Functional specs for AUI's reference PMD labeled registers

Mike Dudek   Marvell
Follow up to D2.3 comment 104.

The problem in D3.0 (and earlier revisions).

- In the AUI Annexes (176D and 176C) the functional specification refers to the PMD clauses. (example from 176C) saying

"The C2C component shall meet the functional specifications in 178.8 and the management variable specifications in 178.13, unless stated otherwise. "

- Nothing is "stated otherwise" so everything in 178.8 and 178.13 is normative.
- 178.13 says "The PMD control and status variables are identical to those defined in 179.14. "
- 179.14 says "

PMD control and status variables intended to be accessible via a management system are listed in Table 179–23 and Table 179–24. Additional variables associated with the APSU functions are listed in Table 178B–6 and Table 178B–7.

If the MDIO Interface (see Clause 45) is implemented, PCS control and status variables shall be mapped to MDIO registers as shown in Table 179–23, Table 179–24, Table 178B–6, and Table 178B–7.

If the MDIO Interface is not implemented, an alternate mechanism to access management variables shall be provided.

179.14 Management Variables.

Table 179–23—PMD control variables and MDIO mapping

Control variable	Variable reference	MDIO register/bit number	MDIO register/bit reference
PMD_reset	179.8.10	1.0.15	45.2.1.1
Global_PMD_transmit_disable	179.8.6	1.9.0	45.2.1.8
PMD_transmit_disable_7, PMD_transmit_disable_6, PMD_transmit_disable_5, PMD_transmit_disable_4[a]	179.8.7	1.9.8:5	45.2.1.8
PMD_transmit_disable_3, PMD_transmit_disable_2[b]	179.8.7	1.9.4:3	45.2.1.8
PMD_transmit_disable_1[c]	179.8.7	1.9.2	45.2.1.8
PMD_transmit_disable_0	179.8.7	1.9.1	45.2.1.8

[a] Available only in 1.6TBASE-CR8.
[b] Available only in 800GBASE-CR4 and 1.6TBASE-CR8.
[c] Available only in 400GBASE-CR2, 800GBASE-CR4, and 1.6TBASE-CR8.

Table 179–24—PMD status variables and MDIO mapping

Control variable	Variable reference	MDIO register/bit number	MDIO register/bit reference
PMD_fault	179.8.8	1.1.7	45.2.1.2
PMD_transmit_fault	179.8.8	1.8.11	45.2.1.7
PMD_receive_fault	179.8.8	1.8.10	45.2.1.7
PMD_signal_detect_7, PMD_signal_detect_6, PMD_signal_detect_5, PMD_signal_detect_4[a]	179.8.5	1.10.8:5	45.2.1.9
PMD_signal_detect_3, PMD_signal_detect_2[b]	179.8.5	1.10.4:3	45.2.1.9
PMD_signal_detect_1[c]	179.8.5	1.10.2	45.2.1.9
PMD_signal_detect_0	179.8.5	1.10.1	45.2.1.9
Global_PMD_signal_detect	179.8.4	1.10.0	45.2.1.9

[a] Available only in 1.6TBASE-CR8.
[b] Available only in 800GBASE-CR4 and 1.6TBASE-CR8.
[c] Available only in 400GBASE-CR2, 800GBASE-CR4, and 1.6TBASE-CR8.

178B Management variables.

Table 178B–6—Control variables and MDIO mapping

Control variable	Variable reference	MDIO register/bit number[a]	MDIO register/bit reference
PMA_reset	178B.8.2.1	1.0.15	45.2.1.1
PMD_reset	178B.8.2.1	1.0.15	45.2.1.1
mr_restart	178B.8.2.1	1.150.0	45.2.1.95
mr_training_enable	178B.8.2.1	1.150.1	45.2.1.95

- Both PMA_reset and PMD_reset control variables exist, but they use the same MDIO register and bit number.

Another Issue.

- The functional specification for the C2C AUI normatively requires meeting clause 178.8.   However the sub-clauses in 178.8 require the electrical specifications in 178.9.2 and 178.9.3 which are not appropriate. (e.g.)

   178.8.2 PMD transmit function
   The PMD transmit function specification is identical to that of 179.8.2 with the exception that electrical signals are delivered to the MDI according to the transmit electrical specifications in 178.9.2

The Problem

- The AUI management is using PMD_reset and other PMD labelled registers which is confusing.
- By referencing other clauses un-intended specifications are being applied.

Possible solutions.

- Option 1.

Follow the practice used in 178B Table 178B-6.

- Insert tables equivalent to Tables 179-23 and 179-24 into 176C. (new tables 176C-xx and xy) With PMA replacing PMD in the variable names.
- In 176C.3 change "The C2C component shall meet the functional specifications in 178.8 and the management variable specifications in 178.13, unless stated otherwise." to "The C2C component shall meet the functional specifications in 178.8 and the management variable specifications in 179.13, with the following exceptions.
  - The management Variables are listed in tables 176C –xx and xy.
  - References to the electrical specifications in 178.9 are replaced with references to the equivalent specifications in 176C.6.
- In 176D.3 change "The C2M component shall meet the functional specifications in 179.8 and the management variable specifications in 179.14, unless stated otherwise." to "The C2M component shall meet the functional specifications in 179.8 unless stated otherwise. The C2M component shall meet the management variable specifications in 179.14, except that the Management Variables are listed in tables 176C-xx and xy.

Possible solution

- Option 2.

  - In 176C.3 change "The C2C component shall meet the functional specifications in 178.8 and the management variable specifications in 178.13, unless stated otherwise." to "The C2C component shall meet the functional specifications in 178.8 and the management variable specifications in 178.13, with the following exceptions.
    - References to the electrical specifications in 178.9 are replaced with references to the equivalent specifications in 176C.6.
    - The management variables called PMD_xxxx refer to PMA variables with the equivalent functionality.
  - In 178B-6 delete the PMA_reset and add a footnote to the PMD_reset saying "This variable is used for PMA_reset in a PMA and PMD_reset in a PMA.
  - In 176D.3 change "The C2M component shall meet the functional specifications in 179.8 and the management variable specifications in 179.14, unless stated otherwise. To The C2C component shall meet the functional specifications in 179.8 and the management variable specifications in 178.13, unless specified otherwise and with the exception that the management variables called PMD_xxxx refer to PMA variables with the equivalent functionality.

- Option 3

  - Same as Option 2 except re-label all the relevant PMD_xxx variables as PMD/PMA_xxxx

Additional Problem and Possible solutions

- Problem

The notes to the tables 179-23 and 179-24 correctly apply to CR, but these tables are normatively referenced by clause 178 where these CR PMD references do not apply but should be replaced by other references.

Solution Option 1

In 178.13 Change "The PMD control and status variables are identical to those defined in 179.14." to "The PMD control and status variables are identical to those defined in 179.14, with the exception that references to CR PMD's are replaced by references to the equivalent KR PMD's".

Solution Option 2

Do nothing as an equivalent problem exists in the published 802.3ck and it does not appear to have caused problems.