

Rx Output Eq Management Comments #182, #183 and #184

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Supporters

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100GAUI-1, 200GAUI-2 and 400GAUI-4 C2M

- Requirement introduced to control module output characteristics to the host
- Two different module output characteristics defined

Module Output

120G.3.2.1 Module output transmit equalizer control

The module output shall support two equalization states: short and long. In the short state, the module shall meet the near-end requirements. In the long state, the module shall meet the far-end requirements.

The state shall be selectable by means of control variable tx_eq_state. When tx_eq_state is 0 the equalizer is configured for a short (low-loss) host channel. When tx_eq_state is 1, the equalizer is configured for a long (high-loss) host channel. The means of controlling and querying tx_eq_state is implementation dependent.

120G.3.2.2 Module output eye height and vertical eye closure

Figure 120G–7 depicts an example module output eye height and vertical eye closure test configuration. Module output eye height and vertical eye closure are measured at TP4 using compliance boards defined in 120G.5.4. Eye height and vertical eye closure are measured according to the method described in 120G.3.2.2.1 with tx_eq_state set to 0 for the near-end measurement and tx_eq_state set to 1 for the far-end measurement.

Module Output Characteristics

Table 120G-3—Module output characteristics (at TP4)

short
long

Parameter	Reference	Value	Units
Signaling rate per lane (range)	120G.3.1.1	53.125 ± 100 ppm	GBd
AC common-mode output voltage (max, RMS)	120G.5.1	17.5	mV
Differential peak-to-peak output voltage (max)	120G.5.1	900	mV
Near-end ESMW (Eye symmetry mask width)	120G.3.1.6	TBD	UI
Near-end eye height, differential (min)	120G.3.1.6	24	mV
Near-end vertical eye closure (max)	120G.3.1.6	7.5	dB
Far-end ESMW (eye symmetry mask width)	120G.3.1.6	TBD	UI
Far-end eye height, differential (min)	120G.3.1.6	24	mV
Far-end vertical eye closure (max)	120G.3.1.6	7.5	dB
Far-end pre-cursor ISI ratio	120G.5.3	TBD	—
Common-mode to differential return loss (min)	120G.3.1.3	Equation (120G-1)	dB
Effective return loss (min)	120G.3.2.3	TBD	dB
Differential termination mismatch (max)	120G.3.1.4	10	%
Transition time (min, 20% to 80%)	120G.3.1.5	TBD	ps
DC common-mode voltage (min) ^a	120G.5.1	-350	mV
DC common-mode voltage (max) ^a	120G.5.1	2850	mV

- The requirement is that the module output shall support two equalization states: *short* and *long*
- Each equalizations state comprises a set of SI parameters for the module output characteristics

^a DC common-mode voltage is generated by the host. Specification includes effects of ground offset voltage.

Common System Implementation Considerations Around AUI

- Systems are designed using pluggable modules for optical and copper cables
- The AUI C2M interface becomes a point of multi-vendor interop between a host chip and a pluggable module over a given host PCB design for optical modules
- End-users are likely to be the ones plugging modules into systems
- Industry groups have gone to considerable work to define form factors for that pluggable module including the management interface specification to enable smooth integration, control and operation around this multi-vendor environment
- Definition of two equalization states (*short* and *long*) for a single AUI has advantages but also complicates usage
- How this is defined in the P802.3ck specification can simplify these usage issues without making any technical changes
- Current draft stops short of defining what would meet the needs of industry usage

Prevalent Implementation Programming

PUBLISHED

SFF-8024 Rev 4.7

4.6 Host Electrical and Media Interface Codes

The following tables provide codes for the various electrical interface and optical or other media interface specifications that may apply to pluggable modules. Separate codes for the electrical and media interfaces enable modules to identify the specific combination of electrical and media specifications that the module supports. Codes for all publicly available networking industry specifications should be included.

Note: The codes are not listed in numerical order

Table 4-5 Host Electrical Interface Codes

ID	Code (Hex)	Application Name	Application Data Rate, Gb/s	Lane Count	Lane Signaling Rate, GBd	Modulation	b/sym
0	0	Undefined					
		Ethernet					
1	1	1000BASE -CX (Clause 39)	1.25	1	1.25	NRZ	1
2	2	XAUI (Clause 47)	12.50	4	3.125	NRZ	1
3	3	XFI (SFF INF-8071i)	9.95-11.18	1	9.95-11.18	NRZ	1
4	4	SFI (SFF-8431)	9.95-11.18	1	9.95-11.18	NRZ	1
5	5	25GAUI C2M (Annex 109B)	25.78	1	25.78125	NRZ	1
6	6	XLAAUI C2M (Annex 83B)	41.25	4	10.3125	NRZ	1
7	7	XLPPi (Annex 86A)	41.25	4	10.3125	NRZ	1
8	8	LAUI-2 C2M (Annex 135C)	51.56	2	25.78125	NRZ	1
9	9	50GAUI-2 C2M (Annex 135E)	53.13	2	26.5625	NRZ	1
10	A	50GAUI-1 C2M (Annex 135G)	53.13	1	26.5625	PAM4	2
11	B	CAUI-4 C2M (Annex 83E) ¹	103.13	4	25.78125	NRZ	1
65	41	CAUI-4 C2M (Annex 83E) without FEC	103.13	4	25.78125	NRZ	1
66	42	CAUI-4 C2M (Annex 83E) with RS(528,514) FEC	103.13	4	25.78125	NRZ	1

Industry recognition and use of AUIs is as prevalent as PMDs

SI parameter setting requirements are left as an issue of fine detail and often not discussed although pivotal for interoperation

Industry specs (such as SFF-8024) define codes for different AUIs and PMDs

Common Management Interface specification (CMIS) used by QSFP-DD, OSFP, COBO, QSFP56 and SFP-DD (2-lane variant) refer to SFF-8024

- Module advertises support
- Host software selects one of the advertised codes to enable configuration

Essential Proposal

- Define distinct AUI nomenclatures for the different tx_eq_states of 0 (short, S) and 1 (long, L)
 - 100GAUI-1-S C2M and 100GAUI-1-L C2M
 - 200GAUI-2-S C2M and 200GAUI-2-L C2M
 - 400GAUI-4-S C2M and 400GAUI-4-L C2M
- Similar to how BiDi PMDs are defined where there is a base PMD name and an extended name to define the “up” and the “down” PMD
 - Clause 58.1 for 100BASE-BX10, "100BASE-BX10-D PMD at one end and a 100BASE-BX10-U PMD at the other."
- Make abundantly clear the module supports two static module output SI configurations through the prevalent industry use of AUI nomenclature
- PICS can call out the short and long AUI variants explicitly

Nomenclature Table

- Based on offline feedback, the submitted suggested remedy is updated as follows
 - Add the following table at the end 120G.3.2.1:
 - Add text: The module state to be configured by management may be determined from Table-xxx.

Table-xxx -- Module State Mapping

IEEE Interface Type	tx_eq_state	Application Name
100GAUI-1 C2M	0	100GAUI-1-S C2M
100GAUI-1 C2M	1	100GAUI-1-L C2M
200GAUI-2 C2M	0	200GAUI-2-S C2M
200GAUI-2 C2M	1	200GAUI-2-L C2M
400GAUI-4 C2M	0	400GAUI-4-S C2M
400GAUI-4 C2M	1	400GAUI-4-L C2M

Recommendation

- Modify the draft to help with defining what would meet the needs of industry usage of AUI
- Embrace the use of extended AUI nomenclature to indicate equalization, the -S and -L

Final thought – we acknowledge the potential increase of effort for the editorial team with this proposal. It represents no technical change to the previously accepted proposal but would enable simplification of deployments and adoption of the technology based on current industry practices.

BACKUP

Submitted Comments #182, #183 and #184

CI 120G SC 120G.3.2.1 P 229 L 51 # 182

Maki, Jeffery

Juniper Networks

Comment Type T Comment Status D C2M modes

For host management of module equalization, it would be aligned with modern management interface specifications (e.g., CMIS with use of SFF-8024 Table 4-5 Host Electrical Interface Codes) to designate a nomenclature for the configuration that the module advertises it supports and the host selects. Since there are only two states to choose between, short and long, this is a very practical approach.

SuggestedRemedy

Add immediately after first occurrence of tx_eq_state the text, "also designated as 100GAUI-1-S or 100GAUI-1-L for 100GAUI-1 C2M, 200GAUI-2-S or 200GAUI-2-L for 200GAUI-2 C2M and 400GAUI-4-S or 400GAUI-4-L for 400GAUI-4 C2M." For the second occurrence of tx_eq_state, insert immediately after "tx_eq_state is 0" the text "or 100GAUI-1-S is selected for 100GAUI-1 C2M, or 200GAUI-2-S is selected for 200GAUI-2 C2M or 400GAUI-4-S is selected for 400GAUI-4 C2M." For the third occurrence of tx_eq_state, insert immediately after "tx_eq_state is 1" the text "or 100GAUI-1-L is selected for 100GAUI-1 C2M, or 200GAUI-2-L is selected for 200GAUI-2 C2M or 400GAUI-4-L is selected for 400GAUI-4 C2M." For the fourth occurrence of tx_eq_state, insert immediately after "tx_eq_state" the text "or the use of 100GAUI-1-S or 100GAUI-1-L for 100GAUI-1 C2M, 200GAUI-2-S or 200GAUI-2-L for 200GAUI-2 C2M and 400GAUI-4-S or 400GAUI-4-L for 400GAUI-4 C2M." Note this is very similar to BiDi optics that designate a base PMD name and an extended name for the "down" and "up" PMD. See for example Clause 58.1 for 100BASE-BX10, where it is written "100BASE-BX10-D PMD at one end and a 100BASE-BX10-U PMD at the other." Here we use the extended AUI name to indicate choice of equalization, short or long.

Proposed Response Response Status W

PROPOSED REJECT.

The two modes supported by the module output @ TP4 are equalization settings that are selected appropriately for a particular host input.

The module management is defined generically and can be mapped to any specific management infrastructure.

It has not been shown that the proposed changes improve the accuracy and clarity of the draft.

For task force discussion.

CI 120G SC 120G.3.2.2 P 230 L 6 # 183

Maki, Jeffery

Juniper Networks

Comment Type T Comment Status D C2M modes

For host management of module equalization, it would be aligned with modern management interface specifications (e.g., CMIS with use of SFF-8024 Table 4-5 Host Electrical Interface Codes) to designate a nomenclature for the configuration that the module advertises it supports and the host selects. Since there are only two states to choose between, short and long, this is a very practical approach.

SuggestedRemedy

Insert immediately after "tx_eq_state set to 0" the text "or 100GAUI-1-S is selected for 100GAUI-1 C2M, or 200GAUI-2-S is selected for 200GAUI-2 C2M or 400GAUI-4-S is selected for 400GAUI-4 C2M." Insert immediately after "tx_eq_state set to 1" the text "or 100GAUI-1-L is selected for 100GAUI-1 C2M, or 200GAUI-2-L is selected for 200GAUI-2 C2M or 400GAUI-4-L is selected for 400GAUI-4 C2M."

Proposed Response Response Status W

PROPOSED REJECT.

Resolve using the response to comment #182.

CI 120G SC 120G.6.3 P 243 L 30 # 184

Maki, Jeffery

Juniper Networks

Comment Type T Comment Status D C2M modes

Major capability/option for the module is missing.

SuggestedRemedy

Add one row to the table. (1) with Item = EQ; Feature = (100GAUI-1-S and 100GAUI-1-L) or (200GAUI-2-S and 200GAUI-2-L) or (400GAUI-4-S and 400GAUI-4-L); Subclause = 120G.3.2.1; Value/Comment = See 120G.3.2.1; Status = M; Support = Yes [].

Proposed Response Response Status W

PROPOSED REJECT.

Resolve using the response to comment #182.

Comment and Suggested Remedy #182

CI 120G, SC 120G.3.2.1, P 229, L 51

Comment:

- For host management of module equalization, it would be aligned with modern management interface specifications (e.g., CMIS with use of SFF-8024 Table 4-5 Host Electrical Interface Codes) to designate a nomenclature for the configuration that the module advertises it supports and the host selects. Since there are only two states to choose between, short and long, this is a very practical approach.

Suggested Remedy

- Add immediately after first occurrence of tx_eq_state the text, "also designated as 100GAUI-1-S or 100GAUI-1-L for 100GAUI-1 C2M, 200GAUI-2-S or 200GAUI-2-L for 200GAUI-2 C2M and 400GAUI-4-S or 400GAUI-4-L for 400GAUI-4 C2M."
- For the second occurrence of tx_eq_state, insert immediately after "tx_eq_state is 0" the text "or 100GAUI-1-S is selected for 100GAUI-1 C2M, or 200GAUI-2-S is selected for 200GAUI-2 C2M or 400GAUI-4-S is selected for 400GAUI-4 C2M."
- For the third occurrence of tx_eq_state, insert immediately after "tx_eq_state is 1" the text "or 100GAUI-1-L is selected for 100GAUI-1 C2M, or 200GAUI-2-L is selected for 200GAUI-2 C2M or 400GAUI-4-L is selected for 400GAUI-4 C2M."
- For the fourth occurrence of tx_eq_state, insert immediately after "tx_eq_state" the text "or the use of 100GAUI-1-S or 100GAUI-1-L for 100GAUI-1 C2M, 200GAUI-2-S or 200GAUI-2-L for 200GAUI-2 C2M and 400GAUI-4-S or 400GAUI-4-L for 400GAUI-4 C2M."

Comment and Suggested Remedy #183

CI 120G, SC 120G.3.2.2, P 230, L 6

Comment:

- -same as for comment #182-

Suggested Remedy

- Insert immediately after "tx_eq_state set to 0" the text "or 100GAUI-1-S is selected for 100GAUI-1 C2M, or 200GAUI-2-S is selected for 200GAUI-2 C2M or 400GAUI-4-S is selected for 400GAUI-4 C2M."
- Insert immediately after "tx_eq_state set to 1" the text "or 100GAUI-1-L is selected for 100GAUI-1 C2M, or 200GAUI-2-L is selected for 200GAUI-2 C2M or 400GAUI-4-L is selected for 400GAUI-4 C2M."

Comment and Suggested Remedy #184

CI 120G, SC 120G.6.3, P 243, L 30

Comment:

- Major capability/option for the module is missing.

Suggested Remedy

- Add one row to the table:

Item = EQ

Feature = (100GAUI-1-S and 100GAUI-1-L) or (200GAUI-2-S and 200GAUI-2-L) or (400GAUI-4-S and 400GAUI-4-L)

Subclause = 120G.3.2.1

Value/Comment = See 120G.3.2.1

Status = M

Support = Yes [].

Thank you