



Data Communication Solution

Smart Logistic and AGV Application

An automated guided vehicle (AGV) is a computer-controlled vehicle used in a wide variety of industrial applications, mainly including the transportation of different types of materials in pallets, rolls, racks, carts, and containers. AGVs are a key component of a flexible manufacturing system and are a proven technology for improving efficiency, safety, and quality in automotive factories. Reliability, configurability, programmability, and real-time communication capabilities are critical to successful implementation.

Project challenges/goals

The customer was planning to build up an automated warehouse system. An AGV (automated guided vehicle) system inside the factory was required to achieve this. Therefore, our mission is to provide a reliable wireless data network (WiFi technology) for the AGV system that would allow all the AGVs to be controlled from the control room.

In this application, we need to transmit I/O signals from each vehicle. Even I/O traffic does not require a lot of bandwidth, but uninterrupted communication is critical. However, a short 60- to 100-millisecond disruption in the link can cause the I/O system to stop an AGV in its tracks. As AGVs move about the plant, their wireless links must “roam” from one fixed radio to another; such roam events can cause enough delay to trip the I/O system offline. JetWave series WIFI AP employs Fast Roaming

technology that ensures AGVs are disconnected for under 50 milliseconds while roaming from one fixed radio to the next without using a central wireless controller or any complicated network configurations.

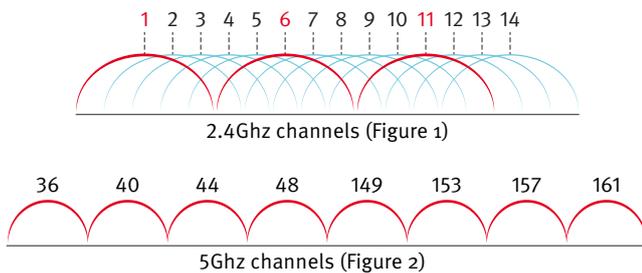
- **Communication Reliability:** Uninterrupted and fast data communication among AGVs and the control center is essential.
- **Trouble-shooting:** When an AGV breaks down, the problem can easily be traced to its source.
- **WiFi deployment and maintenance:** Commissioning the WiFi environment does not require lots of time and resources.

Solution overview

Dual Band/Dual Radio Coverage and Channel Planning

Currently, a majority of the AGVs in use only support 2.4GHz WiFi. However, owing to the limited number of available channels and high interference in the 2.4GHz band, more and more AGVs are starting to support 5GHz WiFi. A future-proof WiFi network for an automated warehouse should support both 2.4GHz and 5GHz simultaneously. JetWave WiFi APs also support dual-band dual-concurrent operation.

There are 13 channels in the 2.4GHz band (Figure 1). The channel spacing is 5MHz while the channel width is 20MHz. Therefore, there are only 3 non-overlapping channels at the same time, e.g., channel 1/6/11 which are commonly used in WiFi network channel planning. The 5GHz band has a higher spectrum width compared with the 600MHz band (Figure 2), and it also has more channels than the 2.4GHz band. Hence making the channel planning becomes much easier. In addition, the 802.11ac standard for the 5GHz band not only supports HT20 and HT40 channel modes, but also supports HT80 channel mode.



All Korenix JetWave WiFi series solutions support both 2.4GHz and 5GHz. JetWave 3200 and 4200 series even have dual radio designs which can support both 2.4GHz and 5GHz individually. Under this condition, we can provide WiFi networks with higher reliability for different AGV applications. It is one of the advantages of our JetWave WiFi series solutions.

Traditional environmental sensors are based on serial communication. Beijer IIoT employs Korenix technologies that enable 4G/LTE, LoRa, and WiFi devices to convert stream communication to network communication and make the output wirelessly, saving wiring and maintenance costs. The wireless infrastructure is flexible for a long or short distance and meets all public network application requirements.

1. Korenix offers fast roaming support averaging 50ms with JetWave WiFi series.
2. Korenix JSR (JetWave Smart Remote) is a smartphone application that could show the WiFi status of all APs and clients.
3. JSM (JetWave Smart Mapping) is a simple and easy tool that helps end-users build up WiFi AP and client settings.



1. **WiFi AP:** At the top of the warehouse to cover the WiFi signal.
2. **WiFi Client:** Inside AGV for data transmission.
3. **Korenix JSM:** SW function – A simple and easy way to set up or maintain the WiFi network.
4. **Korenix JSR APP:** SW function – Smartphone APP to monitor WiFi network.

Why Beijer Electronics/Korenix?

- Compared with other suppliers, fewer Korenix APs (Access Points) are needed to cover the complete factory with excellent WiFi performance.
- JSR (JetWave Smart Remote) smartphone APP enables easy monitoring of AGV WiFi devices, allowing simple and efficient maintenance of WiFi system.
- Korenix WiFi AP provides a PoE PD function that allows end-users to use a PoE switch to provide power directly, saving cabling effort and cost.
- Korenix JSM (JetWave Smart Mapping) provides a simple and easy way to set up a WiFi environment and the customer can easily identify malfunctioning WiFi devices using the routing map.

About Beijer Electronics

Beijer Electronics is a multinational, cross-industry innovator that connects people and technologies to optimize processes for business-critical applications. Our offer includes operator communication, automation solutions, digitalization, display solutions and support. As experts in user-friendly software, hardware and services for the Industrial Internet of Things, we empower you to meet your challenges through leading-edge solutions.

About Korenix Technology

Korenix Technology, a Beijer group company within the Industrial Communication business area, is a global leading manufacturer providing innovative, market-oriented, value-focused Industrial Wired and Wireless Networking Solutions. With decades of experiences in the industry, we have developed various product lines, including, Industrial Ethernet/PoE Switch, Industrial Wireless & Cellular Solution, Industrial Media Converter, network management software and etc.

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