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TELECOMMUNICATION
STANDARDIZATION SECTOR
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G.8262/Y.1362

Amendment 1
(02/2012)

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Summary

Amendment 1 to Recommendation ITU-T G.8262/Y.1362 (2010) adds a new Appendix IV, "Considerations related to synchronous Ethernet over 1000BASE-T and 10GBASE-T".

History

Edition	Recommendation	Approval	Study Group
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1.1	ITU-T G.8262/Y.1362 (2007) Amd. 1	2008-04-29	15
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2.0	ITU-T G.8262/Y.1362	2010-07-29	15
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Recommendation ITU-T G.8262/Y.1362

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Add a new Appendix IV, as follows:

Appendix IV

Considerations related to synchronous Ethernet over 1000BASE-T and 10GBASE-T

(This appendix does not form an integral part of this Recommendation)

Synchronous Ethernet requires the relevant synchronization parameters of the network elements (e.g., link selected as candidate synchronization reference, priority) to be configured according to the network synchronization plan.

The following discussion focuses on 1000BASE-T and 10GBASE-T, as for these interfaces the timing direction could become incompatible with the network synchronization plan due to the configuration of the master-slave relationship as defined by [IEEE 802.3].

NOTE – The following applies to unidirectional (from a synchronization viewpoint) interfaces. The application of similar rules to links in a ring where the timing chain might have to be reversed is for further study.

The following convention is used below:

- Clock master/slave: IEEE 802.3 master or slave state
- Sync master/slave: ITU-T G.8264 sync timing chain master or slave state

In order to allow the proper setting of SyncE over 1000BASE-T and 10GBASE-T links, the Ethernet PHY could be configured either with a manual configuration or via auto-negotiation.

If manual configuration is used, the operator must take care to correctly configure the clock master/slave setting of the PHY ports according to the network synchronization plan so that candidates for sync slaves are clock slaves and the sync master ports are clock masters. The use of manual configuration, if not properly done, may result in a failure condition and the consequent loss of the traffic connection to the equipment.

As an example, if by mistake both ends are forced to be masters, the result is a configuration fault (see Table 40-5 – 1000BASE-T MASTER-SLAVE configuration resolution table in [IEEE 802.3]).

If auto-negotiation is used, the previous potential issues are prevented by the network element thus avoiding the result of a link not working.

NOTE – In this case, even if the PHY ports are not configured according to the network synchronization plan, the auto-negotiation may fail to get working network synchronization (with no indication of such timing discrepancy) but it will not jeopardize the possibility of getting working Ethernet traffic, and subsequent actions are possible in order to correct the PHY port setting.

A possible sequence of steps to be followed when auto-negotiation is used is described below.

NOTE – It is assumed that these synchronous Ethernet interfaces are configured in synchronous operation mode:

1. All 1000BASE-T and 10GBASE-T ports must allow auto-negotiation.
2. Auto-negotiation is initiated:
 - In the case of 1000BASE-T, all ports shall be configured with Bit 9.12 = 0 (auto-negotiation – not forced). If a port is involved in the network synchronization plan, the port that should act as sync master must be configured with Bit 9.10 = 1 (Table 40-3 in [IEEE 802.3]) and the port that should act as sync slave must be configured with Bit 9.10 = 0. If details on the network synchronization plan are not available, ports should be configured with Bit 9.10 = 1. The configuration is done as per Table 40-5 in [IEEE 802.3] ("The device with the higher SEED value is configured as MASTER, otherwise SLAVE"). When details on the network synchronization plan are made available, having ports with Bit 9.10 = 1 as the preferred default state allows the modification of Bit 9.10 on the sync slave side only, usually in the downstream data path (see item 4 below).

NOTE – Having ports with bit 9.10 = 0 as the preferred default state requiring the modification of the Bit 9.10 on the sync master side only, would give a similar result. This Recommendation suggests a default configuration for easier interoperability.

- In the case of 10GBASE-T, all ports shall be configured with Bit U11= 0 (see Table 55-11 in [IEEE 802.3]). If a port is involved in the network synchronization plan, the port that should act as sync master must be configured with Bit U13 = 1 (multiport device, see Table 55-11 in [IEEE 802.3]) and the port that should act as sync slave must be configured with Bit U13 = 0 (single port device, see Table 55-11 in [IEEE 802.3]). If details on the network synchronization plan are not available, ports should be configured with Bit U13 = 1.

When details on the network synchronization plan are made available, having ports with bit U13 =1 as the preferred default state allows the modification of the Bit U13 on the sync slave side only, usually in the downstream data path (see item 4 below).

NOTE – Having ports with bit U13 = 0 as the preferred default state requiring the modification of the Bit U13 on the sync master side only, would give a similar result. This Recommendation suggests a default configuration for easier interoperability.

3. The configuration of the network synchronization parameters in the node according to the network synchronization plan should be done and checked after the clock master/slave of the 1000BASE-T or 10GBASE-T ports has been completed. At this point, the links in the nodes that are clock slave can be configured as sync candidate (if the network synchronization plan requires it).
4. If the network synchronization plan is available only after the clock master/slave procedure has been completed, and if a 1000BASE-T or 10GBASE-T port is not the clock slave, but should be the sync slave candidate according to the network synchronization plan ("sync slave"), this port shall initiate a change clock direction (as part of the sync candidate configuration) by means of the tools defined in Table 40-3 (1000BASE-T) and Table 55-11 (10GBASE-T) of [IEEE 802.3]. In particular,
 - In the case of 1000BASE-T, for this port, Bit 9.10 = 0
 - In the case of 10GBASE-T for this port, Bit U13 = 0.

NOTE 1 – Any change in parameters for 802.3 auto-negotiation would force a reset of the interface, leading to link failure for a certain amount of time (variable up to a few seconds).

NOTE 2 – When these steps are not properly followed (e.g., some of the nodes have been manually configured), a specific alarm might be required in order to notify the operator to take necessary actions.

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