Fakulta strojní VŠB – TUO

Department of Control Systems and Instrumentation

# Automatic Control Devices

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(Materials for write notes)

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Fakulta strojní VŠB – TUO

Department of Control Systems and Instrumentation

**Lecture No. 6**

**Wifi networks, configuration of access points and AD-HOC configuration, connection of control systems to the technological process (ILAN, LAN, WLAN). A sample of the laboratory set-up.**



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**What do you find out?**

- Wifi networks
- Configuration of access points
- AD-HOC configuration
- Connection of control systems to the technological process (ILAN, LAN, WLAN)
- A sample of the laboratory set-up
- … .

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## What is Wifi?

- WiFi ( Wireless Fidelity)
- This technology uses
- Users can thus communicate with each other

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## What is Wifi?

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## What is Wifi?

- A wireless computer network
- .
- For the short-term connection
- For permanent use,

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## What is it?

- **Access Point, AP**

- **Ad-Hoc Mode** (ad-hoc mode, random mode).





## What is it?

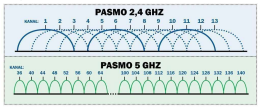
- **Afterburner –**

- **Bridge** (most).





## What is it?




- **Channel**

- **Client**

What is it?

- **DHCP**
- **IP**





What is it?

- **LAN**
- **NAT**





What is it?

- **SSID**
- **VPN**

## What is it?

- **WDS**
- **WEP**





## What is it?

- **WiFi klient**
- **WiFi router**
- **Repeater** -

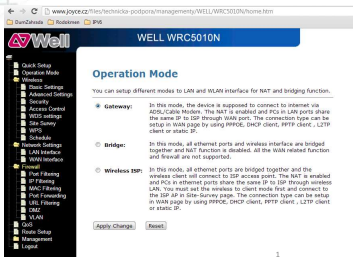




## What is it?

- **IEEE 802.11**.
- **IEEE 802.11a**.
- **IEEE 802.11b**.
- **IEEE 802.11e**.
- **IEEE 802.11g**.
- **IEEE 802.11h**.
- **IEEE 802.11i**.
- **IEEE 802.11j**

## Examples of web management








## INSYS WLAN serial/bridge

- Communication cannot
- The data connection is always
- An AP is an element of a WLAN network through which





## Application

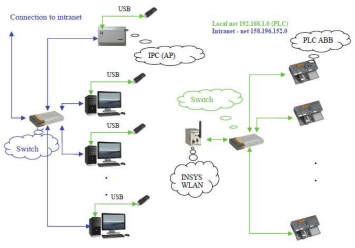



Fig. 2 Connection of particular network components

- **AD-HOC**
- **AP**
- **Client**

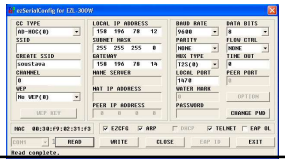
## Converter EZL300W Lite

- Ethernet Network ( WiFi IEEE 802.11b ) - slot for WiFi 3.3V PCMCIA card.
- 1x full RS-232 serial port accessible via WiFi Ethernet.Virtual Serial Port (ezVSP) for Windows - in PC like COM 7 serial port.
- Devices against each other can wirelessly connect the RS-232 port via WiFi.
- Data security - support for all security measures for WiFi technology - SSID, WEP 64bit/128bit encryption, choice of communic. channel, password access to settings.
- LED indication of operation and communication.
- Powered by an external DC 5V source, the module includes a stabilizer.
- Robust design.





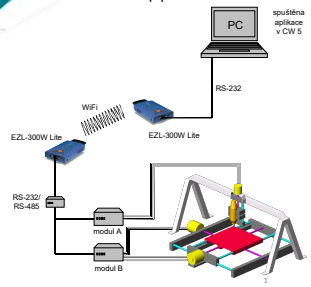
## Configuration







## Application




- Use of Ad-Hoc connections

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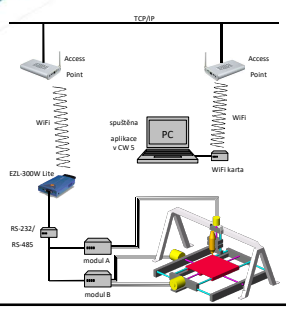
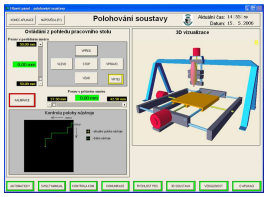
## Application

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## ZigBee-Wireless communication standard

zigbee

It is a wireless communication technology based on the IEEE 802.15.4 standard. This technology enables

Examples of use:


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## ZigBee-Wireless communication standard

| Obchodní jméno standardu | GPRS/GSM | Wi-fi 802.11b | Bluetooth 802.15.1 | ZigBee 802.15.4 |
|---|---|---|---|---|
| Aplikační zaměření | Široká oblast (hlas, data) | Web, Email | Náhrada za kabel | Monitorování, řízení |
| Systémové zdroje (paměť) | 16Mb a více | 1Mb a více | 250kb a více | 4Kb- 32Kb |
| Životnost baterií (dny) | 1- 7 | 0.5- 5 | 1- 7 | 100 - 1000 (i více) |
| Max. velikost prvků (počet uzlů) | 1 | 32 | 7 | 65 000 |
| Přenosový rychlost (KB/s) | 64- 128 | 11 000 | 720 | 20- 250 |
| Komunikační dosah (m) | 1 000 i více | 1- 100 | 1- 10 | 1- 100 |
| Výhody | Dosažitelnost, kvalita | Rychlost, flexibilita | Cena, jednoduchost | Spolehlivost |

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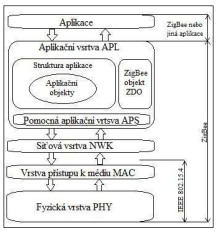
## ZigBee-Wireless communication standard




Like any other communication standard, ZigBee can be described by its specific OSI model,

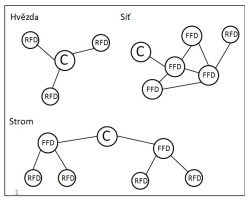
Standard IEEE 802.15.4
ZigBee
Application (User)





## ZigBee-Wireless communication standard

In a ZigBee network, addressing is mediated by addressing codes that can be either 64 or 16 bits in size.





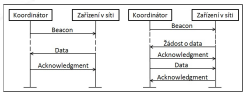



## ZigBee-Wireless communication standard

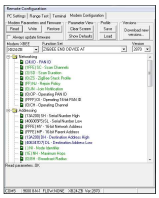
ZigBee - three basic elements. According to their functionality in the network, they are divided into

- **fully functional device (FFD)**
- **reduced functionality device (RFD**
- The main advantage of ZigBee networks is that the specific topology is not precisely defined in advance, and it is possible to expand the network arbitrarily by an appropriate combination of router elements and terminal devices [Bradač 2011].

## ZigBee-Wireless communication standard



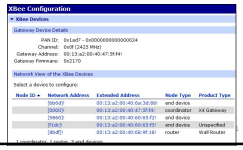

| |
|---|
| ZIGBEE COORDINATOR API |
| ZIGBEE COORDINATOR AT |
| ZIGBEE END DEVICE ANALOG IO |
| ZIGBEE END DEVICE API |
| ZIGBEE END DEVICE AT |
| ZIGBEE END DEVICE DIGITAL IO |
| ZIGBEE END DEVICE PH |
| ZIGBEE ROUTER API |
| ZIGBEE ROUTER AT |
| ZIGBEE SOUTER SENZOR |
| ZIGBEE ROUTER/ END DEVICE ANALOG IO |
| ZIGBEE ROUTER/ END DEVICE DIGITAL IO |
| ZIGBEE ROUTER/ END DEVICE SENZOR |







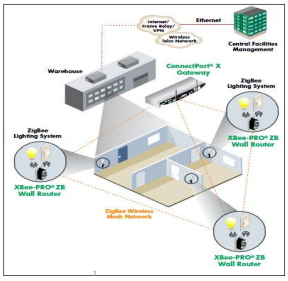
## Connect Port X4

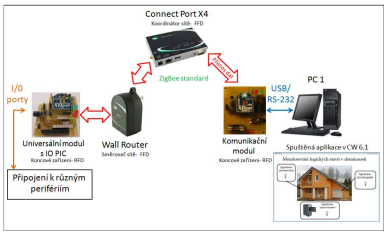





## Example of ZigBee network with Connect Port X4 and Wall Router



Example of ZigBee network with Connect Port X4 and Wall Router







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**Thank you for your attention …**