Tentative Minutes of the FH Ad-hoc Group Meeting Held January 10 - 13, 1993
San Jose, CA

Joint FH and HSFH groups, Monday 10 Jan 94, 16:03
Everyone presiding.

Ed: How do you propose to shift gears?
----- confused discussion of the performance benefits of higher speed modes -----

Ed: Will high and low speeds exist on the same LAN? Will nodes listen to a default preamble and then change speed?

Wayne: Yes. 94/16 says multiple rate PHYs coexist. This is being voted on right now in the MAC group.

Peter: Simultaneously?
Wayne: is not sure.

----- wants to know the performance gain at the application layer. reminds that DFW has time slots. favors file transfer time as a performance metric.

Kamil: will address the issue in tonight's HSFH meeting.


Juan & Ed: discuss the FDDI-type arrangement where the presence of even one high-speed-incompetent node forces all nodes to the low speed mode.

Ed: thinks two independent co-located nets at different speeds are more efficient than a single integrated, multi-rate one. Favors speed changes in the MAC rather than in the packet.

John: decoding is not necessary for avoidance.

Ed: agrees to submit a proposal.

Tim: speaks for the schedule-accelerating benefits of the FDDI-type solution.

Wayne: speaks for reserved bits.

Dave Leeson: thinks the mutual interference problem is perhaps being overstated. just treat them as separate PHYs.

Jim Renfro: too many PHYs work against the idea of standardization.

----- general discussion. there seem to be four possibilities. (1) MAC handles multiple rates at node registration time (2) rate changes occur in the packet with default-rate headers and signaling (3) the FDDI approach (4) write two separate PHYs and ignore coexistence issues --

Wayne & Ed debate overhead inconclusively.
adjourn


A discussion on methodology. Peter constructs the following list of things we've got to produce.

FH Subgroup Deliverables.
1 FH sequence choice and hop sync acquisition method
2 All RF parameter values (the RF template)
3 CCA and diversity management requirements/techniques
4 Power control specification
5 Packet Preamble(s)
6 Low level packet protocol, including delimiters, fragmentation, FEC, ARQ, channel coding and PHY signalling
7 Performance & Conformance evaluation methods, including a channel model
8 The "Bit Mask"

Peter Chadwick: Is ARQ implemented at the PHY level?

Ed Geiger: No. It requires information available only at the MAC

Peter: Then the PHY layer doesn't need CRC info?

Ed: Yes, it does because of CCA.

Tim Blaney: We, the standard rate FH group, need to start our own template document [template being PHY-group jargon for a list of parameter values]. Nathan can't attend both FH groups at once.

Peter: If the MAC group will take on the preamble, FH sequence and synchronization then we shall accomplish our deliverables by November easily. No problem.

Tim: Jerry Loraine was going to contribute on measurement and bit masks.

Ed Geiger presents 94/18.

Jerry Socci: Why is the checksum 16 bits?

Peter: Ed, do you have IPR on what you presented?

Ed: I use this polynomial elsewhere. It's overkill here. 8 is probably enough.

----- discussion of the sufficiency of detection of errors in the packet length field, without correction ------- discussion on stuffing, dual scramblers and the necessity of transmitting all data -------

Peter: Ed, do you have IPR on what you presented?

Ed: No, I just want error correction on 29 byte fragments independently.

----- break -------

Peter: let's see what consensus we can identify on CCA (generates following foil).

Clear Channel Assessment
I Information (which the assessment might be based on)
   A power on channel
   B decoding valid information
   1 detect transitions
   2 detect words
   3 calculations based on words, e.g., CRC
   C signal signatures (pilot tones, etc.)

II Implications
   A frequency reuse
   B C/I
   C system capacity in (bits/sec)/(Hz floor area)
   D coexistence with noninteroperating systems

III Timing

------- Juan Grau & Ed discuss CCA and whether and how to defer to a packet already in progress when you awaken. We all assume no node need simultaneously transmit and receive -------

Peter: thinks more than power detection will be required.

Wayne: we might defer (only) when we recognize a friendly net ID.

Ed: it's better to defer upon recognizing any information (presence of bits).

Dave Leeson: ovens don't obey LBT etiquettes or deference rules. The question is "why wouldn't you want to transmit?" You should defer only if that's the only way to avoid busting somebody's packet.

Someone (Dave?): the more you believe in the capture effect, the more you favor ALOHA.

Tim to Jerry: How do we set the power threshold?

Jerry: make it ride the noise

------- uncaptured mulling and pondering -------

Juan: describes (to the consternation of many listeners) a multirate LAN Proxim has built. Considers it successful and not overly complex.

John: enjoys the moment.

Dave: advocates a simple standard, fixed upper packet length limit, announcement packets.

MOTION 1: We accept Jerry's proposal [above] as a baseline and call for submissions on CCA

Moved: T. Blaney, Seconded: E. Geiger

The chair ruled Motion 1 passed unanimously.

------- break -------

Ed presents 94/19.

Tim: If we accept the CCA of Motion 1, how will different data rates coexist (since default devices can't decode high rate transmissions)?

Roger: make the higher bit rates multiples of the default rate

Peter: we could extend the flow chart and go for channel ID.

------- Peter vs. Ed on whether the protocol needs doing on every channel -------

John: still, net ID's might be the basis of a second layer of defense. You might adjust your hop sequence or something, in order to escape having to time share [or, in English, share time] with the alien net.

Dean: is worried about the interaction of power saving techniques with changes in hop sequence [sleeping nodes might lose the net if it's done poorly].

------- more uncaptured discussion. Several agree to form a working group to draft language for CCA [see below] -------

Peter: let's move on to diversity management. RSSI? CRC?

Larry: maybe we can leave that out of the standard

--------- adjourn -------

Frequency Hop PHY, 8:50 Wednesday, 12 January 1994
Chairman Chadwick presiding.

Peter brandishes his list of deliverables; wants dates for each.
shall we advise the MAC group they are to select the hop sequence and synchronization method?

Bill Huhn: send it to them with recommendations.

Peter: our list of sequence alternatives is (1) Francois Lemaut's or (2) Ed Geiger's. Did Francois consider the method for obtaining sync?

Dean Kawaguchi: 93/190 [the main DFW MAC exposition] has a lot of stuff on hop sync.

Peter: does it specify how to set hop times?

Dean: Yes.

Peter: writes as follows

Hopping Issues

1 Sequences
2 Timing
3 Sync Acquisition

Fraa: 93/190 takes care of all that.

Peter: even acquisition?

Dean: that's in section 4.

Peter: in the MAC?

Dean: yes.

Peter: so it's a closed issue?

MOTION 1 The FH PHY group accepts IBM's proposed hopping sequences, in document 93/@ for 802.11-compatible FH WLANs.

Moved: J. McKown, Seconded: W. Moyers

VOTE ON MOTION 1: Yes=16, No=0, Abstain=2. Motion 1 passes.

Ed: draws a document map

802.11 PHY SPECS

Peter: is power control adaptive? We voted to allow several levels.

Dean: that's another MAC issue.

Peter: learned discussion on power control consensus is that the MAC decides when to adjust power and which way

we start on Nathan's template, 83r2, working on the FH column to see what should go into 161. It quickly becomes apparent that we don't adequately remember which parameter values have been voted on and which have not. The following people accept assignments to promptly examine the minutes of one session and communicate all approved values to Tim Blaney, who is the editor of 93/161.

John McKown November 1993
Dean Kawaguchi September 1993
Wayne Moyers July 1993
Jerry Socci May 1993
Tim Blaney March 1993
Roger Jellicoe January 1993

Peter: what does 83r2 mean specifying a maximum input level at the receiver? That the receiver should function properly at that value?

Larry Zuckerman: Yes. It's to set the minimum separation at which compliant units must work.

Wayne: we should take that to the full PHY group.

MOTION 1 We shall remove from 93/161 all reference to the subject matter of line 16 of 93/83r2 (fall back data rates below 1 Mbps).

Moved: J. McKown, Seconded: J. Renfro

VOTE ON MOTION 1: Yes=12, No=0, Abstain=5

MOTION 2 We shall remove from 93/161 all reference to the subject matter of line 17 of 93/83r2 (baseband bit clock jitter).

Moved: E. Geiger No second

Wayne: that was inserted by the full PHY committee and we shouldn't remove it.

MOTION 3 We shall remove from 93/161 all reference to the subject matter of lines 17 and 17a of 93/83r2 (baseband bit jitter & clock accuracy).

Moved: J. McKown, Seconded: M. Traynor

VOTE ON MOTION 3: Yes=4, No=1, Abstain=2. Motion 3 passes.

Peter: Preamble length is to be closed July 94.
Ed (re line 19, maximum run length to be withstood by the synchronizer): Apple submitted a paper to the effect it's difficult to build a scrambler which will guarantee no runs longer than 7.

--- Ed vs. Wayne on sync hardware vs. scrambler hardware. ---

Juan: perhaps we should switch scramblers upon re transmission.

----- Ed vs. Juan on scramblers. ----- 

Peter: advocates 1 MHz

Wayne: thinks line 21 is probably consistent with line 12.

Dave Leeson: also wants bandwidth for line 12.

------- learned discussion about images. Tim looked at 15.209 to see where the 500 micro volts per meter applies; he did document 93/223 on how the FCC wants us to perform the measurements. Juan & Roger endorse Tim's position.-------

Peter: the DS folks specified -55 dB for in-band spurs; I suggest we do the same.

Roger: Yes. We must compete with them.

Wayne: the DS guys should not be presumed to have thought this through well.

Peter: delivers detailed defense of -55 dB. Stuns the audience.

MOTION 4 In-band spurious emissions shall be -55 dBc.

Moved: P. Chadwick, seconded R. Jellicoe

VOTE ON MOTION 4: Yes=9, No=0, Abstain=5. Motion 4 passes.

------------- break -------------

adjourn

Peter: let's do line 23 (of 93/83r2); T/R turnaround time

Jerry: turnaround time needs a precise definition. Does it include the preamble? If so, the figure shown is too short.

---------- learned discussion ----------

Roger: it came out again yesterday in the joint session that R to T time is critical, as is knowing exactly when the transmission ends.

Various: T/R and R/T need to be symmetrical. can use the preamble to make up the difference [?]

Roger: shows a diagram; proposes T to R and R to T both include the ramps; so defined, Roger likes 24 microseconds.

Nathan: the quantity of most interest to the MAC group is the interval between the last data bit out and the first data bit in.

Dean: wonders what preamble has to do with carrier sense.

John: it looks like there will be a range of times required to calculate the channel is busy. If so, the MAC group need to come to grips with that.

Jerry: Yeah.

Everyone: Quite so, Jerry. You're absolutely right.

Ed: The MAC needs to process a while prior to ordering an ACK be sent. We can turn around in that interval.
Jerry: they're planning on being fast --- using hardware. We're proposing a length field. They're saying they won't put a length field in the MAC.

Jerry: doesn't care where the length calculations are done.

Larry: did a simpler system 8 years ago. It takes time to recognize that the signal is down.

Ed & Tim: think the length field should be in the PHY header.

Ed: at the end of the length field, the PHY could send the MAC a "packet receive interrupt."

----- Ed and others debate smart PHYs vs. dumb PHYs ----- 

Dean: the ramp down should not be included in the specified switching time. Instead, replace it with the minimum CCA time.

John: don't you mean the maximum CCA time?

Dean: no.

: likes Dean's idea

Larry: wants MAC to give us an RTS

Someone: that won't do. the MAC wants continuous CCA information.

John: But that's exactly what we gave them in our presentation yesterday [see Ed's flow chart in the minutes of the full PHY]. We shouldn't have shown them a flow chart, which to most people suggests sequential processing and thus delay. We should have shown them a gate array whose input lines were labeled "output of continuously-running power meter" and "output of continuously running clock detector" or, perhaps, "clock present", and whose output was "channel clear".

Various: the flow chart was OK, they got confused by the wording.

-------- more learned discussion ------

Peter: repeats call for submissions on CCA.

----- adjourn ------