Basic Doorbell Project

with XBee 802.15.4

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Ding, Dong!
Basic Doorbell

XBee Direct: no external microcontrollers:

1. doorbell switch connected to an XBee radio

2. buzzer connected to another XBee radio sounds the alert

3. someone’s at the door!
Background
I/O Intro

- For simple input and/or output
- Eight digital input/outputs
- One additional digital output
- Seven analog inputs
- Two analog outputs
- But **not all at once!** Pins are shared.
I/O Why

• Why:
  • Save space, save power, save weight and save money
  • Reduce complications for simple projects

• Why not:
  • Limited inputs/outputs
  • No access to logic
  • Might make complicated projects even more complicated
Input/Output Wiring

- +3.3 V
- Transmit
- Receive
- PWM Out!
- Analog in
- Voltage Reference
- Ground

 dostępne porty: 1/0 pin
I/O AT Commands

- ATD0...D8 -> configure pins for I/O
- ATIR -> sample rate
- ATIT -> samples before transmit
- ATP0...P1 -> PWM configuration
- ATIA -> I/O input address
Setting I/O Pins

- ATDx 0  Disabled
- ATDx 1  Built-in Function (sometimes)
- ATDx 2  Analog Input (sometimes)
- ATDx 3  Digital Input
- ATDx 4  Digital Output, low to start with
- ATDx 5  Digital Output, high to start with

...so ATD32 would set digital pin 3 to analog input mode
Basic Doorbell Project
Button Schematic
Pressing the button brings the pin LOW. An internal resistor pulls the pin high whenever the button is released.
Buzzer Breadboard

Buzzer sounds when pin goes LOW, because current is flowing from power to ground.
Setup Strings

• Button XBee:
  • ATRE,ID3001,MY1,DL2,IR64,IT1,D03,IAFFFF,WR

• Buzzer XBee:
  • ATRE,ID3001,MY2,DL1,IR64,IT1,D05,IAFFFF,WR

• *** be sure to change 3001 to your own PAN ID!!
Addressing

- ATRE
  resets to factory settings

- ATID
  sets the PAN ID (choose your own)

- ATMY
  sets the local radio’s address

- ATDL
  sets the destination address
Input/Output Settings

- **ATIR**
  sets the data sample rate (uses hexadecimal notation)

- **ATIT**
  how many samples transmitted at a time

- **ATD0**
  mode for digital pin zero (3=digital input, 5=digital output)

- **ATIA**
  remote address that’s allowed to control local pins

- **ATWR**
  writes the settings to firmware (like saving to a disk)
CoolTerm

++4OK
ATRE, ID3333, MY2, DL1, IR64, IT1, D05, IAFFF, WROK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
OK
++4OK
ATRE, ID3333, MY1, DL2, IR64, IT1, D03, IAFFF, WROK
OK
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OK
OK

usbserial-A7007qtR / 9600 8-N-1
Connected 01:25:51
More

• Got it already?

  • Try going the other way: a light for “I’ll be right there” feedback.
    • remember that input and output pins are paired and mirrored

• Use analog: how loud to ring (use light to simulate if needed)

  • ATD02 sets for analog inputs

  • analog outputs come from PWM pins ATP0 & ATP1, so paired but not mirrored with inputs