



October 5, 2015



# Meeting Agenda

- Welcome-Visitors and Members
  - Introductions
- Old Business
  - Peter's (WB9KHR) Equipment
  - OT 100 – Steve Miller
  - JOTA (Boy Scouts Field Day) – Martina Baur / Joe Council
- New Business/ Announcements/ Calendar
  - ARES – Joe Council
  - Tech Talk – Personal Area Networks (PAN), IEEE 802.15.4
  - Repeater Work Day
  - Announcements
  - Calendar for 2015
- Next Meeting – November 2nd



# Peter's (WB9KHR) Equipment

Need help testing.

Peter donated a signal generator.



# OT 100 - Coordinator Needed



November 7th

Same club involvement as last year

- Operating at two checkpoints
  - Pigeon Roost 10 (4pm to 6am)
  - Berryman 11 (5pm to 8am)
- Steve Miller is the coordinator



# JOTA – Boy Scouts

- Jamboree on the Air
- Annual Boy Scout event
- Near Dixon at Kickapoo Trace Muzzleloading Club
- Possible learning session for scouts





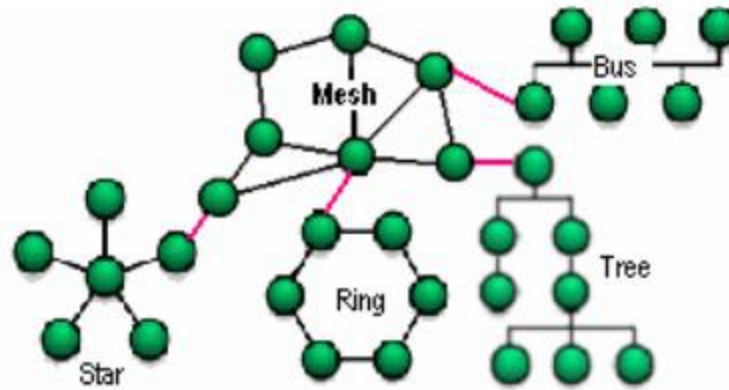
# ARES

Joe Council – K0OG



# Tech Talk – IEEE 802.15.4 Personal Area Networks

Louis McCarthy – AI0LM

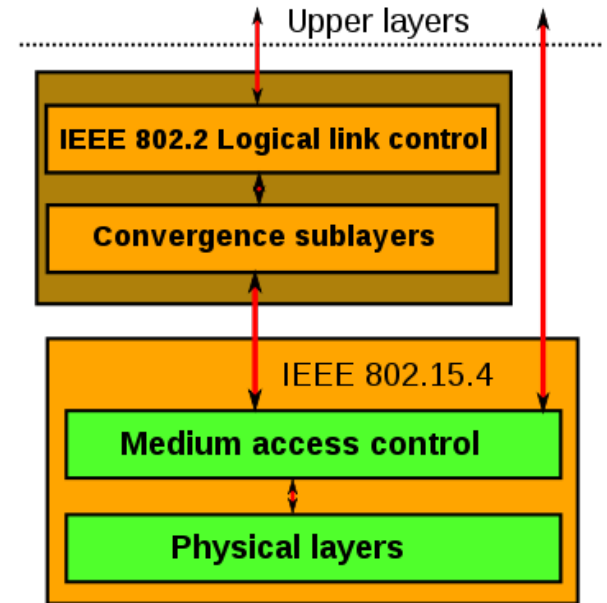




# Tech Talk – IEEE 802.15.4 Personal Area Networks

## IEEE 802.15.4

- Low Power ( $\sim 20$  mA @ 3.3 v)
- Low Cost ( $\sim \$9$  per module)
- Low Speed (up to 250 kbits/s)
- Three bands
  - 868 MHz (Europe)
  - 915 MHz (902-928 MHz, North America)
  - 2450 MHz (2400-2483.5 MHz, Worldwide)



Ham Bands: 902-928 MHz, 2.300 - 2.310 GHz, and 2.390-2.450 GHz

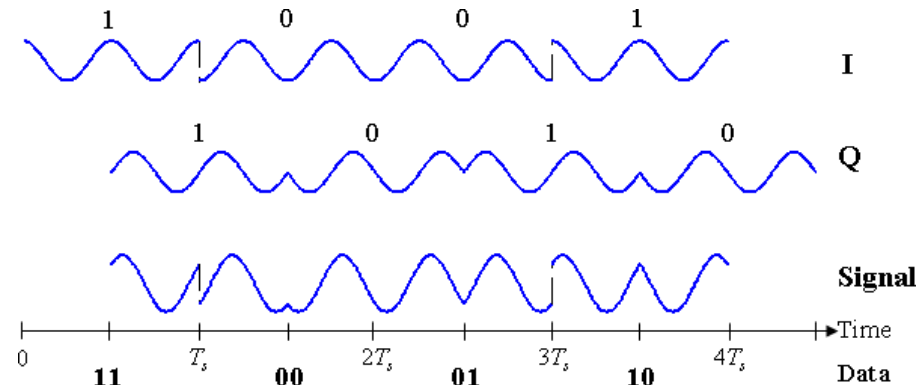




# Tech Talk – IEEE 802.15.4 Personal Area Networks

## IEEE 802.15.4 Physical Layer

- Direct Sequence Spread Spectrum (DSSS)
  - Binary Quadrature Phase Shift Keying
  - Offset Quadrature Phase Shift Keying
- Parallel Sequential Spread Spectrum (PSSS)
  - Binary Keying + Amplitude Shift Keying
- 868/915 MHz use any of the methods
- 2.4 GHz use O-QPSK:

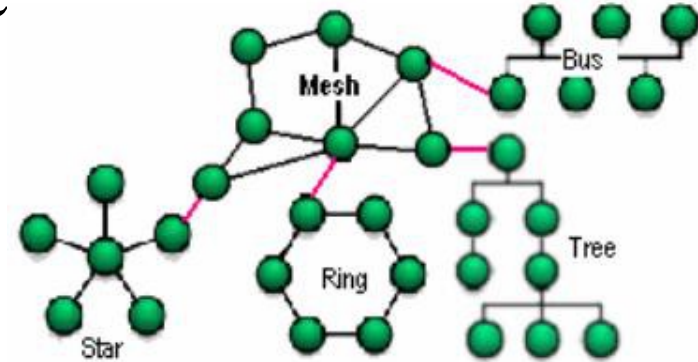




# Tech Talk – IEEE 802.15.4 Personal Area Networks

## IEEE 802.15.4 Network Layer

- Peer-to-Peer or Star
- Need at least one master for network
- Data transferred in frames via timeslots
- Uses CSMA/CA
  - Carrier Sense Multiple Access  
with Collision Avoidance
- Each unit has unique 64 bit ID
- Supports encryption





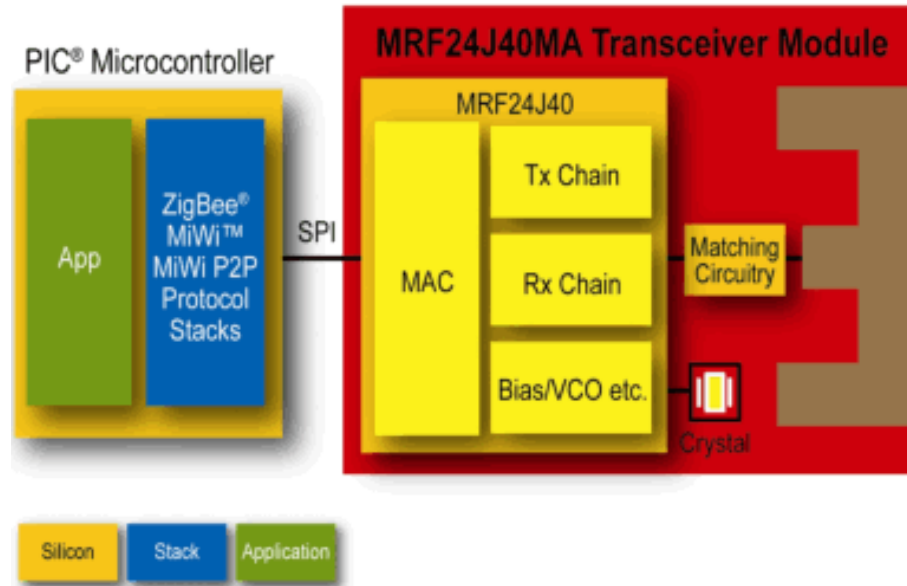
# Tech Talk – IEEE 802.15.4 Personal Area Networks

## IEEE 802.15.4 Application Layer Examples

- 6LoWPAN
- ZigBee
- MiWi
- MiWi P2P



# Tech Talk – IEEE 802.15.4 Personal Area Networks



## Why Microchip?

- FCC certified RF module
- Protocol stack is separate from module
- Prior experience



# Tech Talk – IEEE 802.15.4 Personal Area Networks

## Microchip MRF24J40MA

- Sensitivity: -94 dBm
- Supply Current:
  - RX: 19 mA
  - TX: 23 mA
- Power Output: 0 dBm
- Interface: SPI
- Data Rate: 250 kbps
- Range: ~200 feet (claim 400)
- Cost: ~\$9

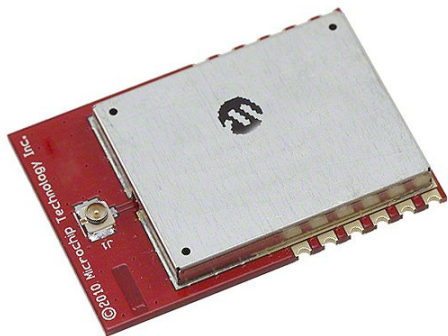




# Tech Talk – IEEE 802.15.4 Personal Area Networks

## Microchip MRF24J40ME

- Sensitivity: -104 dBm
- Supply Current:
  - RX: 32 mA
  - TX: 140 mA
- Power Output: 19 dBm
- Interface: SPI
- Data Rate: 250 kbps
- Range: >800 feet (claim 4000)
- Cost: \$16 to \$20





# Tech Talk – IEEE 802.15.4

## Personal Area Networks

### Uses

- Remote radio control (front panel)
- Remote control of structures
  - Observatory
  - Chicken coop
- Remote sensors
  - Battery voltages
  - Solar voltages
  - Weather



Anything that could benefit from data transfer!



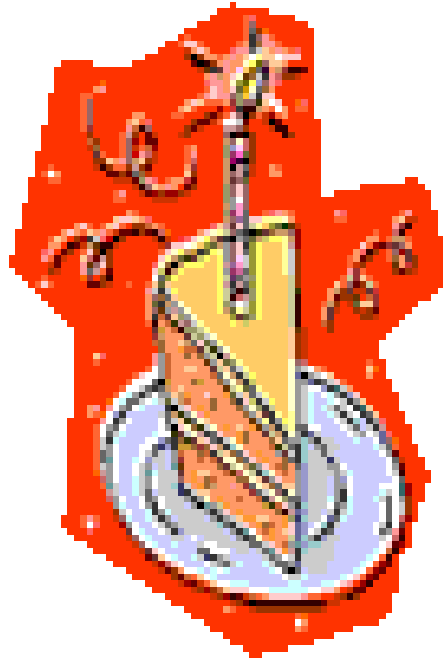
# Announcements

## New business, Announcements, Ideas....

- Halloween Hamfest, October 31, Kirkwood Community Center
- NARCFEST, **November 14**, Nixa Event Center
- OMAR Hamfest, January 9, Brighton, MO



**Happy Birthday  
William!**





# Calendar/ Events/ Ideas 2015

January

February 28th Test Session

March Spotter Training

April Joint Mtg w/ LARC April 6th (in **Waynesville**)

May Test Session 3rd

June Hellbender, Field Day (Test Session at ~2:30)

July Hellbender Adventure Race

August

September Test Session/Fox Hunt September 12th KD0JLM

October Repeater work day October 10th 9-12 Hancock

November Ozark Trails 100

December Club Elections



Next meeting: November 2nd



# Meeting Notes

None