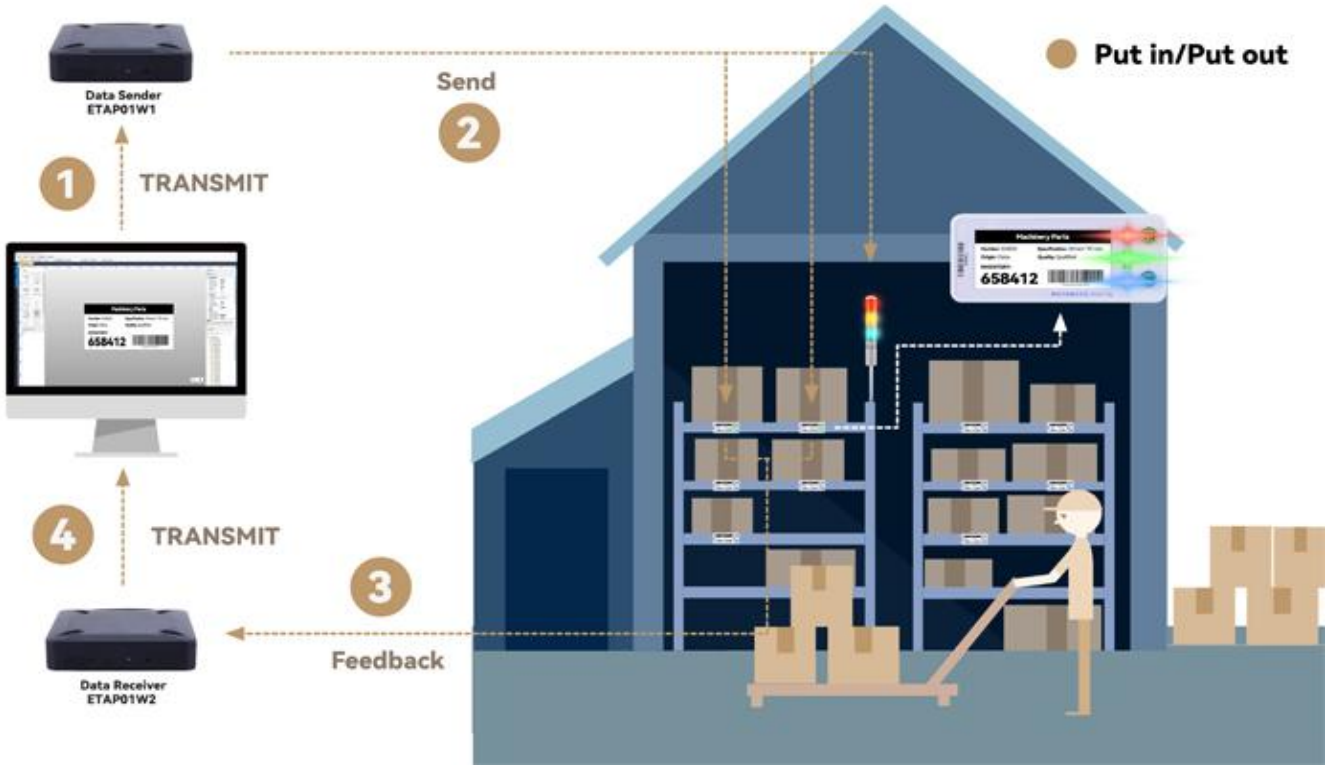
The system uses electronic paper display and ultra-low-power wireless networking technology to provide an electronic shelf label system solution suitable for the warehouse logistics industry and helps warehouse & logistics industry realize paperless management, product information management, refined inventory management, product batch and period management. To help customers save a lot of manpower costs, goods expired loss and other costs, while improving warehouse efficiency and the overall level of information.

2. Warehouse ESL Solution

2.1. Working Principle

Warehouse Electronic Shelf Label(ESL)Solution consists of five components, including Warehouse ESL Management System, 433Mhz Data Sender Base Station,Lora Data Receiver Base Station, ESL, LED Lighthouse.

Warehouse ESL management system can be integrated with the warehouse's ERP and other management systems to obtain the data. And the data is transmitted to the 433Mhz Data Sender Base Station by the TCP/IP protocol (supporting wireless network).The 433Mhz Data Sender Base Station transmits the data to the label and lights up the LED Lighthouse through the RFID wireless signal. Warehouse workers operate it according to the LED Lighthouse and the label instructions, and the operation results are feedback to the warehouse ESL management system through the Lora Data Receiver Base Station to form closed-loop management.



Working steps:

1) The Warehouse ESL Management System issues a picking task.

2) The 433Mhz Data Sender Base Station sends the data to the label and light up the LED Lighthouse.

3) When the worker finds the label through warehouse LED Lighthouse and the label LED lights, he go to pick up the corresponding quantity of goods. After picking, the worker needs to press the OK button and will feedback the "confirmation information"to the Lora Data Receiver Base Station.

4) The Lora Data Receiver Base Station will feed this information back to the system, and the system will go to do an action to reduce the inventory, and update the latest inventory to the label by the 433Mhz Data Sender Base Station.

2.2. Advantages

- Saving time in and out of storage, reduce labor costs.
- Reduce the error rate and staff complaints, improve effective.
- Online and offline, timely synchronization of inventory information.
- Achieve bar code management, easy to operate
- Stocktaking operations automatically generate “inventory profit & loss statements” and inventory list
- Dock with ERP system, analysis of inventory status

2.3.System Introduction

2.3.1. Function

Warehouse ESL management system is .NET language designed to provide warehouse managers with an excellent human-machine interface. Mainly provides the following functions:

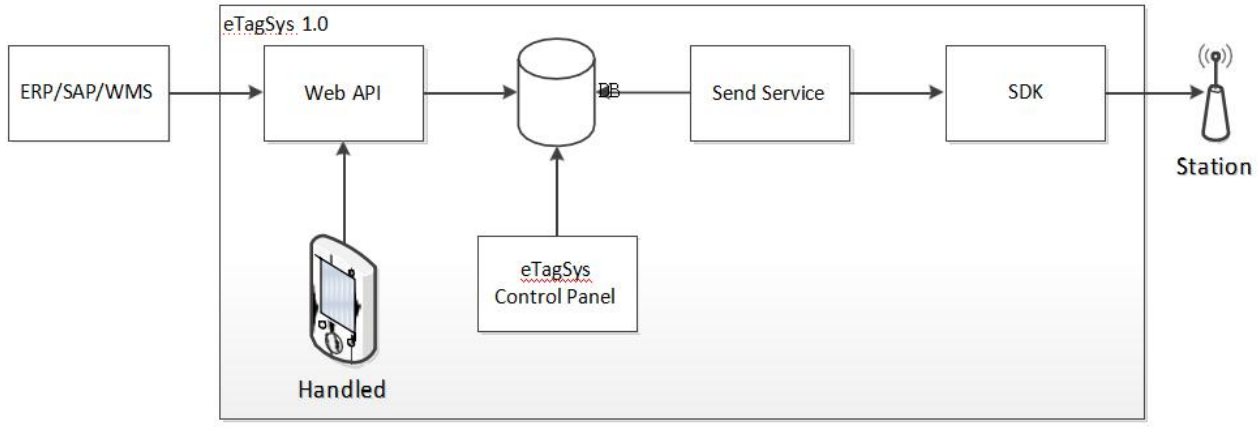
- **Query:** Query the goods's number, name, manufacturer and other key words to query the inventory details of goods, as well as detailed in & out of the warehouse operation record list.
- **Storage:** Create a storage data of goods, submitted to the system, the system will send the storage data to the Data Sender Base Station.The Data Sender Base station will send the data to the label and light up the LED Lighthouse to guide the worker storage the goods.After storage, press the OK button, the system will adjust the real-time inventory data through the confirmation feedback sent by the Data Receiver Base Station.
- **Out of the Storage:** Create a pick out list of goods, submitted to the system, the system will send the pick up data to the Data Sender Base Station.The Data Sender Base station will send the data to the label and light up the LED Lighthouse to guide the worker pick up the goods. After picking,press the OK button,the system will adjust the real-time inventory data through the confirmation feedback sent by the Data Receiver Base Station.
- **Inventory:** Select goods to create inventory plan. The system will send the inventory data to the Data Sender Base Station.The Data Sender Base station will send the data to the label and light up the LED Lighthouse to guide the worker inventory the goods.The worker through the handheld Android scanner to check the current inventory of stocks and the exact quantity. If there is a recording error, real-time inventory data can be modified.

2.3.2. System Architecture

Warehouse ESL management system consists of the following components:

- **Web API:** provides data import interface, import the customer information system data to the warehouse electronic shelf label management system database, then issued. The default WebAPI uses the HTTP protocol, supports a variety of data transmission methods, such as JSON, XML or custom format data transmission;
- **eTagSys Control Panel:** is the control panel of the entire warehouse electronic shelf label system. Operators can use it to view the real-time operation of the system, retrieve historical data and the entire system operational performance analysis view;
- **SendService:** is Windows service, scheduling and monitoring server in the background of the entire warehouse logistics electronic label system operation;
- **Warehouse Electronic Shelf Label Management System** using SQL server database.
- The system communicates with the base station hardware through the **SDK** driver.

Web API is the generic name for importing data from the outside to the entire Electronic tag system.



2.3.3. System Docking

1**Import:** Warehouse Electronic Shelf Label System uses ASP.NET MVC-based lightweight Web API as the preferred interface communication standard to replace the traditional

WebService / WCF solution as it is easy to deploy. This model is suitable for customers have mature and robust information systems, such as ERP / SAP / WMS, etc.; Need to develop with the customer's system operation and maintenance staff. Also supports customized docking programs, such as: based on Excel or XML text import FTP Server program; database client query programs.

2 . **Feedback:** Warehouse Electronic Shelf Label System supports customized feedback solutions. You can choose to passively publish WebAPI interface for customer information system queries, or active access to customer information system interface submission data. (Optional)

3 . **System interface docking:** Depending on the customer's existing software, develop the interface for IT docking. (It need to development before installation.)

2.4. Base Station Introduction

2.4.1. Parameters

Data Sender	ETAP01W1	Data Interface 1	Standard network cable interface(Standard)
Data Receiver	ETAP01W2	Data Interface 2	WIFI network interface (Optional matching)
Accessories	2*AC Adapter 4*Antenna	Communication Mode	**433MHz & Lora**
Dimensions(mm)	120*120*25	Communication Distance	≥ 50 meters
Weight	350g	Indicator light	Working status indication (R/Y/B)
Appearance color	Black	Operating Temperature	-10℃~55℃
Operating Voltage	DC 5V (original power supply)	Storage Temperature	-20℃~70℃
Operating Current	Less than 200mA	Operating Humidity	≤75%

2.4.2. Characteristics

- Based on ARM processor high-performance industrial-grade wireless data exchange node, seamlessly connects back-end servers and smart electronic label.
- Unique wireless network protocol, the largest support for 65,000 smart labels often online connection.
- Support traditional network cable interface, support POE cable interface.
- Backstage sends the data to the base station through the network cable, after the base station processes the data for the second time, transmit the data to the intellectual electronic label according to our unique encryption agreement, realize the wireless data distribution.
- The status of the smart electronic label will feedback to the backstage system through the base station.

2.5. Warehouse ESL Introduction

- Electronic Label and base stations using wireless communication, button battery-powered, easy to install, simple and beautiful (support wired power supply, can customization).
- Quickly display data information.
- With three-color light, quickly find the target.
- Provide batch management, expiration date management, to avoid expired goods.
- improve the goods storage and inventory efficiency, ensure inventory accuracy.
- Label has a temperature detection function, can draw the warehouse temperature distribution.
- Information display: support for multiple languages, graphics, text, symbols, etc.
- Temperature detection: support for temperature sampling, system readable.
- Power detection: each tag supports power sampling and can be read by the system.

2.5.1. Parameters

Display	Dimensions（mm）	107*45*16	Other Info.	Operating Frequency	433MHz & Lora
	Display Size	2.9 inch		Response Time	10s-15s
	Active Area（L*H）	67*29 (mm)		Protocol	Private
	Display Resolution	296(H)*128(V)		Page Cache	4 pages
	Display Color	Black+White		Operating Voltage	2.4V~3.6V
	Display Technology	Dot-matrix E-ink Epaper Display		Physical Buttons	FN / OK Button,Silicone
	Viewable Angle	Close to 180°		LED Light	R,G,B
Battery	Type & Quantity	CR 2450*2	Operating & Storage Ambient	Operate Temperature	0℃~50℃
	Battery Life	≥ 2 years		Storage Temperature	-10℃~60℃
	Replacement Battery	Quick-Release		Operate Humidity	＜75%

2.5.2. Battery Removal

Insert the ejector pin from the battery removal hole in the lower left corner of the label, and then push to the right to open the battery compartment, for battery replacement, convenient and quick.

2.6. Warehouse Lighthouse Introduction

Lighthouse achieves the path instructions, positioning the goods area. When the electronic label needs to operate, the corresponding area of the lighthouse beacon will light. When the operation is completed, turn off the lighthouse manually or automatically.

Function		Parameters
Model		NPT5-3K-D
Communication	Frequency	430M-434.92MHz
	Protocol	Private
	Response Time	0.5 ~ 1S
Power	Power Supply	DC 24V
	Power	2-3W/light
Light and Sound	Lights	Red, yellow, green LED, arbitrary control
	Lighting mode	Flashing or Always light
	Buzzer	100 ~ 130 dB, intermittent buzzer or often
Installation method		Bolt or base
Protection		IP55 dust-proof, waterproof. Adapt to harsh environment
Confirm Button		Turn off the light
Environment	Operate Temperature	0 ~ 50C
	Storage Temperature	-10 ~ 60C
	Operate Humidity	5% - 80% (no condensation)
	Storage Humidity	5% - 85% (no condensation)

3. Demo Kit Provision

2.9inch ESL *10

LED Lighthouse

Labels	10x 2.9"ESL(B/W)	**Accept Point**	1x ESL Data Sender(ETAP01W1)	**Software & SDK**	1x Demo Software
LED Lighthouse	1x Warehouse LED Lighthouse		1x ESL Data Receiver(ETAP01W2)		1x SDK
	1x AC adapter		2x AC adapter&4x Antenna		1x Demo Manual
	1x Controller		2x Network cable		1x SDK Manual

4. After-sales & Common Troubleshooting

（一）After-sales: We will provide videos of installation, deployment and operation; at the same time, we will remotely assist customers with software deployment and label update demonstrations; if necessary, our company relevant technical personnel can provide on-site guidance.

（二）Common Troubleshooting:

- Electronic Shelf Label cannot be updated
  1. Make sure the label ID is entered correctly. (For example, consider B as 8, and o as 0)
  2. Low battery power, you should check and replace the battery in time.
- Electronic Shelf Label without information feedback alert
  1. Make sure that the label is within valid control.
  2. Low battery power, you should check and replace the battery in time.

If you encounter any problems in the products or other installation and deployment, please contact us in time, we will assist you to complete the product testing and deployment work as soon as possible.

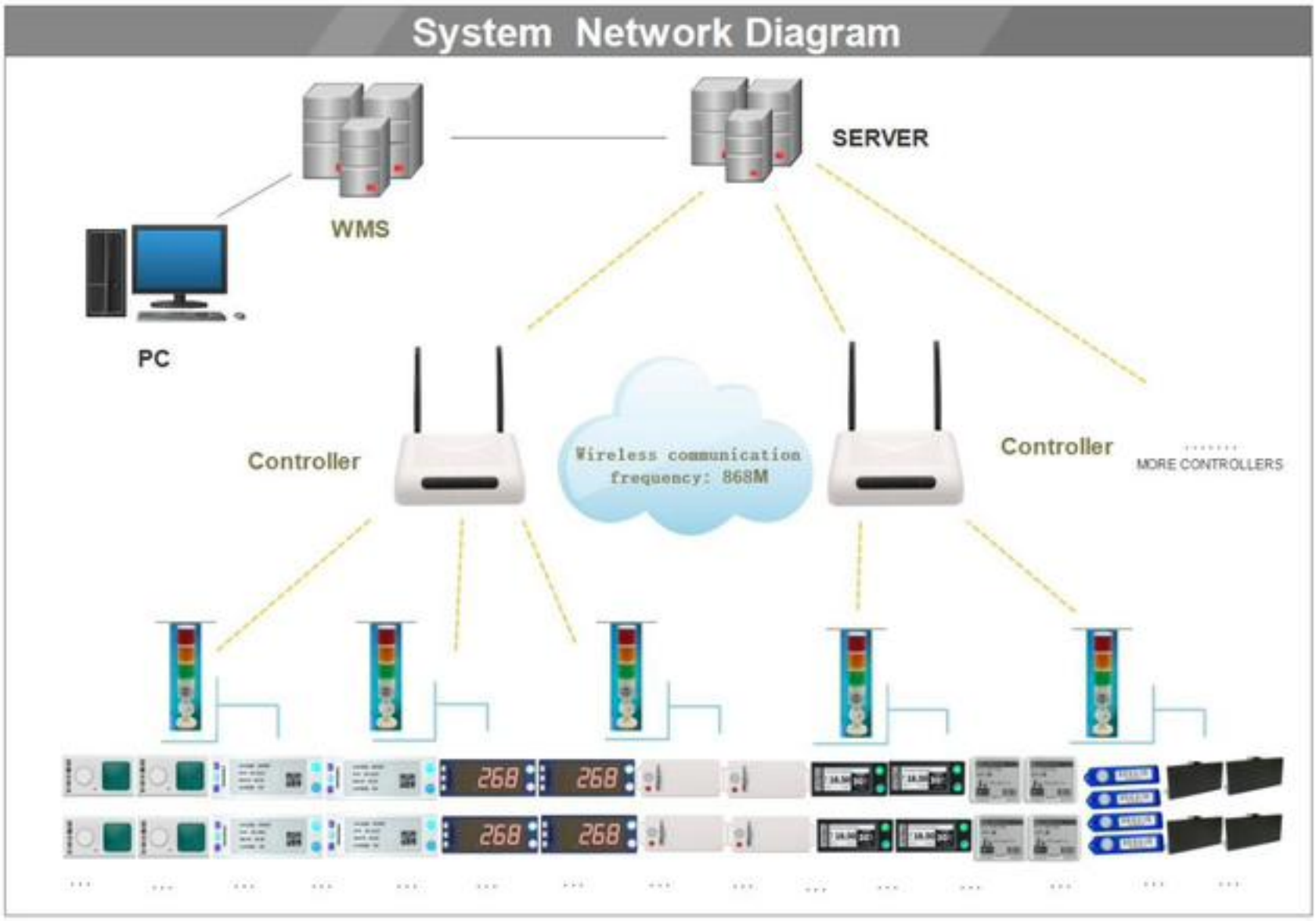


Figure 1.1

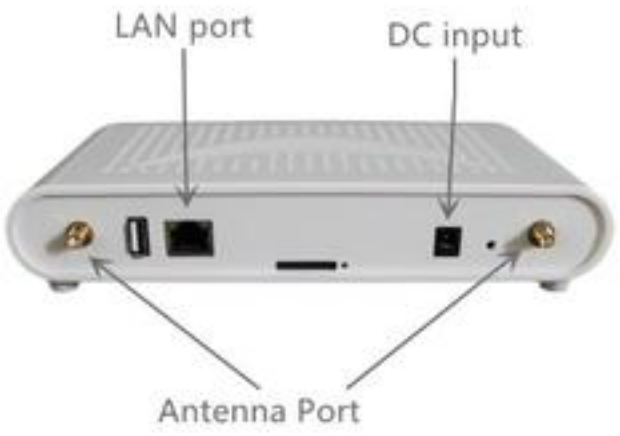
Using the wireless network to connect several controllers to the PTL system controlling PC

3. Planning a Wiring Schema for the Network

You will have to plan a wiring schema before installing the Pick-to-Light system in yo warehouse/distribution center. You will need to figure out how many controllers according the length and the width of the warehouse/center. And you will also have to calculate ho many picking tags and where they are going to be attached.After planning the wiring schem you can start the operation by operated guide.

4. Product categories

4.1 Label Controller Pick_Controller_V1.4



4.1.1 Features and Limitation

- One LAN port
- One DC input
- Two Antenna
- Communication mode： 868M,RJ45
- **Built-in server and software,one-stop controller**
- Power Supply:DC 12V 1A or POE
- Dimension: 210mm(L) x 140mm (W) x 43mm (H)
- The coverage of Wireless distance is radius 30m approx, support up to 10000 devices (picking tags)

4.2 Label Controller Pick_Controller_V1.2

Figure 4.2

4.2.1 Features and Limitation

- One LAN port
- One DC input
- Two Antenna
- Communication mode： 868M
- Power Supply:DC 12V 1A or POE
- Dimension: 210mm(L) x 140mm (W) x 43mm (H)
- The coverage of Wireless distance is radius 30m approx, support up to 10000 devices (picking tags)It needs to be used with software.

4.3 CK_Label_V1