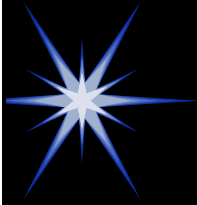


Requirement Criteria to be defined for IEEE 1394 Long Distance

Contact: Shuntaro Yamazaki
(yamazaki@optsys.cl.nec.co.jp)

NEC

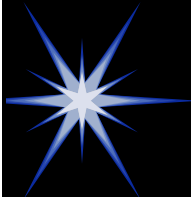
**Opto-Electronic Network
Research Laboratory**



Requirement criteria to be defined for IEEE 1394 Long Distance

NEC

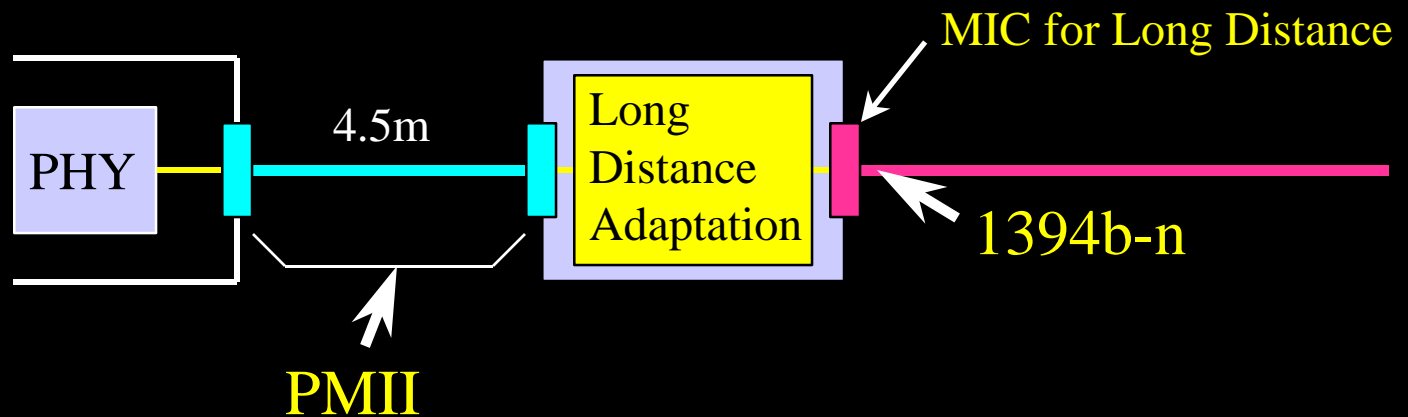
- 1. Architecture**
 - PMII & 1394b-n -
 - Home Network Modeling -
- 2. Delay**
- 3. Maximum Speed**
- 4. Start up**
- 5. Block coding**
- 6. Powering ID (P1394a issue)**



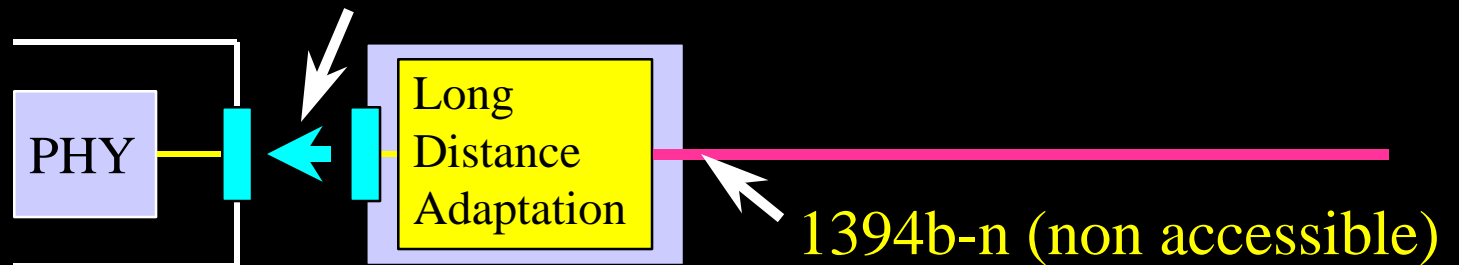
Architecture alternatives

- PMII & 1394b-n -

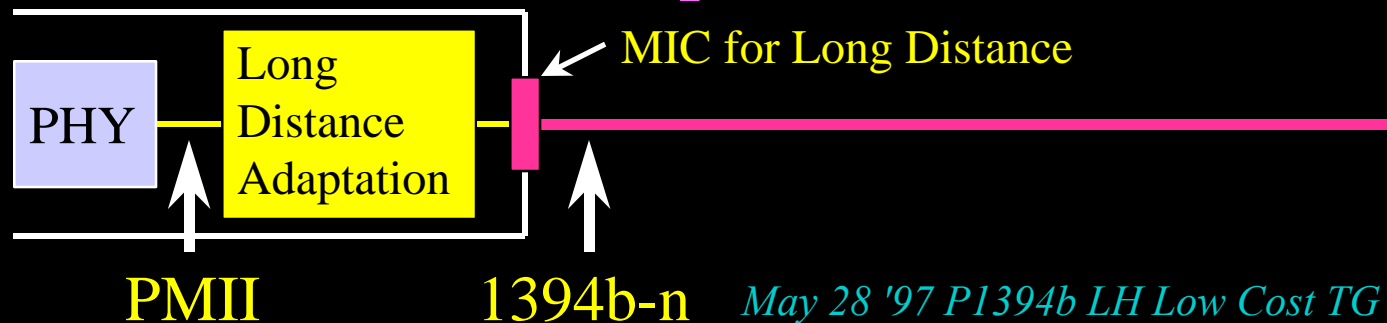
Repeater



Dongle

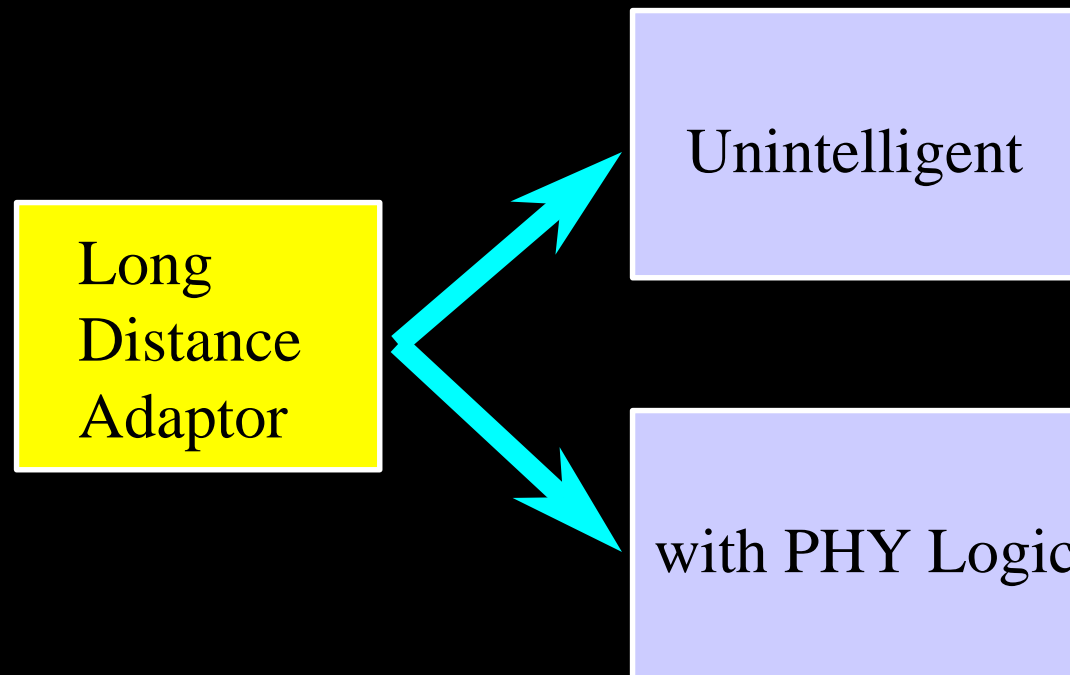


Internal PMII (considerable impact on current 1394)

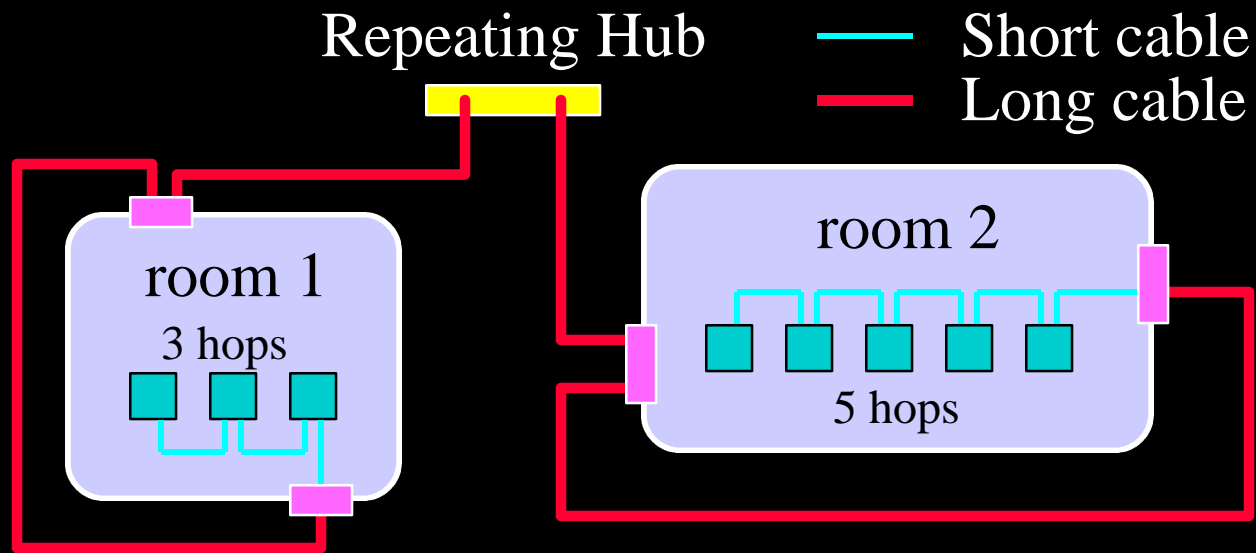




Long Distance Adaptor

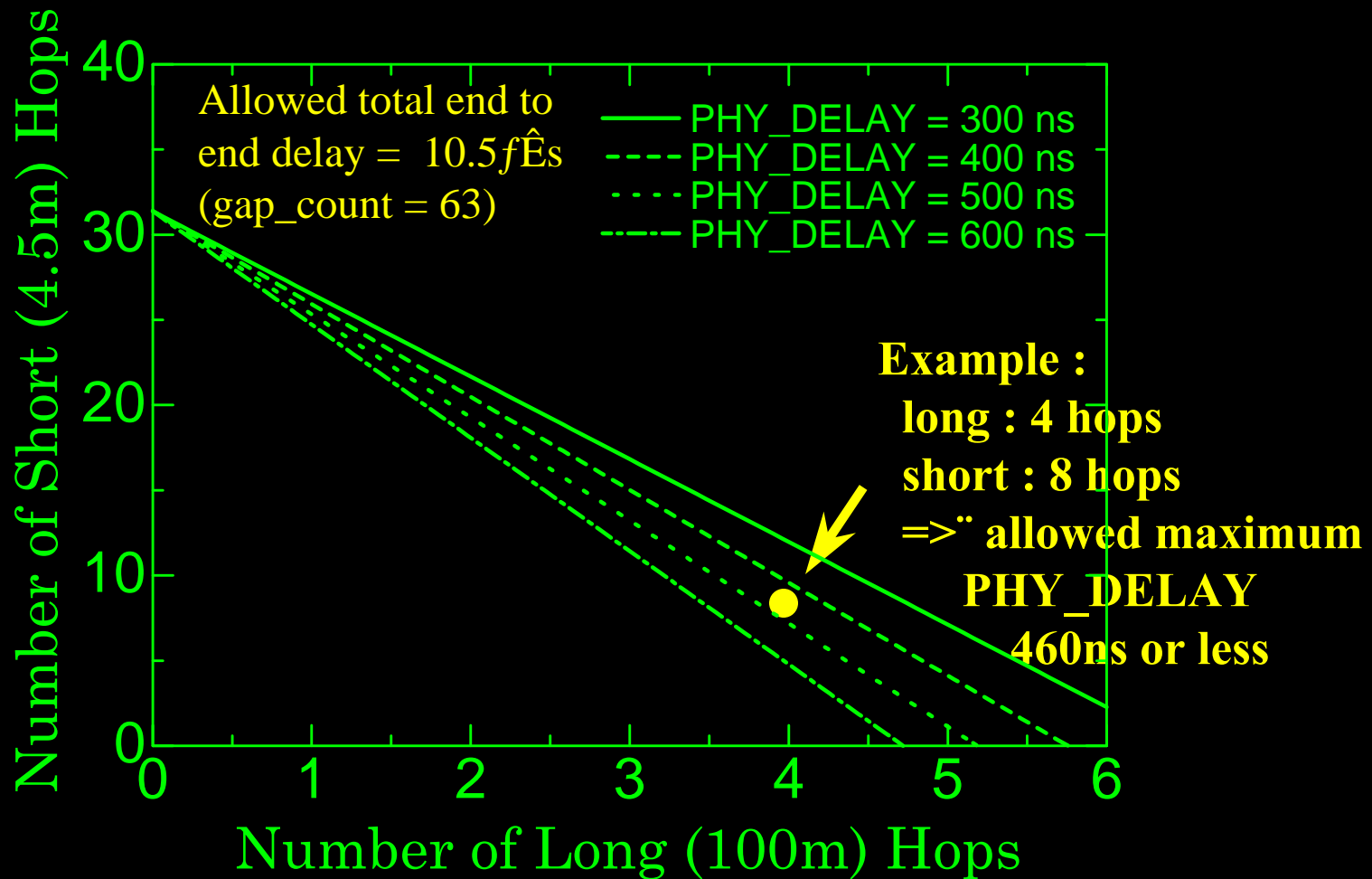


- Network topology : STAR (Room to Room)
- Number of hops
 - Long cable : 4 (2 outlets in the room)
 - Short cable : 8
- Length of long cable : 100m (max.)
- Length of 1394 STP cable : 4.5m (max.)





PHY_DELAY vs. Hops



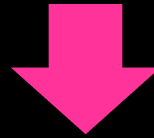


Important Study Item: Delay

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Long Cable :

Ex. 100m = Round Trip Time is about 1.1 μ s



1. The specification of the PHY timing constant ;
Minimum of MAX_ARB_STATE_TIME
(No specification in the IEEE 1394-1995)
→ **>1.1 μ s + margin**
2. At the Root Contention Resolution Phase
 - Change the difference between
ROOT_CONTEND_FAST and **ROOT_CONTEND_SLOW**
(300ns in the IEEE 1394-1995 is too small)
 - or
 - Introduce the new Root Contention Resolution process



Maximum speed requirement for the P1394B/Long-Haul Low Cost Task Group

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Requirement for maximum speed :

Mbps

The results of votes for priority
in last P1394B meeting (May 5)

I	II	Speed & Technology
0	2	S100/UTP
0	5	S100/Fiber
1	1	S200/Fiber
1	2	S400/Fiber
11	0	S800/Fiber
7	0	S1600/Fiber
0	8	S3200/Fiber



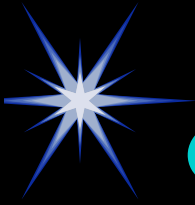
Proposal of the start - up (Beta mode)

- Bit synchronization
- Symbol alignment
- Speed negotiation

Proposed requirement at the last P1394b meeting (May 5)

- To start up in Beta mode at the maximum baud rate which is acceptable to both ends
- To start up with no user intervention or configuration

etc



Comparison between proposed block codings

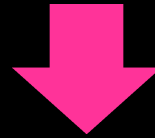
	4B/5B(+NRZI) NEC	4B/5B(+NRZI) SONY	8B/10B IBM	8B/10B HP
Max run length	4 bit (Data) 5 bit (Arb)	4 bit (Data) 5 bit (Arb)	5 bit	17 bit (Data) 8 bit (Arb)
DC balance compensation	NRZI	NRZI	yes	yes
DC wander	$\pm 10\%$	$\pm 10\%$	$\sim 0\%$	$\sim 0\%$
Hamming distance	1	1	1	1 (Data - Data) 2 (Arb/Data,Arb)
Error detection	No	No	yes	yes
Gates count	small	small	large	large
Delay (@125Mbps)	$\sim 230\text{ ns}^{(*1)}$	should be quantitatively estimated		

(*1) Serial/Parallel + coding + NRZI



Powering ID

POF / UTP : No power line



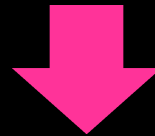
The addition of the **POWER_CLASS** code in Self-ID packet

Ex. Repeater :

powered from the bus and not repeat power

or

self-powered and not provide on the POF side



This issue is to be discussed in P1394a WG.

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Thank you for your attention.