FC-PH FRAME

0

SEQ_CNT ₩ 2 Destination_ID Source_ID FCT Start of Frame Parameter DF_CTL 24 23 Q ŏ R_CTL reserved SEQ_ID TYPE 31 Ŋ

Expiration Time (Least Significant Word) Expiration Time (Most Significant Word) reserved S_Type

 $\Pi \times \Gamma$

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Network Destination Address (high order bits) Network Destination Address (low order bits) Security

 $Z \coprod \vdash \geq \bigcirc \subseteq X$

Network Source Address (high order bits) Network Source Address (low order bits) reserved Valid S_NAA

Originator Process_Associator

Originator Operation_Associator (least significant word) Originator Operation_Associator (most significant word) Responder Process_Associator

 $A \circ \circ \circ \circ - A \vdash - \circ S$

Responder Operation_Associator (least significant word) Responder Operation Associator (most significant word)

Device Header (0,16,32,64 bytes) (For use of protocol mappings)

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Payload Data of 0 to (2112 minus length of optional headers) bytes

 \Box \prec \succ \Box \Box

CRC (32 bit polynomial as per FDDI)

bits 31-24 are action code, bits 23-00 are reason code Act 01 retry, 02 non-retry, reason see next page Action 01 Seq term, 02 Seq active. Reason 01 N_Port phys bsy, 03 N_port resource bsy, FF vendor unique

Parameter in Link_Ctl P&F_REJ P&F_BSY

Z in Type field is Info Cat of frame being busied.

Note:

End of Frame

HEADER FIELDS BY FRAME GROUP

"DEVICE" TYPE FIELD VALUES OF FC-4 DATA & LINK FRAMES

Field	# hex	"Data"	Non-basic Link Services	Basic Link Services	Link Control
R_CTL bits 31-28 (routing bits) (# in field ->)	its (>-)	0 device 4 video	2 extend 3 FC-4	ω	O
	0	uncategorized		dou	ACK_1
	1	solicited data	reserved	abort seq	ACK_N ACK_0
	2	unsolicited ctrl	Request	rem conn	P_RJT
R_CTL bits	က	solicited ctrl	Reply	reserved	F_RJT
27-24 information	4	unsolicited data		BA_ACC	P_BSY
category	2	data descrpt.		BA_RJT	F_BSY (data)
	9	unsolicited	reserved		F_BSY (link ctrl)
	2	omd status		reserved	ECB.
	other	nusbec			reserved
TYPE		device - see next page	1 extend	c	1ZF_BSY 3ZP_BSY
(# in field ->)	<u>^</u>	video reserved	FC-4 as dev	Þ	(Z - see note) other reserved
	0	abort, discard mult	rd mult seq		cont sed
F_CTL bits 5-4	-	abort, discard one seq	rd one sed	not	abort seq request ABTS
(data 1st frame of	2	process seq (infinite buffers)	nfinite buffers)	meaningful	bes dots
Exch)	က	discard mult seq (immed retrans)	nult seq retrans)		immed retrans request
по_за		all valid	exp_sec only	not mee	not meaningful
					ACK 0,1,N
Parameter	er.	relative offset	not meaningful	ıningful	BSY&REJ reason&action
Payload	1	0-2112	bytes	0-12 bytes	0 bytes
DF_CTL:		bit 22=1 bit 21=1 bit 20=1 bits17-16		Expiration_Security header present Network, Header present Association_Header present Device Header (01=16, 10=32, 11=64)	r present nt 0=32, 11=64)

Expiration_Security header present
Network_ Header present
Association_ Header present
Device Header (01=16, 10=32, 11=64)

3		Reserved for FutureBus		FCFP		Vendor Unique	
hex	ç	9 p K	j	40	S	# Q E	:
FC4	SBCCS Chan	SBCCS CU	FC-GS	FC-FG	FC-SW	FCAL	SNMP
hex	19	1A	20	21	22	23	24
FC-4	LLC (in order)	LLC/SNAP	SCSI-FCP	SCSI-GPP	IPI-3 master	IPI-3 slave	lPl-3 peer
hex	8	90	88	8	11	12	13

F_CTL BITS FOR ALL FRAMES (WORD 2)

Bit Function Bit Function 23 exch Origi Resp 16 holdi xifer Si 7 Seq to follow: 70 minor info 22 seq init; Recp 15 X_ID reassign 10 minor info 00 minor info 21 1st seq of exch 14 X_ID invalidate 6 02 soon 20 lest seq of exch 9 origi rexmit Seq 3 RO present 19 last frame in seq 8 unidir connect 1 FIII Data Bytes 18 end_connection 5 to 00 None 17 chained_seq 4 0 10 One etc.
exch Origi Resp 16 hold;xfer SI seq init;Recp 15 X_ID reassign 1st seq of exch 14 X_ID invalidate last seq of exch 9 origi:rexmit Seq last frame in seq 8 unidir connect end_connection to See left page chained_seq 4
Function Bit exch Origi Resp 16 seq Init; Recp 15 last seq of exch 9 last seq of exch 9 last frame in seq 8 end_connection 5 to chained_seq 4
Function exch Origi Resp seq Initi Recp 1st seq of exch last seq of exch last frame in seq end_connection chained_seq
BH 23 23 23 24 25 24 25 25 24 25 25 25 25 25 25 25 25 25 25 25 25 25

REJECT (P_RJT, F_RJT) REASON CODES

Ą	8	Д	Ь	Я	Д.	Ь	Ь	Ь	Д.
Description	length error	unexp ACK	unexp link_resp	login required	excessive seq attempt	establish exch. error	exp/sec hdr invalid	fabric path error	vu error
Code	13	14	15	16	17	18	19	1A	Ħ
By	₽.	Ь	Д	Ф.	Ъ	Д	Д	Д	<u>Ф</u>
Description	F_CTL invalid	OX_ID invalid	RX_ID invalid	SEQ_ID invalid	DF_CTL invalid	SEQ_CNT invalid	parameter invalid	exchange error	protocol error
Code	90	90	0C	Q0	æ	9F	10	11	12
B,	В	В	ш	Щ	В	В	В	Ь	Д
Description	D_ID invalid	S_ID invalid	N_Port not avail (temp)	N_Port not avail (perm)	class unsup	delimiter use error	type unsupported	link ctl invalid	R_CTL invalid
Code	10	02	œ	20	05	90	07	08	8

CLASS CHARACTERISTICS

Class 3	Datagram	Yes	o many	<u>9</u>	olicable	olicable	<u>8</u>	Yes, N_Port to F_port only	No, frame is discarded	No, frame is discarded	Depends on Fabric,
Class 2	Multiplex (Frame Switched)	No	Many tt	No	Not app	Not app	Yes	Yes, throughout Fabric	Yes, only for routing problems etc.	Yes, for long-term resource contention	Depends on Fabric,
Class 1	Dedicated Connection	<u>8</u>	One to One	Yes	Optional	Optional	Yes	First frame only	N O	No	Yes
Characteristic	Function	Fabric discards frames?	Communications type between ports	Initial Roundtrip delay?	Stacked Connect Request	Unidirectional Connection	End-End flow ctrl	Buffer-buffer flow ctrl	Fabric can reject frames?	Fabric busies frames?	Delivery order
	Class 1 Class 2	Class 1 Class 2 Dedicated Multiplex Connection (Frame Switched)	Class 1 Class 2 Dedicated Multiplex Connection (Frame Switched) No No	Class 1 Class 2 Dedicated Multiplex Connection (Frame Switched) No N	Class 1 Class 2 Dedicated Multiplex Connection (Frame Switched) No No No Yes No	Class 1 Class 2 Dedicated Multiplex Connection (Frame Switched) No No No Yes No Yes No Optional Not applicab	Class 1 Class 2 Dedicated Multiplex Connection (Frame Switched) No No Yes No Optional Not applicab	Class 1 Class 2 Dedicated Multiplex Connection (Frame Switched) No No No Yes No Optional Not applicab Optional Not applicab	Dedicated Multiplex Connection (Frame Switched) No No One to One Yes No Optional Not applic Optional Yes Yes Yes Yes First frame only Yes, throughout First frame only Fabric	Dedicated Multiplex Connection (Frame Switched) No No No Tes No Many to many many to many many many many many many many many	Dedicated Multiplex Connection (Frame Switched) No No One to One Optional Not applic Optional Not applic Yes Inoughout Flirst frame only Yes, throughout Flirst frame only Yes, for long-term No resource One to One No Yes, only for Fabric Yes, only for Fabric Yes, for long-term No resource Contention

(Project 1050-D) Generio Services SD-OH

(D-836 toe(o19)

Generio Fabrio Requirements EC+C

(O-636 toe(o19)

Switch Fabric EC-2M

Revision to IPI-3 Disk sta

EC43

(T10 Project 991-D)

Generic Packetized Protocol

SCSI-Gbb

(Project 960-D)

q∞ol betsitidiA EC-VE

(Project 496-R) (Project 505-R)

ot noizivaA bts aqsT 8-191

EC-13

Topics to be included as future enhancements:

Fibre Channel Implementation Guide (Project 956-D)

Fibre Channel Physical Interface CD14165-1

(Project 901-D)

Fibre Channel Enhanced Physical

ьс-еь

(Project 955-D)

Link Encapsulation

EC-FE

ьс-ьн

X3.230-199X

(a-868 # 0 LL)

OR ISOS

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2, 4, 8 & 16 gigabaud physical variants Variants based on twinax cable

Asynchronous and Isochronous services Fractional bandwidth allocation

Unacknowleded multicast service Hunt Groups and Striping

ec⊣e

×86 L-192.5X

Mapping of

ьсъь

Generic Service definitions including Directory and Time services Mapping for many more existing and new protocols

For further information, contact:

(Project 1025-D)

to gniqqeM MTA

МтА-ОН

(Project 957-D)

Mapping of Single-Byte Command Code Sets

EC-2B

Fibre Channel Association 12407 MoPac Expressway North 100-357 P.O. Box 9700 Austin, TX 78758-9700

(800) 272-4618 FCA-info@amcc.com

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FIBRE CHANNEL REFERENCE

CARD

FEEDS AND SPEEDS

	F	11 T	Performance	rance	Dist
		Media	MBand	MByte/s	km
	Longwave	62.5 µm Multimode Fiber	132,81	12.5	-
	Longwave Laser	Single Mode Fiber			2 or 10
0 1	Longwave Led	62.5 µm Multimode Fiber	265.62	25	1.5
O ∢	Shortwave Laser	50 μm Multimode Fiber			2
_	Shortwave Laser	50 μm Multimode Fiber	531,25	50	ļ
	Longwave Laser	Single Mode Fiber			2 or 10
	Shortwave Laser	50 μm Multimode Fiber	! !	(0.5
	Longwave Laser	Single Mode Fiber	1062:5	<u>8</u>	2 or 10
		CATV Coax			0.100
		Submin Coax	132.81	12.5	0.040
ш		Twist pair			0.100
– ш		CATV Coax			0.075
0 -		Submin Coax	265.62	25	0:030
<u> </u>	ECL	Twist pair			0:050
OK		CATV Coax	0	ç	0:050
		Submin Coax	02.1.20	Oc.	0:020
		CATV Coax	L ()	Ç	0.025
		Submin Coax	1062.5	30	0.010