MPCP – Messages Format

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Message Structure

- **MAC Control is layer responsible for message generation and termination**

- **MAC Control imposes known EtherType**
  - Demultiplexing is performed through opcode field that is defined for each message type

- **Constant length of 64 bytes imposed by MAC Control**
  - Content when using a 64 bytes MAC control packet is:

  64 – 6(DA) – 6(SA) – 2(EtherType) – 2(MAC control opcode) – 4(FCS) = 44

Frame Structure

- Opcode field is used to distinguish message types
- A timestamp is preppended to all messages
- All messages have fixed mandatory parameters
- Optional parameters **may** follow for some messages
- Optional fields appear in frames based on context and circumstances
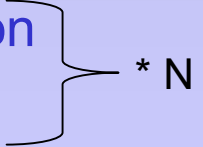- All defined fields **must** be supported

HEADER
OPCODE
TIME STAMP
PARAMETER LIST
ZEROS PADDING
FCS
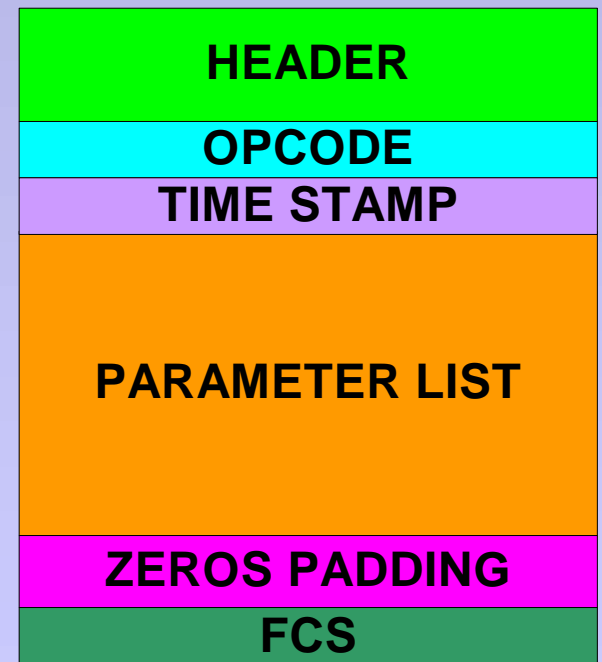
Time Stamp Field

- ❐ **All messages contain a 32-bit time stamp field**

- ❐ **The time stamp is the value of PON counter at the moment MAC control passed the frame to the MAC**

- ❐ **ONU must update its local PON counter when receiving any valid message**

- ❐ **Timestamp granularity is 16 bit-times, 32 bit resolution**

`GATE` Message

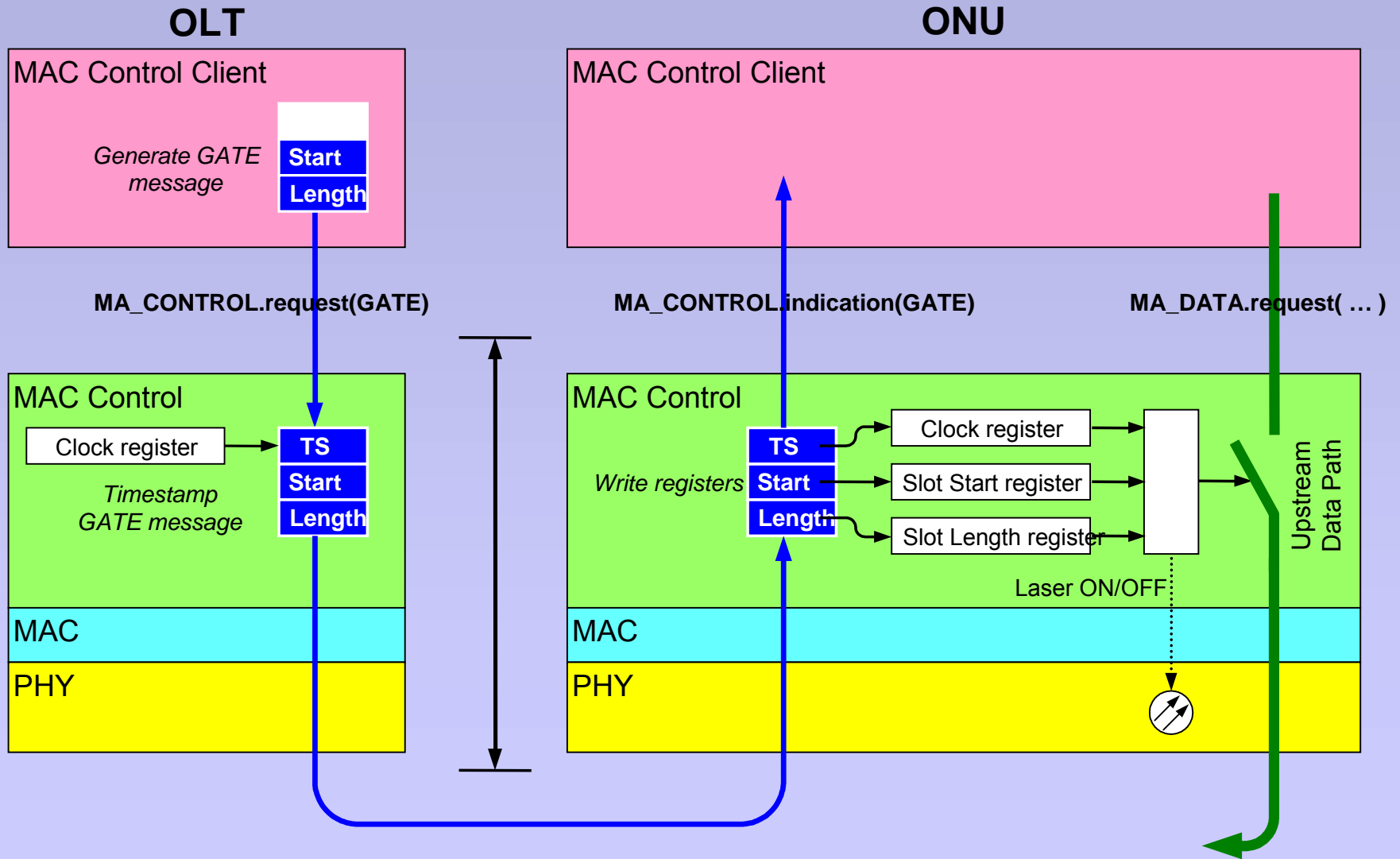**Fields:**

- 6 octets: Destination address
- 6 octets: Source address
- 2 octets: Type 88-08
- 2 octets: Opcode 02
- 4 octets: Timestamp
- 1 octet: Number of grants –
  MSB is grant type (0 – regular / 1 – discovery)
- 4 octets: Grant start time - time laser should be turned on ⎫
- 2 octets: Grant length - time laser must be off ⎭ * N
- Additional fields to be discussed
- 4 octets: CRC

GATE Operation

- ❐ **Grant mechanism gates MAC-client delivery of frames.**
- ❐ **ONU transmits only during the time indicated in the grant**
- ❐ **ONU MAC-control enables PHY transmission at the start of a grant duration and disables it at the end of the grant duration**
- ❐ **Multiple grants may be outstanding – up to a limit**
- ❐ **ONU is free to use granted period to it's best ability**
- ❐ **GATE messages can be used with timestamps only**

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GATE Operation Illustrated

`REPORT` Message

□ Fields

- 6 octets: Destination address
- 6 octets: Source address
- 2 octets: Type 88-08
- 2 octets: Opcode 03
- 4 octets: Timestamp
- 1 octets: Report bitmap – 1 for each queue reported
- 4*8 octets: Queue report * 8
- Optional fields to be discussed
- Zero padding
- 4 octets: CRC

`REPORT` Message

- A reported element contains the number of bytes requested per 802.1Q priority queue
- A bit mask specifies the queues reported
- A `REPORT` message may contain queue reports
- The OLT must process `REPORT` messages
- The OLT may consider the `REPORT` when allocating bandwidth
- The ONU must issue `REPORT`s periodically
- `REPORT` messages can be used with timestamps only

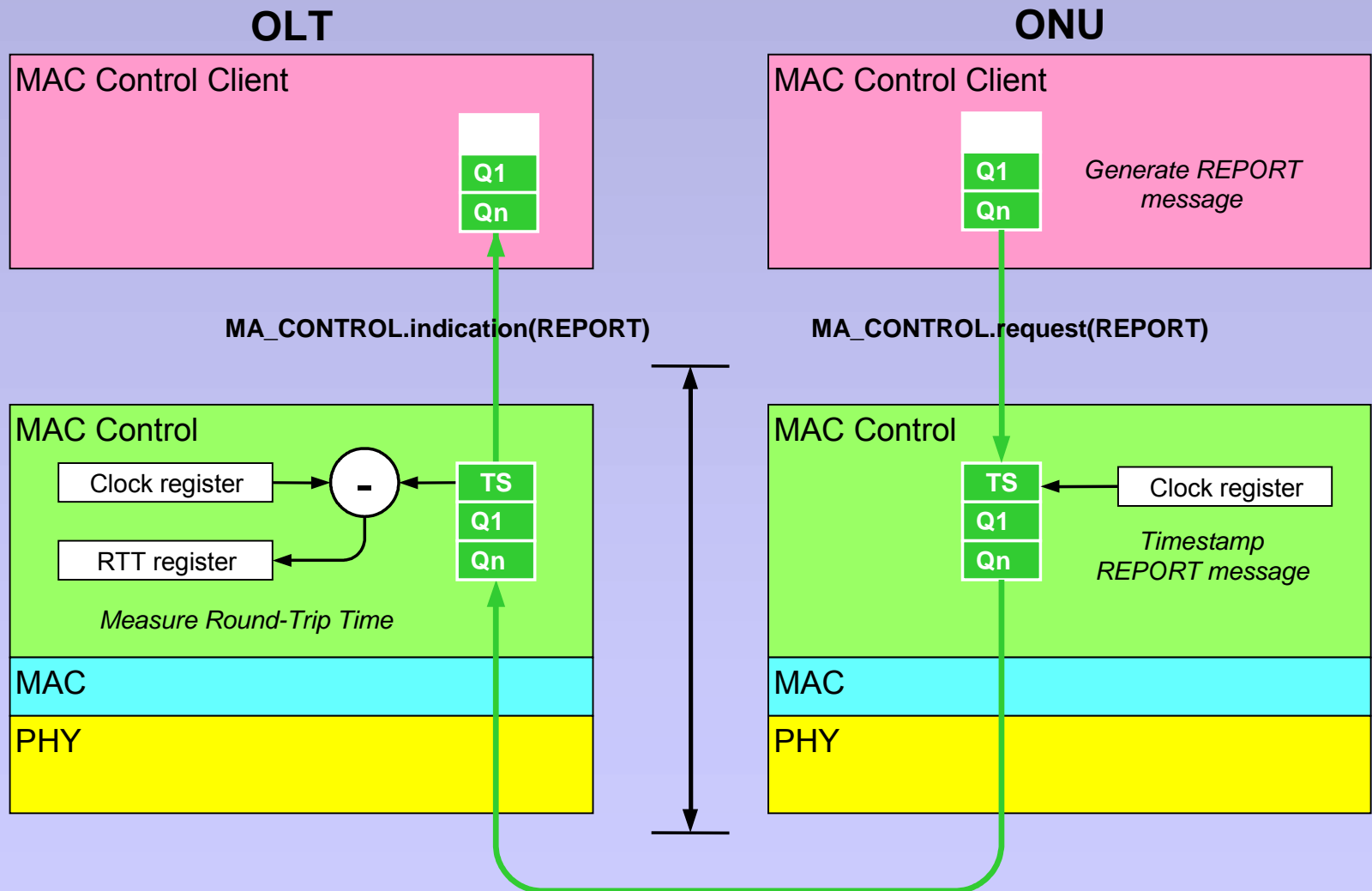| REPORT BIT MASK [1BYTE] Bit #n is 0: No report for queue #n Bit #n is 1: Queue #n report exists |
|---|
| REPORT #0[4BYTE] Number of bytes reported for queue #n |
| .... |
| REPORT #X[4BYTE] Number of bytes reported for queue #m |

REPORT Operation Illustrated

OLT

MAC Control Client

Q1
Qn

MA_CONTROL.indication(REPORT)

MAC Control

Clock register

RTT register

TS
Q1
Qn

Measure Round-Trip Time

MAC

PHY

ONU

MAC Control Client

Q1
Qn

Generate REPORT message

MA_CONTROL.request(REPORT)

MAC Control

TS
Q1
Qn

Clock register

Timestamp REPORT message

MAC

PHY

REGISTER_REQUEST Message

❒ Fields

- – 6 octets: Destination address
- – 6 octets: Source address
- – 2 octets: Type 88-08
- – 2 octets: Opcode 04
- – 4 octets: Timestamp
- – 1 octets: P2PE request - Number of P2PE ports requested
- – Optional ONU capabilities report: PMD performance, queue depth, maximal number of pending grants, support single copy broadcast
- – Zero padding
- – 4 octets: CRC

`REGISTER` Message

- ❐ Fields
  - – 6 octets: Destination address
  - – 6 octets: Source address
  - – 2 octets: Type 88-08
  - – 2 octets: Opcode 05
  - – 4 octets: Timestamp
  - – 1 octets: P2PE ports - Number of P2PE ports assigned
  - – 2N octets: P2PE PHY IDs – List of assigned IDs
  - – Optional OLT capabilities report: CDR lock time, GRANT generation delay
  - – Optional echo of understood ONU capabilities
  - – Zero padding
  - – 4 octets: CRC

REGISTER_ACK **Message**

❐ Fields

- 6 octets: Destination address
- 6 octets: Source address
- 2 octets: Type 88-08
- 2 octets: Opcode 06
- 4 octets: Timestamp
- Optional echo of understood OLT capabilities
- Zero padding
- 4 octets: CRC

P2MP Motion: Message Format

P2MP Track Motion:

Use proposal <hirth_1_0302.pdf> as a basis for the first
P2MP draft, with the exception of:

- Slide 9: Change from 802.1Q to 802.1P

- Add bullet: All PMD negotiation parameters are pending on PMD
specifications.
- Add bullet: The PHY ID negotiation parameters are pending on
ONU identification

Motion: Onn Haran

Second: Tom Dineen

Y: __33

N: __1

A: __9