






Summary of Modifications

Instructions for the Editor

1. Clause 4.2.4.1
 - Table 6
 - i. Change SFP Diagnostic descriptor reference to 4.3.49.5.4
 - ii. Change **Priority Range descriptor reference to 4.3.50.4**
 - iii. Change **VEM ID descriptor reference to 4.3.51.3**
 - iv. Change Instantiated VE Mapping descriptor reference to  **51.3**
 - v. Change Deinstantiated VE Mapping descriptor reference to  **51.3**
 - vi.  **descriptor definition for Link Fault Capabilities descriptor**
2. Clause 4.3.1
 - Table 9
 - i. Add Exchange Diagnostic Capabilities command code
3. Clause 4.3.50
 - **Change clause number from 4.3.49 to 4.3.50**
4. Clause 4.3.51
 - **Change clause number form 4.3.50 to 4.3.51**
5. Clause 4.3.52
 - **Add new clause**

*Changes are shown highlighted in yellow.

4.2.4 Link Service TLV descriptors

4.2.4.1 Overview

Link Service TLV descriptors are specified in table 6.

Table 6 – Link Service TLV descriptors

Tag value	Descriptor	Reference
0000 0000h	Reserved	
0000 0001h	Link Service Request Information	4.2.4.2
0000 0002h	Reserved	
0000 0003h	N_Port_ID descriptor	4.2.4.3
0001 0000h	SFP Diagnostics descriptor	4.3.49.5.4
0001 0001h	Port Speed descriptor	4.3.49.5.1
0001 0002h	Link Error Status Block descriptor	4.3.49.5.2
0001 0003h	Port Names descriptor	4.3.49.5.3
0001 0004h	QSFP Diagnostics descriptor	4.3.49.5.5
0001 0005h	FEC Status descriptor	4.3.49.5.6
0001 0006h	Buffer Credit descriptor	4.3.49.5.7
0001 0007h	Optical Element Data descriptor	4.3.49.5.8
0001 0008h	Optical Product Data descriptor	4.3.49.5.9
0001 0009h	Priority Range descriptor	4.3.50.4
0001 000Ah	VEM ID descriptor	4.3.51.3
0001 000Bh	Instantiated VE Mapping descriptor	4.3.51.3
0001 000Ch	Deinstantiated VE Mapping descriptor	4.3.51.3
0001 000Dh	Link Fault Capability descriptor	4.3.52
All other values	Reserved	

4.3 Extended Link Service requests

4.3.1 Introduction

A Sequence Initiator shall transmit an ELS Sequence in order to solicit the destination Nx_Port to perform a link-level function or service. Unless otherwise noted, Extended Link Service requests shall not be issued prior to completion of N_Port Login. Table 9 applies to ELSs sent to or received by all valid addresses, including well known addresses. FLOGI is required before any other ELS if a Fabric is present.

The LFA is used as the destination ID (D_ID) in the LINIT and LSTS ELS Request Sequences, and is used as the source ID (S_ID) in the Reply Sequences. No other Sequences shall be directed to a LFA.

Table 9 – ELS_Command codes

Value (Bits 31-24)	Description	Abbr.	Reference	N_Port Login Required	TLV Format
01h	Link Service Reject	LS_RJT	4.4.4	N/A	No
02h	Link Service Accept	LS_ACC	4.4.2	N/A	No
03h	N_Port Login	PLOGI	4.3.7	No	No
04h	F_Port Login	FLOGI	4.3.7	No	No
05h	Logout	LOGO	4.3.8	No	No
06h	Abort Exchange – obsolete	ABTX	N/A	N/A	No
07h	Read Connection Status – obsolete	RCS	N/A	N/A	No
08h	Read Exchange Status Block – obsolete	RES	N/A	N/A	No
09h	Read Sequence Status Block – obsolete	RSS	N/A	N/A	No
0Ah	Request Sequence Initiative	RSI	4.3.12	Yes	No
0Bh	Establish Streaming	ESTS	4.3.6	Yes	No
0Ch	Estimate Credit	ESTC	4.3.5	Yes	No
0Dh	Advise Credit	ADVC	4.3.3	Yes	No
0Eh	Read Timeout Value	RTV	4.3.10	Yes	No
0Fh	Read Link Error Status Block	RLS	4.3.9	Yes	No
10h	Echo	ECHO	4.3.4	No	No
11h	Test	TEST	4.3.13	Yes	No
12h	Reinstate Recovery Qualifier	RRQ	4.3.11	Yes	No
13h	Read Exchange Concise	REC	4.3.36	Yes	No
14h	Reserved for legacy implementations ^a				
17h	Exchange Diagnostic Capabilities ^b	EDC	4.3.51	No	Yes
18h	Read Diagnostic Parameters	RDP	4.3.48	Yes	Yes
20h	Process Login	PRLI	4.3.19	Yes	No
21h	Process Logout	PRLO	4.3.20	Yes	No
23h	Test Process Login	TPLS	4.3.21	Yes	No

^a Some early implementations of FCP-2 may have used the value 14h for SRR (Sequence Retransmission Request). This code is permanently reserved in this standard to avoid conflicts with such implementations. See FCP-3 for the standard implementation of SRR as an FC-4 Link Service.

^b N_Port Login required if the D_ID is the N_Port_ID of an N_Port. N_Port Login not required if the D_ID is the F_Port Controller.

4.3.50 Query Fabric Priority Allocation (QFPA)

4.3.50.1 Overview

4.3.50.2 Protocol

4.3.50.3 Request Sequence

4.3.50.4 Reply Sequence

4.3.51 Update VE Mappings (UVEM)

4.3.51.1 Overview

4.3.51.2 Protocol

4.3.51.3 Request Sequence

4.3.51.4 Reply Sequence

4.3.52 Exchange Diagnostic Capabilities (EDC)

4.3.52.1 Description

The EDC ELS requests an FC_Port to return the diagnostic capabilities parameters associated with the FC_port. This provides the Nx_Port transmitting the request with information that may be used for link or port diagnostic capabilities, or degraded conditions associated with the designated FC_Port.

4.3.52.2 Protocol

- a) Exchange Diagnostic Capabilities Request Sequence; and
- b) LS_ACC or LS_RJT Reply Sequence

4.3.52.3 Request Sequence

Addressing: The S_ID field designates the source Nx_Port requesting the diagnostic parameters. The D_ID field shall be set as follows:

- a) to the F_Port Controller (FFFEh); or
- b) to any Nx_Port N_Port_ID

Payload: The format of the EDC Request Payload is shown in table 178.

Table 178 – EDC Payload

Bits Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	EDC (17h)	00h	00h	00h
1	Descriptor list length ((n-1)*4) bytes			
2 - n	Diagnostic capability descriptors			

The diagnostic capability descriptors (see 4.3.52.5) in an EDC request shall include the Link Fault Capability descriptor.

4.3.52.4 Reply Sequence

LS_RJT: LS_RJT signifies rejection of the EDC command.

LS_ACC: LS_ACC signifies acceptance of the request and provides the requested data. The format of the LS_ACC Payload is shown in Table 179.

Table 179 – EDC LS_ACC Payload

Bits Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	LS_ACC (02h)	00h	00h	00h
1	Descriptor list length ((n-1)*4) bytes)			
2	MSB	Link Service Request Information descriptor		
3		(see 4.2.4.2)		
4				LSB
5 - n	Diagnostic capability descriptors			

The diagnostic capability descriptors (see 4.3.52.5) in an EDC LS_ACC shall include the Link Fault Capability descriptor.

4.3.52.5 Diagnostic capability descriptors

4.3.52.5.1 Link Fault Capability descriptor

Link Degrade Signaling is supported by monitoring errors in the FEC logic (see FC-FS-5). The Link Fault Capability descriptor provides a mechanism to exchange the Link Degrade Signaling function parameters between two ports. This allows each port to determine the error rate associated with the Link Degrade Signal when it is received.

The Link Fault Capability descriptor is shown in table 151.

Table 151 – Link Fault Capability descriptor

Bits Word	31 .. 24	23 .. 16	15 .. 08	07 .. 00
0	Link Fault Capability Descriptor tag = 0001 000Dh			
1	Link Fault Capability Descriptor Length (12 bytes)			
2	Activate threshold symbol error count			
3	Deactivate threshold symbol error count			
4	RS-FEC code word interval count			

Activate threshold symbol error count: The upper threshold of pre-FEC symbol errors that, when exceeded, activates the remote degrade signal.

Deactivate threshold symbol error count: The lower threshold of pre-FEC symbol errors that deactivates the remote degrade signal when the count falls below the threshold while the remote degrade signal is active.

RS-FEC code word interval count: The number of code words defining an interval.