Embedded Platform

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

RF Module Selection:

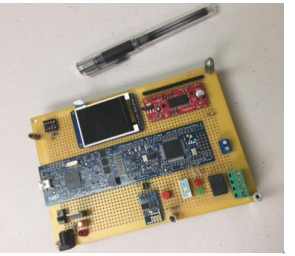
1. PSK is desired to match up to IEEE 802.11x and industrial Commonly adopted RF modules, with balancing consideration of performance, cost, and educational/class usage; FSK and ASK are all ok for this class use. However, you may find ASK is the most popular low cost RF module without MAC (Media Access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

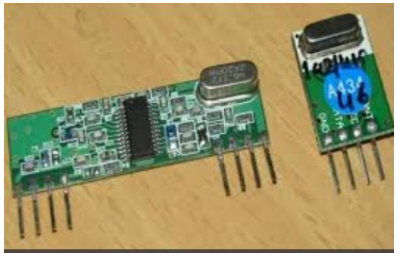
Raspberry Pie



NXP
LPC1769

Wireless Modules

Cat I

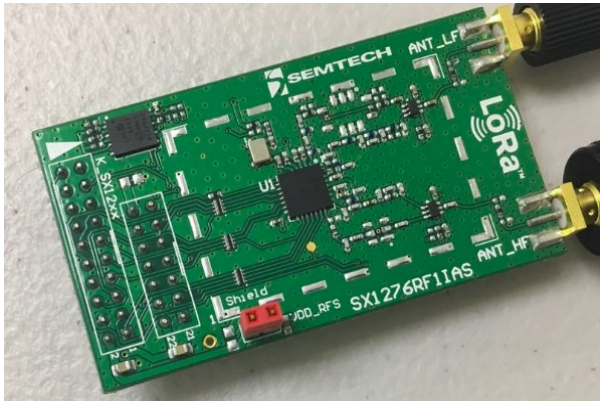


For Software Defined Radio and CR
(Cognitive Radio) Project Implementations

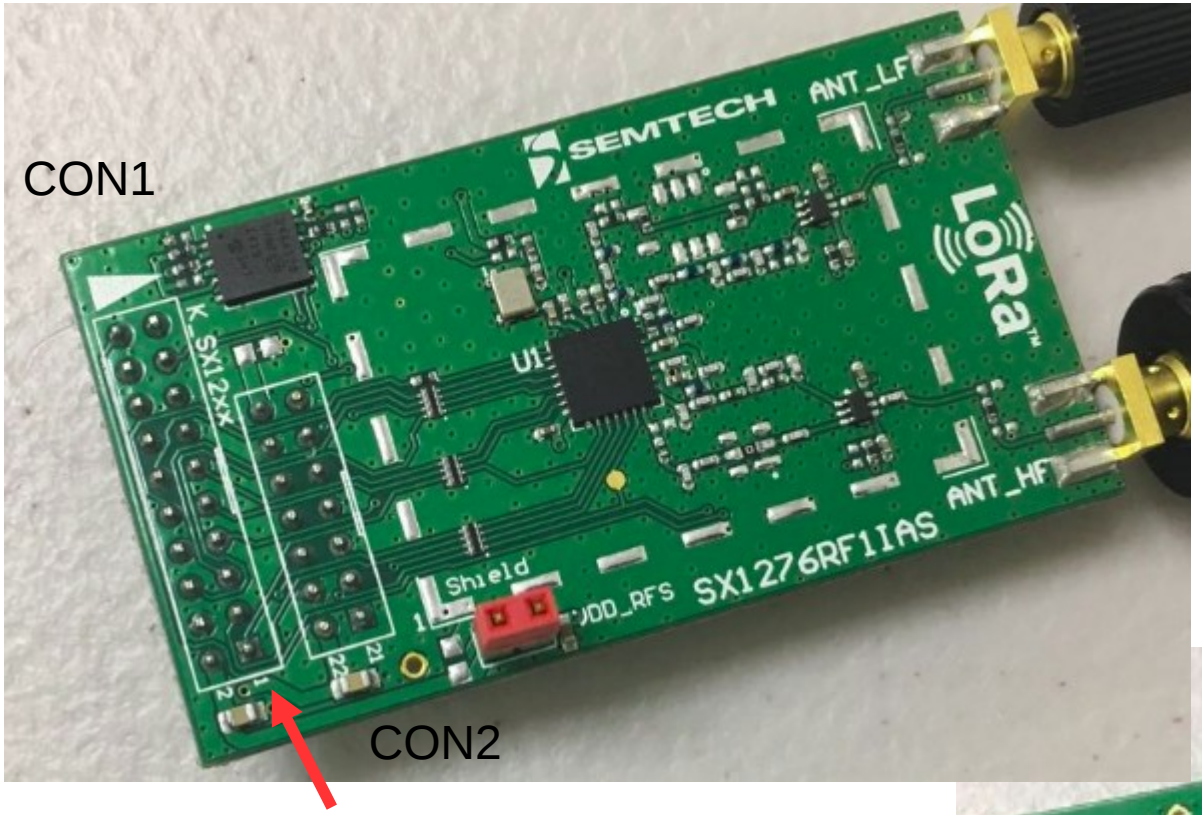
Google ASK RF module

Cat II

For state-of-the-art
Industrial IoT applications

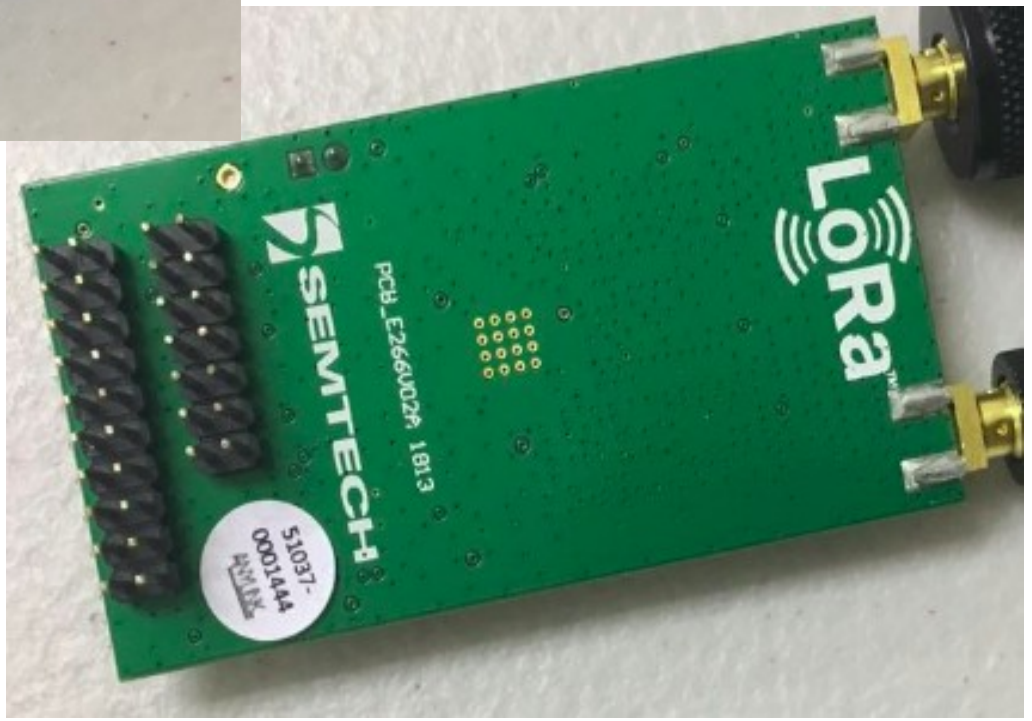


SX1276RF1IAS Modules I



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%252bvDhIeJeGldE033Lg%3D%3D&gclid=EAIaIQobChMI34irpMn_3AIVBMJkCh0e2gc8EAAYASAAEgIWMPD_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.

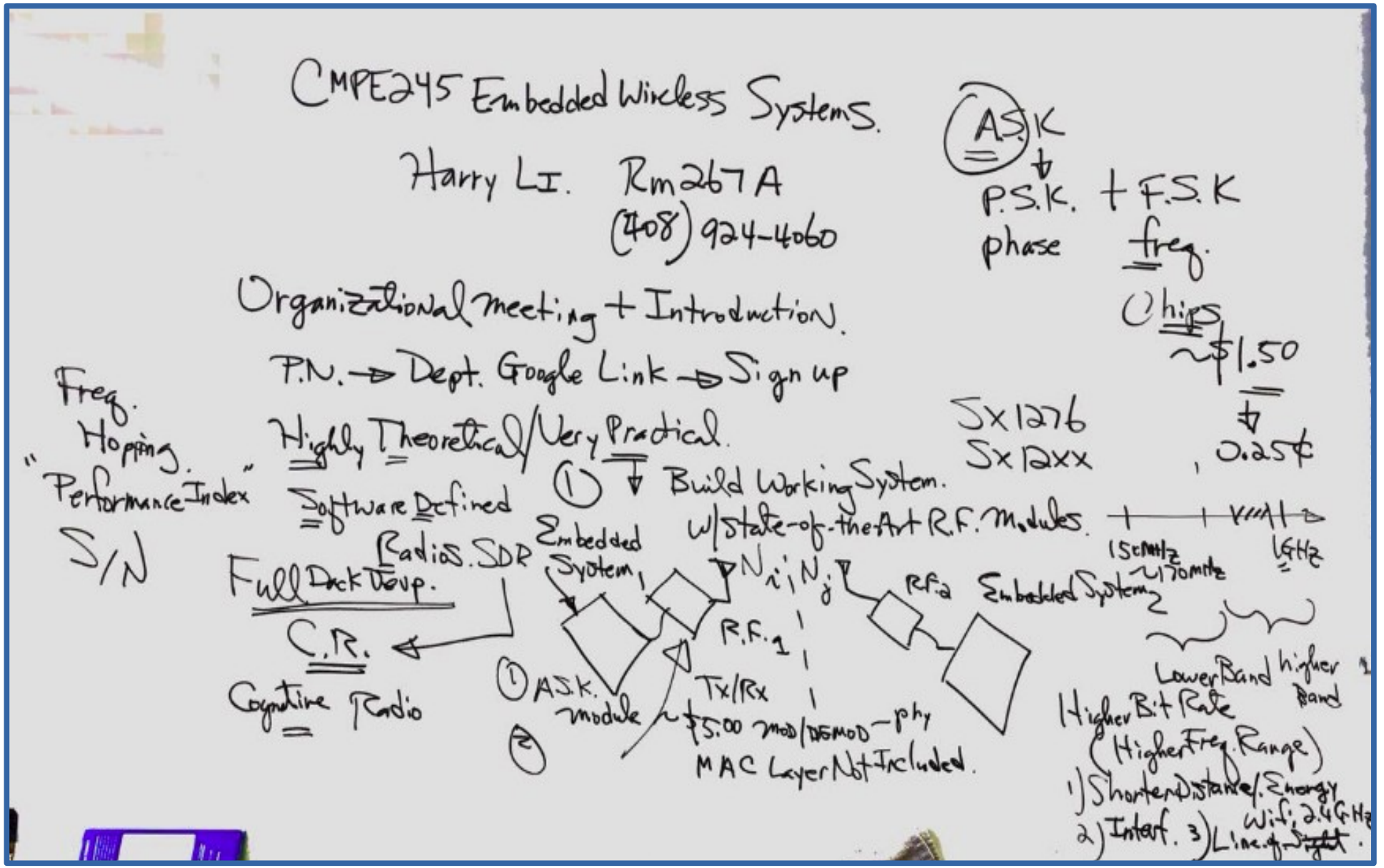
3. Check my github for document, references and design notes, lecture notes and sample code

https://github.com/hualili

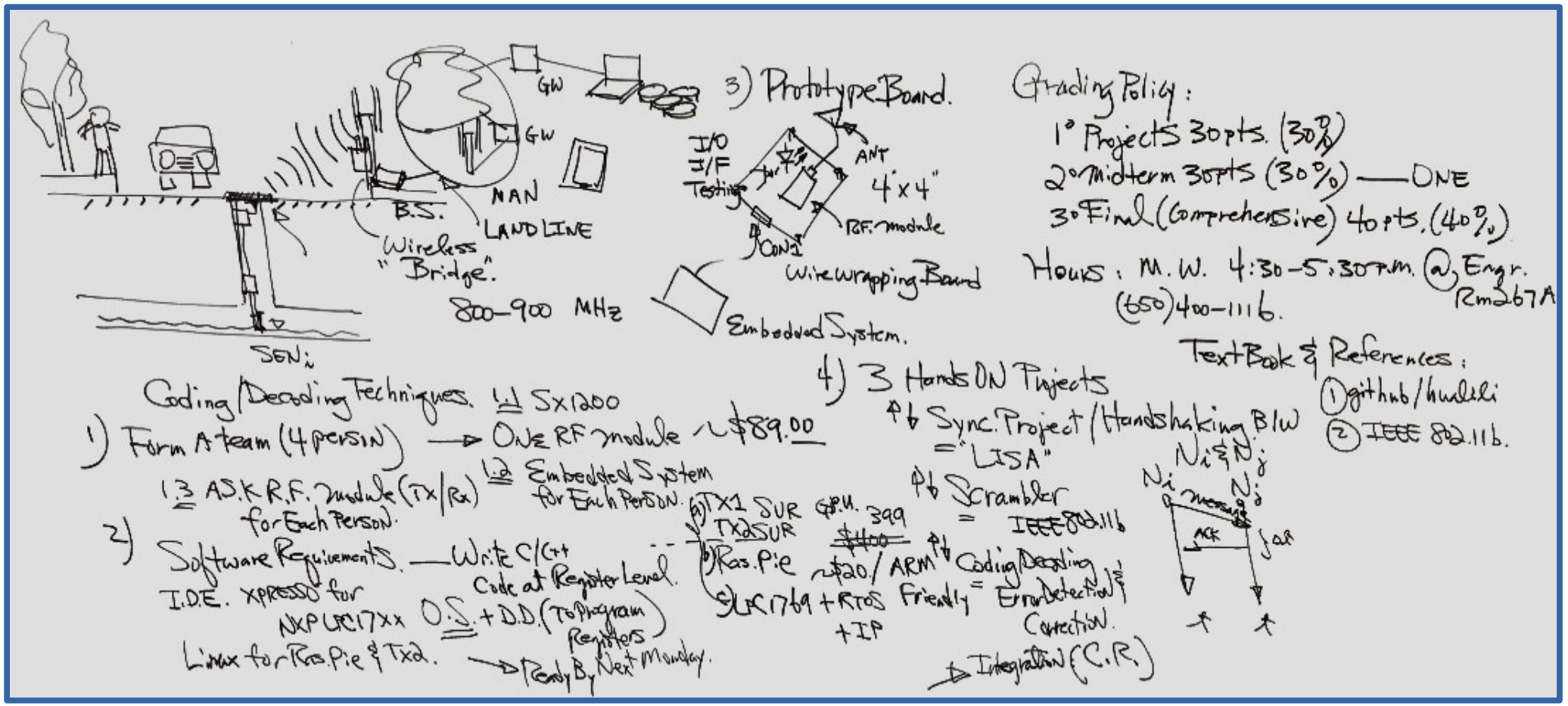
Other resources

http://www.ctione.com/

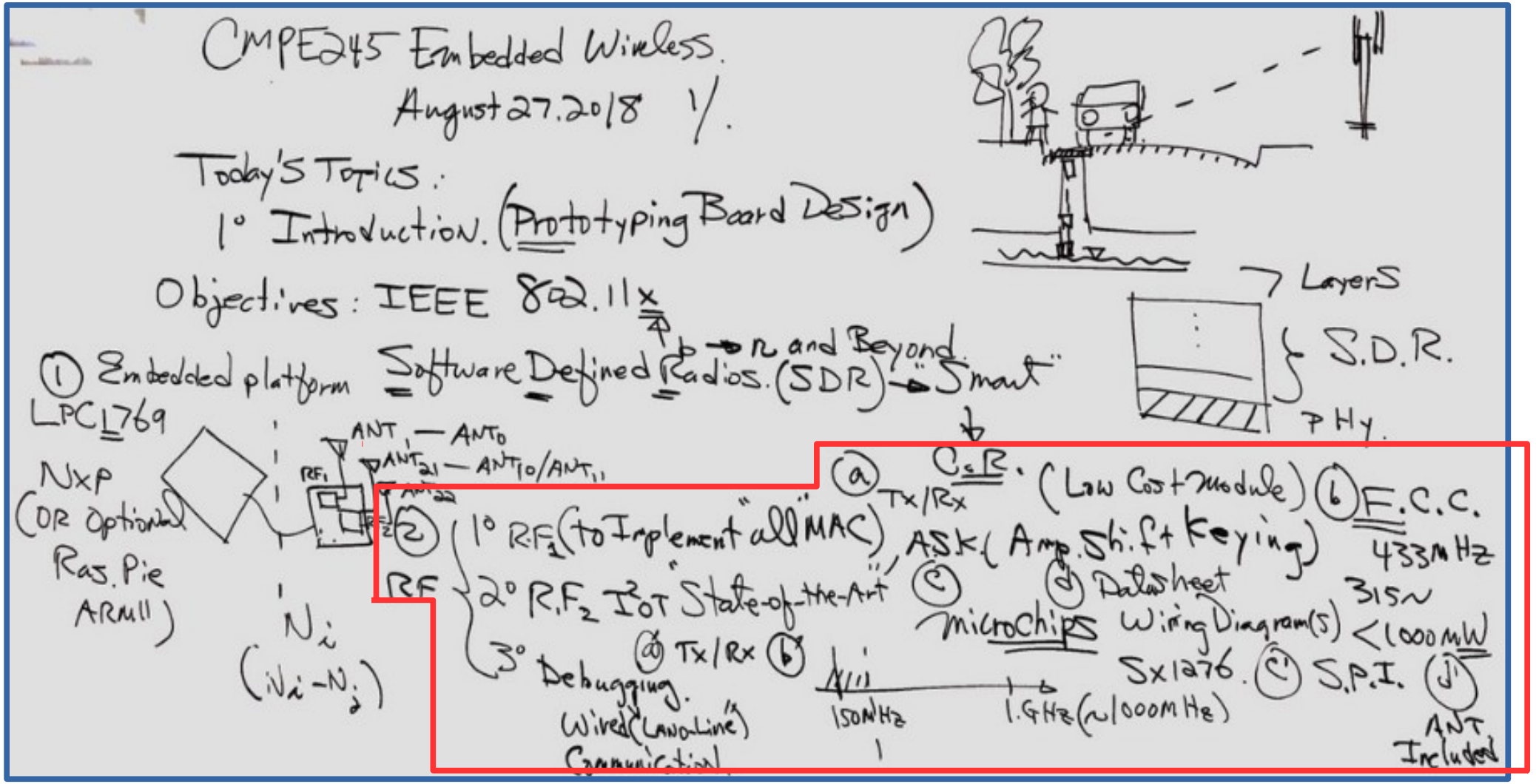
8-22-2018 Organizational Meeting



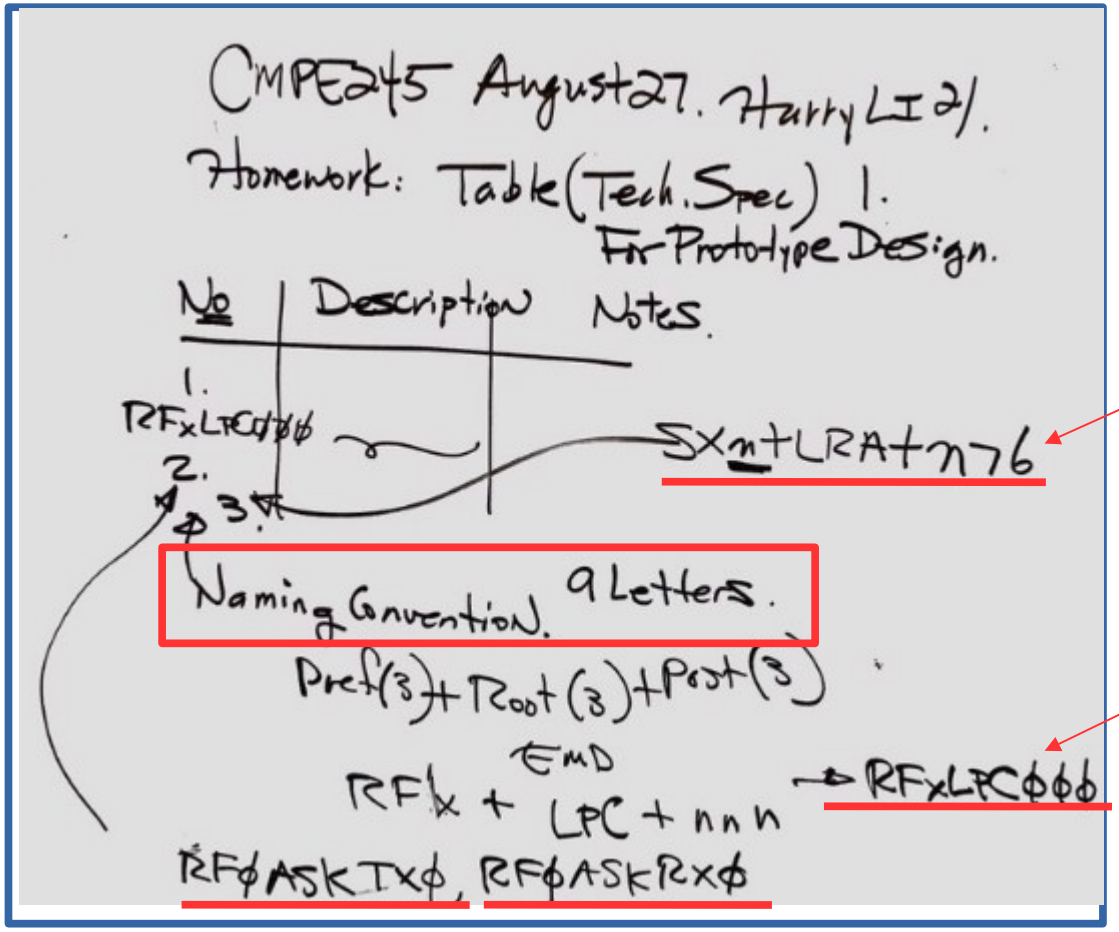
8-22-2018 RF Module Requirements



8-27-2018 RF Module Requirements



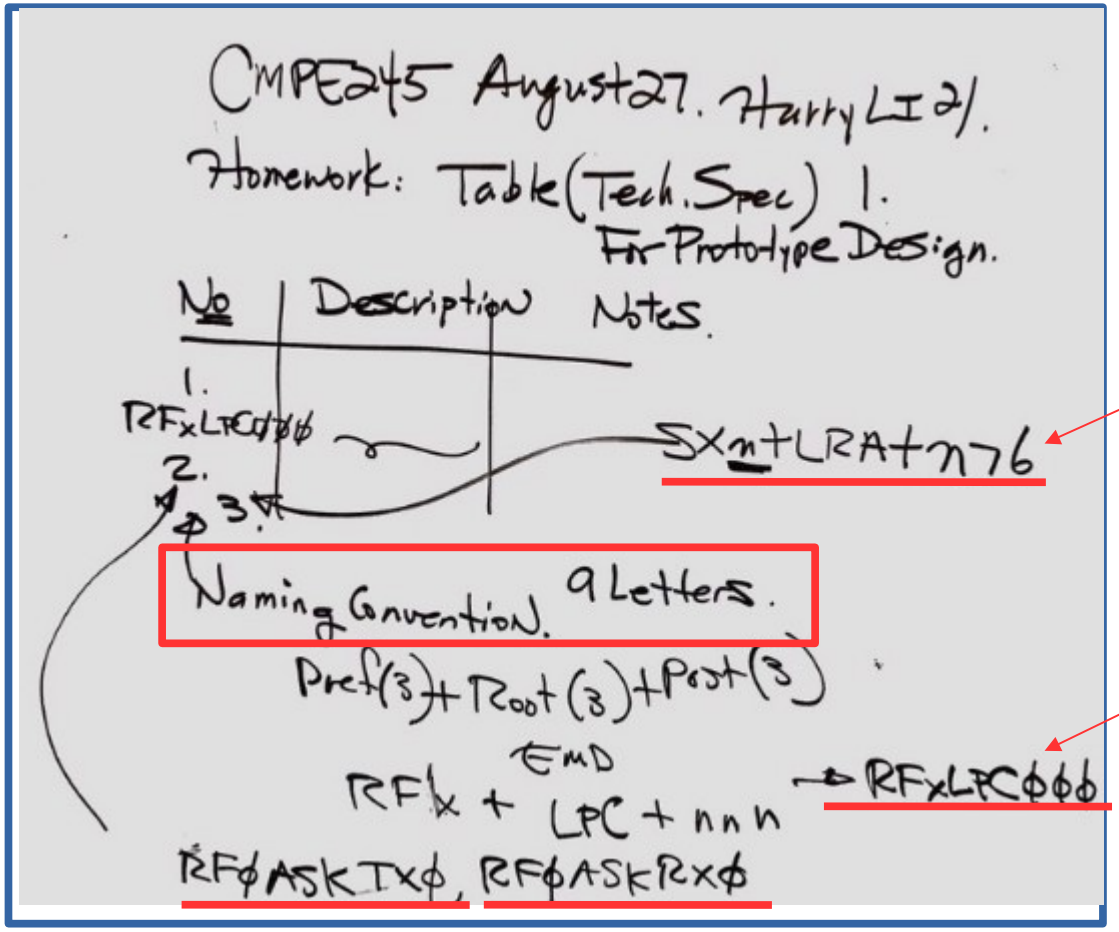
8-27-2018 Build Tech Spec For Prototype Design



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

Embedded System: RF0+LPC+NOD

8-27-2018 Build Tech Spec For Prototype Design



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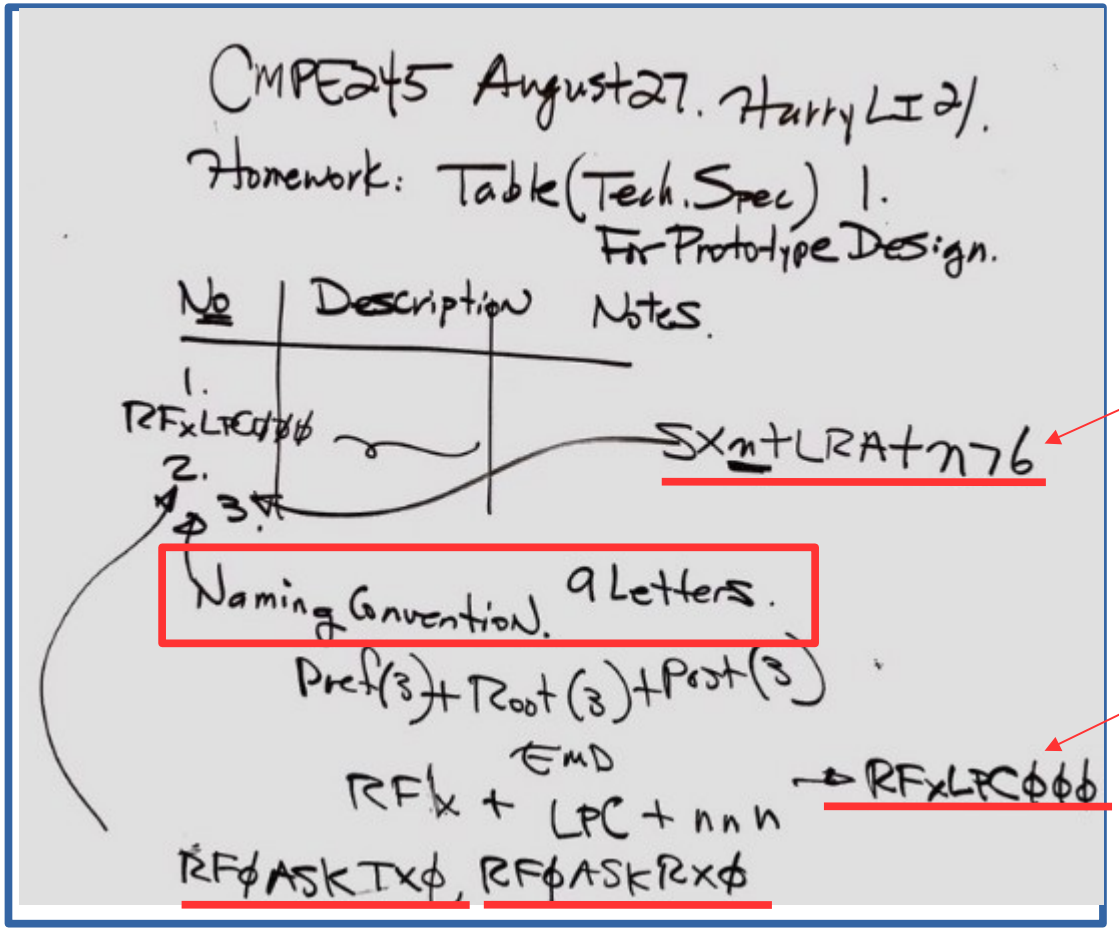
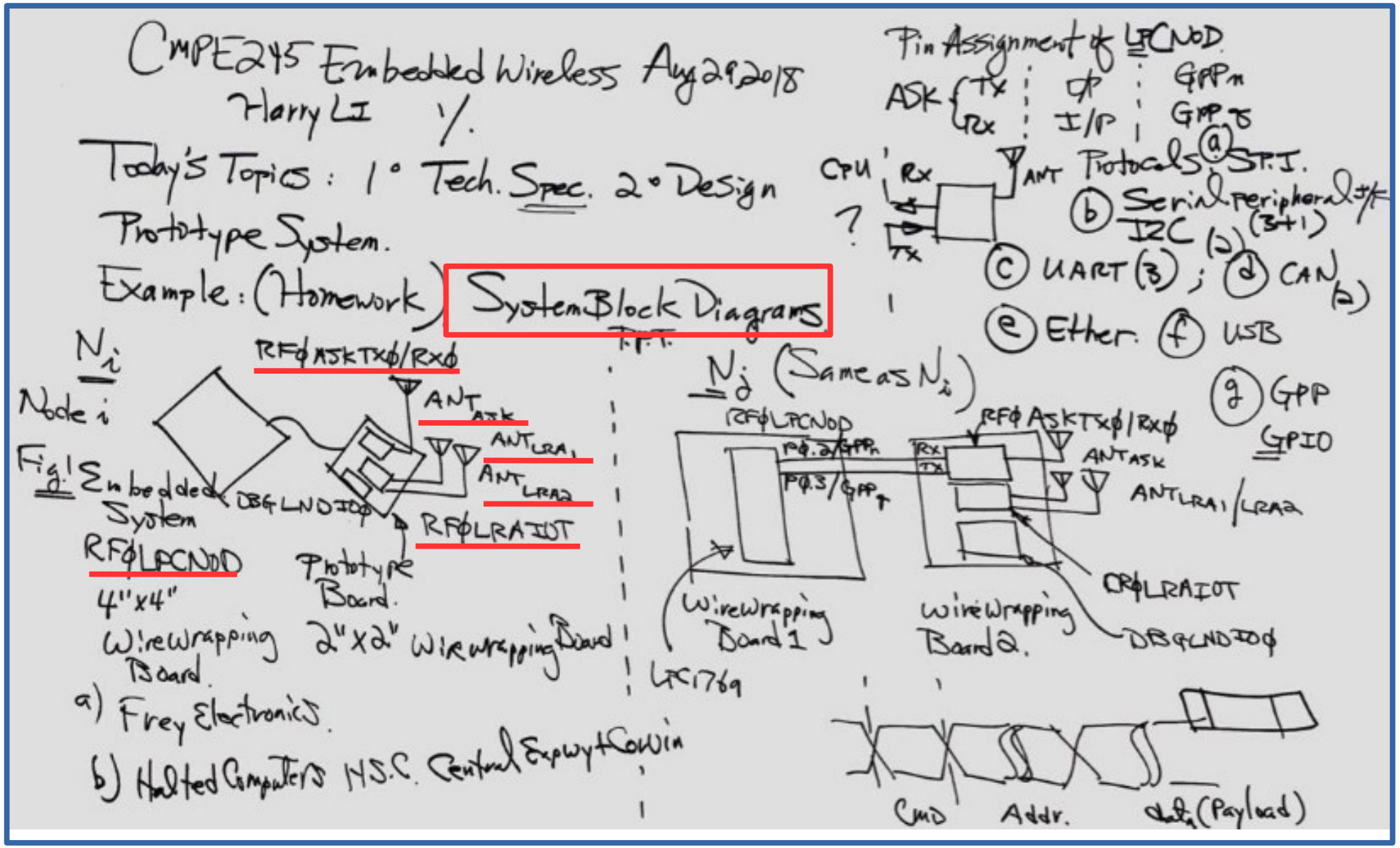


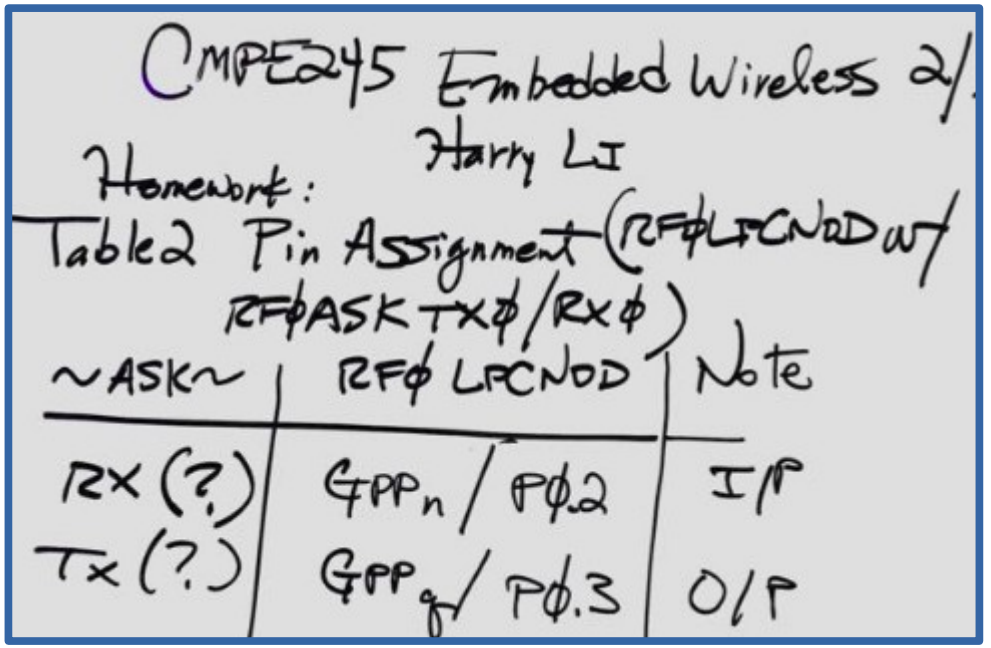
Option (Cognitive Radio Module): CR0+LRA+IOT

Embedded System: RF0+LPC+NOD

8-29-2018 Prototype System Block Diagram



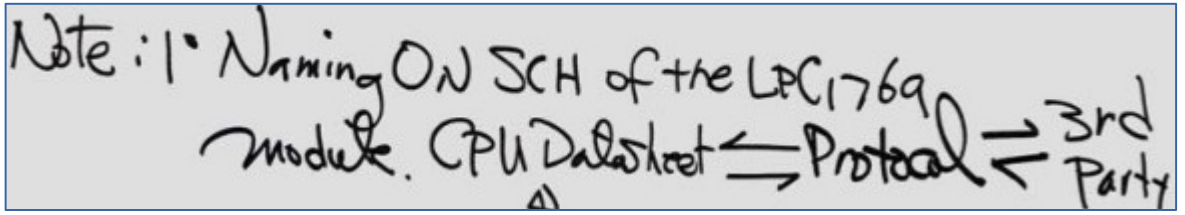
8-29-2018 Prototype System Block Diagram



CMPE245 Embedded Wireless 2/
Harry Li
Homework:
Table2 Pin Assignment (RF0LPCNOD w/ RF0ASKTX0/RX0)

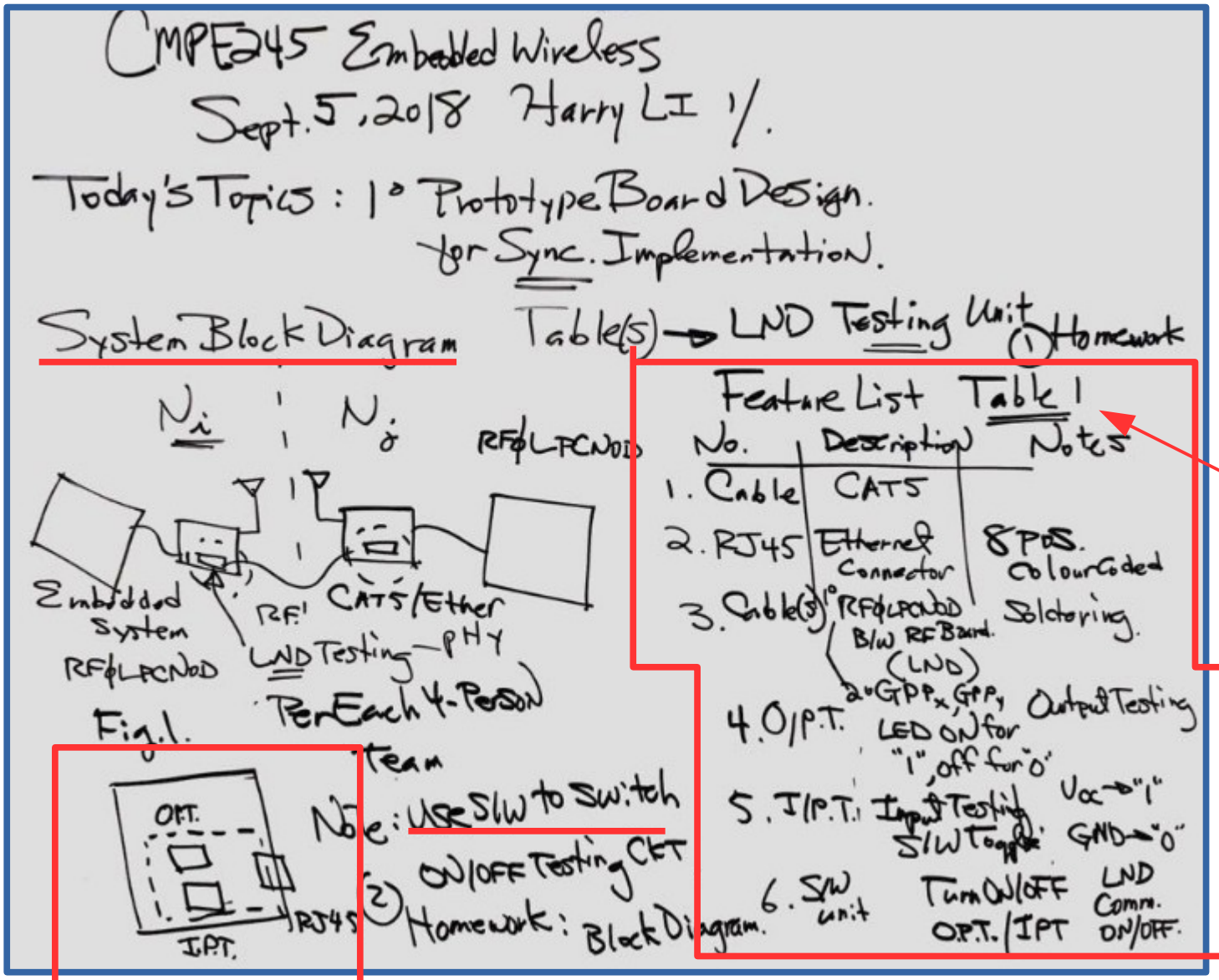
~ASK~	RF0 LPCNOD	Note
RX (?)	GPPn / P0.2	I/P
Tx (?)	GPPn / P0.3	O/P

Prototype System	
RF0LPCNOD	Embedded System
RF0ASKTX0	Tx for RF module 0
RF0ASKRX0	Rx for RF module 0
ANT0_ASK	ANT for the Tx
ANT1_ASK	ANT for the Rx
CR0LRAIOT	RF module for CR
ANT0_LRA	ANT0 for the RF module
ANT1_LRA2	ANT1 for the RF module



Note: 1° Naming ON SCH of the LPC1769 module. CPU Datasheet ⇐⇒ Protocal ⇐⇒ 3rd Party

9-5-2018 Feature List



Build table 1 feature list for the RF prototype board

9-5-2018 Timing Information

CMPE245 Embedded Wireless 2/.
Sept. 5th 2018

Naming Convention: 245repo-LV2-+HL+2018-09-05
(1) (2) (3) (4)

lec 1-3-4-7-9-0-

RJ45 Connector (Right Angle) H.S.C Halted Computer
Central Expwy+Lawrences.
Corvindri.

Sync Algorithm Development

Objectives: To Establish Hand Shaking B/W 2 Nodes

Technical Challenges:
① N_i N_j
② bit Rate
Digital Comm. "1" & "0"
③ Clk Skew
④

Observation 1:
Same bit Rate
But always w/
Clock skew.

Question: Given a sequence of digital Signal "0"s and "1"s.
Which part(s) Carries Timing information? → Change of the State

Example: 101100 "zeroCrossing"

Observation 2: Timing information is embedded in the "zero-Crossing" Change of the State.

Observation 3: For N-bit Sequence, we can have as many as N-1 Change-of-State as possible to maximize timing information