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T11/00-284 version 3  
T10/00-230 revision 3

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Subject: FCP-2 items that need to be included in FC-FS

During the creation of FCP-2, a number of items were identified that must be corrected or added to FC-FS. As comment resolution continues, there may be more such requirements and the present requirements may change slightly. This document is intended to track those requirements that have been proposed and those that have been agreed to for FCP-2 and FC-FS.

#### Changes to FC-FS identified during FCP-2 development

Ref	FCP-2 clause	FCP-2 comment	FC-FS clauses	Proposed	Revision	Approval for FC-FS
1	B.2.1	00-150r3, 1.49	12.6, 12.12, 15.2.2,	05/04/00		June, 2000
2	B.3.1	00-150r3, 1.49	15.4	05/04/00		June, 2000
3	All	00-150r3, 4.18	All	05/10/00		Rejected
4	All	00-150r3, 4.36, 4.96, 4.78, 4.157, 4.175, 4.261	All	05/22/00		Rejected
5	12	00-150r6, 11.2	12.1.1	6/30/00		

#### 1 Change requested to ABTS in Annex B.2.1 of FCP-2

The text of B.2.1 is intended to improve the capabilities of the ABTS basic link service. FCP-2 explains the required change with the following text, slightly modified from revision 4:

The Abort Sequence Basic Link Service frame shall be used by the Sequence Initiator or Sequence Recipient to request that the ABTS Recipient abort one or more sequences, or abort the entire Exchange, based on the value of bit 0 in the parameter field

To meet the requirements of the FCP-2 standard, the default value of bit 0 in the ABTS request parameter field shall be interpreted as requiring the aborting of the exchange, as described in section 9.1.2.2 on page 41 of FCP-2, revision 4. A value of 1 in bit 0 of the parameter field requires that the sequence be aborted as described in FC-FS and as described in section 12.4 on page 67 of FCP-2 revision 4.

## ABTS Parameter Field Bit Definitions

Parameter Field	Meaning
Bit 0 = 0	Abort Exchange
Bit 0 = 1	Abort Sequence

To install this, the following changes must be placed in FC-FS, using T11/99-145v1 as the reference.

In 12.6, table 22, the following modification must be made in the control field definition:

Control Field	Word 2, Bits	Description	Reference
Relative Offset present	3	0 = <u>Parameter field defined for some frames</u> 1 = Parameter Field = Relative Offset	15.2.2

In section 12.6, explanation of word 2 bit 3, the following modification must be made:

### Bit 3- Relative Offset present

When bit 3 is set to zero on a Data frame, the Parameter Field is not meaningful. That is, it may be set by the Sequence Initiator, but it shall be ignored by the Sequence Recipient. When bit 3 is set to one in a Data frame, the Parameter Field contains the Relative Offset for the Payload of the frame. Bit 3 is only meaningful on Data frames of a Sequence and shall be ignored on ACK and Link\_Response frames. Regardless of the state of bit 3, the parameter field has defined meanings for certain Link\_Control frames and Basic\_Link\_Data frames.

NOTE - When bit 3 is set to 0 on a Data frame, although the Sequence Recipient ignores the value in the Parameter Field, it may pass it to an upper level.

In 12.12, the following changes must be made to reflect the expanded capability demanded of the parameter field.

### 12.12 Parameter

The Parameter field (Word 5, Bits 31-0) has two meanings based on frame type. For Basic\_Link\_Data frames and for Link\_Control frames, the Parameter field is used to carry information specific to the individual Link\_Control frame. For Data frames, the Parameter field specifies Relative Offset, a four-byte field that contains the relative displacement of the first byte of the Payload of the frame from the base address as specified by the ULP. Relative Offset is expressed in terms of bytes (see 11.7). The use of the Relative Offset field is optional and is indicated as a Login Service Parameter. The setting of F\_CTL bit 3 determines whether the Parameter Field shall be meaningful as a Relative Offset for Data frames.

The offset value shall be relative to an Information Category within a Sequence for an Exchange. If Relative Offset is being used, the number of bytes transmitted in a single Sequence shall not exceed the maximum value of the Relative Offset (Parameter) field.

NOTE - Performance may be improved if data is aligned on natural boundaries.

See clause 21 for a discussion concerning Relative Offset. See clause 14 for a discussion concerning use of the Parameter field in Link\_Control frames. See clause 12 for a discussion concerning use of the Parameter field in Basic\_Link\_Data frames.

In 15.2.2, the following change must be made.

**15.2.2 Abort Sequence (ABTS)**

The Abort Sequence Basic Link Service frame shall be used

- 1) by the Sequence Initiator to request that the Sequence Recipient abort one or more Sequences (see 15.2.2.1 and 23.6.1.1).
- 2) by the Sequence Initiator or Sequence Recipient to request that the ABTS Recipient abort the entire Exchange (see 15.2.2.2).

The decision to attempt to abort one or more Sequences may be determined by the Sequence Initiator (Sequence time-out) or the Sequence Recipient (ACK frame Abort Sequence Condition bits 5-4 or P\_RJT frame).

The Sequence Initiator may optionally require that the Sequence Recipient abort one or more sequences by setting bit 0 of the parameter field to 1. If the parameter field bit 0 is set to 0, the Sequence Recipient may elect to abort one or more sequences or elect to abort the entire Exchange in a protocol specific manner.

The Sequence Recipient may request that one or more Sequences in progress be aborted by setting the Abort Sequence Condition bits to a value of 0 1 on an ACK frame (see 12.6). The ABTS frame may be transmitted without regard to which N\_Port holds, or may hold, the Sequence Initiative.

**2 Addition of REC to ELS definitions in FC-FS**

The following text, presently included as normative clause B.3.1, defines the REC ELS. This is intended to be defined in the standard format as specified in section 15.4 of FC-FS. The text should be placed in 15.4.x, probably (by alphabetical order) just after section 15.4.9. Changes that need to be included are:

On page 169 of FC-FS, table 50 needs an additional line having the following format:

**Table 50 - LS\_Command codes**

Encoded Value (Bits 31-24)	Description	Abbr.
0001 0011	Read Exchange Concise	REC

Just after section 15.4.9, the following description of REC must be installed. This is all new text. The text has been partially updated to reflect the present state of the FCP-2 comment resolution document and the change in context from FCP-2 to FC-FS.

**15.4.x Read Exchange Concise (REC)**

The REC (Read Exchange Concise) Extended Link Service request Sequence requests an N\_Port to return Exchange information for the RX\_ID and OX\_ID originated by the S\_ID specified in the Payload of the request Sequence. The specification of OX\_ID and RX\_ID shall be

provided for the destination N\_Port to locate the status information requested. The RX\_ID may have the unassigned value of FFFFh if no sequences have been transmitted from the responder or if RX\_IDs are not used by the responder. A Responder destination N\_Port would use the RX\_ID and verify that the OX\_ID is consistent, unless the RX\_ID was undetermined (i.e., RX\_ID = FFFFh). If the RX\_ID is specified as undetermined in the request, the Responder must identify the Exchange by means of the S\_ID and OX\_ID. An Originator N\_Port would use the OX\_ID and verify that the RX\_ID is consistent.

If the destination N\_Port of the REC request determines that the Originator S\_ID, OX\_ID, or RX\_ID are inconsistent, then it shall reply with an LS\_RJT Sequence with a reason code hex '09' (i.e. Unable to perform command request).

Refer to FC-FS for a description of other applicable LS\_RJT reason codes and reason code explanations if the N\_Port or SCSI Target is unable to perform the REC request.

The REC shall be sent in a new Exchange.

**Protocol:**

- Read Exchange Concise request Sequence
- Accept (ACC) reply Sequence

**Format:**

FT\_1

**Addressing:**

The S\_ID field designates the source N\_Port requesting the Exchange information. The D\_ID field designates the destination N\_Port to which the request is being made.

**Payload:**

The format of the Payload is shown in the following table.

**REC Payload**

REC Payload	
Item	Size - Bytes
hex '13000000'	4
Reserved	1
Exchange Originator S_ID	3
OX_ID	2
RX_ID	2

**Reply Link Service Sequence:**

Service Reject (LS\_RJT)

Signifies rejection of the REC request.

ACC

Signifies that the N\_Port has transmitted the requested data.

### Accept payload:

- The format of the Accept Payload is shown in the table below. The format of the Concise Exchange Status is specified below.

**REC Accept Payload**

REC Accept Payload	
Item	Size - Bytes
hex '02000000'	4
Concise Exchange Status	
OX_ID	2
RX_ID	2
Originator Address Identifier	4
Responder Address Identifier	4
Data Transfer Count	4
E_STAT	4

The E\_STAT is as defined for the Exchange Status Block. The bits specifying whether the Exchange is complete (Bit 29) and whether the responder holds Sequence Initiative (Bit 30) must be valid; the setting of other bits is not required.

The Originator Address Identifier is set to the S\_ID with the high-order byte reserved.

The Responder Address Identifier is set to the D\_ID with the high-order byte reserved.

The Data Transfer Count is the number of bytes received by the Device Server for a write or the number of bytes transmitted by the Target for a read.

### 3 Capitalization conventions

Throughout FC-FS, there are grave inconsistencies in capitalization conventions. The following conventions should be used for all entries in FC-FS:

The word “information unit” should always be in lower case. When it is abbreviated, the letters should be all upper case: “IU”. (See T10/00-150r3, comment resolution 4.18.)

This proposal was rejected in the June, 2000 meetings.

### 4 Capitalization conventions violating modern documentation standards

Throughout FC-FS, many words are capitalized for no particular reason and should be in lower case. The following words should be changed as shown below:

Exchange, Sequence, Originator, and Responder should not be capitalized. (See T10/00-150r3, comment resolution 4.36, 4.96)

Process Login should not be capitalized. (See T10/00-150r3, comment resolution 4.78, 4.157).

Process Associator should not be capitalized. (See T10/00-150r4, comment resolution 4.175).

Link Services, Sequences, Information Category, Unable, Relative Offset, Target, Exchange, Payload, Recipient, Vendor Specific should not be capitalized. (See T10/00-s150r4, comment resolution 4.261)

This proposal was rejected in the June, 2000 meetings.

## 5 Complete definition of Recovery Qualifier

For historical reasons, the Recovery Qualifier has been defined as:

When one or more Sequences are aborted using the Abort Sequence Protocol (see 23.7.1.1), a Recovery\_Qualifier range is identified by the Sequence Recipient which consists of S\_ID, D\_ID, OX\_ID, RX\_ID in combination with a range of SEQ\_CNT values (low and high). In Class 2 and 3, the Recovery\_Qualifier range shall be used by the Sequence Initiator to discard ACK and Link\_Response frames and by the Sequence Recipient to discard Data frames.

The work being done in FCP-2 has indicated that recovery capabilities for all protocols would be significantly enhanced if the definition was modified as follows:

When one or more Sequences are aborted using the Abort Sequence Protocol (see 23.7.1.1), a Recovery\_Qualifier range is identified by the Sequence Recipient which consists of S\_ID, D\_ID, OX\_ID, RX\_ID, and SEQ\_ID in combination with a range of SEQ\_CNT values (low and high). In Class 2 and 3, the Recovery\_Qualifier range shall be used by the Sequence Initiator to discard ACK and Link\_Response frames and by the Sequence Recipient to discard Data frames.

This was discovered during the solution of problem 11.2 in document T10/00-150r6.