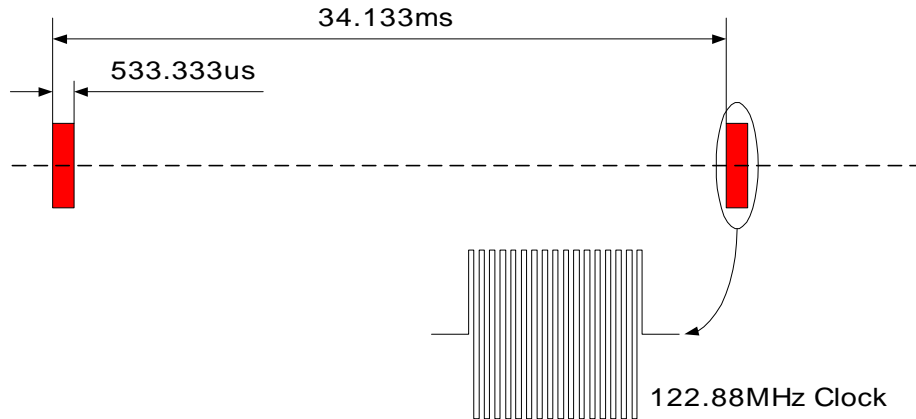


1. The fundamental connected_tone proposal

[This connected_tone proposal is copied from the P1394b draft (Feb. 8th, 1998)] The proposal is based on the open-loop transmission/reception of a regular tone. Reception of a tone indicates a connection, lack of a tone indicates no connection.

The proposal is to transmit a “tone” every 34.133 milliseconds ($122.88/2^{23}$), i.e. approx. 30 tones a second. The tone comprises a signal of frequency 122.88 MHz (S800 transmission rate / 4), and has a duration of 533.333 microseconds (2^{17} clocks of a 122.88 MHz clock). Note, for EMC reasons on UTP, it may be necessary to use a signal of half this frequency, and it needs to be verified that this can pass through an optical transceiver sufficiently well to provide a signal detect at the far end. Note, the transmitters are active for 1/256 of the time, and will not be consuming power otherwise. The connected_tone timing diagram is shown as below.



Connected_tone Timing Diagram

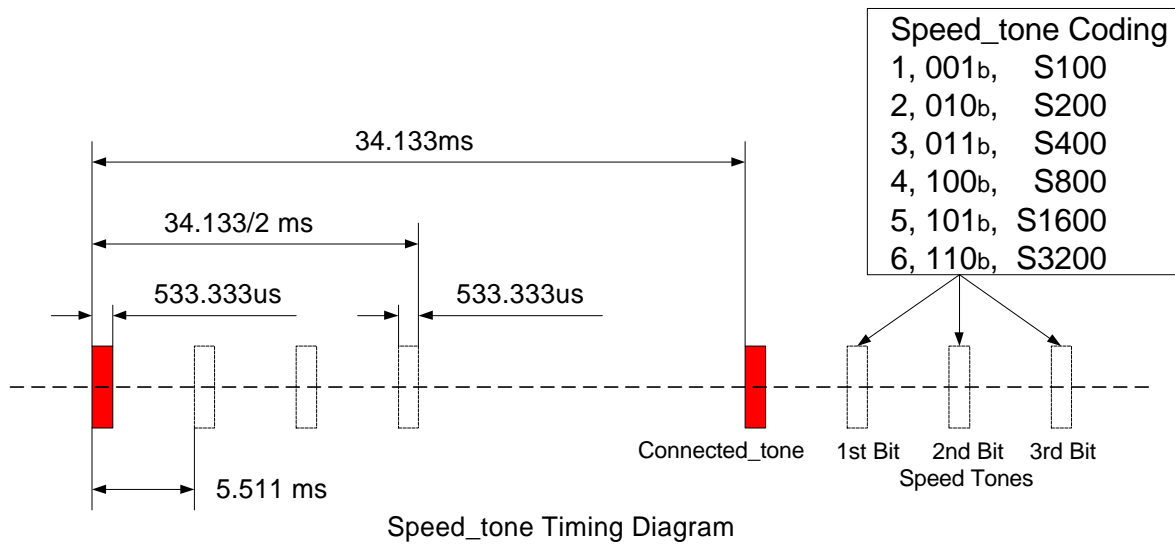
A signal detect circuit is used to detect that a valid signal is received. This is latched, and the latch sampled at appropriate intervals. The latch is reset after each sampling, i.e. the latch indicates that a valid tone has been received since the last time a sample was taken.

If the port is disconnected or suspended, the latch is sampled at the same interval as the toning interval. If the port is suspended, the far end signals a resume by changing to a continuous transmission (actually of IDLE characters for synchronization). In this case, if the port detects a signal, it samples again after an interval of $2 * \text{TONE_DURATION}$. If it detects a signal, then it starts a resume. (NB this needs some tightening up, as there are some buggy corner cases, but two samples will fix it).

2. The 6 operating speed tones

Upon the connection, the only thing we really know is the 122.88MHz connected_tones with the duration of 533.333 microseconds. Until the continuous operation is established, we can't really do much more. But we would like the continuous operation to be at the correct operating speed which is the common denominator of the highest operating speeds at each end. It seems that we can use this single connected_tone to achieve the speed negotiation by differentiating between the occasional tone to identify connect/disconnect events and a pattern of tones to negotiate the operating speed. For this latter, the only difference from the single connected_tone is its duration.

Based on the above discussion, the 6 operating speeds are coded into the 3 bit binaries. The patterns of the 3 bit binaries will be presented in the identical connect detect indication tone following the connected_tone. The speed tones will fall in the first half interval of the connect detect indication tone, bit value “1” will be represented by the tone with the same duration 533.333 microseconds, the bit value “0” will be represented by no tone, the interval between the adjacent bit speed tones or between the connected_tone and the first bit speed tone is 5.511 milliseconds. The speed_tone coding and timing diagrams are shown as below.



Speed_tone Coding

1, 001b, S100

2, 010b, S200

3, 011b, S400

4, 100b, S800

5, 101b, S1600

6, 110b, S3200

Connected_tone

