



BitBlitz Communications,

***CX4 Register Bits
Revisiting Comments
1, # 329, etc.***

Register 1.7 in 802.3ae-2002

➤ Pattern of bits 1.7.2:0 :-

<u>Bits 2:0</u>	<u>PMA/PMD Type</u>
111	10GBASE-SR
110	10GBASE-LR
101	10GBASE-ER
100	10GBASE-LX4
011	10GBASE-SW
010	10GBASE-LW
001	10GBASE-EW
000	Reserved

Registers 1.7 & 1.8 in 802.3ae-2002



➤ Relationship of bits 1.7.2:0 to bits in 1.8:-

<u>1.7.2:0</u>	<u>PMA/PMD Type</u>	<u>Bit in 1.8</u>
111	10GBASE-SR	1.8.7
110	10GBASE-LR	1.8.6
101	10GBASE-ER	1.8.5
100	10GBASE-LX4	1.8.4
011	10GBASE-SW	1.8.3
010	10GBASE-LW	1.8.2
001	10GBASE-EW	1.8.1
000	Reserved	not a 'type' bit

Logical Patterns in 1.7 & 1.8

- Each 10GBASE-X has 1.7.1:0 = 00'b
- The 10GBASE-E, -L and -S have 1.7.1:0 as 01'b, 10'b & 11'b in order.
- All 10GBASE-W have 1.7.2 = 0, all 10GBASE-R have 1.7.2 = 1
- In register 1.7, only 7 of the available 65k values are used. Register 1.8 is nearly full.

Proposed Register 1.7 for 802.3ak



➤ Pattern of bits 1.7.3:0 :-

<u>Bits 3:0</u>	<u>PMA/PMD Type</u>
1100	10GBASE-CX4
1000:1011	Reserved
<i>0111</i>	<i>10GBASE-SR</i>
<i>0110</i>	<i>10GBASE-LR</i>
<i>0101</i>	<i>10GBASE-ER</i>
<i>0100</i>	<i>10GBASE-LX4</i>
<i>0011</i>	<i>10GBASE-SW</i>
<i>0010</i>	<i>10GBASE-LW</i>
<i>0001</i>	<i>10GBASE-EW</i>
<i>0000</i>	<i>Reserved</i>

Registers 1.7 & 1.8/1.11 in 802.3ak



➤ Relationship of 1.7 to 1.8 & 1.11:-

<u>1.7.3:0</u>	<u>PMA/PMD Type</u>	<u>Bit in 1.8/1.11</u>
1100	10GBASE-CX4	1.11.4
1000:1011	Reserved	1.11.0:3
0111	10GBASE-SR	1.8.7
0110	10GBASE-LR	1.8.6
0101	10GBASE-ER	1.8.5
0100	10GBASE-LX4	1.8.4
0011	10GBASE-SW	1.8.3
0010	10GBASE-LW	1.8.2
0001	10GBASE-EW	1.8.1
0000	Reserved	not a 'type' bit

Future 1.7 & 1.8/1.11 Uses @ 10G



<u>1.7.3:0</u>	<u>PMA/PMD Type</u>	<u>Bit in 1.8/1.11</u>
1101:1111	10GBASE-T?R ?	1.11.5:7
1100	10GBASE-CX4	1.11.4
1001:1011	10GBASE-T?W ?	1.11.1:3
1000	10GBASE-SX4 ?	1.11.0
0111	10GBASE-SR	1.8.7
0110	10GBASE-LR	1.8.6
0101	10GBASE-ER	1.8.5
0100	10GBASE-LX4	1.8.4
0011	10GBASE-SW	1.8.3
0010	10GBASE-LW	1.8.2
0001	10GBASE-EW	1.8.1
0000	Reserved	not a 'type' bit

Patterns in 1.7 & 1.8/11 as proposed



- Each 10GBASE-X has 1.7.1:0 = 00'b
- The 10GBASE-E, -L and -S have 1.7.1:0 as 01'b, 10'b & 11'b in order, & 1.7.3 = 0.
- All 10GBASE-W have 1.7.2 = 0, all 10GBASE-R have 1.7.2 = 1
- The 10GBASE-T (variations) have 1.7.3 = 1 and(whatever)
- In register 1.7, less than 16 of the available 65k values are used. Register 1.8 is full, new 1.11 is half full.

Future Expansion? 30G; 40G; 100G?



- **What future extensions can we imagine?**
 - **30GBASE-CX##, a 30G equivalent to the IBx12?**
 - **40GBASE-xxx, a quad XFI-like interface?**
 - **100GBASE-???**
- **Each of these would require modifications to D.0.5:2 (& 13,6??), and D.4, as well as 1.7, 2.7 & 3.7, 1.11, 3.8...**

Accommodating the future in 1.7



- **It would be readily possible to use 1.7.4 as a 30/40GBASE bit, 1.7.5 for 100GBASE. This still leaves 15 total variations of 10GBASE available (9/10 are currently in use or planning).**
 - **1BASE uses 1, 10BASE uses 6, 100BASE uses 6, 1000BASE uses 5**
- **Or if the field is more crowded, 1.7.5 for 30/40GBASE, and 1.7.6 for 100GBASE. This leaves 32 variations of each.**

Enough Room in 1.7?

- **Even with 32 variations of each, we have 'squandered' only 128 of the 65k available values.**
- **Are YOU nervous there aren't enough left?**
- **For what? for 1000GBASE, 10KGBASE? Guess what, they have 9 bits left to work on!**

Accommodating the future in 1.11, etc.



- This is a bigger problem. However, we need space for at least one (probably two) variations of 10GBASE-T, and I can conceive of an XFI-like electrical cable proposal, so (with -R & -W), that fills up the bottom half of 1.11. There are still 7⁽¹⁾ bits left.
 - Still available are 1.12 and 1.13, 30 bits in all⁽¹⁾ which could allow a lot of expansion.
- (1) Allowing for an 'extended...' bit**

Recommendations

- **Use a 'rational' structure for 1.7, and 1.11 expansion for CX4, rather than one driven by 'conserving' a very plentiful resource.**
- **Structure this expansion so as to accommodate likely near-future extensions of the 10GBASE standards, and allow for easy progression to probable further-future extensions (30GBASE, 40GBASE, 100GBASE)**

Final Considerations



- **At least this way we reduce the possibility of future committees saying 'Why did those (expletive deleted) WG members do it like THAT!**
- **And not join the long and embarrassing line of people we now laugh at:-**
 - **'Short wave'**
 - **'High Frequency', Very High Frequency', 'Ultra High Frequency'....**
 - **'Large Scale Integration'....**