

Table 45–117—Auto-Negotiation MMD registers

Register address	Register name
7.0	AN control
7.1	AN status
7.2, 7.3	AN device identifier
7.4	Reserved
7.5, 7.6	AN devices in package
7.7 through 7.13	Reserved
7.14, 7.15	AN package identifier
7.16 through 7.18	AN advertisement
7.17 through 7.18	Reserved
7.19 through 7.21	AN LP base page ability
7.20 through 7.21	Reserved
7.22 through 7.24	AN X NP transmit
7.25 through 7.27	AN LP X NP ability
7.28 through 7.31	Reserved
7.32	10GBASE-T AN control
7.33	10GBASE-T AN status
7.34 through 7.32 767	Reserved
7.32 768 through 7.65 535	Vendor specific

45.2.7.6 AN advertisement register (7.16, 7.17 and 7.18)

This register contains the advertised ability for the 10GBASE-T PHY. The bit definition for the base page is defined in 28.2.1.2. On power-up, before Auto-Negotiation starts, this register shall have the following configuration: The Selector field (7.16.4:0) is set to an appropriate code as specified in Annex 28A. The Acknowledge bit (7.16.14) is set to zero. The Extended next page ability (7.16.12) and the Technology ability field (7.16.11:5) is set based on the values defined in Annex 28B (see 28B.2).

Only the bits in the Technology ability field that represent the technologies supported by the Local Device may be set. Any of the Technology ability field bits that may be set can also be cleared by management before a renegotiation. This can be used to enable management to Auto-Negotiate to an alternate common mode.

The management entity may initiate renegotiation with the Link Partner using alternate abilities by setting the Selector field (7.4:0), the Extended next page ability (7.16.12) and Technology ability field (7.11:5) to indicate the preferred mode of operation and setting the Restart Auto-Negotiation bit (7.0.9) in the AN control register (Register 7.0) to one.

Table 45–120—AN advertisement register bit definitions

Bit(s)	Name	Description	R/W
7.16.15	Next page	See 28.2.1.2	R/W
7.16.14	Acknowledge	See 28.2.1.2	R/W
7.16.13	Remote fault	See 28.2.1.2	R/W
7.16.12	Extended next page ability	1 = Extended next page capable 0 = Is not extended next page capable See 28.2.1.2	R/W
7.16.11:5	Technology ability field	See 28.2.1.2	R/W
7.16.4:0	Selector field	See 28.2.1.2	R/W
<u>7.17.15:0</u>	<u>Reserved</u>	<u>Reserved</u>	<u>R/W</u>
<u>7.18.15:0</u>	<u>Reserved</u>	<u>Reserved</u>	<u>R/W</u>

Bit 7.16.12 reports whether a PHY supports extended next pages and may be used to control whether a PHY exchanges extended next pages.

Any writes to this register prior to completion of Auto-Negotiation as indicated by bit 7.1.5 should be followed by a renegotiation for the new values to be properly used for Auto-Negotiation. Once Auto-Negotiation has completed, this register value may be examined by software to determine the highest common denominator technology.

If the Auto-Negotiation advertisement register (Register 4) is present, (see 28.2.4.1.3), then this register is a copy of the Auto-Negotiation advertisement register (Register 4). In this case reads to the AN advertisement register (7.16) will report the value of the Auto-Negotiation advertisement register (Register 4), writes to the AN advertisement register (7.16) will cause a write to occur to the Auto-Negotiation advertisement register (Register 4).

Note: Auto-Negotiation that support a 48-bit base page uses registers 7.16, 7.17 and 7.18 for storing base page information. Auto-Negotiation that support a 16-bit base page only use register 7.16 for storing base page information

45.2.7.7 AN LP base page ability register (7.19, 7.20 and 7.21)

Support for 10GBASE-T requires support to store the Link Partner (LP) base page ability register as shown in Table 45–121. All of the bits in the AN LP base page ability register are read only. A write to the AN LP base page ability register shall have no effect. Register 7.19 is a copy of register 5, if present (See 28.2.4.1).

Table 45–121—AN LP base page ability register bit definitions

Bit(s)	Name	Description	R/W ^a
7.19.15	Next page	See 28.2.1.2	RO
7.19.14	Acknowledge	See 28.2.1.2	RO
7.19.13	Remote fault	See 28.2.1.2	RO
7.19.12	Extended next page	1 = Extended next page will be used 0 = Extended next page will not be used	RO
7.19.11:5	Technology ability field	See 28.2.1.2	RO
7.19.4:0	Selector field	See 28.2.1.2	RO
<u>7.20.15:0</u>	<u>Reserved</u>	<u>Reserved</u>	<u>R/W</u>
<u>7.21.15:0</u>	<u>Reserved</u>	<u>Reserved</u>	<u>R/W</u>

a.RO = Read Only

45.2.7.7.1 Extended next page (7.19.12)

When set to one bit 7.19.12 indicates that the Link Partner has indicated support for extended next page. When set to zero bit 7.19.12 indicates that the Link Partner does not support extended next page.

Note: Auto-Negotiation that support a 48-bit base page uses registers 7.19, 7.20 and 7.21 for storing LP base page information; Auto-Negotiation that support a 16-bit base page only use register 7.19 for storing LP base page information

45.2.7.8 AN XNP transmit register (7.22, 7.23, and 7.24)

The Auto-Negotiation ~~extended~~ next page (XNP) transmit register contains the next page link code word to be transmitted when extended next page is enabled by setting bit 7.0.13 to one. The contents are defined in 28.2.3.4. On power-up or AN reset, this register shall contain the default value, which represents a Message Page with the Message Code set to Null Message. This value may be replaced by any valid extended Next Page Message Code that the device intends to transmit. A write to registers 7.23 or 7.24 does not set `mr_next_page_loaded`. Only a write to register 7.22 will set `mr_next_page_loaded` to true as described in 28.2.4.1.8. Therefore, when updating the three register set, 7.23 and 7.24 register values should be written first followed by register 7.22.

Table 45–122—AN XNP transmit register bit definitions

Bit(s)	Name	Description	R/W ^a
7.22.15	Next Page	See 28.2.3.4	R/W
7.22.14	Reserved	Write as 0, ignore on read	RO
7.22.13	Message Page	See 28.2.3.4	R/W
7.22.12	Acknowledge 2	See 28.2.3.4	R/W
7.22.11	Toggle	See 28.2.3.4	RO
7.22.10:0	Message Code Field	See 28.2.3.4	R/W
7.23.15:0	Unformatted Code field (bits U15:U0)	See 28.2.3.4	R/W
7.24.15:0	Unformatted Code field (bits U31:U16)	See 28.2.3.4	R/W

a.R/W = Read/Write, RO = Read Only

45.2.7.9 AN LP XNP ability register (7.25, 7.26, and 7.27)

Support for 10GBASE-T requires support for extended next pages and the provision of an AN LP XNP ability register (registers 7.25, 7.26, and 7.27) to store Link Partner extended next pages as shown in Table 45–123. All of the bits in the AN LP XNP ability register are read only. A write to the AN LP XNP ability register shall have no effect.

NOTE—If this register is used to store multiple Link Partner extended next pages, the previous value of this register is assumed to be stored by a management entity that needs the information overwritten by subsequent Link Partner extended next pages.

Table 45–123—AN LP XNP ability register bit definitions

Bit(s)	Name	Description	R/W ^a
7.25.15	Next Page	See 28.2.3.4	RO
7.25.14	Acknowledge	See 28.2.3.4	RO
7.25.13	Message Page	See 28.2.3.4	RO
7.25.12	Acknowledge 2	See 28.2.3.4	RO
7.25.11	Toggle	See 28.2.3.4	RO
7.25.10:0	Message Code Field	See 28.2.3.4	RO
7.26.15:0	Unformatted Code field (bits U15:U0)	See 28.2.3.4	RO
7.27.15:0	Unformatted Code field (bits U31:U16)	See 28.2.3.4	RO

a.RO = Read Only