

9-10-2018 Sync Design

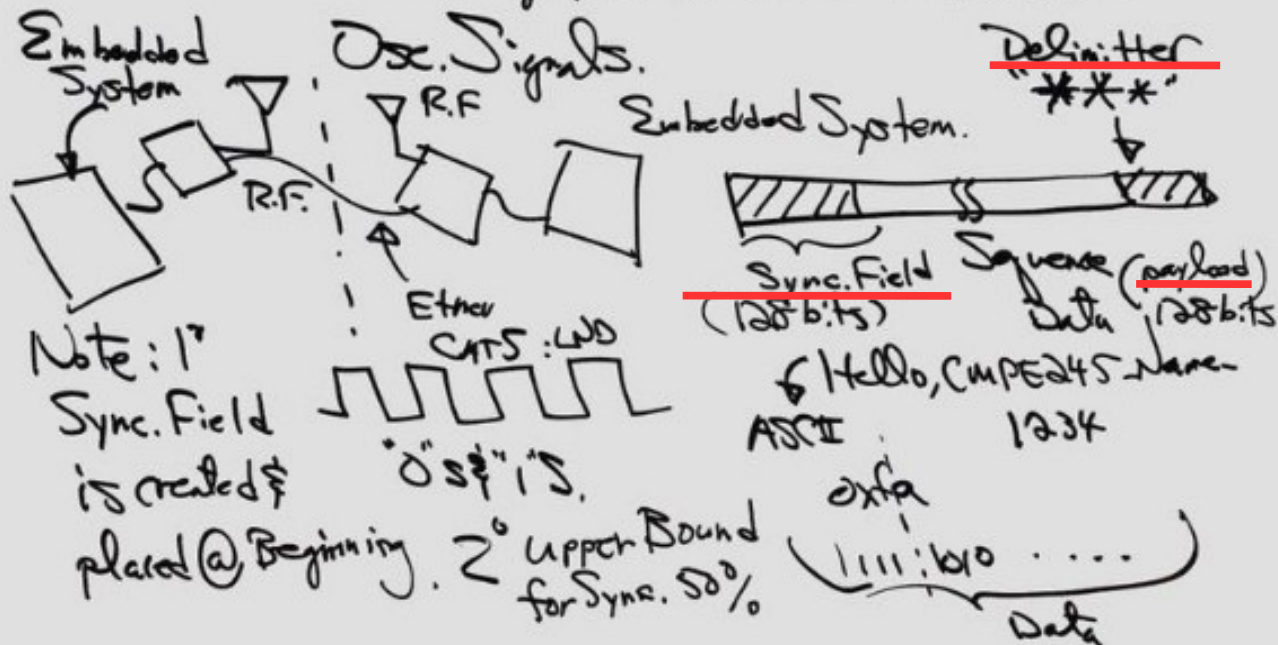
CMPE245 Embedded Wireless Sept. 10, 18
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Today's Topics:

1° Sync. Algorithm Design & Prototyping. S/N

Check github/hualili

Example: To Establish Handshaking B/W
 N_i & N_j , From D.B.3: Generate



9-9-2018 LISA Algorithm

CMPE245 Sept. 10, 2018 HL 2/.



Step 3. Parse the Payload. By look-up table (ASCII)

Step 4. Check Delimiter
4 "*" Symbols.

Question: 10

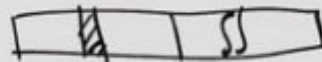

Ex R_x to Decode
Sync field

How to Detect Corruption Bit(s) in the Sync Field? Parity?

N_i Step 1: $t = t_0$ Communication Starts.

Step 2: $N_i(R_x)$ listens to N_i via $GPP_x(R_x) \xrightarrow{\text{For } N_i} N_i$
 Detect "1010...10 (Total 108 bits)".

Once done, then the next bit (129th) is the starting bit of the payload.



Question: How to handle Corruptions in the Sync Field? yet to Be able to pinpoint to the Starting bit of the Payload?

Counter \rightarrow Path Bit \rightarrow "LISA"
LINEAR Invariant
Sync. Algorithm.

Counter: (Root) 0000 ... 0
0001 ...
...
1111 ... f

Zero Crossing (pref) 1010 ... 0xa
0101 ... 0x5

Observation 1: 32 Bytes Needed for this

Sync. Algorithm.

0xa0
0xa1
...
0xaf
0x50
0x51
...
0x5f

Observation 1:

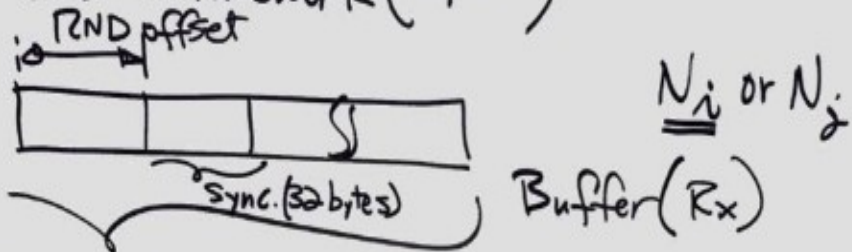
32 Bytes Needed for this

Design: $0x5F$
Observation 2: Minimum Byte for Sync is 1.

Observation 3: \sim whose confidence level is $1/32$.

9-12-2018 LISA Implementation

1° LISA Homework (C/C++)



- ① mytestdata.txt 2k bits
Size (2k bits) $2048 = 2 \cdot 2^{10}$
e.g. 256 Bytes 2^3 (unsigned 8 bits) 2^8
- ② Random offset
- ③ payload, SSU-CMPE245_Harry_1234 256 Bytes 2^8
- ④ Sync Field w/ Random Corruption Per User Input
- ⑤ User defines Confidence level for Sync. decoding
Hint: "Mask" (perfect Sync. Pattern) 0xA0

Algorithm (LISA Implementation):

- 1° Define A mask. e.g. 0xA0, for Example;
- 2° Start from the 1st bit of the Data buffer,
Perform bitwise pattern matching. If matched,
then the sync. is established w/ Confidence Level $\frac{1}{32}$. If No matching, Shift to the right 1 bit,
repeat the matching Process. (bit wise matching)
till the matching Pattern found or the end of the
buffer Reached;
- 3° Start New Mask, e.g. 0xA1, and continue this
process as the above till all the masks checked
And/or the Confidence Level reached.

9-12-2018 LISA For Sync Adaptation

Table 1. Sync Bytes vs.
Confidence Level, vs. QI index

Define QI (quality index) between Node i and
Node j communication.

32 Bytes Sync Field			Q.I
No. of Byte Matched	Confidence Level	Resource Needed	Quality of Comm.
1	$\frac{1}{32}$		(Design Part.)
2	$\frac{2}{32}$		
3	$\frac{3}{32}$		
...	...		
32	(100%) $\frac{32}{32}$		