PROTOCOL ANALYSER

How do we debug the firmware?

Technique 1: Protocol Analyzer

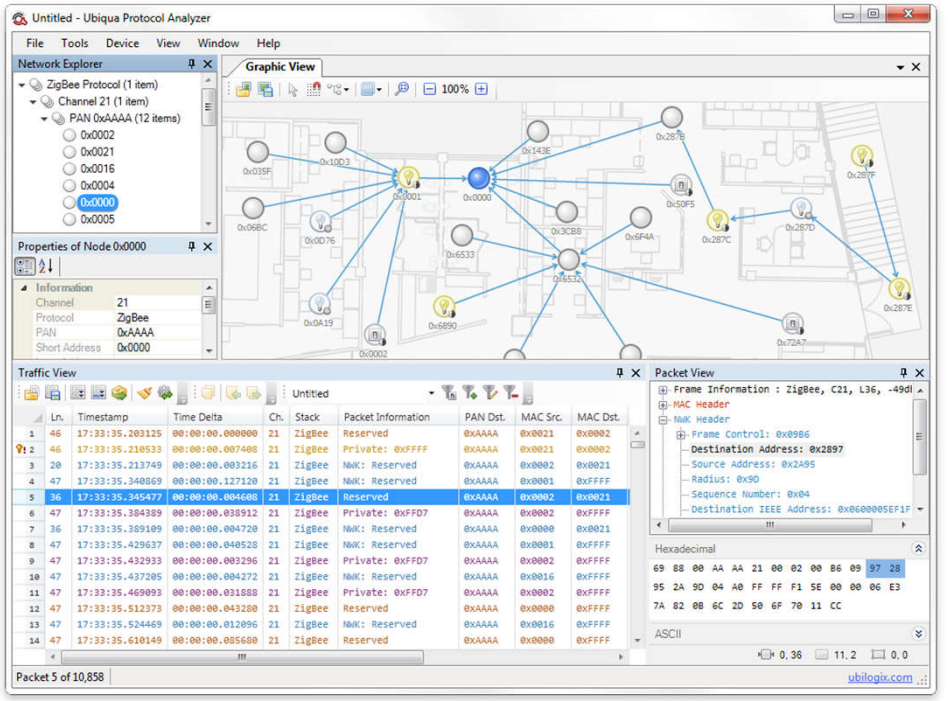
- Used to capture on air packets
- Useful for debugging
  - Data flow
  - Acknowledgments
  - Packet dissection
- Commonly known as a sniffer
- Requires a JN51xx device connected to a PC USB port

Software Development Tools Overview

Ubilogix Ubiqua

https://www.ubilogix.com/

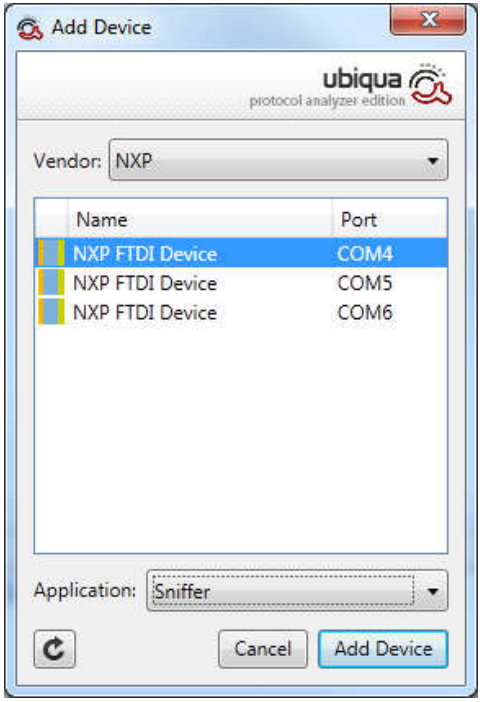
- Professional IEEE 802.15.4 Packet Sniffer
  - $999 license fee
- Uses the same sniffer binaries as Wireshark
- Supports multiple security keys (network and APS)



Software Development Tools Overview

- Program the following binary into a JN5168 device using the flash programmer
- Reset the JN5168 device
- Launch Ubiqua
  - Select ‘continue’ once the trial has expired
- Add a sniffer device to Ubiqua
  1. Go to Devices > Add Device
  2. Select NXP as the Vendor
  3. Select the relevant COMM port
  4. Select ‘Add Device’

Configuring the sniffer

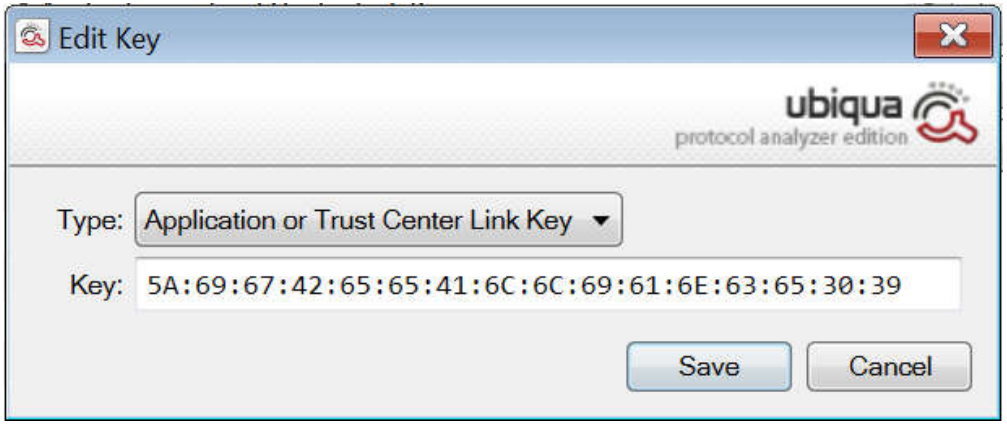


Capturing Packets

- Select which protocol you would like to sniff
  1. In the device manager window right click on the relevant COMM port
  2. Highlight ‘Set Protocol’
  3. Select the relevant protocol (e.g. ZigBee, IEEE 802.15.4 x)
- Select which channel you would like to sniff
  1. Again in the device manager window right click on the relevant COMM port
  2. Highlight ‘Set Channel’
  3. Select the relevant channel
- Begin capture by clicking on the toggle switch indicated below:

Decrypting Secure Packets

- Add a security key as follows:
  1. Tools > Options
  2. Select the Security tab
  3. Click Add
  4. Select the key type from the drop down box
  5. Enter the key and click Add

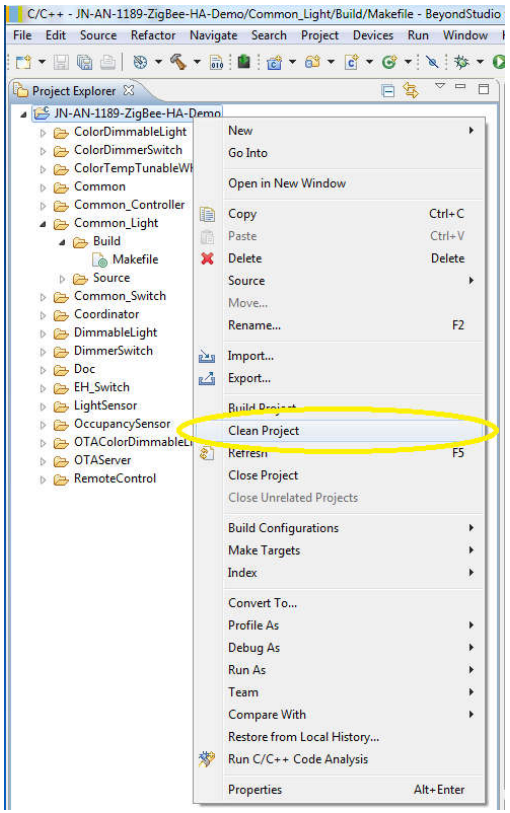


Live Sniffer Demonstration!

SERIAL DEBUG

Technique 2: Serial Debug

- ZigBee HA Application Examples all contain serial debug
- Enable this in the makefile:
  - `TRACE ?=1`
  - `CFLAGS += -DDEBUG_START_UP`
  - `CFLAGS += -DDEBUG_LIGHT_NODE`
  - `CFLAGS += -DDEBUG_LIGHT_TASK`
  - `CFLAGS += -DDEBUG_JOIN`
  - `CFLAGS += -DDEBUG_COMMISSION`
- Now perform a clean and then a build
- Download the new binary into the board



Software Development Tools Overview

- Use a terminal emulator to observe the debug
- Set to 115200-8-N-1