

Annex 64B

(normative)

Multipoint MAC Control definitions for 10 Gb/s EPONs

64B.1 Introduction

64B.2 Multipoint Control Protocol (MPCP)

This section introduces extensions to MultiPoint Control Protocol (MPCP) required for proper operation of 10 Gb/s EPON systems.

64B.2.1 Extensions to the single copy broadcast support

In 10 Gb/s EPON OLT, apart from the SCB MAC instance associated with the LLID 0x7FFF, there is one additional SCB MAC instance, providing broadcast services for ONUs operating at 10 Gb/s in the downstream direction and associated with the LLID 0x7FFE. Optional higher layers may be implemented to perform selective broadcast of frames. Such layers may require additional MACs (multicast MACs) to be instantiated in the OLT for some or all ONUs increasing the total number of MACs beyond the number of ONUs + 2.

When connecting the SCB MAC instances to an 802.1D bridge port, it is possible that loops may be formed due to the broadcast nature of the underlying links. Thus it is recommended that the said MAC instances are not connected to an 802.1D bridge port.

Configuration of SCB channels as well as filtering and marking of frames for support of SCB is defined in 65.1.3.3.2 and @@TBD@@ for 1000 Mb/s and 10 Gb/s EPON compliant Reconciliation Sublayers, respectively.

64B.2.2 Multipoint transmission control, Control Parser, and Control Multiplexer

64B.2.2.1 Functions

FEC_Overhead(length)

This function calculates the size of additional overhead to be added by the FEC encoder while encoding a frame of size length. Parameter length represents the size of an entire frame including preamble, SFD, DA, SA, Length/Type, and FCS. As specified in @@92.2.3.4@@, FEC encoder adds 32 parity octets for each block of 216 data octets. The function returns the value of FEC overhead in units of time_quanta. The following formula is used to calculate the overhead @@TBD - align with comment #963 against D1.1@@.

tqSize

In 10 Gb/s EPONs, this function always returns the value of 0x14.

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64B.2.3 Discovery Processing

64B.2.3.1 Variables

syncTime

During the synchronization time, an ONU sends a pattern composed of a series of 0x55 characters (binary 0101...) followed by a burst delimiter and idle blocks as defined in @@92.2.3.5@.

64B.2.3.2 Functions

GetLaserTime(data)

In 10 Gb/s EPONs, this function always returns the value calculated as prescribed below:

$$getLaserTime(data) = \begin{cases} data; & data \leq 0x20 \\ 0x20; & data > 0x20 \end{cases}$$

64B.2.4 Gate Processing

64B.2.4.1 Functions

confirmDiscovery(data)

This function is used to check whether the current Discovery Window is open for the given ONU (returns TRUE) or not (returns FALSE). For 1000 Mb/s ONUs, this function always returns TRUE.

64B.3 MPCPDU structure and encoding

This subclause provides the definitions of the MPCPDUs specific for 10 Gb/s EPONs.

64B.3.1 GATE description

The internal structure of the 16 bit wide Discovery Information field is presented in Table 64B-1.

Table 64B-1—GATE MPCPDU Discovery Information Fields

Bit	Flag Field	Values
0	OLT is 1G upstream capable	0 – OLT supports 1000 Mb/s transmission in the upstream direction 1 – OLT does not support 1000 Mb/s transmission in the upstream direction
1	OLT is 10G upstream capable	0 – OLT does not support 10 Gb/s transmission in the upstream direction 1 – OLT supports 10 Gb/s transmission in the upstream direction
2 – 3	reserved	Ignored on reception.
4	OLT is opening 1G discovery window	0 – OLT can receive 1000 Mb/s data in this window 1 – OLT cannot receive 1000 Mb/s data in this window
5	OLT is opening 10G discovery window	0 – OLT cannot receive 10 Gb/s data in this window 1 – OLT can receive 10 Gb/s data in this window
6 – 15	reserved	Ignored on reception.

64B.3.2 REGISTER_REQ description

The internal structure of the 16 bit wide Discovery Information field is presented in Table 64B–2.

Table 64B–2—REGISTER_REQ MPCPDU Discovery Information Fields

Bit	Flag Field	Values
0	ONU is 1G upstream capable	0 – ONU transmitter not support 1000 Mb/s transmission in the upstream direction 1 – ONU transmitter supports 1000 Mb/s transmission in the upstream direction
1	ONU is 10G upstream capable	0 – ONU transmitter supports 10 Gb/s transmission in the upstream direction 1 – ONU transmitter does not support 10 Gb/s transmission in the upstream direction
2 – 3	reserved	Ignored on reception.
4	1G registration attempt	0 – 1 G registration is not attempted 1 – 1 G registration is attempted
5	10 G registration attempt	0 – 10 G registration is not attempted 1 – 10 G registration is attempted
6 – 15	reserved	Ignored on reception.

The Laser On Time and the Laser Off Time values transmitted by a 10 Gb/s ONU (either supporting symmetric or asymmetric data rates) shall be equal to the time necessary to turn the laser on and off, respectively, expressed in the units of time_quanta.

64B.3.3 REGISTER description

The Echoed Laser On Time and the Echoed Laser Off Time values shall be equal to the Laser On Time and Laser Off Time values delivered by a registering ONU in the REGISTER_REQ MPCPDU. These values are delivered to the registering ONU for confirmation purposes only and their utilization is not prescribed in this specification.

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