

# Embedded Platform

## Embedded Platform Selection:

1. 32 bit RISC, ARM CPU is recommended;
2. RTOS supported is desired and recommended;

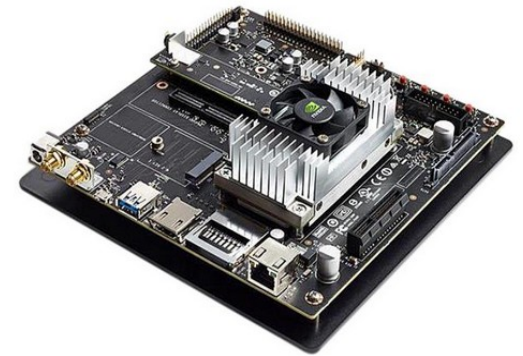
## RF Module Selection:

1. PSK is desired to match up to IEEE 802.11x and industrial Commonly adopted RF modules, with balancing consideration of performance, cost, and educational/class usage; FSK and ASK are all ok for this class use. However, you may find ASK is the most popular low cost RF module without MAC (Media Access Layer) layer implementation (we will implement MAC layer in C/C++ in the class) ;

## Industrial IoT Aspect:

1. Use this high end RF module. 4 person team will be formed , each team with one module. Hence, you will be required to work with other team for a project implementation.

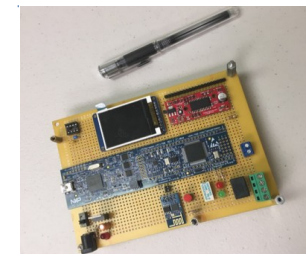
<https://www.digikey.com/product-detail/en/semtech-corporation/SX1276RF1IAS/SX1276RF1IAS-ND/4490401>



TX2 NVDA GPU



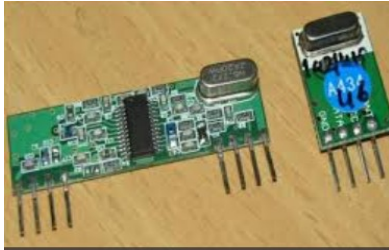
Raspberry Pie



NXP  
LPC1769

# Wireless Modules

Cat I



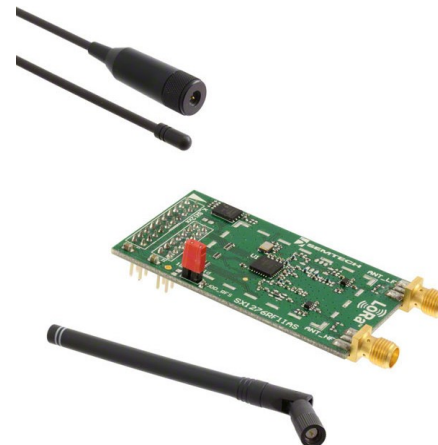
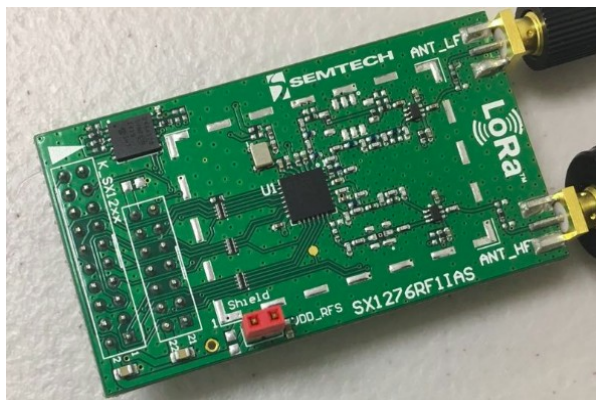
For Software Defined Radio and CR  
(Cognitive Radio) Project Implementations

Google ASK RF module

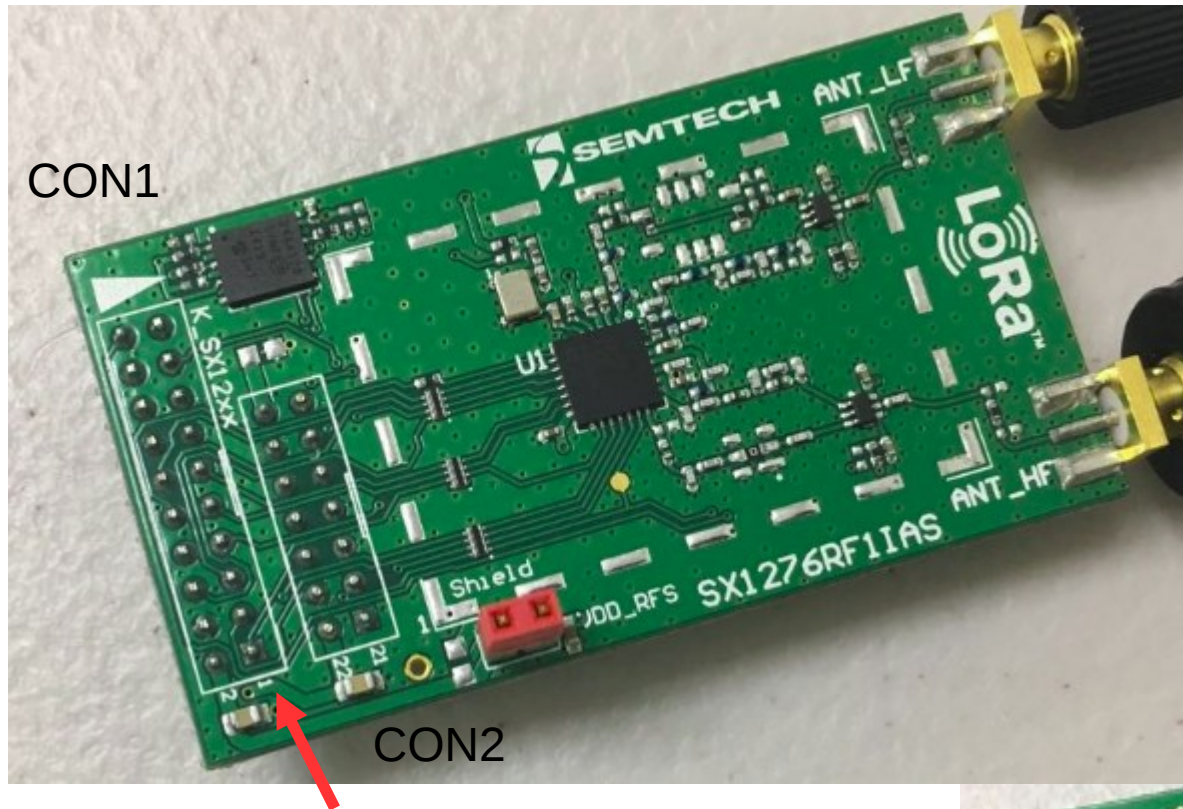
Cat II



For state-of-the-art  
Industrial IoT applications



# SX1276RF1IAS Modules I

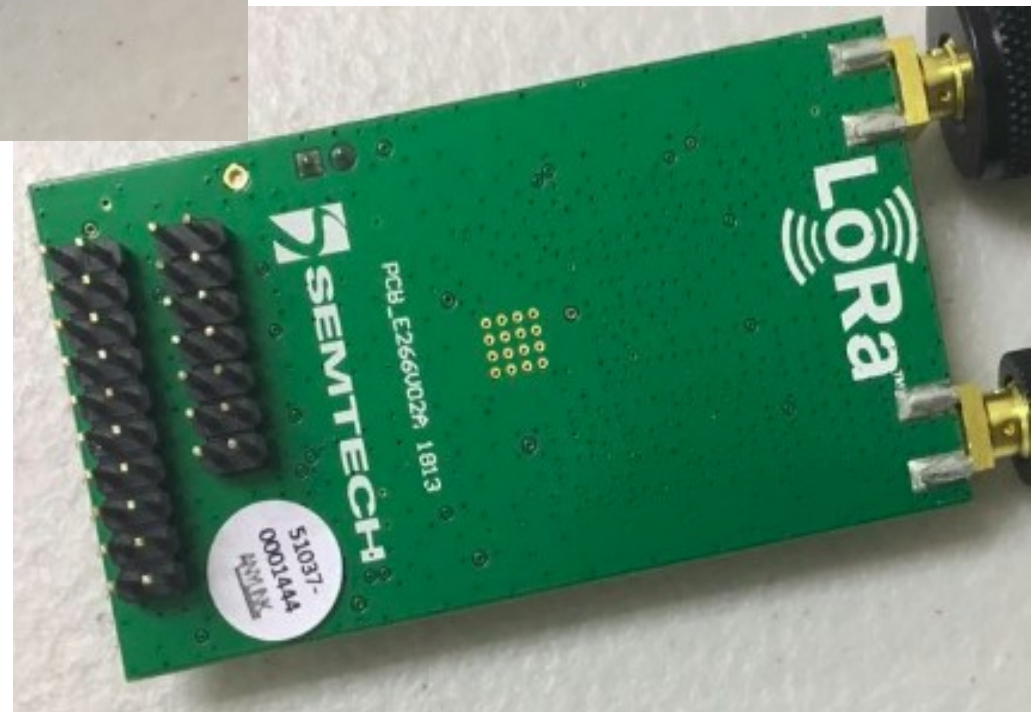


For Real Industrial IoT Applications

For the design interface to embedded systems: SPI interface.

To Buy:

[https://www.mouser.com/ProductDetail/Semtech/SX1276RF1IAS?qs=rBWM4%252bvDhleJeGldE033Lg%3D%3D&gclid=EAlaIqobChMI34irpMn\\_3AIVBMJkCh0e2gc8EAAYASAAEglWMPD\\_BwE](https://www.mouser.com/ProductDetail/Semtech/SX1276RF1IAS?qs=rBWM4%252bvDhleJeGldE033Lg%3D%3D&gclid=EAlaIqobChMI34irpMn_3AIVBMJkCh0e2gc8EAAYASAAEglWMPD_BwE)



# Document

1. IEEE 802.11b Standard for Software Defined Radio and CR (Cognitive Radio) implementation, also for theoretical/mathematical discussion.
2. Datasheet of sx1276rf1ias for state-of-the-art industrial IoT implementation throughout the semester.
3. Check my github for document, references and design notes, lecture notes and sample code

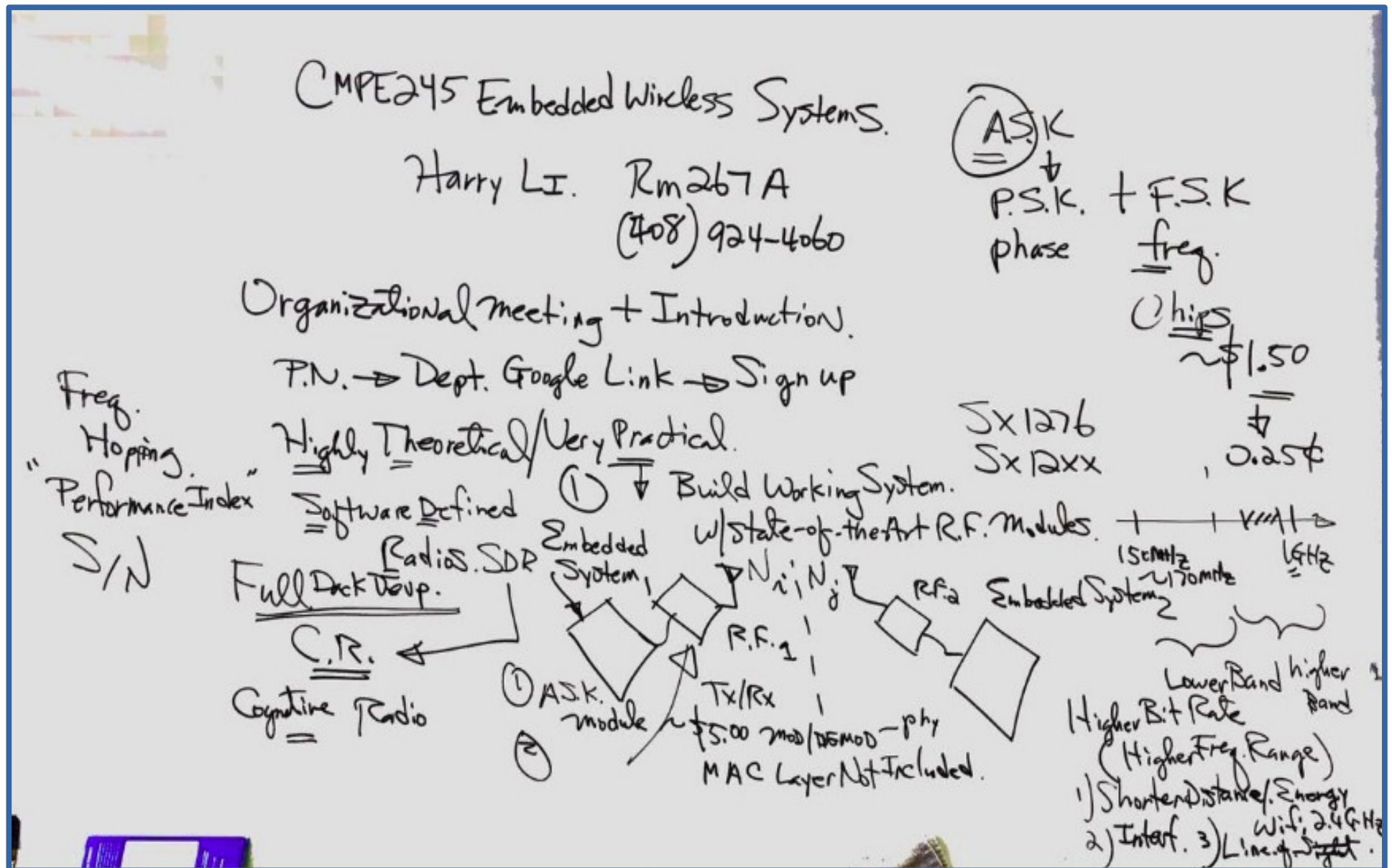
<https://github.com/hualili>

Other resources

<http://www.ctione.com/>



# 8-22-2018 Organizational Meeting





# 8-27-2018 RF Module Requirements

CMPE245 Embedded Wireless.

August 27, 2018 1/.

Today's Topics:

1° Introduction. (Prototyping Board Design)

Objectives: IEEE 802.11x

① Embedded platform Software Defined Radios (SDR) → Smart

LPC1769

NXP  
(OR Optional  
Ras. Pie  
ARM11)



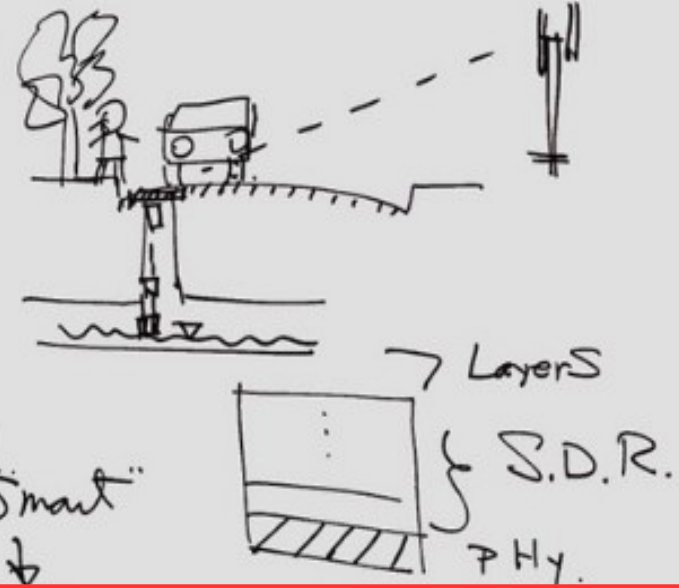
$N_1$   
( $N_1 - N_2$ )

② 1° R.F. (to Implement "all" MAC)

2° R.F. IOT "State-of-the-Art"

3° Debugging.  
Wired (Cable) Communication

③ Tx/Rx (Low Cost Module) ④ F.C.C. 433MHz  
ASK (Amp. Shift Keying) ⑤ Data sheet 315~  
⑥ Microchips Wiring Diagram(s) < 1000mW  
Sx1276. ⑦ S.P.I. ⑧ ANT Included  
150MHz 1.4GHz (~1000MHz)





# 8-27-2018 Build Tech Spec For Prototype Design

CMPE245 August 27. Harry Li 2/.

Homework: Table(Tech.Spec) 1.  
For Prototype Design.

No	Description	Notes
1.	RFxLPCφφφ	→ <u>SX<sub>n</sub>+LRA+n76</u>
2.		
3.		

Naming Convention. 9 Letters.

Pref(3)+Root(3)+Post(3)

RFx + LPC + nnn

RFφASKTXφ, RFφASKRXφ

Option (Cognitive  
Radio Module):  
CR0+LRA+IOT

Embedded System:  
RF0+LPC+NOD