Systems Network Architecture Reference Summary

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Preface

This handbook provides selected reference information about SNA (Systems Network Architecture). The information included here is intended to supplement the information contained in various manuals on specific IBM SNA products.

This handbook contains summary material about the structure of SNA and SDLC (Synchronous Data Link Control), but mainly contains format and profile descriptions, and sense code definitions.

For further information on SNA, refer to:

- *Systems Network Architecture Introduction,* GA27-3116
- *Advanced Function for Communications System Summary,* GA27-3099
- *Systems Network Architecture General Information,* GA27-3102
- *IBM Synchronous Data Link Control General Information,* GA27-3093
- *Systems Network Architecture Format and Protocol Reference Manual: Architecture Logic,* SC30-3112
- *Introduction to Advanced Communications Function,* GC30-3033

Third Edition (October 1978)
This is a major revision of, and obsoletes, GA27-3136-0; this third edition also replaces and obsoletes GA27-3136-1, which was not released for distribution. Significant new material has been added, and existing material has been changed extensively; therefore, no vertical bars appear in the margins, and the manual should be reread in its entirety.

Information in this manual is subject to changes; any such changes will be reported in a subsequent revision. Before using this publication in connection with the operation of IBM systems or equipment, be sure that you are using the latest edition.

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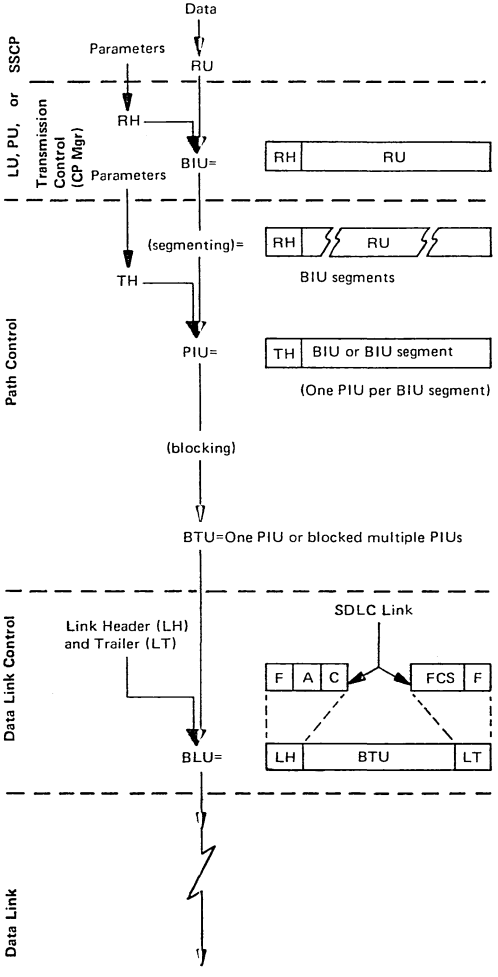
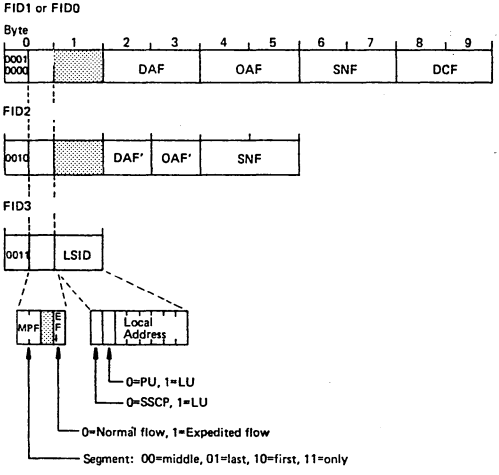
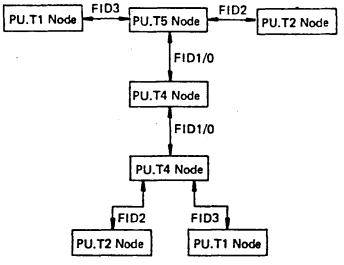
DATA UNITS


Data
Parameters
RU
SSCP
LU, PU, or
Transmission
Control
(CP Mgr)
RH
BIU=
RH
RU
Parameters
(segmenting)=
RH
RU
BIU segments
TH
PIU=
TH
BIU or BIU segment
(One PIU per BIU segment)
Path Control
(blocking)
BTU=One PIU or blocked multiple PIUs
SDLC Link
Link Header (LH)
and Trailer (LT)
F
A
C
FCS
F
Data Link Control
BLU=
LH
BTU
LT
Data Link

TRANSMISSION HEADER (TH)

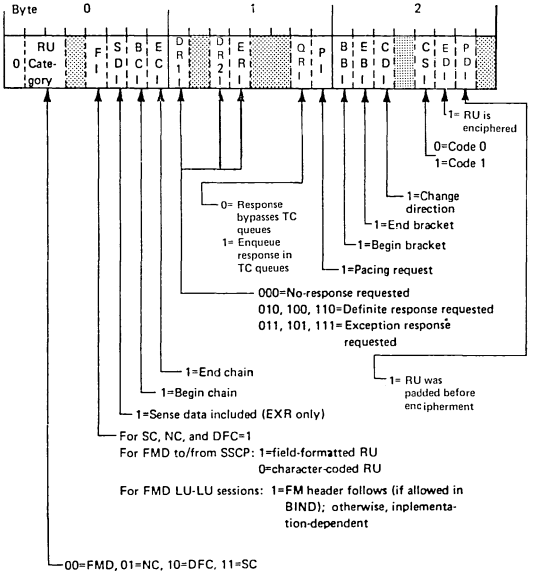


PU Types vs. FID Types

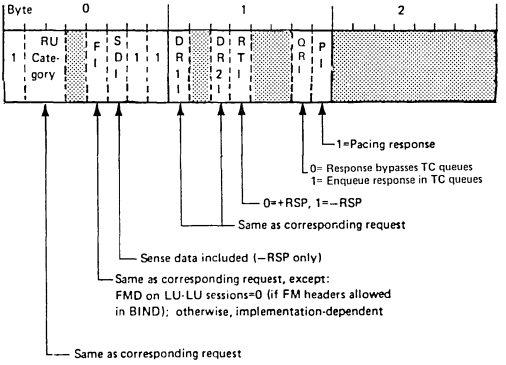


REQUEST/RESPONSE HEADER (RH)

Request Header



Response Header



Function Management (FM) Profiles

The Function Management (FM) Profiles described in this section are listed below; all other profile numbers are reserved.

FM Profiles 0, 2 through 5, 7, 17, and 18
—referred to in ACTCDRM, ACTPU, ACTLU, and BIND

FM Profile 16
—used for PU-PU sessions, but not referred to in any RU

Note: If the FM Usage field specifies a value for a parameter, that value is used unless it conflicts with a value specified by the FM profile. The FM profile overrides the FM Usage field.

FM Profile 0

Profile 0 specifies the following session rules:

Primary and secondary half-sessions use immediate request mode and immediate response mode.
Only single-RU chains allowed.
Primary and secondary half-session chains indicate definite response.
No compression.
Primary half-session sends no DFC RUs.
Secondary half-session may send LUSTAT.
NS headers are allowed.
No FM headers.
No brackets.
No alternate code.
Normal-flow send/receive mode is HDX-CONT.
Secondary half-session wins contention.
Primary half-session is responsible for recovery.

FM Profile 2

Profile 2 specifies the following session rules:

Secondary LU half-session uses delayed request mode.
Secondary LU half-session uses immediate response mode.
Only single-RU chains allowed.
Secondary LU half-session requests indicate no-response.
No compression.
No DFC RUs.
No NS or FM headers.
Secondary LU half-session is first speaker if brackets are used.
Bracket termination rule 2 is used if brackets are used.
Primary LU half-session will send EB.
Secondary LU half-session will not send EB.
Normal-flow send/receive mode is FDX.
Primary LU half-session is responsible for recovery.

The FM Usage fields defining the options for Profile 2 are:

Primary request control mode selection
Primary chain response protocol (no-response may not be used)
Brackets
Alternate code

FM Profile 3

Profile 3 specifies the following session rules:

Primary LU half-session and secondary LU half-session use immediate response mode.
No NS headers.
Primary LU half-session and secondary LU half-session support the following DFC functions:

CANCEL
SIGNAL
LUSTAT (allowed secondary-to-primary only)
CHASE

SHUTD
SHUTC
RSHUTD
BID and RTR (allowed only if brackets are used)

The FM Usage fields defining the options for Profile 3 are:

Chaining use (primary and secondary)
Request control mode selection (primary and secondary)
Chain response protocol (primary and secondary)
Compression indicator (primary and secondary)
Send EB indicator (primary and secondary)
FM header usage
Brackets
Bracket termination rule
Alternate Code Set Allowed indicator
Normal-flow send/receive mode
Recovery responsibility
Contention winner/loser
Half-duplex flip-flop reset states

FM Profile 4

Profile 4 specifies the following session rules:

Primary LU half-session and secondary LU half-session use immediate response mode.
No NS headers.
Primary LU half-session and secondary LU half-session support the following DFC functions:

CANCEL
SIGNAL
LUSTAT
QEC
QC
RELQ
SHUTD
SHUTC
RSHUTD
CHASE
BID and RTR (allowed only if brackets are used)

The FM Usage fields defining the options for Profile 4 are:

Chaining use (primary and secondary)
Request control mode selection (primary and secondary)
Chain response protocol (primary and secondary)
Compression indicator (primary and secondary)
Send EB indicator (primary and secondary)
FM header usage
Brackets
Bracket termination rule
Alternate Code Set Allowed indicator
Normal-flow send/receive mode
Recovery responsibility
Contention winner/loser
Half-duplex flip-flop reset states

FM Profile 5

Profile 5 specifies the following session rules:

Only single-RU chains allowed.
Primary half-session uses delayed request mode.
Secondary half-session uses delayed request mode and delayed response mode.
Primary half-session chains indicate definite response.
Secondary half-session chains indicate no-response.
No compression.
No DFC RUs.
NS headers are allowed.
No FM headers.
No brackets.
No alternate code.
Normal-flow send/receive mode is FDX.

FM Profile 7

Profile 7 specifies the following session rules:

Primary and secondary half-sessions use immediate response mode.
Primary and secondary half-sessions may send multiple RU chains.
Primary and secondary half-session chains indicate definite or exception response.
Exception response chains carry CD.
EB chains indicate definite response.
Brackets reset state is INB if brackets are used.
Brackets first speaker will not send EB.
Bracket termination rule 1 is used if brackets are used.
Normal-flow send/receive mode is HDX-FF, without the CONT.ERP states.
Half-duplex flip-flop reset state is SEND for the primary half-session and RECEIVE for the secondary half-session.
Primary and secondary half-sessions support the following DFC functions:

CANCEL
LUSTAT
RSHUTD
SIGNAL

The FM Usage fields defining the options for Profile 7 are:

Request control mode selection (primary and secondary)
Compression indicator (primary and secondary)
Send EB indicator (for primary or secondary, whichever is bidder)
FM header usage
Alternate Code Set Allowed indicator
Recovery responsibility
Contention winner/loser

FM Profile 16

Profile 16 specifies the following session rules:

No DFC RUs.
No FMD RUs.

FM Profile 17

Profile 17 specifies the following session rules:

Only single-RU chains allowed.
Primary and secondary half-sessions use delayed request mode and delayed response mode.
Primary and secondary half-session chains indicate definite response.
No DFC RUs
All FMD RUs include NS headers.
No FM headers.
No compression.
No brackets.
No alternate code.
Normal-flow send/receive mode is FDX.

FM Profile 18

Profile 18 specifies the following session rules:

Primary LU half-session and secondary LU half-session use immediate response mode.
No NS headers.
Primary LU half-session and secondary LU half-session support the following DFC functions:

CANCEL
SIGNAL
LUSTAT
BIS and SBI (allowed only if brackets are used)
RSHUTD
CHASE
BID and RTR (allowed only if brackets are used)

The FM Usage fields defining the options for Profile 18 are:

Chaining use (primary and secondary)
Request control mode selection (primary and secondary)
Chain response protocol (primary and secondary)
Compression indicator (primary and secondary)
Send EB indicator (primary and secondary)
FM header usage
Brackets
Bracket termination rule
Alternate Code Set Allowed indicator
Normal-flow send/receive mode
Recovery responsibility
Contention winner/loser
Half-duplex flip-flop reset states

The following table specifies which FM profiles may be used with each type of session.

	Type of Session				
FM Profile	*(SSCP, SSCP)*	*(SSCP, PU)*	*(SSCP, LU)*	*(LU,LU)*	*(PU,PU)*
0	no	yes	yes	no	no
2	no	no	no	yes	no
3	no	no	no	yes	no
4	no	no	no	yes	no
5	no	yes	no	no	no
7	no	no	no	yes	no
16	no	no	no	no	yes
17	yes	no	no	no	no
18	no	no	no	yes	no

Transmission Subsystem (TS) Profiles

The Transmission Subsystem (TS) Profiles described in this section are listed below; all other profile numbers are reserved.

TS Profiles 1 through 5, 7, and 17
—referred to in ACTCDRM, ACTPU, ACTLU, and BIND

TS Profile 16
—used for PU-PU sessions, but not referred to in any RU

TS Profile 1

Profile 1 specifies the following session rules:

No pacing.
Identifiers rather than sequence numbers are used on the normal flows (whenever the TH format used includes a sequence number field).
SDT, CLEAR, RQR, STSN, and CRV are not supported.
Maximum RU size on the normal flow for either half-session is 256, unless a different value is specified in RSP(ACTLU).

This profile does not require the use of the TS Usage field.

TS Profile 2

Profile 2 specifies the following session rules:

Primary-to-secondary and secondary-to-primary normal flows are paced.
Sequence numbers are used on the normal flows (whenever the TH format used includes a sequence number field).
CLEAR is supported.
SDT, RQR, STSN, and CRV are not supported.

The TS Usage subfields defining the options for this profile are:

Pacing counts
Maximum RU sizes on the normal flows

TS Profile 3

Profile 3 specifies the following session rules:

Primary-to-secondary and secondary-to-primary normal flows are paced.
Sequence numbers are used on the normal flows (whenever the TH format used includes a sequence number field).
CLEAR and SDT are supported.
RQR and STSN are not supported.
CRV is supported when session-level crypto is selected (via a BIND parameter).

The TS Usage subfields defining the options for this profile are:

Pacing counts
Maximum RU sizes on the normal flows

TS Profile 4

Profile 4 specifies the following session rules:

Primary-to-secondary and secondary-to-primary normal flows are paced.
Sequence numbers are used on the normal flows (whenever the TH format used includes a sequence number field).
SDT, CLEAR, RQR, and STSN are supported.
CRV is supported when session-level crypto is selected (via a BIND parameter).

The TS Usage subfields defining the options for this profile are:

Pacing counts
Maximum RU sizes on the normal flows

TS Profile 5

Profile 5 specifies the following session rules:

No pacing.
Sequence numbers are used on normal flows.
SDT is supported.
CLEAR, RQR, STSN, and CRV are not supported.
No maximum RU sizes for the normal flows are specified.

This profile does not require the use of the TS Usage field.

TS Profile 7

Profile 7 specifies the following session rules:

Primary-to-secondary and secondary-to-primary normal flows are paced.
Sequence numbers are used on the normal flows (whenever the TH format used includes a sequence number field).
SDT, CLEAR, RQR, and STSN are not supported.
CRV is supported when session-level crypto is selected (via a BIND parameter)

The TS Usage subfields defining the options for this profile are:

Pacing counts
Maximum RU sizes on the normal flows

TS Profile 16

Profile 16 specifies the following session rule:

Only NC RUs are supported.

TS Profile 17

Profile 17 specifies the following session rules:

Primary-to-secondary and secondary-to-primary normal flows are paced.
Identifiers rather than sequence numbers are used in the normal flows.
SDT, CLEAR, and RQR are supported.
STSN and CRV are not supported.
No maximum RU sizes for the normal flow are specified.

The TS Usage subfields defining the options for this profile are:

Pacing counts

The following table specifies which TS profile may be used with each type of session.

	Type of Session				
TS Profile	*(SSCP, SSCP)*	*(SSCP, PU)*	*(SSCP, LU)*	*(LU,LU)*	*(PU,PU)*
1	no	yes	yes	no	no
2	no	no	no	yes	no
3	no	no	no	yes	no
4	no	no	no	yes	no
5	no	yes	no	no	no
7	no	no	no	yes	no
16	no	no	no	no	yes
17	yes	no	no	no	no

Request/Response Unit (RU) Formats

This section defines detailed RU formats. A categorized list of RU abbreviations is presented first, followed by an alphabetic list of request RU format descriptions, a summary of response RUs, a list of response format descriptions for those positive response RUs that return data in addition to the request code, and a list of control vectors and control lists that are referred to in various RUs.

The initial line for each RU in the two format description lists is in one of the following formats:

Requests:

"RU ABBREVIATION; Origin NAU—>Destination NAU, Normal (Norm) or Expedited (Exp) Flow; RU Category (RU NAME)"

Responses:

"RSP(RU ABBREVIATION); Origin NAU—>Destination NAU, Norm or Exp Flow; RU Category"

Notes:

1. "RU Category" is abbreviated as follows:

DFC	data flow control
SC	session control
NC	network control
FMD NS(c)	function management data, network services, configuration services
FMD NS(ma)	function management data, network services, maintenance services
FMD NS(me)	function management data, network services, measurement services
FMD NS(s)	function management data, network services, session services

2. The formats of character-coded FMD NS RUs and of LU—>LU FMD RUs (other than FM headers) are implementation-dependent.

3. All values for field-formatted RUs that are not defined in this section are reserved.

4. The request code value X'FF' and the NS header values X'(3 | 7 | B | F)F****' and X'**(3 | 7 | B | F)F**' are set aside for implementation internal use, and will not be otherwise defined in SNA.

Summary of Request RUs by Category

NC

ANSC	LSA

SC

*ACTCDRM	*BIND	DACTLU	SDT
*ACTLU	CLEAR	DACTPU	*STSN
*ACTPU	CRV	RQR	UNBIND
	DACTCDRM		

DFC

BID	LUSTAT	RELQ	SHUTC
BIS	QC	RSHUTD	SHUTD
CANCEL	QEC	RTR	SIG
CHASE		SBI	

FMD NS(c)

ABCONN	DACTCONNIN	IPLFINAL
ABCONNOUT	DACTLINK	IPLINIT
ACTCONNIN	DISCONTACT	IPLTEXT
ACTLINK	DUMPFINAL	ISETCV
ANA	*DUMPINIT	NSLSA
CESLOW	*DUMPTEXT	REQCONT
CEXSLOW	ESLOW	REQDISC
CONNOUT	EXSLOW	*RNAA
CONTACT	FNA	RPO
CONTACTED	INOP	SETCV

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*These request RUs require response RUs that, if positive, may contain data in addition to the request code. See "Summary of Response RUs" and "Positive Response RUs with Extended Formats."

FMD NS(ma)

ACTTRACE	RECFMS	RECTRD
DACTTRACE	RECMS	REQMS
DISPSTOR	RECSTOR	REQTEST
EXECTEST	RECTD	

FMD NS(me)

RECMD	STARTMEAS	STOPMEAS

FMD NS(s)

BINDF	*CDTERM	NSPE
CDCINIT	CINIT	SESSEND
*CDINIT	CLEANUP	SESSST
CDSESSEND	CTERM	TERM-OTHER
CDSESSSF	*DSRLST	TERM-OTHER-CD
CDSESSST	INIT-OTHER	TERM-SELF
CDSESSTF	*INIT-OTHER-CD	UNBINDF
CDTAKED	INIT-SELF	
CDTAKEDC	NOTIFY	

Request RU Formats

Byte(s) *Description*

ABCONN; SSCP—>PPU, Norm; FMD NS(c)
(ABANDON CONNECTION)
ABCONN requests the PPU to deactivate all connections on the specified link.

0-2 X'01020F' NS header

3-4 Network address of link

ABCONNOUT; SSCP—>PPU,Norm; FMD NS(c)
(ABANDON CONNECT OUT)
ABCONNOUT requests the PPU to terminate a connect-out procedure on the designated link.

---

*These request RUs require response RUs that, if positive, may contain data in addition to the request code. See "Summary of Response RUs" and "Positive Response RUs with Extended Formats."

Byte(s)	*Description*
0-2	X'010218' NS header
3-4	Network address of link

ACTCDRM; SSCP—>SSCP, Exp; SC (ACTIVATE CROSS-DOMAIN RESOURCE MANAGER)
ACTCDRM is sent from one SSCP to another SSCP to activate a session between them and to exchange information about the SSCPs.

0	X'14' request code
1	bits 0-3, format: X'0' (only value defined) bits 4-7, type activation requested: X'1' cold (only value defined)
2	FM profile
3	TS profile
4-11	Contents ID: eight-character EBCDIC symbolic name that represents implementation and installation dependent information about the SSCP issuing the ACTCDRM; eight blanks is the value used if no information is to be conveyed. (This field could be used to provide a check for a functional and configurational match between the SSCPs.)
12-17	SSCP ID: a six-byte field that includes the ID of the SSCP issuing the ACTCDRM; the first four bits specify the format for the remaining bits: bits 0-3, format 0000 (only value defined) bits 4-7, physical unit type of the node containing the SSCP bits 8-47, implementation and installation dependent binary identification
18	*TS Usage* bits 0-1, reserved bits 2-7, primary CPMGR receive pacing count (*zero* means no pacing of requests flowing to the primary)
19-n	Control vector, as described in the topic "Control Vectors and Control Lists," later in this section **Note:** The following vector key is used in ACTCDRM: X'06'.

Byte(s) *Description*

ACTCONNIN; SSCP—>PPU, Norm; FMD NS(c) (ACTIVATE CONNECT IN)
ACTCONNIN requests the PPU to enable the primary station of the specified switched link to accept incoming connections.

0-2 X'010216' NS header
3-4 Network address of link
5 bit 0, type: 0 (only value defined)
bits 1-7, reserved

ACTLINK; SSCP—>PU, Norm; FMD NS(c) (ACTIVATE LINK)
ACTLINK initiates a procedure at the PU (1) to activate the link station specified by the link network address parameter in the request and (2) to set up control of the link according to the link type.

0-2 X'01020A' NS header
3-4 Network address of link

ACTLU; SSCP—>LU, Exp; SC (ACTIVATE LOGICAL UNIT)
ACTLU is sent to activate a session between the SSCP and the LU and to establish common session parameters.

0 X'0D' request code
1 Type activation requested: X'01' cold
X'02' ERP
2 bits 0-3, FM profile
bits 4-7, TS profile

ACTPU; SSCP—>PU, Exp; SC (ACTIVATE PHYSICAL UNIT)
ACTPU is sent to activate a session between the SSCP and the PU and to obtain certain information about the PU.

0 X'11' request code
1 Type activation requested: X'01' cold
X'02' ERP
2 bits 0-3, FM profile
bits 4-7, TS profile

Byte(s)	*Description*
3-8	A six-byte field that specifies the ID of the SSCP issuing ACTPU; the first four bits specify the format for the remaining bits: bits 0-3, format: 0000 (only value defined) bits 4-7, PU type of the node containing the SSCP bits 8-47, implementation and installation dependent binary identification

ACTTRACE; SSCP—>PU, Norm; FMD NS(ma) (ACTIVATE TRACE)

ACTTRACE requests the PU to activate the specified type of resource trace related to the specified network address.

0-2	X'010302' NS header
3-4	Network address of the resource to be traced
5	Binary value specifying which trace is to be activated: X'01' link (only value defined)
6-n	Data to support trace

ANA; SSCP—>PPU, Norm; FMD NS(c) (ASSIGN NETWORK ADDRESSES)

ANA updates the path control routing algorithm in the PPU node, such that PIUs with the specified LU network addresses (one or more) will be routed to the specified SPU node.

0-2	X'010219' NS header
3-4	Network address of PU associated with the node to which LU network addresses are to be assigned
5	Number of network addresses to be assigned
6	Type: X'80' noncontiguous (only value defined)
7-8	First network address
9-n	Any additional network addresses (two-byte multiples)

Byte(s) *Description*

ANSC; PU.T4—>SSCP, Exp; NC (AUTO NETWORK SHUTDOWN COMPLETE)

ANSC is sent with no-response requested by a PU.T4 to the SSCP to indicate that an automatic network shutdown procedure has been completed.

0 X'07' request code

1 Reason code, indicating why the completed automatic network-shutdown procedure was initiated:

X'01' operator-initiated

X'02' unrecoverable timeout occurred on the link used for the session between the SSCP and the shutdown-initiating PU

X'03' ACTPU(ERP) was received while (SSCP,PU).SEC.SESS.RCV:ACTIVE

X'04' DISC was received while (SSCP,PU).SEC.SESS.RCV:ACTIVE

X'05' SNRM (SDLC command) was received while (SSCP,PU).SEC.SESS .RCV:ACTIVE

X'06' unrecoverable link error occurred on the link used for the session between the SSCP and the shutdown-initiating PU

Note: ANSC is always sent with no-response indicated.

BID; LU—>LU, Norm; DFC (BID)

BID is used by the bidder to request permission to initiate a bracket, and is used only when using the bracket protocols.

0 X'C8' request code

BIND; PLU—>SLU, Exp; SC (BIND SESSION)

BIND is sent to activate a session between the LUs. For a BIND to be valid, the PLU and SLU must have active sessions with their SSCPs.

0 X'31' request code

1 bits 0-3, format: 0000 (only value defined)
bits 4-7, type: 0000 negotiable (cold)
0001 nonnegotiable (cold)

Byte(s)	*Description*
2	FM profile
3	TS profile
	FM Usage—Primary LU Protocols for FM Data
4	bit 0, chaining use selection: 0 only single-RU chains allowed from primary LU half-session 1 multiple-RU chains allowed from primary LU half-session bit 1, request control mode selection: 0 immediate request mode 1 delayed request mode bits 2-3, chain response protocol used by primary LU half-session for FMD requests; chains from primary will ask for: 00 no response 01 exception response 10 definite response 11 definite or exception response bits 4-5, reserved bit 6, compression indicator: 0 compression will not be used on requests from primary 1 compression may be used bit 7, send End Bracket indicator: 0 primary will not send EB 1 primary may send EB
	FM Usage—Secondary LU Protocols for FM Data
5	bit 0, chaining use selection: 0 only single-RU chains allowed from secondary LU half-session 1 multiple-RU chains allowed from secondary LU half-session bit 1, request control mode selection: 0 immediate request mode 1 delayed request mode bits 2-3, chain response protocol used by secondary LU half-session for FMD

Byte(s)	*Description*
	requests; chains from secondary will ask for: 00 no response 01 exception response 10 definite response 11 definite or exception response
	bits 4-5, reserved
	bit 6, compression indicator: 0 compression will not be used on requests from secondary 1 compression may be used
	bit 7, send End Bracket indicator: 0 secondary will not send EB 1 secondary may send EB
	FM Usage—Common LU Protocols
6	bit 0, reserved
	bit 1, FM header usage: 0 FM headers not allowed 1 FM headers allowed
	bit 2, brackets usage and reset state: 0 brackets not used if neither primary nor secondary will send EB, that is, if byte 4, bit 7 = 0 and byte 5, bit 7 = 0; brackets are used and bracket state managers' reset states are INB if either primary or secondary, or both, may send EB, that is, if byte 4, bit 7 = 1 or byte 5, bit 7 = 1 1 brackets are used and bracket state managers' reset states are BETB
	bit 3, bracket termination rule selection (reserved if brackets not used, that is, if byte 6, bit 2 = 0, byte 4, bit 7 = 0, and byte 5, bit 7 = 0): 0 Rule 2 (unconditional termination) will be used during this session 1 Rule 1 (conditional termination) will be used during this session
	bit 4, alternate code set allowed indicator: 0 alternate code set will not be used 1 alternate code set may be used
	bits 5-7, reserved

Byte(s)	*Description*
7	bits 0-1, normal-flow send/receive mode selection: 00 full-duplex 01 half-duplex contention 10 half-duplex flip-flop 11 reserved bit 2, recovery responsibility (reserved if normal-flow send/receive mode is FDX, that is, if byte 7, bits 0-1 = 00): 0 contention loser responsible for recovery (see byte 7, bit 3 for specification of which half-session is the contention loser) 1 symmetric responsibility for recovery bit 3, contention winner/loser (reserved if normal flow send/receive mode is FDX, that is, if byte 7, bits 0-1 = 00; or if the normal flow send/receive mode is HDX-FF, brackets are not used, and symmetric responsibility for recovery is used, that is, if byte 7, bits 0-1 = 10, byte 4, bit 7 = 0, byte 5, bit 7 = 0, byte 6, bit 2 = 0, and byte 7, bit 2 = 1): 0 secondary is contention winner and primary is contention loser 1 primary is contention winner and secondary is contention loser **Note:** Contention winner is also brackets first speaker if brackets are used. bits 4-6, reserved bit 7, half-duplex flip-flop reset states (reserved unless (1) normal-flow send/receive mode is half-duplex flip-flop (byte 7, bits 0-1 = 10) and (2) brackets are not used or bracket state manager's reset state): 0 HDX-FF reset state is RECEIVE for the primary and SEND for the secondary (for example, the secondary sends normal-flow requests first after session activation) 1 HDX-FF reset state is SEND for the primary and RECEIVE for the secondary (for example, the primary sends

Byte(s)	*Description*
	normal-flow requests first after session activation)
	TS Usage
8	bit 0, staging indicator for secondary CPMGR to primary CPMGR normal flow: 0 pacing in this direction occurs in one stage 1 pacing in this direction occurs in two stages **Note:** The meanings of 0 and 1 are reversed from the staging indicator for primary CPMGR to secondary CPMGR.
	bit 1, reserved
	bits 2-7, secondary CPMGR's send pacing count: *zero* means no pacing of requests flowing from the secondary
9	bits 0-1, reserved
	bits 2-7, secondary CPMGR's receive pacing count: a value of *zero* causes the boundary function to substitute the value set by a system definition pacing parameter (if the system definition includes such a parameter) before it sends the BIND RU on to the secondary half-session; a value of *zero* received at the secondary is interpreted to mean no pacing of requests flowing to the secondary
10	Maximum RU size sent on the normal flow by the secondary half-session: if bit 0 is set to *zero,* then no maximum is specified and the remaining bits 1-7 are ignored; if bit 0 is set to *one,* then the byte is interpreted as X'ab' = a•2**b. (Notice that, by definition, a≥8 and therefore X'ab' is a normalized floating point representation.) See a later topic in this section titled "RU Sizes Corresponding to Values X'ab' in BIND" for a chart listing all the possible RU sizes that result from this computation.

Byte(s)	*Description*
11	Maximum RU size sent on the normal flow by the primary half-session: identical encoding as described for byte 10
12	bit 0, staging indicator for primary CPMGR to secondary CPMGR normal flow: 1 pacing in this direction occurs in one stage 0 pacing in this direction occurs in two stages **Note:** The meanings of 0 and 1 are reversed from the staging indicator for secondary to primary CPMGR. bit 1, reserved bits 2-7, primary CPMGR's send pacing count: a value of *zero* causes the value set by a system definition pacing parameter (if the system definition includes such a parameter) to be assumed for the session; if this is also *zero,* it means no pacing of requests flowing from the primary. (For single-stage pacing in the primary-to-secondary direction, this field is redundant with, and will indicate the same value as, the secondary CPMGR's receive pacing count—see byte 9, bits 2-7, above.)
13	bits 0-1, reserved bits 2-7, primary CPMGR's receive pacing count: a value of *zero* means no pacing of requests flow to the primary. (For single-stage pacing in the secondary-to-primary direction, this field is redundant with, and will indicate the same value as, the secondary CPMGR's send pacing count—see byte 8, bits 2-7, above.) *PS Profile*
14	bit 0, PS Usage field format: 0 basic format 1 reserved bits 1-7, LU type *PS Usage*
15-25	PS characteristics *End of PS Usage Field*

Byte(s)	*Description*
26-k	*Cryptographic Options*
26	bits 0-1, private or end-user crypto options: 00 no private or end-user crypto supported 01 private crypto supported: the session crypto key and crypto protocols are privately supplied by the end user 10 end-user crypto supported: the session crypto key is distributed by the SVC.MGR.SSCP and SVC.MGR.LU; the crypto protocols are privately supplied by the end user bits 2-3, session-level crypto options: 00 no session-level crypto supported 01 session-level selective crypto supported; all crypto key management is supported by SVC.MGR.SSCP and SVC.MGR.LU; exchange (via +RSP(BIND)) and verification (via CRV) of the crypto session-seed value is supported by the SVC.MGR.LUs for the session; all FMD requests carrying ED are enciphered/deciphered by the CPMGRs 10 reserved 11 session-level mandatory crypto supported; same as session-level selective crypto except *all* FMD requests are enciphered/deciphered by the CPMGRs bits 4-7, session-level and/or end-user crypto options field length: X'0' no session-level or end-user crypto specified; following additional crypto options fields (bytes 27-k) omitted X'9' session-level and/or end-user crypto specified; additional options follow in next nine bytes
27	bits 0-1, session crypto key encipherment mode: 00 session crypto key enciphered under SLU master crypto key using a seed value of *zero* (only value defined)

Byte(s)	*Description*
	bits 2-4, reserved bits 5-7, crypto cipher method: 000 block chaining with seed and cipher text feedback, using the Data Encryption Standard (DES) algorithm (only value defined)
28-k	Session crypto key enciphered under secondary LU master crypto key; an eight-byte value that, when deciphered, yields the session crypto key used for enciphering and deciphering FMD requests
k+1	Length of primary LU name—see Note, below
k+2-m	Primary LU name
m+1	Length of user data (X'00' = no user data field present)—see Note, below
m+2-n	User data
n+1	Length of user request correlation field (X'00' = no user request correlation present)
n+2-p	User request correlation field
p+1	Length of secondary LU name (X'00' = no secondary LU name present)
p+2-r	Secondary LU name

Note: The length of the BIND RU cannot exceed 256 bytes, lest a negative response be returned.

BINDF; PLU—>SSCP, Norm; FMD NS(s) (BIND FAILURE)

BINDF is sent by the PLU to notify the SSCP that the attempt to activate the session between the specified LUs has failed.

0-2	X'810685' NS header
3-6	Sense data: 0801, 0803, 0804, 0805, 080A, 080C, 080E, 080F, 0810, 0812, 0815, 081C, 0821, 1003, 1005, and path, RH, and state error sense codes. (See the description of sense codes in the next section.)
7	Reason bit 0, reserved bit 1, 1 BIND error in reaching SLU bit 2, 1 setup reject at PLU

Byte(s)	*Description*
	bit 3, 1 setup reject at SLU
	bits 4-7, reserved
8	Session key
	X'06' uninterpreted name pair
	X'07' network address pair
9-m	*Session Key Content*
	•For session key X'06': uninterpreted name pair
9	Type: X'F3' logical unit
10	Length, in binary, of symbolic name of PLU
11-k	Symbolic name in EBCDIC characters
k+1	Type: X'F3' logical unit
k+2	Length, in binary, of symbolic name of SLU
k+3-m	Symbolic name, in EBCDIC characters
	•For session key X'07': network address pair
9-10	Network address of PLU
11-12(=m)	Network address of SLU

BIS; LU—>LU, Norm; DFC (BRACKET INITIATION STOPPED)

BIS is sent by the half-session that received SBI to acknowledge its agreement not to send BB or BID. A BIS request can also be sent unsolicited to inform the receiving half-session that the sending half-session will not send any subsequent BB or BID requests.

0	X'70' request code

CANCEL; LU—>LU, Norm; DFC (CANCEL)

CANCEL may be sent by a half-session to terminate a partially sent chain of FMD requests. CANCEL may be sent only when a chain is in process. The sending half-session may send CANCEL to end a partially sent chain if a negative response is received for a request in the chain, or for some other reason. If a valid CANCEL is received by a half-session, it always returns a positive response.

0	X'83' request code

Byte(s)	*Description*
CDCINIT; SSCP—>SSCP, Norm; FMD NS(s)	(CROSS-DOMAIN CONTROL INITIATE) CDCINIT passes information about the SLU from the SSCP(SLU) to the SSCP(PLU) and requests that the SSCP(PLU) send CINIT to the PLU. After the SSCP(PLU) successfully processes the CDCINIT request, it returns a positive response to the SSCP(SLU) and sends a CINIT to the PLU.
0-2	X'81864B' NS header
3	Format: bits 0-3, 0000 Format 0 (only value defined) bits 4-7, reserved
4	Reserved
5-12	*PCID*
5-6	The network address of SSCP(ILU)
7-12	A unique 6-byte value, generated by the SSCP(ILU), which is retained and used in all cross-domain requests dealing with the same procedure until it is completed. The SSCP(ILU) maintains correlation between PCID and the URC, if one has been provided by the INIT-SELF or INIT-OTHER request.
13-14	Network address of PLU
15-16	Network address of SLU
17-18	Length, in binary, of BIND image
19-n	BIND image: the BIND RU (see BIND format description), excluding the request code field **Note:** For SLUs not in the sending SSCP's PU.T5 node, the session crypto key is enciphered under the SLU master crypto key; for SLUs in the PU.T5 node, the sending SSCP enciphers the session crypto key under a dummy SLU master crypto key.
n+1-n+2	Length, in binary, of LU or non-SNA device characteristics field and format (**Note:** X'00' = no characteristics/format field)
n+3	LU or non-SNA device characteristics format: X'01' Format 1: access method unique device characteristics (only value defined)
n+4-p	LU or non-SNA device characteristics. (See CINIT for the specification of this field.)

Byte(s)	*Description*
p+1	Length, in binary, of session crypto key (**Note:** X'00' = no Session Crypto Key field is present.)
p+2-q	Session crypto key for primary: the session crypto key, enciphered under the cross-domain crypto key defined for the SSCP(SLU) to SSCP(PLU) direction (a different cross-domain crypto key is defined for the opposite direction) and using a seed value of *zero*.

CDINIT; SSCP—>SSCP, Norm; FMD NS(s)
(CROSS-DOMAIN INITIATE)
CDINIT from the SSCP(OLU) requests that the SSCP(DLU) assist in activating an (LU,LU) session for the specified (OLU,DLU) pair. A positive response is returned once the CDINIT request is accepted and LU availability verified. Information about the DLU is returned in the response to the CDINIT.

0-2 X'818641' NS header

Format 0

3 Format:
bits 0-3, 0000 Format 0, specifies the full set of parameters; it is used when Type = I, I/Q, or Q; bytes 17-18 are zero for Format 0
bits 4-7, reserved

4 Type:
bits 0-1, 00 reserved
01 initiate only (I)
10 queue only (Q)
11 initiate or queue (I/Q)
bits 2-4, reserved
bits 5-6, 00 DLU is PLU
01 DLU is SLU
10 SSCP determines PLU/SLU
11 reserved
bit 7, reserved

Byte(s)	*Description*
5	Queuing Conditions for DLU bit 0, 0 do not queue if session count exceeded 1 queue if session count exceeded bit 1, 0 do not queue if DLU not enabled 1 queue if DLU not enabled bit 2, 0 do not queue if CDINIT loses contention 1 queue if CDINIT loses contention bit 3, 0 do not queue if no SSCP(DLU)-DLU path 1 queue if no SSCP(DLU)-DLU path bit 4, reserved bits 5-6, queuing position/service 00 put this request on the bottom of the queue. (This request is put at the bottom of the queue and serviced last.) 01 enqueue this request FIFO 10 enqueue this request LIFO 11 reserved bit 7, 0 do not queue for recovery retry 1 queue for recovery retry (The element will be maintained on the recovery retry queue even after the activation of the session so that the session can be retried in the event of a session failure.) **Note:** Queuing will not be done if the DLU is unknown, or the domain of the DLU is in takedown status.
6	OLU status: bit 0, reserved bit 1, 0 LU is not available 1 LU is available bits 2-3,(if LU is not available) 00 LU session count exceeded 01 reserved 10 LU is not enabled (not accepting new sessions) 11 reserved bit 4, 0 existing SSCP to LU path 1 no existing SSCP to LU path (connectivity is lost) bit 5, reserved

Byte(s)	*Description*
	bits 6-7, 00 reserved 01 OLU is PLU 10 OLU is SLU 11 OLU may be either (SSCP(DLU) decides)
7-14	*PCID*
7-8	The network address of SSCP(ILU)
9-14	A unique 6-byte value, generated by the SSCP (ILU), which is retained and used in all cross-domain requests dealing with the same procedure until it is completed
15-16	Network address of OLU
17-18	Reserved
19	INITIATE origin: bit 0, 0 OLU is origin 1 third party is origin bit 1, reserved bit 2, 0 PLU is DLU 1 PLU is OLU bit 3, 0 network user is the initiator 1 network manager is the initiator bits 4-7, reserved
20	NOTIFY specification: bits 0-1, 00 do not send NOTIFY to LUs in session with DLU 01 send NOTIFY to all LUs in session with DLU 10 send NOTIFY to all LUs in session with DLU only if the CINIT request is queued 11 reserved bits 2-7, reserved
21-28	Mode: an eight-character symbolic name (implementation- and installation-dependent) that identifies the set of rules and protocols to be used for the session; used by the SSCP(SLU) to select the BIND image that will be used by the SSCP(PLU) to build the CINIT request.
29-m	*Network Name of DLU*
29	Type: X'F3' logical unit

Byte(s)	*Description*
30	Length, in binary, of symbolic name
31-m	Symbolic name, in EBCDIC characters
m+1-n	*Requester ID*
m+1	Length, in binary, of requester ID (**Note:** X'00' = no requester ID is present.)
m+2-n	Requester ID: the ID, in EBCDIC characters, of the end user initiating the request. (May be used to establish the authority of the end user to access a particular resource.)
n+1-p	*Password*
n+1	Length, in binary, of password (**Note:** X'00' = no password is present.)
n+2-p	Password used to verify the identity of the end user
p+1-q	*User Field*
p+1	Length, in binary, of user data (**Note:** X'00' = no user data is present.)
p+2-q	User data: user-specific data that is not processed by network services protocol machines but is passed to the primary LU on the CINIT request
q+1-r	*Network Name of OLU*
q+1	Type: X'F3' logical unit
q+2	Length, in binary, of symbolic name
q+3-r	Symbolic name in EBCDIC characters
r+1-s	*Uninterpreted Name of DLU*
r+1	Type: X'F3' logical unit
r+2	Length, in binary, of symbolic name (**Note:** X'00' = no uninterpreted name; the network name in bytes 29-m is used as the uninterpreted name.)
r+3-s	Symbolic name in EBCDIC characters
Format 1	
3	Format: bits 0-3, 0001 Format 1, specifies a subset of the parameters; only bytes 0-18 are used in Format 1; Format 1 is used when Type = DQ bits 4-7, reserved

Byte(s)	*Description*
4	Type: bits 0-1, 00 dequeue (DQ) bits 2-3, 00 leave on queue if dequeue retry is unsuccessful 01 remove from queue if dequeue retry is unsuccessful 10 do not retry—remove from queue 11 reserved bit 4, reserved bits 5-6, 00 LU2 is PLU 01 LU2 is SLU 10 reserved 11 reserved bit 7, reserved
5	Queuing Status (For LU associated with SSCP sending CDINIT(DQ)) bits 0-3, reserved bit 4, reserved bits 5-6, 00 request on bottom of queue 01 enqueued request FIFO 10 enqueued request LIFO 11 reserved bit 7, reserved
6	LU Status (For LU associated with SSCP sending CDINIT(DQ)) bit 0, reserved bit 1, 0 LU is unavailable 1 LU is available bits 2-3, (if LU is unavailable) 00 LU session count exceeded 01 reserved 10 LU is not enabled (not accepting new sessions) 11 reserved bit 4, 0 existing SSCP to LU path 1 no existing SSCP to LU path bit 5, reserved bits 6-7, 00 reserved 01 LU is PLU 10 LU is SLU 11 reserved

Byte(s)	*Description*
7-14	*PCID*
7-8	The network address of SSCP(ILU)
9-14	A unique 6-byte value, generated by the SSCP(ILU), which is retained and used in all cross-domain requests dealing with the same procedure until it is completed. (This PCID must be the same as in the original CDINIT request.)
15-16	Network address of LU1
17-18	Network address of LU2

CDSESSEND; SSCP(PLU)—>SSCP(SLU), Norm; FMD NS(s) (CROSS-DOMAIN SESSION ENDED)
CDSESSEND notifies the SSCP(SLU) of the successful completion of the session deactivation procedure for the session identified by the Session Key Content field, together with the PCID for the deactivation procedure.

0-2	X'818648' NS header
3-10	*PCID*
3-4	Network address of SSCP(TLU) (**Note:** A network address value of zero indicates that no PCID is present in bytes 5 through 10; bytes 5-10 are reserved when bytes 3-4 are zero.)
5-10	A unique 6-byte value, generated by the SSCP(TLU), which is retained and used in all cross-domain requests dealing with the same procedure until it is completed
11	Reserved
12	Session key: X'06' network name pair X'07' network address pair
13-n	*Session Key Content* •For session key X'06': network name pair
13	Type: X'F3' logical unit
14	Length, in binary, of symbolic name of PLU
15-m	Symbolic name in EBCDIC characters
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name of SLU
m+3-n	Symbolic name in EBCDIC characters •For session key X'07': network address pair

Byte(s)	*Description*
13-14	Network address of PLU
15-16(=n)	Network address of SLU

CDSESSSF; SSCP(PLU)—>SSCP(SLU), Norm; FMD NS(s) (CROSS-DOMAIN SESSION SETUP FAILURE)

CDSESSSF notifies the SSCP(SLU) that the cross-domain session activation procedure identified by the Session Key Content field, together with the PCID for the session activation procedure, has failed. The reason for the failure and associated sense data are given.

0-2	X'818645' NS header
3-10	*PCID*
3-4	The network address of SSCP (ILU)
5-10	A unique 6-byte value, generated by the SSCP(ILU), which is retained and used in all cross-domain requests dealing with the same procedure until it is completed
11-14	Sense data 0801, 0803, 0804, 0805, 080A, 080C, 080E, 080F, 0810, 0812, 0815, 081C, 0821, 1003, 1005, and path, RH, and state error sense codes. (The next section contains a description of sense codes.)
15	Reason: bit 0, 1 CINIT error in reaching PLU bit 1, 1 BIND error in reaching SLU bit 2, 1 setup reject at PLU bit 3, 1 setup reject at SLU bits 4-7, reserved
16	Session key: X'06' network name pair X'07' network address pair
17-n	*Session Key Content* •For session key X'06': network name pair
17	Type: X'F3' logical unit
18	Length, in binary, of symbolic name of PLU
19-m	Symbolic name in EBCDIC characters
m+1	Type: X'F3' logical unit

Byte(s)	*Description*
m+2	Length, in binary, of symbolic name of SLU
m+3-n	Symbolic name in EBCDIC characters
	•For session key X'07': network address pair
17-18	Network address of PLU
19-20(=n)	Network address of SLU

CDSESSST; SSCP(PLU)—>SSCP(SLU), Norm; FMD NS(s) (CROSS-DOMAIN SESSION STARTED)

CDSESSST notifies the SSCP(SLU) that the session identified by the Session Key Content field, together with the specified PCID for the activation procedure, has been successfully activated.

0-2	X'818646' NS header
3-10	*PCID*
3-4	The network address of SSCP(ILU)
5-10	A unique 6-byte value, generated by the SSCP(ILU), which is retained and used in all cross-domain requests dealing with the same procedure until it is completed
11	Reserved
12	Session key: X'06' network name pair X'07' network address pair
13-n	*Session Key Content* •For session key X'06': network name pair
13	Type: X'F3' logical unit
14	Length, in binary, of symbolic name of PLU
15-m	Symbolic name in EBCDIC characters
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name of SLU
m+3-n	Symbolic name in EBCDIC characters
	•For session key X'07': network address pair
13-14	Network address of PLU
15-16(=n)	Network address of SLU

Byte(s)	*Description*
CDSESSTF; SSCP(PLU)—>SSCP(SLU), Norm; FMD NS(s) (CROSS-DOMAIN SESSION TAKEDOWN FAILURE) CDSESSTF notifies the SSCP(SLU) that the session deactivation procedure for the session identified by the Session Key Content field, together with the PCID for the deactivation procedure, was unsuccessful.	
0-2	X'818647' NS header
3-10	*PCID*
3-4	The network address of SSCP(TLU) (**Note:** A network address value of zero indicates that no PCID is present; bytes 5-10 are reserved when bytes 3-4 are zero.)
5-10	A unique 6-byte value, generated by the SSCP(TLU), which is retained and used in all cross-domain requests dealing with the same procedure until it is completed
11-14	Sense data 0801, 0803, 0804, 080A, 080E, 080F, 0810, and path, RH, and state error sense codes. (The next section contains a description of sense codes.)
15	Reason: bit 0, 1 CTERM error in reaching PLU bit 1, 1 UNBIND error in reaching SLU bit 2, 1 takedown reject at PLU bits 3-7, reserved
16	Session key: X'06' network name pair X'07' network address pair
17-n	*Session Key Content* •For session key X'06': network name pair
17	Type: X'F3' logical unit
18	Length, in binary, of symbolic name of PLU
19-m	Symbolic name in EBCDIC characters

Byte(s)	*Description*
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name of SLU
m+3-n	Symbolic name in EBCDIC characters • For session key X'07': network address pair
17-18	Network address of PLU
19-20(=n)	Network address of SLU

CDTAKED; SSCP—>SSCP, Norm; FMD NS(s)
(CROSS-DOMAIN TAKEDOWN)
CDTAKED initiates a procedure to cause the takedown of all cross-domain (LU,LU) sessions involving the domains of both the sending and receiving SSCPs. It also prevents the initiation of new (LU,LU) sessions between these domains until CDTAKEDC has been processed. Each session termination is reported individually via CDSESSEND or CDSESSTF for quiesce, orderly, or forced takedown procedures. Takedown using cleanup is mutual; both SSCPs participate, but no CDSESSEND or CDSESSTF is sent. The Type byte specifies the takedown procedure—quiesce, orderly, forced, or cleanup.

0-2	X'818649' NS header
3-10	*PCID*
3-4	The network address of the SSCP sending the request
5-10	A unique 6-byte value generated by the sending SSCP and retained and used in all cross-domain requests dealing with the same procedure until it is completed
11	Type:

Byte(s)	*Description*
	bits 0-1, 00 active and pending-active sessions 01 active, pending-active, and queued sessions 10 queued sessions 11 reserved
	bits 2-3, 00 quiesce 01 orderly 10 forced 11 cleanup (mutual procedure)
	bits 4-7, reserved
12	Reason:
	bit 0, 0 network user 1 network manager
	bit 1, 0 normal 1 abnormal
	bits 2-7, detailed reason (dependent upon bits 0-1):
	•For bits 0-1, 00 user and normal:
	bits 2-7, 000000 general category (only value defined)
	•For bits 0-1, 01 user and abnormal:
	bits 2-7, 000000 general category
	•For bits 0-1, 10 manager and normal:
	bits 2-7, 000000 general category 000011 operator command—domain is going away
	•For bits 0-1, 11 manager and abnormal:
	bits 2-7, 000000 general category 000001 operator command 000010 restart procedure

Byte(s)	*Description*
CDTAKEDC; SSCP—>SSCP, Norm; FMD NS(s) (CROSS-DOMAIN TAKEDOWN COMPLETE) Except when the Cleanup option was specified, the SSCP that received CDTAKED (and responded positively to it) sends CDTAKEDC upon completion of its domain takedown procedure. The other SSCP, after completing its domain takedown procedure and receiving a CDTAKEDC, also sends a CDTAKEDC.	
0-2	X'81864A' NS header
3-10	*PCID*
3-4	The network address of the SSCP that initiated the takedown procedure
5-10	A unique 6-byte value, generated by the SSCP initiating the takedown procedure, which is retained and used in all cross-domain requests dealing with the same procedure until it is completed
11	Type: X'01' summary (only value defined)
12	Status: •For Type X'01' summary: X'01' all sessions successfully taken down X'02' takedown failures occurred
CDTERM; SSCP(OLU)—>SSCP(DLU), Norm; FMD NS(s) (CROSS-DOMAIN TERMINATE) CDTERM from the SSCP(OLU) requests that the SSCP(DLU) assist in the deactivation of the cross-domain (LU,LU) session identified by the Session Key Content field and the Type byte of the RU. Each SSCP executes that portion of terminate processing that relates to the LU it manages.	
0-2	X'818643' NS header
3	bits 0-3, 0000 Format 0 (only value defined) bits 4-7, reserved
4	Type: bits 0-1, 00 request applies to active and pending-active sessions

Byte(s)	*Description*
	01 request applies to active, pending-active, and queued sessions 10 request applies to queued sessions only 11 reserved
	bit 2, 0 forced termination, session to be deactivated immediately and unconditionally 1 orderly termination, permitting an end-of-session procedure to be executed at the PLU before the session is deactivated
	bit 3, 0 not last session for DLU 1 last session for DLU
	(**Note:** The "last session" is relative to the information that SSCP(OLU) has concerning its LUs and the DLU.)
	bit 4, reserved
	bits 5-6, 00 DLU is PLU 01 DLU is SLU 10 SSCP determines PLU/SLU 11 reserved
	bit 7, 0 not cleanup 1 cleanup (not allowed when bit 2 = 0)
5-12	*PCID*
5-6	The network address of the SSCP(TLU)
7-12	A unique 6-byte value, generated by the SSCP(TLU), which is retained and used in all cross-domain requests dealing with the same procedure until it is completed
13	Reason:
	bit 0, 0 network user 1 network manager
	bit 1, 0 normal 1 abnormal
	bits 2-7 detailed reason (dependent upon bits 0-1):
	•For bits 0-1, 00 user and normal:
	bits 2-7, 000000 general category 000001 self, OLU=PLU 000010 self, OLU=SLU 000011 other

Byte(s)	*Description*
	•For bits 0-1, 01 user and abnormal: bits 2-7, 000000 general category •For bits 0-1, 10 manager and normal: bits 2-7, 000000 general category 000001 operator command—session 000010 operator command—LU 000011 operator command—domain •For bits 0-1, 11 manager and abnormal: bits 2-7, 000000 general category 000001 operator command 000010 restart procedure 000011 preempt procedure 000100 unrecoverable path error 000101 unrecoverable destination error
14-15	Reserved
16	Session key: X'06' network name pair X'07' network address pair X'08' network address-network name
17-n	*Session Key Content* •For session key X'06': network name pair
17	Type: X'F3' logical unit
18	Length, in binary, of symbolic name of OLU
19-m	Symbolic name in EBCDIC characters
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name of DLU
m+3-n	Symbolic name in EBCDIC characters •For session key X'07': network address pair
17-18	Network address of PLU
19-20(=n)	Network address of SLU •For session key X'08': network address-network name
17-18	Network address of OLU
19	Type: X'F3' logical unit
20	Length, in binary, of symbolic name of DLU
21-n	Symbolic name in EBCDIC characters
n+1-p	*Requester ID*
n+1	Length, in binary, of requester ID (**Note:** X'00' = no requester ID is present.)

Byte(s)	*Description*
n+2-p	Requester ID: the ID, in EBCDIC characters, of the end user initiating the request
p+1-q	*Password*
p+1	Length, in binary, of password (**Note:** X'00' = no password is present.)
p+2-q	Password used to verify the identity of the end user

CESLOW; SSCP—>PU, Norm; FMD NS(c) (CONTROL ENTERING SLOWDOWN)
CESLOW informs the receiving PU (PU1) that the node of the specified PU (PU2) has entered slowdown. PU1 is expected to take action to reduce traffic to PU2.

0-2	X'01020C' NS header
3-4	Network address of PU that has entered slowdown

CEXSLOW; SSCP—>PU, Norm; FMD NS(c)
(CONTROL EXITING SLOWDOWN)
CEXSLOW informs the receiving PU (PU1) that the node of the specified PU (PU2) has exited slowdown. PU1 may resume regular traffic with PU2.

0-2	X'01020D' NS header
3-4	Network address of PU that has exited slowdown

CHASE; LU—>LU, Norm; DFC (CHASE)
CHASE is sent by a half-session to request the receiving half-session to return all outstanding responses to normal-flow requests previously received from the issuer of CHASE. The receiver of CHASE sends the response to CHASE after processing (and sending any necessary responses to) all normal-flow requests received before the CHASE.

0	X'84' request code

Byte(s)	*Description*
CINIT; SSCP—>PLU, Norm; FMD NS(s) (CONTROL INITIATE)	CINIT requests the PLU to attempt, via a BIND request, to activate a session with the specified SLU.
0-2	X'810601' NS header
3	Format: bits 0-3, 0000 Format 0 (only value defined) bits 4-7, reserved
4	INITIATE origin: bit 0, 0 OLU is origin 1 third party is origin bit 1, reserved bit 2, 0 PLU is DLU 1 PLU is OLU bit 3, 0 network user is the initiator 1 network manager is the initiator bits 4-5, reserved bit 6, 0 no recovery retry 1 recovery retry to be used bit 7, reserved
5	Session key: X'07' network address pair
6-7	Network address of PLU
8-9	Network address of SLU
10-11	Length of BIND Image field
12-m	BIND image: the BIND RU, excluding the request code field (see BIND format description)
m+1-n	*Name of SLU*
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name
m+3-n	Symbolic name, in EBCDIC characters **Note:** The SLU name is the: • uninterpreted name if the INITIATE origin was INIT-SELF issued by the PLU. • network name if the INITIATE origin was INIT-SELF issued by the SLU, or was INIT-OTHER.
n+1-p	*Requester ID*
n+1	Length, in binary, of requester ID (**Note:** X'00' = no requester ID is present.)

Byte(s)	*Description*
n+2-p	Requester ID: the ID, in EBCDIC characters, of the end user initiating the session activation request. (May be used to establish the authority of the end user to access a particular resource.)
p+1-q	*Password*
p+1	Length, in binary, of password (**Note:** X'00' = no password is present)
p+2-q	Password used to verify the identity of the end user
q+1-r	*User Field* (from INITIATE RU)
q+1	Length, in binary, of user data (**Note:** X'00' = no user data is present)
q+2-r	User data: user-specific data that is not processed by FI.FMD network services protocol machines but is passed to the SVC.MGR.PLU
r+1-s	*LU or Non-SNA Device Characteristics*
r+1-r+2	Length of characteristics field, including both format and characteristics fields (**Note:** X'0000' = no Format and no Characteristics fields are present.)
r+3	Characteristics format: X'01' device characteristics (only value defined)
r+4-s	*LU or Non-SNA Device Characteristics* •Format X'01': (This format represents an access-method-unique LU/device characteristics definition. For more specific information refer to access method implementation documentation.)
r+4	Scheduling information: X'80' input device X'40' output device X'20' conversational mode X'10' reserved X'08' start print sensitive X'04' reserved X'02' additional information provided (always *on*) X'01' specific poll=*on* general poll=*off*

Byte(s)	*Description*
r+5	Device type: X'00' undefined device type X'04' 2741 X'08' WTTY X'10' 115A X'20' TWX (33-35) X'30' 83B3 X'40' 2740 X'80' 1050 X'90' 2780 X'19' 3277 X'1A' 3284 X'1B' 3286/3288 X'1C' 3275 X'6D' SNA logical unit
r+6	Model information: X'00' Model 1 X'01' Model 2
r+7	Feature information: bits 0-1, 00 SLDC 01 start/stop 10 BSC 11 reserved bits 2-7, X'20' XMIT interrupt feature X'10' SWITCHED LINE = ON LEASED LINE = OFF X'08' attention X'04' checking X'02' station control X'01' selector pen
r+8	Physical device address
r+9	Miscellaneous flags: X'80' SNA-compatible application program interface (always *on*) X'40' non-SNA application program interface (always *off*) X'20' buffered X'10' continue mode X'08' contention mode X'04' inhibit mode (text timeout)

Byte(s)	*Description*
	X'02' end-to-end control X'01' reserved
r+10	Reserved
r+11	Reserved
r+12-r+16	Screen size
r+17-s	*Work Area*
r+17	Work area format: X'00' unformatted X'01' TCAM format
r+18-s	Work area excluding format
s+1	Length of Session Crypto Key field (**Note:** X'00' = no Session Crypto Key field is present)
s+2-t	Session Crypto Key field: session crypto key enciphered under PLU master crypto key

CLEANUP; SSCP—>SLU, Norm; FMD NS(s) (CLEAN UP SESSION)

CLEANUP is sent by the SSCP to the SLU (in a PU.T4 | 5 node only) to reset the specified (PLU,SLU).SEC half-session; CLEANUP has the same effect as UNBIND; that is, the (PLU,SLU).SEC.SESS.SUBTREE and (PLU,SLU).SEC.SESS.RCV are reset.

0-2	X'810629' NS header
3	bits 0-3, 0000 Format 0 (only value defined) bits 4-7, reserved
4	Reserved
5	Reason: bit 0, 0 network user 1 network manager bit 1, 0 normal 1 abnormal bits 2-7, detailed reason (dependent upon bits 0-1): •For bits 0-1, 00 user and normal: bits 2-7, 000000 general category 000001 self, OLU=PLU 000010 self, OLU=SLU 000011 other

Byte(s)	*Description*
	•For bits 0-1, 01 user and abnormal: bits 2-7, 000000 general category (only value defined) •For bits 0-1, 10 manager and normal: bits 2-7, 000000 general category 000001 operator command—clean up session 000010 operator command—clean up all sessions for LU 000011 operator command—clean up all LU-LU sessions for LUs in the domain •For bits 0-1, 11 manager and abnormal: bits 2-7, 000000 general category 000001 operator command 000010 restart procedure 000011 preempt procedure 000100 unrecoverable path error 000101 unrecoverable destination error
6	Session key: X'06' uninterpreted name pair X'07' network address pair
7-n	*Session Key Content* •For session key X'06': uninterpreted name pair
7	Type: X'F3' logical unit
8	Length, in binary, of symbolic name of PLU
9-m	Symbolic name in EBCDIC characters
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name of SLU
m+3-n	Symbolic name in EBCDIC characters
	•For session key X'07': network address pair
7-8	Network address of PLU
9-10	Network address of SLU

Byte(s) *Description*

CLEAR; PLU—>SLU, SSCP—>SSCP, Exp; SC
(CLEAR)
CLEAR is sent by primary session control to reset the data traffic FSMs and subtrees (for example, brackets, pacing, sequence numbers) in both the primary and secondary half-sessions (and boundary function, if any). CLEAR can be used after a catastrophic error as the first step in a data traffic recovery sequence. Sending CLEAR precludes sending any further DFC or FMD requests or responses until SDT (where supported) is successfully processed. All pending responses to DFC and FMD requests are discarded. CLEAR is a valid request whenever the session is active, so any number of CLEARs can be outstanding at one time.

0 X'A1' request code

CONNOUT; SSCP—>PPU, Norm; FMD NS(c)
(CONNECT OUT)
CONNOUT requests the PPU to initiate a connect-out procedure to a designated secondary station, via the primary station of the specified link.

0-2 X'01020E' NS header

3-4 Network address of link

5 Address of link station

6 bit 0, type: 0 (only value defined)
bit 1, manual:
0 automatic connect out
1 manual connect out
bits 2-7, reserved
Note: Bytes 7-n are not permitted on manual-connect calls.

7 Retry limit: number of times the connect-out procedure is to be retried

8 Number of dial digits

9-n Dial digits: decimal EBCDIC characters plus end-of-numbers (X'FC') and separator (X'FD') characters, where used

Byte(s) *Description*

CONTACT; SSCP—>PU, Norm; FMD NS(c)
(CONTACT)
CONTACT requests the initiation of a procedure at the PU to activate DLC-level contact with the link station associated with an adjacent PU addressed in the request. The DLC-level contact must be activated before any PIUs can be sent to or from the adjacent node. A positive response to CONTACT is issued when the DLC contact procedure begins.

0-2 X'010201' NS header
3-4 Network address of PU in node to be contacted

CONTACTED; PU—>SSCP, Norm; FMD NS(c)
(CONTACTED)
CONTACTED is issued by the PU to indicate to the SSCP the completion of the DLC contact procedure. A status parameter conveyed by this request informs SSCP configuration services whether or not the contact procedure was successful; if not successful, the status indicates whether an adjacent PU node load is required or whether an error occurred on the contact procedure.

0-2 X'010280' NS header
3-4 Network address of PU in node being contacted
5 Status of the PU being contacted:
X'01' loaded
X'02' load required
X'03' error on CONTACT

CRV; PLU—>SLU, Exp; SC (CRYPTOGRAPHIC VERIFICATION)
CRV, a valid request when session-level crypto was selected in BIND, is sent by the PLU session control to the SLU session control and carries an enciphered transform of the test value sent enciphered by the secondary in its previous +RSP(BIND). This exchange provides a crypto verification test to enable sending and receiving of FMD requests by both half-sessions.

Byte(s)	*Description*
0	X'C0' request code
1-8	A transform of the (deciphered) crypto session-seed value received (enciphered) in bytes 28-k of +RSP(BIND), re-enciphered under the session crypto key using a seed value of *zero*; the transform is the crypto session-seed value with the first four bytes inverted. (**Note:** The crypto session-seed is used as the seed for all session-level crypto encipherment and decipherment provided for FMD RUs.)

CTERM; SSCP—>PLU, Norm; FMD NS(s) (CONTROL TERMINATE)

CTERM requests that the PLU attempt to deactivate a session with the specified SLU.

0-2	X'810602' NS header
3	bits 0-3, 0000 Format 0 (only value defined) bits 4-7, reserved
4	Type: bits 0-1, reserved bits 2-3, 00 reserved 01 orderly 10 forced 11 cleanup bits 4-7, reserved
5	Reason: bit 0, 0 network user 1 network manager bit 1, 0 normal 1 abnormal bits 2-7, detailed reason (dependent upon bits 0-1): •For bits 0-1, 00 user and normal: bits 2-7, 000000 general category 000001 self, OLU = PLU 000010 self, OLU = SLU 000011 other •For bits 0-1, 01 user and abnormal: bits 2-7, 000000 general category (only value defined)

Byte(s)	*Description*
	•For bits 0-1, 10 manager and normal: 000001 operator command—session 000010 operator command—LU 000011 operator command—domain •For bits 0-1, 11 manager and abnormal: bits 2-7, 000000 general category 000001 operator command 000010 restart procedure 000011 preempt procedure 000100 unrecoverable path error 000101 unrecoverable destination error
6-7	Reserved
8	Session key: X'07' network address pair
9-10	Network address of PLU
11-12	Network address of SLU
13-n	*Requester ID*
13	Length, in binary, of requester ID (**Note:** X'00' = no requester ID is present.)
14-n	Requester ID: the ID, in EBCDIC characters, of the end user initiating the session deactivation request. (May be used to establish the authority of the end user to access a particular resource or service.)
n+1-p	*Password*
n+1	Length, in binary, of password (**Note:** X'00' = no password is present.)
n+2-p	Password used to verify the identity of the end user
p+1-q	*User Request Correlation (URC) field*
p+1	Length, in binary, of URC
p+2-q	URC: end-user defined identifier; this value can be returned by the SSCP in a subsequent NOTIFY or NSPE to correlate a given session to the initiating request

DACTCDRM; SSCP—>SSCP, Exp; SC (DEACTIVATE CROSS-DOMAIN RESOURCE MANAGER)

DACTCDRM is sent from either SSCP to deactivate an (SSCP,SSCP) session.

0	X'15' request code

Byte(s)	*Description*
1	bits 0-3, format: X'0' (only value defined) bits 4-7, type deactivation requested: X'1' normal end of session X'2' invalid activation parameter, sent by the primary half-session to deactivate the session and to indicate to the secondary that the response to ACTCDRM contained an invalid parameter
2-3	Reason code (included only if type deactivation requested is invalid activation parameter, that is, byte 1, bits 4-7 = 2): X'0808' invalid contents ID X'081D' invalid SSCP ID X'0821' invalid session parameters
4-5	Reserved if bytes 2-3 present; not included if bytes 2-3 not included

DACTCONNIN; SSCP—>PPU, Norm; FMD NS(c)
(DEACTIVATE CONNECT IN)
DACTCONNIN requests the PPU to disable the primary station of the specified switched link from accepting incoming connections.

0-2	X'010217' NS header
3-4	Network address of link

DACTLINK; SSCP—>PU, Norm; FMD NS(c)
(DEACTIVATE LINK)
DACTLINK initiates a procedure at the PU to deactivate the link station specified by the link network address parameter in the request. It is used after all stations on the specified link have been discontacted.

0-2	X'01020B' NS header
3-4	Network address of link

DACTLU; SSCP—>LU, Exp; SC (DEACTIVATE LOGICAL UNIT)
DACTLU is sent to deactivate the session between the SSCP and the LU.

0	X'0E' request code

Byte(s) *Description*

DACTPU; SSCP—>PU, Exp; SC (DEACTIVATE PHYSICAL UNIT)
DACTPU is sent to deactivate the session between the SSCP and the PU.

0 X'12' request code

1 Type deactivation requested:
X'01' final use, physical connection may be broken
X'02' not final use, physical connection should not be broken

DACTTRACE; SSCP—>PU, Norm; FMD NS(ma) (DEACTIVATE TRACE)
DACTTRACE requests that the specified trace be deactivated.

0-2 X'010303' NS header

3-4 Network address of resource to be traced

5 Selected trace

6-n Data to support trace deactivation

DISCONTACT; SSCP—>PU, Norm; FMD NS(c) (DISCONTACT)
DISCONTACT requests the PU to deactivate DLC-level contact with the specified adjacent node. The discontact procedure is DLC-dependent; if applicable, polling is stopped. DISCONTACT may be used to terminate contact, IPL, or dump procedures before their completion. The PU responds negatively to DISCONTACT if an uninterruptible link-level procedure is in progress for the referenced link.

0-2 X'010202' NS header

3-4 Network address of PU in node to be discontacted

DISPSTOR; SSCP—>PU, Norm; FMD NS(ma) (DISPLAY STORAGE)
DISPSTOR requests the PU to send a RECSTOR request containing a specified number of bytes of storage beginning at a

Byte(s) *Description*

specified location. If the Type byte specifies nonstatic storage display, the storage contents may be changing while the bytes are being set up in the RECSTOR RU. If the Type byte specifies static snapshot display, the RECSTOR RU is built with the assurance that storage contents are not being changed while the RU is being prepared.

0-2 X'010331' NS header

3-4 Network address of resource to be displayed

5 Display type:
X'01' nonstatic storage display
X'02' static snapshot display

6 Reserved

7-8 Number of bytes to be displayed

9-12 Beginning location of display

DSRLST; SSCP—>SSCP, Norm; FMD NS(s) (DIRECT SEARCH LIST)
DSRLST identifies a control list type and specifies a list search argument to be used at the receiving SSCP; the latter searches the control list accordingly, and returns the appropriate control list entry data in the response.

0-2 X'818627' NS header

3 Control list type : X'01' (only value defined)

4-m Control list search argument: network name of LU (only value defined)

4 Type: X'F3' logical unit

5 Length, in binary, of symbolic name

6-m Symbolic name in EBCDIC characters

DUMPFINAL; SSCP—>PPU, Norm; FMD NS(c) (DUMP FINAL)
DUMPFINAL terminates the dump sequence, whether DUMPTEXT is used or not.

0-2 X'010208' NS header

3-4 Network address of PU in node being dumped (the SPU)

Byte(s) *Description*

DUMPINIT; SSCP—>PPU, Norm; FMD NS(c) (DUMP INITIAL)

DUMPINIT requests a DLC-level dump from the SPU node to the PPU node, for eventual transmission to the SSCP. From the specified SPU address, the PPU determines the correct link and station addresses to be used. Basic dump data, such as register, key, and indicator values, may be returned to the SSCP on the response.

0-2 X'010206' NS header

3-4 Network address of PU in node to be dumped (the SPU)

DUMPTEXT; SSCP—>PPU, Norm; FMD NS(c) (DUMP TEXT)

If further dump data is required, DUMPINIT may be followed by DUMPTEXT. DUMPTEXT causes the dump data specified by the starting-address parameter to be returned to the SSCP on the response. The PPU obtains the dump data from the SPU node, using a DLC-level interchange.

0-2 X'010207' NS header

3-4 Network address of PU in node to be dumped (the SPU)

5-8 Starting address where dump data is to begin

9-10 Length of text: two-byte binary count of the number of bytes of dump data to be returned

ESLOW; PU—>SSCP, Norm; NS(c) (ENTERING SLOWDOWN)

ESLOW informs the SSCP that the node of the sending PU has entered a slowdown state. This state is generally associated with buffer depletion, and requires traffic through the node to be reduced or suspended.

0-2 X'010214' NS header

3-4 Network address of PU

Byte(s) *Description*

EXECTEST; SSCP—>PU, Norm; FMD NS(ma)
(EXECUTE TEST)
EXECTEST requests the PU to activate the specified test type related to the specified network address. The test code specifies the test type and defines the contents of the test data field. The test may be for the PU, or for the LUs or links supported by the PU.

0-2 X'010301' NS header
3-4 Network address of resource to be tested
5-8 Binary code selecting the test
9-n Data to support the selected test

EXSLOW; PU—>SSCP, Norm; FMD NS(c) (EXITING SLOWDOWN)
EXSLOW informs the SSCP that the node of the sending PU is no longer in the slowdown state and regular traffic can resume.

0-2 X'010215' NS header
3-4 Network address of PU

FNA; SSCP—>PPU, Norm; FMD NS(c) (FREE NETWORK ADDRESSES)
FNA updates the path control routing algorithm at the PPU node, such that PIUs with the specified LU network addresses (one or more) will no longer be routed to the specified SPU node. Freed network addresses may be reassigned via ANA.

0-2 X'01021A' NS header
3-4 Network address of target link or SPU
5 Number of SPU or LU network addresses to be freed. (X'00' = all: bytes 7-n not present.)
6 Type: X'80' noncontiguous
7-8 First network address to be freed
9-n Any additional network addresses (two-byte multiples)

Byte(s) *Description*

INIT-OTHER; ILU—>SSCP, Norm; FMD NS(s)
(INITIATE-OTHER)
INIT-OTHER from the ILU requests that a session be activated between the two LUs named in the RU. The requester may be one of the two named LUs.

0-2 X'810680' NS header

3 Format:
bits 0-3, 0001 Format 1 (only value defined)
bits 4-7, reserved

4 Type:
bits 0-1, 00 dequeue (DQ) a previously enqueued initiate request. (See bits 2-3 for further specification of dequeue actions.)
01 initiate only (I); do not enqueue
10 enqueue only (Q). (See bytes 5-6 for further specification of queuing conditions.)
11 initiate/enqueue (I/Q); enqueue the request if it cannot be satisfied immediately
bits 2-3, (used for DQ; otherwise, reserved)
00 leave on queue if dequeuing attempt is unsuccessful
01 remove from queue if dequeuing attempt is unsuccessful
10 remove from queue; do not attempt initiation
11 reserved
bit 4, reserved
bits 5-6, PLU/SLU specification:
00 LU1 is PLU
01 LU2 is PLU
10 SSCP determines PLU/SLU specification, or when Type=DQ, the corresponding entry on the target queue may indicate that LU1 or LU2 is the PLU.
11 reserved
bit 7, reserved

Byte(s)	*Description*
5	Queuing conditions for LU1 (When Type = DQ, bits 0-7 are reserved.) bit 0, 0 do not enqueue if session count will be exceeded 1 enqueue if session count will be exceeded bit 1, 0 do not enqueue if the LU is not enabled 1 enqueue even though the LU might not be enabled bit 2, 0 do not enqueue if CDINIT loses contention 1 enqueue if CDINIT loses contention bit 3, 0 do not enqueue if there are no SSCP-LU paths 1 enqueue if there are no SSCP-LU paths bit 4, reserved bits 5-6, queuing position/service: 00 enqueue this request at the bottom of the queue. (The request is put at the bottom of the queue and serviced last.) 01 enqueue this request FIFO 10 enqueue this request LIFO 11 reserved bit 7, 0 do not enqueue for recovery retry 1 enqueue for recovery retry. (This is a queue that is used for recovery-reactivating an LU-LU session when the session, though it had been successfully activated, fails for some reason. Elements on this queue are not dequeued when a session activation is successfully completed; explicit session deactivation requests are needed to dequeue elements from this queue.)
6	Queuing conditions for LU2 (When Type = DQ, bits 0-7 are reserved.) bit 0, 0 do not enqueue if session count will be exceeded 1 enqueue if session count will be exceeded bit 1, 0 do not enqueue if the LU is not enabled 1 enqueue though the LU might not be enabled

Byte(s)	*Description*
	bit 2, 0 do not enqueue if CDINIT loses contention 1 enqueue if CDINIT loses contention bit 3, 0 do not enqueue if there are no SSCP-LU paths 1 enqueue if there are no SSCP-LU paths bit 4, reserved bits 5-6, queuing position/service: 00 enqueue this request at the bottom of the queue. (The request is put at the bottom of the queue and serviced last.) 01 enqueue this request FIFO 10 enqueue this request LIFO 11 reserved bit 7, 0 do not queue for recovery retry 1 enqueue for recovery retry. (This is a queue that is used for recovery-reactivating an LU-LU session when the session, though it had been successfully activated, fails for some reason. Elements on this queue are not dequeued when a session activation is successfully completed; explicit session deactivation requests are needed to dequeue elements from this queue.) **Notes:** • If enqueuing for recovery is desired, then it must be indicated in both LU1 and LU2 Enqueuing Conditions bytes (bit 7 = '1'). • Bit 2 (CDINIT contention) must have the same setting for both LU1 and LU2. (Contention occurs when both SSCPs try to set up a session between the same LUs at the same time.) • Enqueuing is not performed if the DLU is unknown, or if the domain of either LU is in takedown status.
7	INITIATE origin: bits 0-2, reserved bit 3, (when Type = DQ, bit 3 is reserved) 0 network user is the initiator 1 network manager is the initiator bits 4-7, reserved

Byte(s)	*Description*
8	NOTIFY bits 0-1, (when Type = DQ, bits 0 and 1 are reserved) 00 do not send NOTIFY to LUs in session with LU1 01 send NOTIFY to all LUs in session with LU1 10 send NOTIFY to all LUs in session with LU1 only if the request is queued 11 reserved bits 2-3, (when Type = DQ, bits 2 and 3 are reserved) 00 do not send NOTIFY to LUs in session with LU2 01 send NOTIFY to all LUs in session with LU2 10 send NOTIFY to all LUs in session with LU2 only if the request is enqueued 11 reserved bit 4, 0 do not send NOTIFY to the ILU when INIT is dequeued 1 send NOTIFY to the ILU when INIT is dequeued bit 5, 0 do not send NOTIFY to the ILU when the requested session is set up 1 send NOTIFY to the ILU when the requested session is set up bits 6-7, reserved
9-16	Mode: an eight-character symbolic name (implementation- and installation-dependent) that identifies the set of rules and protocols to be used for the session; used by the SSCP(SLU) to select the BIND image that will be used by the SSCP(PLU) to build the CINIT request. (When Type = DQ, the Mode field is reserved.)
17-m	*Uninterpreted name of LU1*
17	Type: X'F3' logical unit

Byte(s)	*Description*
18	Length, in binary, of symbolic name
19-m	Symbolic name, in EBCDIC characters
m+1-n	*Uninterpreted name of LU2*
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name
m+3-n	Symbolic name, in EBCDIC characters
n+1-p	*Requester ID*
n+1	Length, in binary, of requester ID (**Note:** X'00' = no requester ID is present.)
n+2-p	Requester ID: the ID, in EBCDIC characters, of the end user initiating the request. (May be used to establish the authority of the end user to access a particular resource.)
p+1-q	*Password*
p+1	Length, in binary, of password (**Note:** X'00' = no password is present.)
p+2-q	Password used to verify the identity of the end user
q+1-r	*User Field* (When Type = DQ, user field is reserved)
q+1	Length, in binary, of user data (**Note:** X'00' = no user data is present.)
q+2-r	User data: user-specific data that is not processed by network services protocol machines, but is passed to the primary LU on the CINIT request
r+1-s	*User Request Correlation (URC) field* (When Type = DQ, the URC must be the same as on the original INIT-OTHER request.)
r+1	Length, in binary, of URC (**Note:** X'00' = no URC is present.)
r+2-s	URC: end-user defined identifier; this value can be returned by the SSCP in a subsequent NOTIFY or NSPE to correlate a given session to the initiating request

Byte(s) *Description*

INIT-OTHER-CD; SSCP—>SSCP, Norm; FMD NS(s)
(INITIATE-OTHER CROSS-DOMAIN)
INIT-OTHER-CD from the SSCP(ILU) requests that a session be activated between the two LUs named in the RU. The INIT-OTHER-CD request simply transports an INIT-OTHER from the SSCP(ILU)—a third-party SSCP in this case—to the SSCP(OLU). A positive response is returned once the INIT-OTHER-CD request (and CDINIT, if required) is accepted and LU availability, mode, password, and requester ID have been verified for both LUs.

0-2 X'818640' NS header

3 Format:
bits 0-3, 0000 Format 0 (only value defined)
bits 4-7, reserved

4 Type:
bits 0-1, 00 dequeue (DQ) a previously enqueued initiate request. (See bits 2-3 for further specification of dequeue actions.)
01 initiate only (I); do not enqueue
10 enqueue only (Q). (See bytes 5-6 for further specification of queuing conditions.)
11 initiate/enqueue (I/Q); enqueue the request if it can not be satisfied immediately
bits 2-3, (used for DQ; otherwise, reserved)
00 leave on queue if dequeuing attempt is unsuccessful
01 remove from queue if dequeuing attempt is unsuccessful
10 remove from queue, do not attempt initiation
11 reserved
bit 4, reserved
bits 5-6, PLU/SLU specification:
00 LU1 is PLU
01 LU2 is PLU

Byte(s)	*Description*
	10 SSCP determines PLU/SLU specification, or when Type=DQ, the corresponding entry on the target queue may indicate that LU1 or LU2 is the PLU.
	11 reserved
	bit 7, reserved
5	Queuing conditions for LU1. (When Type = DQ, bits 0-7 are reserved.)
	bit 0, 0 do not enqueue if session count will be exceeded
	1 enqueue if session count will be exceeded
	bit 1, 0 do not enqueue if the LU is not enabled
	1 enqueue if the LU is not enabled
	bit 2, 0 do not enqueue if CDINIT loses contention
	1 enqueue if CDINIT loses contention
	bit 3, 0 do not enqueue if there are no SSCP-LU paths
	1 enqueue if there are no SSCP-LU paths
	bit 4, reserved
	bits 5-6, queuing position/service:
	00 enqueue this request at the bottom of the queue. (The request is put at the bottom of the queue and serviced last.)
	01 enqueue this request FIFO
	10 enqueue this request LIFO
	11 reserved
	bit 7, 0 do not enqueue for recovery retry
	1 enqueue for recovery retry. (This is a queue that is used for recovery-reactivating an LU-LU session when the session, though it had been successfully activated, fails for some reason. Elements on this queue are not dequeued when a session activation is successfully completed. Explicit session deactivation requests are needed to dequeue elements from this queue.)

Byte(s)	*Description*
6	Queuing conditions for LU2. (When Type = DQ, bits 0-7 are reserved.) bit 0, 0 do not enqueue if session count will be exceeded 1 enqueue if session count will be exceeded bit 1, 0 do not enqueue if the LU is not enabled 1 enqueue even though the LU might not be enabled bit 2, 0 do not enqueue if CDINIT loses contention 1 enqueue if CDINIT loses contention bit 3, 0 do not enqueue if there are no SSCP-LU paths 1 enqueue even if there are no SSCP-LU paths bit 4, reserved bits 5-6, queuing position/service: 00 enqueue this request at the bottom of the queue. (The request is put at the bottom of the queue and is serviced last.) 01 enqueue this request FIFO 10 enqueue this request LIFO 11 reserved bit 7, 0 do not enqueue for recovery retry 1 enqueue for recovery retry. (This is a queue that is used for recovery-reactivating an LU-LU session when the session, though it had been successfully activated, fails for some reason. Elements on this queue are not dequeued when a session activation is successfully completed; explicit session deactivation requests are needed to dequeue elements from this queue.) **Notes:** • If enqueuing for recovery is desired, then it must be indicated in both LU1 and LU2 Queuing Conditions bytes (bit 7='1'). • Bit 2 (CDINIT contention) must have the same setting for both LU1 and LU2. (Contention occurs when both

Byte(s)	*Description*
	SSCPs try to set up a session between the same LUs at the same time.) • Enqueuing is not performed if the DLU is unknown, or if the domain of either LU is in takedown status.
7-14	*PCID* (When Type = DQ, the PCID must be the same as in the original INIT-OTHER-CD request.)
7-8	The network address of SSCP(ILU)
9-14	A unique 6-byte value, generated by the SSCP(ILU), which is retained and used in all cross-domain requests dealing with the same procedure until it is completed; an SSCP maintains correlation between PCID and the URC, if a URC has been provided by the INIT-OTHER request
15	INITIATE origin: bits 0-2, reserved bit 3, (reserved when Type = DQ) 0 network user is the initiator 1 network manager is the initiator bits 4-7, reserved
16	NOTIFY bits 0-1, (When Type = DQ, bits 0-1 are reserved.) 00 do not send NOTIFY to LUs in session with LU1 01 send NOTIFY to all LUs in session with LU1 10 send NOTIFY to all LUs in session with LU1 only if the request is enqueued 11 reserved bits 2-3, (When Type = DQ, bits 2-3 are reserved.) 00 do not send NOTIFY to LUs in session with LU2 01 send NOTIFY to all LUs in session with LU2 10 send NOTIFY to all LUs in session with LU2 only if the request is enqueued 11 reserved

Byte(s)	*Description*
	bit 4, 0 do not send NOTIFY to the SSCP(ILU) when INIT is dequeued 1 send NOTIFY to the SSCP(ILU) when INIT is dequeued
	bits 5-7, reserved
17-24	Mode: an eight-character symbolic name (implementation and installation dependent) that identifies the set of rules and protocols to be used for the session; used by the SSCP(SLU) to select the BIND image that will be used by the SSCP(PLU) to build the CINIT request. (When Type = DQ, the Mode field is reserved.)
25-m	*Network Name of LU1*
25	Type: X'F3' logical unit
26	Length, in binary, of symbolic name
27-m	Symbolic name, in EBCDIC characters
m+1-n	*Network Name of LU2*
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name
m+3-n	Symbolic name, in EBCDIC characters
n+1-p	*Requester ID*
n+1	Length, in binary, of requester ID (**Note:** X'00' = no requester ID is present.)
n+2-p	Requester ID: the ID, in EBCDIC characters, of the end user initiating the request. (May be used to establish the authority of the end user to access a particular resource.)
p+1-q	*Password*
p+1	Length, in binary, of password (**Note:** X'00' = no password is present.)
p+2-q	Password used to verify the identity of the end user
q+1-r	*User Field* (When Type = DQ, this field is reserved.)
q+1	Length, in binary, of user data (**Note:** X'00' = no user data is present.)
q+2-r	User data: user-specific data that is not processed by network services protocol machines but is passed to the primary LU on the CINIT request **Note:** With the exception of the NS header and PCID, all

Byte(s)	*Description*
	the fields in the INIT-OTHER-CD RU are derived from its corresponding INIT-OTHER RU.
INIT-SELF; ILU—>SSCP, Norm; FMD NS(s)	(INITIATE-SELF) INIT-SELF from the ILU requests that the SSCP authorize and assist in activating a session between the LU sending the request (that is, the ILU, which also becomes the OLU) and the LU named in the request (the DLU).
0-2	X'010681' NS header
3	bits 0-3, format: 0000 Format 0: specifies a subset of the parameters shown in Format 1 of INIT-SELF (described separately, because the NS header differs in the first byte), with the receiver supplying default values bit 4, reserved bits 5-6, PLU/SLU specification: 00 DLU is PLU 01 DLU is SLU 10 SSCP determines PLU and SLU 11 reserved bit 7, 0 initiate only (I); do not enqueue 1 initiate/enqueue (I/Q); enqueue the request if it cannot be satisfied immediately
4-11	Mode: an eight-character symbolic name (implementation- and installation-dependent) that identifies the set of rules and protocols to be used for the session; used by the SSCP(SLU) to select the BIND image that will be used by the SSCP(PLU) to build the CINIT request
12-m	*Uninterpreted Name of DLU*
12	Type: X'F3' logical unit
13	Length, in binary, of symbolic name
14-m	Symbolic name, in EBCDIC characters
m+1-p	*Requester ID*
m+1	Length, in binary, of requester ID (**Note:** X'00' = no requester ID is present.)

Byte(s)	*Description*
m+2-p	Requester ID: the ID, in EBCDIC characters, of the end user initiating the request. (May be used to establish the authority of the end user to access a particular resource.
p+1-q	*Password*
p+1	Length, in binary, of password (**Note:** X'00' = no password is present.)
p+2-q	Password used to verify the identity of the end user
q+1-r	*User Field*
q+1	Length, in binary, of user data (**Note:** X'00' = no user data is present.)
q+2-r	User data: user-specific data that is not processed by network services protocol machines but is passed to the primary LU on the CINIT request **Note:** The following default values are supplied by the SSCP(ILU) receiving the Format 0 INIT-SELF request: • Queuing conditions (if queuing is specified): - enqueue if session count exceeded - enqueue this request FIFO • Initiate origin: network user is the initiator • NOTIFY: do not notify

INIT-SELF; ILU—>SSCP, Norm; FMD NS(s) (INITIATE-SELF) (See the description with Format 0 of INIT-SELF.)

0-2	X'810681' NS header
3	bits 0-3, format: 0001 Format 1: specifies the full set of parameters bits 4-7, reserved
4	Type: bits 0-1, 00 dequeue (DQ) a previously enqueued initiate request. (See bits 2-3 for further specification of setup actions.) 01 initiate only(I); do not enqueue 10 enqueue only (Q). (See byte 5 for further specification of queuing conditions.)

Byte(s)	*Description*
	11 initiate/enqueue (I/Q); enqueue the request if it cannot be satisfied immediately
	bits 2-3, (used for DQ; otherwise, reserved)
	00 leave on queue if setup attempt is unsuccessful
	01 remove from queue if setup attempt is unsuccessful
	10 remove from queue; do not attempt setup
	11 reserved
	bit 4, reserved
	bits 5-6, PLU/SLU specification:
	00 DLU is PLU
	01 DLU is SLU
	10 SSCP determines PLU/SLU specification, or when Type=DQ, the corresponding entry on the target queue may indicate that LU1 or LU2 is the PLU.
	11 reserved
	bit 7, reserved
5	Queuing conditions for DLU. (When Type = DQ, bits 0-7 are reserved.)
	bit 0, 0 do not enqueue if session count exceeded
	1 enqueue if session count exceeded
	bit 1, 0 do not enqueue if DLU not enabled
	1 enqueue if DLU not enabled
	bit 2, 0 do not enqueue if CDINIT loses contention
	1 enqueue if CDINIT loses contention
	bit 3, 0 do not enqueue if no SSCP(DLU)-DLU path
	1 enqueue if no SSCP(DLU)-DLU path
	bit 4, reserved
	bits 5-6, queuing position/service:
	00 put this request at the bottom of the queue. (The request is put at the bottom of the queue and serviced last.)
	01 enqueue this request FIFO
	10 enqueue this request LIFO

Byte(s)	*Description*
	11 reserved bit 7, 0 do not enqueue for recovery retry 1 enqueue for recovery retry. (The element is maintained on the recovery retry queue even after the activation of the session, so that the session can be retried in the event of a session failure.)
	Note: Since queuing conditions are specified for the DLU only, the following default values are used by SSCP(OLU) for the OLU: • Enqueue if session count exceeded. • Enqueue this request at the foot of the queue (FIFO). • For "CDINIT contention" and "recovery retry," the default values are the same as those specified for the DLU. (See bits 2 and 7 above.)
6	INITIATE origin: bits 0-2, reserved bit 3, (bit 3 is reserved when Type = DQ) 0 network user is the initiator 1 network manager is the initiator bits 4-7, reserved
7	NOTIFY specifications: bits 0-1, (bits 0 and 1 are reserved when Type = DQ) 00 do not notify LUs in session with DLU 01 notify all LUs in session with DLU that the ILU/OLU has requested a session with the DLU 10 notify LUs in session with DLU only if request is queued 11 reserved bits 2-3, reserved bit 4, 0 do not notify the ILU when the request is dequeued 1 notify the ILU when the request is dequeued bits 5-7, reserved
8-15	Mode: an eight-character symbolic name (implementation- and installation-dependent) that identifies the set of rules and protocols to be used for the session; used by the SSCP(SLU) to

Byte(s)	*Description*
	select the BIND image that will be used by the SSCP(PLU) to build the CINIT request. (When Type = DQ, the Mode field is reserved.)
16-n	*Uninterpreted Name of DLU*
16	Type: X'F3' logical unit
17	Length, in binary, of symbolic name
18-n	Symbolic name, in EBCDIC characters
n+1-p	*Requester ID*
n+1	Length, in binary, of requester ID (**Note:** X'00' = no requester ID is present.)
n+2-p	Requester ID: the ID, in EBCDIC characters, of the end user initiating the request. (May be used to establish the authority of the end user to access a particular resource.)
p+1	*Password*
p+1	Length, in binary, of password (**Note:** X'00' = no password is present.)
p+2-q	Password used to verify the identity of the end user
q+1-r	*User Field* (When Type = DQ, User field is reserved.)
q+1	Length, in binary, of user data (**Note:** X'00' = no user data is present.)
q+2-r	User data: user-specific data that is not processed by network services protocol machines but is passed to the primary LU on the CINIT request
r+1-s	*User Request Correlation (URC) Field* (When Type = DQ, the URC must be the same as in the original INIT-SELF request.)
r+1	Length, in binary, of URC (**Note:** X'00' = no URC is present.)
r+2-s	URC: end-user defined identifier; this value can be returned by the SSCP in a subsequent NOTIFY or NSPE to correlate a given session to this initiating request

Byte(s) *Description*

INOP; PU—>SSCP, Norm; FMD NS(c) (INOPERATIVE)

INOP is sent to the SSCP by the PU to report a link-related connection or contact failure involving one or more nodes.

0-2 X'010281' NS header

3-4 Network address of (1) an inoperative link or (2) a PU (when the PU is inoperative)

5 bits 0-3, format: X'0' (only value defined)
bits 4-7, reason:
- X'1' station inoperative (loss of contact, unexpected loss of connection, or connection establishment failure)
- X'2' link inoperative (link failure)
- X'3' station (discontact—loss of synchronization)
- X'4' station (incomplete discontact—loss of synchronization
- X'5' station (request resynchronization—unexpected request for resynchronization)

IPLFINAL; SSCP—>PPU, Norm; FMD NS(c) (IPL FINAL)

IPLFINAL completes an IPL sequence and supplies the load-module entry point to the SPU node. A positive response to IPLFINAL indicates that the SPU node is successfully loaded.

0-2 X'010205' NS header

3-4 Network address of PU in node being loaded (the SPU)

5-8 Entry point location within load module

IPLINIT; SSCP—>PPU, Norm; FMD NS(c) (IPL INITIAL)

IPLINIT transfers initial load information to the PPU, where it initiates a DLC-level load of an SPU node. The PPU determines from the specified SPU address the correct link and secondary station addresses to be used.

Byte(s)	*Description*
0-2	X'010203' NS header
3-4	Network address of PU in node to be loaded (the SPU)

IPLTEXT; SSCP—>PPU, Norm; FMD NS(c) (IPL TEXT)

IPLTEXT transfers load module information to the PPU, where it is passed as a DLC-level load to the SPU node. Following an IPLINIT, any number of IPLTEXT requests are valid.

0-2	X'010204' NS header
3-4	Network address of PU in node to be loaded (the SPU)
5-n	Text: a variable-length byte string in the form required by the node being loaded

ISETCV; SSCP—>PU, Norm; FMD NS(c) (INDIRECT SET CONTROL VECTOR)

ISETCV sets a control vector that is maintained by the PU receiving the request and that is associated with the network address specified in the RU.

0-2	X'410222' NS header
3-4	Network address of resource to which control vector applies, as described in the note below
5-n	Control Vector, as described in the topic "Control Vectors and Control Lists," later in this section

Note: The following combinations are used in ISETCV:

Vector Key (Byte 5)	*Resource (Bytes 3-4)*
X'01'	PU
X'02'	Link to be used for routing to the subarea specified in byte 6
X'03'	SPU
X'04'	LU
X'05'	Link (S/370 channel)

LSA; PU—>PU, Exp; NC (LOST SUBAREA)

LSA is sent from PU.T4 | 5 to PU.T4 | 5 within a network to identify subareas to which routing has been interrupted, as well as to specify the reason

Byte(s)	*Description*
	for and location of the routing interruption. An LSA is sent only with no-response requested.
0	X'05' request code
1-2	Reserved
3	Reason code, specifying why LSA was originated: X'01' unexpected routing interruption X'02' controlled routing interruption
4	Format: X'01' (only value defined)
5-8	*Origination Address*
5-6	Reserved
7-8	Network address of the PU that originated the LSA
9-12	*Lost Subarea Address Field*
9-10	Reserved
11	Subarea address (left-justified) for a lost subarea
12	Reserved
13-n	Additional 4-byte fields in the form of bytes 9-12, corresponding to additional lost subareas

LUSTAT; LU—>LU | SSCP, Norm; DFC (LOGICAL UNIT STATUS)

LUSTAT is used by a half-session to send status information to its paired half-session. The RU format allows the sending of either end-user information or LU status information. If the high-order two bytes of the status information are zero, then the low-order two bytes carry end-user information and may be set to any value. In general, LUSTAT is used to report failures and error recovery conditions for an LU component or subsidiary device.

0	X'04' request code
1-4	Status value + status extension field (two bytes each): X'0000'+'uuuu' no-op (no system-defined status) + user-defined field X'0001'+'cc00' component now available + component identification (see Note)

Byte(s)	*Description*
	X'0002'+'rrrr' no FMD requests to transmit + reserved field
	X'0003'+'cc00' component entering attended mode of operation + component identification (see Note)
	X'0004'+'cc00' component entering unattended mode of operation + component identification (see Note)
	X'0005'+'iiii' prepare to commit all resources required for atomic unit of work + information field: '0001' request End Bracket be sent on next chain (only value defined)
	X'0801'+'cc00' component not available (for example, not configured) + component identification (see Note)
	X'0802'+'cc00' component failure (intervention required) + component identification (see Note)
	X'081C'+'cc00' component failure (permanent error) + component identification (see Note)
	X'0824'+'rrrr' function canceled + reserved field
	X'082B'+'cc00' component available, but presentation space integrity lost + component identification (see Note)
	X'0831'+'cc00' component disconnected (power off or some other disconnecting condition) + component identification (see Note)

Byte(s) *Description*

X'0848'+'rrrr' crypto component failure + reserved field

X'400A'+'ssss' no-response mode not allowed + sequence number of the request specifying no-response

Note: Values for "cc" byte are:
X'00' = LU itself rather than a specific LU component.
Otherwise,
bit 0, set to 1
bits 1-3, LU component medium class:
- 000 console
- 001 exchange (for example, customer-removable diskette)
- 010 card punch
- 011 printer
- 101 display

bits 4-7, LU component device address

NOTIFY; SSCP—>SSCP | LU, Norm; FMD NS(s)
(NOTIFY)
NOTIFY is used to send information about (LU,LU) session status (for example, session requested, session terminated) from an SSCP to another SSCP or to an LU. NOTIFY carries information in the form of a (vector key,vector data) pair.

0-2 X'810620' NS header (for SSCP—> LU)

0-2 X'818620' NS header (for SSCP—> SSCP)

3 NOTIFY vector key:

X'01' resource requested: used to send NOTIFY to the current users (LUs) of a resource (LU) to inform them that another LU wishes to use the resource

X'02' ILU/TLU notification: used to send NOTIFY to the issuer of an INIT or TERM request to give the status of the session

X'03' third party SSCP notification: used to send NOTIFY to a third party SSCP (the SSCP whose LU issued an INIT-OTHER or

Byte(s)	*Description*
	TERM-OTHER request) to give the status of the setup/takedown procedure
4-n	*NOTIFY Vector Data*
	•For NOTIFY vector key X'01':
4-m	*Network name of requested LU*
4	Type: X'F3' logical unit
5	Length, in binary, of symbolic name of LU
6-m	Symbolic name in EBCDIC characters
m+1-n	*Network name of requesting LU*
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name
m+3-n	Symbolic name in EBCDIC characters
	•For NOTIFY vector key X'02':
4	Session key: X'06' uninterpreted name pair
5-n	*Session Key Content*
5	Type: X'F3' logical unit
6	Length, in binary, of symbolic name of PLU (or OLU or LU1)
7-m	Symbolic name in EBCDIC characters
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name of SLU (or DLU or LU2)
m+3-n	Symbolic name in EBCDIC characters
n+1	Status: X'01' session terminated X'02' setup process started
n+2-p	*User Request Correlation Field*
n+2	Length, in binary, of the URC
n+3-p	URC: end-user defined identifier, specified in an INIT or TERM request; used to correlate the given session to the initiating or terminating requests
	•For NOTIFY vector key X'03':
4	Status: X'01' session terminated X'02' session initiated X'03' procedure error X'04' setup process started
5-12	*PCID*

Byte(s)	*Description*
5-6	Network address of the SSCP(ILU) or SSCP(TLU)
7-12	A unique 6-byte value, generated by the SSCP(ILU) or SSCP(TLU), which is used in all cross-domain requests dealing with the same setup or takedown procedure until it is completed
13	Reason (defined for Status value of X'03' only) **Note:** There are two encodings of the Reason byte: • If bit 4 = 0, then the Reason byte is encoded for a setup procedure error. • If bit 4 = 1, then the Reason byte is encoded for a takedown procedure error. *Setup Procedure Error* bit 0, 1 CINIT error in reaching the PLU bit 1, 1 BIND error in reaching the SLU bit 2, 1 setup reject at the PLU bit 3, 1 setup reject at the SLU bit 4, 0 setup procedure error bit 5, reserved bit 6, 1 setup reject at SSCP bit 7, reserved *Takedown Procedure Error* bit 0, 1 CTERM error in reaching the PLU bit 1, 1 UNBIND error in reaching the SLU bit 2, 1 takedown reject at the PLU bit 3, 1 takedown reject at the SLU bit 4, 1 takedown procedure error bit 5, 1 takedown reject at the SSCP bit 6, 0 see following Note bit 7, reserved **Note:** The bit combination of 11 for bits 4 and 6 is set aside for implementation internal use and will not be otherwise defined.
14-17	Sense data (defined for Status value of X'03' only): 0000, 0801, 0803, 0804, 0805, 0806, 0809, 080A, 080C, 080E, 080F, 0810, 0812, 0815, 0816, 081C, 0821, 0836, 0839, 083B, 083D, 083E, 083F, 0842, 1002, 1003, 1005
18	Session key: X'06' network name pair X'07' network address pair

Byte(s)	*Description*
19-n	*Session Key Content* •For session key X'06': network name pair
19	Type: X'F3' logical unit
20	Length, in binary, of symbolic name of PLU (or OLU or LU1)
21-m	Symbolic name in EBCDIC characters
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name of SLU (or DLU or LU2)
m+3-n	Symbolic name in EBCDIC characters •For session key X'07': network address pair
19-20	Network address of PLU
21-22(=n)	Network address of SLU
n+1-p	*User Request Correlation (URC) Field*
n+1	Length, in binary, of the URC
n+2-p	URC: end-user defined identifier, specified in an INIT or TERM request; used to correlate the given session to the initiating or terminating requests

NSLSA; PU.T4 | 5—>SSCP, Norm; FMD NS(c)

(NETWORK SERVICES LOST SUBAREA)

NSLSA is sent by a PU.T4 | 5 to every SSCP with which it has an active session to report the interruption of routing capability to a set of subareas after originating or propagating an LSA. The list of subareas in the NSLSA request is identical to the list sent by the PU.T4 | 5 in the LSA request.

0-2	X'410285' NS header **Note:** Bytes 3-n are identical to those in the originated or propagated LSA.
3	Reason code, specifying why LSA was originated: X'01' unexpected routing interruption X'02' controlled routing interruption
4	Format: X'01' (only value defined)
5-8	*Origination Address*
5-6	Reserved
7-8	Network address of the PU that originated the LSA

Byte(s)	*Description*
9-12	*Lost Subarea Address Field*
9-10	Reserved
11	Subarea address (left-justified) for a lost subarea
12	Reserved
13-n	Additional 4-byte fields in the form of bytes 9-12, corresponding to additional lost subareas

NSPE; SSCP—>ILU or TLU, Norm; FMD NS(s)
(NETWORK SERVICES PROCEDURE ERROR)

NSPE is used by the SSCP to inform an ILU or TLU that a session activation or deactivation attempt has failed after a positive response has been sent to the corresponding activation or deactivation request. An NSPE is also sent to the TLU that issued a TERM-ALL to identify each session that has failed the termination process (one NSPE per deactivation failure) after a positive response has been sent to the TERM-ALL. (A negative response to CDTERM is an example of a failure causing NSPE to be sent.)

0-2 X'010604' NS header

Note: The remainder of this RU has two formats: a comprehensive form and a condensed form, based upon the setting of bit 7 of the Reason byte (byte 3). The choice is implementation-dependent.

Comprehensive Format

3 Reason:

Note: There are two encodings of the Reason byte in the comprehensive format:

- If bit 4 = 0, then the Reason byte is encoded for a setup procedure error.
- If bit 4 = 1, then the Reason byte is encoded for a takedown procedure error.

Setup Procedure Error

bit 0, 1 CINIT error in reaching the PLU
bit 1, 1 BIND error in reaching the SLU
bit 2, 1 setup reject at the PLU
bit 3, 1 setup reject at the SLU
bit 4, 0 setup procedure error
bit 5, reserved

Byte(s)	*Description*
	bit 6, 1 setup reject at SSCP bit 7, 1 comprehensive format of Reason byte *Takedown Procedure Error* bit 0, 1 CTERM error in reaching the PLU bit 1, 1 UNBIND error in reaching the SLU bit 2, 1 takedown reject at the PLU bit 3, 1 takedown reject at the SLU bit 4, 1 takedown procedure error bit 5, 1 takedown reject at SSCP bit 6, 0 see following Note bit 7, 1 comprehensive format of Reason byte **Note:** The bit combination of 11 for bits 4 and 6 is set aside for implementation internal use and will not be otherwise defined.
4-7	Sense Data: 0000, 0801, 0803, 0804, 0805, 0806, 0809, 080A, 080C, 080E, 080F, 0810, 0812, 0815, 0816, 081C, 0821, 0836, 0839, 083B, 083D, 083E, 083F, 0842, 1002, 1003, 1005, and path, RH, and state error sense codes. (See the description of sense codes in the next section.)
8	Session key: X'06' uninterpreted name pair X'0A' session correlation
9-n	*Session Key Content* •For session key X'06': uninterpreted name pair
9	Type: X'F3' logical unit
10	Length, in binary, of the symbolic name of the PLU
11-m	Symbolic name in EBCDIC characters
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of the symbolic name of the SLU
m+3-n	Symbolic name in EBCDIC characters •For session key X'0A': session correlation
9	Length, in binary, of the URC
10-n	URC: end-user defined identifier, specified in an INIT or TERM request, used to correlate the given session to the initiating request

Byte(s)	*Description*
	Condensed Format
3	Reason: bit 0, 1 CINIT error in reaching the PLU bit 1, 1 BIND error in reaching the SLU bit 2, 1 setup reject at the PLU bit 3, 1 setup reject at the SLU bit 4, 1 takedown failure bit 5, 1 takedown reject at SSCP bit 6, 1 setup reject at SSCP bit 7, 0 condensed format
4-m	Uninterpreted name of PLU
4	Type: X'F3' logical unit
5	Length, in binary, of symbolic name of PLU
6-m	Symbolic name in EBCDIC characters
m+1-n	Uninterpreted name of SLU
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name of SLU
m+3-n	Symbolic name in EBCDIC characters

QC; LU—>LU, Norm; DFC (QUIESCE COMPLETE)

QC is sent by either half-session after receiving QEC, to indicate that it has quiesced. QC is the last normal-flow request sent by a quiesced half-session until RELQ is received. If QC is received when QEC has not been sent, then the QC is rejected with a negative response and the sense code, Mode Inconsistency.

0	X'81' request code

QEC; LU—>LU, Exp; DFC (QUIESCE AT END OF CHAIN)

QEC may be sent by either half-session to request the receiving half-session to quiesce (stop sending normal-flow requests) at the end of the FMD chain currently being sent (if any).

0	X'80' request code

RECFMS; PU—>SSCP, Norm; FMD NS(ma) (RECORD FORMATTED MAINTENANCE STATISTICS)

RECFMS permits the passing of maintenance statistics from a PU to maintenance services at

Byte(s)	*Description*
	the SSCP. The PU may send statistics for itself, or for its link, LU, or adjacent nodes as indicated by the type code and network address in the request. If the request is generated by a PU.T1 or PU.T2, its network address is not put in the request. Maintenance services at the SSCP is responsible for associating the PU network address with the request. RECFMS may be solicited (by REQMS request) or may be sent unsolicited.
0-2	X'410384' NS header
	Link Test Statistics
3-4	Link network address (or X'0000' if PU.T1 | 2 is the sender)
5-6	Reserved
7	bit 0, solicitation indicator: 0 unsolicited 1 solicited—sent in reply to REQMS bits 1-7, type code: B'0000001'
8-11	bits 0-11, block number bits 12-31, ID number associated with the sending PU
12-13	Reserved
14-15	Counter: the number of times the secondary SDLC station has received an SDLC TEST command
16-17	Counter: the number of times the secondary SDLC station has transmitted an SDLC TEST response
	(**Note:** All counters are in binary.)
	Summary Error Data
3-4	PU network address (or X'0000' if PU.T1 | 2 is the sender)
5-6	Reserved
7	bit 0, solicitation indicator: 0 unsolicited 1 solicited—sent in reply to REQMS bits 1-7, type code: B'0000010'

Byte(s)	*Description*
8-11	bits 0-11, block number bits 12-31, ID number associated with the sending PU
12-13	Reserved
14	Summary counter validity mask: bit 0, set to 1 if machine check counter is valid bit 1, set to 1 if communication check counter is valid bit 2, set to 1 if SNA error counter is valid bits 3-7, reserved
15-16	Reserved
17-18	Machine check counter
19-20	Communication check counter
21-22	Count of SNA negative responses at this PU (**Note:** All counters are in binary.)
	Communication Adapter Data
3-4	Link network address (or X'0000' if PU.T1 | 2 is the sender)
5-6	Reserved
7	bit 0, solicitation indicator: 0 unsolicited 1 solicited—sent in reply to REQMS bits 1-7, type code: B'0000011'
8-11	bits 0-11, block number bits 12-31, ID number associated with the sending PU
12-13	Reserved
14	Adapter type: X'01' SDLC CCA link adapter (only value defined)
15	Communication adapter counter validity mask, byte 1: bit 0, set to 1 if nonproductive timeout counter is valid bit 1, set to 1 if idle time-out counter is valid bit 2, set to 1 if write retry counter is valid bit 3, set to 1 if overrun counter is valid bit 4, set to 1 if underrun counter is valid bit 5, set to 1 if connection problem counter is valid

Byte(s)	*Description*
	bit 6, set to 1 if FCS error counter is valid bit 7, set to 1 if primary station abort counter is valid
16	Communication adapter counter validity mask, byte 2: bit 0, set to 1 if command reject counter is valid bit 1, set to 1 if DCE error counter is valid bit 2, set to 1 if write time-out counter is valid bits 3-7, reserved
17	Reserved
18	Nonproductive time-out counter
19	Idle time-out counter
20	Write retry counter
21	Overrun counter
22	Underrun counter
23	Connection problem counter
24	FCS error counter
25	Primary station abort counter
26	Command reject counter
27	DCE error counter
28	Write time-out counter (**Note:** All counters are in binary.)
	PU/LU-Dependent Data
3-4	PU/LU network address (or X'0000' if PU.T1 | 2 is the sender)
5-6	Reserved
7	bit 0, solicitation indicator: 0 unsolicited 1 solicited—sent in reply to REQMS bits 1-7, type code: B'0000100'
8-11	bits 0-11, block number bits 12-31, ID number associated with the sending PU
12-13	Reserved
14-n	PU/LU-dependent data
	Engineering Change Levels
3-4	PU network address (or X'0000' if PU.T1 | 2 is the sender)
5-6	Reserved

Byte(s)	*Description*
7	bit 0, solicitation indicator: 0 unsolicited 1 solicited—sent in reply to REQMS bits 1-7, type code: B'0000101'
8-11	bits 0-11, block number bits 12-31, ID number associated with the sending PU
12-13	Reserved
14-n	Implementation-defined data describing hardware, microcode, and programming levels

RECMD; LU | PU—>SSCP, Norm; FMD NS (me)
(RECORD MEASUREMENT DATA)
RECMD sends data collected during a measurement to the SSCP. The format of the data and the frequency of reporting it are functions of the particular measurement.

0-2	X'010480' NS header
3-4	Network address of resource being measured: if the request sender is an LU, then the resource is the sending LU itself; if the request sender is a PU, then the resource is a link, LU, or PU (either the sending PU or an adjacent PU)
5	Selected measurement type: no values yet defined
6-n	Measurement data: not defined

RECMS; PU—>SSCP, Norm; FMD NS(ma) (RECORD MAINTENANCE STATISTICS)
RECMS permits the passing of maintenance statistics from a PU to a centralized recording facility at the SSCP. A PU may send statistics for itself, for its node, for supporting links, or for adjacent SPU nodes, as indicated by the network address in the request.

0-2	X'010381' NS header
3-4	Network address of resource
5-n	Maintenance statistics

Byte(s)	*Description*
RECSTOR; PU—>SSCP, Norm; FMD NS (ma) (RECORD STORAGE) RECSTOR carries the storage display as requested by a DISPSTOR request.	
0-2	X'010334' NS header
3-4	Network address of resource to be displayed
5	Display type: X'01' nonstatic storage display X'02' static snapshot display
6	Reserved
7-8	Number of bytes of program storage following in this record
9-12	Beginning location
13-n	Storage display
RECTD; PU—>SSCP, Norm; FMD NS(ma) (RECORD TEST DATA) RECTD returns the status and results of a test to SSCP maintenance services.	
0-2	X'010382' NS header
3-4	Network address of resource under test
5-8	Binary code selecting the test
9-n	Test status and results
RECTRD; PU—>SSCP, Norm; FMD NS(ma) (RECORD TRACE DATA) RECTRD returns data collected during a trace of the specified resource.	
0-2	X'010383' NS header
3-4	Network address of resource under trace
5	Selected trace
6-n	Trace data

Byte(s) *Description*

RELQ; LU—>LU, Exp; DFC (RELEASE QUIESCE)

RELQ may be sent by either half-session to remove the quiesced condition of the receiving half-session. Only one RELQ is required to remove a quiesced condition that is the result of both QEC and SHUTD. If RELQ is received by an LU that is not quiesced but is otherwise able to process the request, a positive response is sent.

0 X'82' request code

REQCONT; PPU—>SSCP, Norm; FMD NS(c)

(REQUEST CONTACT)

REQCONT notifies the SSCP that a connection between the primary station of the specified link and a specified secondary station has been activated via a successful connect-in or connect-out procedure. A DLC-level station identification exchange (XID in SDLC) is required before issuing REQCONT.

0-2 X'010284' NS header

3-4 Network address of link
Station ID

5 bits 0-3, reserved
bits 4-7, PU type: a binary value corresponding to the PU type of the SPU with which the PPU has established a physical connection

6 Reserved

7-10 Block number (12 bits): see the individual product specifications for the specific values used; ID number (20 bits): a binary value uniquely identifying a specific station within a network installation. The ID number can be assigned in various ways, depending on the product. See individual product specifications for details.

Byte(s)	*Description*
REQDISCONT; SPU—>SSCP, Norm; FMD NS(c) (REQUEST DISCONTACT) With REQDISCONT, the SPU requests the SSCP to start a procedure that will ultimately discontact the secondary station associated with the SPU.	
0-2	X'01021B' NS header
3	Type: X'00' normal X'80' immediate
REQMS; SSCP—>PU, Norm; FMD NS(ma) (REQUEST MAINTENANCE STATISTICS) REQMS requests the PU to transmit maintenance statistics regarding the resource indicated by the network address in bytes 3 and 4 (or by the type code in byte 7 for PU.T1 | 2). These statistics are transmitted to maintenance services at the SSCP via the RECFMS request.	
0-2	X'410304' NS header
	Link Test Statistics
3-4	Link network address (or may be X'0000' if PU.T1 | 2 is the sender)
5-6	Reserved
7	bit 0, reset indicator (see Note) bits 1-7, type code: B'0000001'
	Summary Error Data
3-4	PU network address (or may be X'0000' if PU.T1 | 2 is the sender)
5-6	Reserved
7	bit 0, reset indicator (see Note) bits 1-7, type code: B'0000010'
	Communication Adapter Data
3-4	Link network address (or may be X'0000' if PU.T1 | 2 is the sender)
5-6	Reserved

Byte(s)	*Description*
7	bit 0, Reserved bits 1-7, type code: B'0000011' *PU/LU-Dependent Data*
3-4	PU/LU network address (or may be X'0000' if PU.T1 | 2 is the sender)
5-6	Reserved
7	bit 0, reset indicator (see Note) bits 1-7, type code: B'0000100' *Engineering Change Levels*
3-4	PU network address (or may be X'0000' if PU.T1 | 2 is the sender)
5-6	Reserved
7	bit 0, reserved bits 1-7, type code: B'0000101' **Note:** The reset indicator is set to 1 if data is to be reset when RECFMS is sent.

REQTEST; LU | PU—>SSCP, Norm; FMD NS(ma)
(REQUEST TEST PROCEDURE)
REQTEST requests that the specified test procedure be executed for network name 2 and be controlled by network name 1.

0-2	X'010380' NS header *Network Name 1*
3	Type: X'F3' logical unit
4	Length: binary number of bytes in symbolic name (**Note:** X'00' = no symbolic name is present.)
5-m	Symbolic name, in EBCDIC characters, of LU controlling the test *Network Name 2*
m+1	Type: X'F1' physical unit X'F3' logical unit X'F9' link
m+2	Length: binary number of bytes in symbolic name (**Note:** (X'00' = no symbolic name is present.)
m+3-n	Symbolic name, in EBCDIC characters, of resource to be tested *Procedure Name*

Byte(s)	*Description*
n+1	Type: X'F5' test procedure name
n+2	Length: binary number of bytes in symbolic name (**Note:** X'00' = no symbolic name is present.)
n+3-p	Symbolic name, in EBCIDIC characters, of test procedure to be executed
	Requester ID
p+1	Length: binary number of bytes in requester ID (**Note:** X'00' = no requester ID is present.)
p+2-q	Requester ID, in EBCDIC characters, of the end user initiating the request. (May be used to verify end user's authority to access a particular resource.)
	Password
q+1	Length: binary number of bytes in password (**Note:** X'00' = no password is present.)
q+2-r	Password field used to verify the identity of an end user
	User Field
r+1	Length: binary number of bytes of user data (**Note:** X'00' = no user data is present.)
r+1-s	User data

RNAA; SSCP—>PPU, Norm; FMD NS(c) (REQUEST NETWORK ADDRESS ASSIGNMENT)

RNAA requests the PPU to update its path control routing table and to assign network addresses: (1) to SPUs, where the SPUs are identified in the RNAA request by a link network address and secondary link station addresses; or (2) to LUs, where the LUs are identified in the RNAA request by an SPU network address and the LU local addresses. The PPU returns the network addresses in the RNAA response.

0-2	X'410210' NS Header
3-4	Network address of target link or SPU
5	Assignment type: X'00' request is for network address assignment of PU(s) associated with target link

Byte(s)	*Description*
	X'01' request is for network address assignment of LU(s) associated with target SPU
6	Number of network addresses to be assigned
7-8	*Link Station Address or LU Local Address Entry*
7	Reserved
8	Secondary link station address associated with the SPU for which a network address is requested (if bytes 3-4 contain a link network address); or a local address of an LU for which a network address is requested (if bytes 3-4 contain an SPU network address), where the local address has either the one-byte format of FID2 or the six-bit local address format of FID3 (in this case, bits 0-1 of byte 8 are reserved)
9-n	Any additional two-byte entries in the same format as bytes 7-8

RPO; SSCP—>PPU, Norm; FMD NS(c) (REMOTE POWER OFF)

RPO causes the receiving PPU to initiate a DLC-level power-off sequence to the SPU node specified by the network address conveyed in the request. The SPU node being powered off does not need to have an active (SSCP,SPU) half-session nor be contacted.

0-2	X'010209' NS header
3-4	Network address of PU in node to be powered off (the SPU)

RQR; SLU—>PLU, SSCP—>SSCP, Exp; SC (REQUEST RECOVERY)

RQR is sent by the secondary session control to request the primary session control to initiate recovery procedures.

0	X'A3' request code

RSHUTD; SLU—>PLU, Exp; DFC (REQUEST SHUTDOWN)

RSHUTD is sent from the SLU to the PLU to indicate that the SLU is ready to have the session

Byte(s)	*Description*
	deactivated. RSHUTD *does not* request a shutdown, therefore SHUTD is not a proper reply; RSHUTD requests an UNBIND.
0	X'C2' request code

RTR; LU—>LU, Norm; DFC (READY TO RECEIVE)

RTR indicates to the bidder that it is now allowed to initiate a bracket. RTR is issued by the first speaker, and is used only when using bracket protocols.

0	X'05' request code

SBI; LU—>LU, Exp; DFC (STOP BRACKET INITIATION)

SBI is sent by either half-session to request that the receiving half-session stop initiating brackets (via BB or BID). The receiving half-session may continue to initiate brackets until BIS is sent in reply; that is, BIS need not be sent at the next entry to the between brackets (BETB) state following the receipt of SBI.

0	X'71' request code

SDT; PLU—>SLU, SSCP—>PU | SSCP, Exp; SC (START DATA TRAFFIC)

SDT is sent by the primary session control to the secondary session control to enable both the sending and receiving of FMD and DFC requests and responses by both half-sessions.

0	X'A0' request code

SESSEND; PLU—>SSCP, Norm; FMD NS(s) (SESSION ENDED)

SESSEND is sent by the PLU to notify the SSCP that the session between the specified LUs has been successfully deactivated.

0-2	X'810688' NS header
3	Reserved
4	Session key: X'06' uninterpreted name pair X'07' network address pair

Byte(s)	*Description*
5-n	*Session Key Content* •For session key X'06': uninterpreted name pair
5	Type: X'F3' logical unit
6	Length, in binary, of symbolic name of PLU
7-m	Symbolic name in EBCDIC characters
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name of SLU
m+3-n	Symbolic name in EBCDIC characters •For session key X'07': network address pair
5-6	Network address of PLU
7-8	Network address of SLU

SESSST; PLU—>SSCP, Norm; FMD NS(s) (SESSION STARTED)

SESSST is sent by the PLU to notify the SSCP that the session between the specified LUs has been successfully activated.

0-2	X'810686' NS header
3	Reserved
4	Session key: X'06' uninterpreted name pair X'07' network address pair
5-n	*Session Key Content* •For session key X'06': uninterpreted name pair
5	Type: X'F3' logical unit
6	Length, in binary, of symbolic name of PLU
7-m	Symbolic name in EBCDIC characters
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name of SLU
m+3-n	Symbolic name in EBCDIC characters •For session key X'07': network address pair
5-6	Network address of PLU
7-8	Network address of SLU

SETCV; SSCP—>PU, Norm; FMD NS(c) (SET CONTROL VECTOR)

SETCV sets a control vector that is maintained by the PU receiving the request and that is associated with the network address specified in the RU.

Byte(s)	*Description*
0-2	X'010211' NS header
3-4	Network address of resource to which control vector applies, as described in the Note below
5-n	Control vector, as described in the topic "Control Vectors and Control Lists," later in this section

Note: The following combinations are used in SETCV:

Vector Key (Byte 5)	*Resource (Bytes 3-4)*
X'01'	PU
X'02'	Link to be used for routing to
X'03'	SPU
X'04'	LU
X'05'	Link (S/370 channel)

SHUTC; SLU—>PLU, Exp; DFC (SHUTDOWN COMPLETE)

SHUTC is sent by the SLU to indicate that it is ready to end the session and has quiesced. RELQ may be sent by the PLU to remove the quiesced condition of the SLU. If SHUTC is received when SHUTD has not been sent, then the SHUTC is rejected with a negative response and sense code, Mode Inconsistency.

0 X'C1' request code

SHUTD; PLU—>SLU, Exp; DFC (SHUTDOWN)

SHUTD may be sent by the PLU to request the SLU to quiesce when the SLU is ready to end the session. If SHUTD is received by an SLU while it is in the quiesced condition, the response to SHUTD must be issued. An SLU can be quiesced due to a QEC-QC sequence and can then receive a SHUTD that causes a SHUTC to be issued.

0 X'C0' request code

SIG; LU—>LU, Exp; DFC (SIGNAL)

SIG can be sent between half-sessions, regardless of the status of the normal flows. It carries a four-byte signal code, of which the first two

Byte(s) *Description*

bytes are the Signal field and the last two bytes are the User field. The signal code values are used in higher level protocols.

0 X'C9' request code

1-4 Signal code + signal extension field (2 bytes each), set by the sending end user or NAU services manager; has meaning only to the NAU services level or above:

X'0000'+'uuuu'	no-op (no system-defined code) + user-defined field
X'0001'+'rrrr'	request to send + reserved field
X'0003'+'uuuu'	intervention required (no data loss) + user-defined field

STARTMEAS; SSCP—>LU | PU, Norm; FMD NS(me) (START MEASUREMENT)

STARTMEAS requests the PU or LU to activate the specified test type on the resource specified by the network address in the RU. If sent to an LU, the resource is the LU itself. If directed to a PU, the resource may be a link, an LU, or a PU (the DAF PU itself or an adjacent PU).

0-2 X'010401' NS header

3-4 Network address of resource to be measured: if request receiver is an LU, then the resource is the LU itself; if request receiver is a PU, then the resource is a link, LU, or PU (either the receiving PU or an adjacent PU)

5 Selected measurement type: no values yet defined

6-n Measurement parameters: none yet defined

STOPMEAS; SSCP—> LU | PU, Norm; FMD NS(me) (STOP MEASUREMENT)

STOPMEAS requests the PU or LU to terminate the specified test type for the resource specified by the network address in the RU.

0-2 X'010402' NS header

3-4 Network address of resource being measured: if request receiver is an LU, then the resource is the

Byte(s)	*Description*
	LU itself; if request receiver is a PU, then the resource is a link, LU, or PU (either the receiving PU or an adjacent PU)
5	Selected measurement type: no values yet defined

STSN; PLU—>SLU, Exp; SC (SET AND TEST SEQUENCE NUMBERS)

STSN is sent by the primary session control to resynchronize the values of the CPMGR sequence numbers, for one or both of the normal flows at both ends of the session.

0	X'A2' request code
1	bits 0-1, action code for S—>P flow (related data in bytes 2-3) bits 2-3, action code for P—>S flow (related data in bytes 4-5) **Note:** Each action code is set and processed independently. Values for either action code are: 00 ignore; this flow not affected by this STSN 01 set; CPMGR's value must be set to the value in bytes 2-3 or 4-5, as appropriate 10 sense; secondary end user (or NAU services manager) must return its sequence number for this flow in the response RU 11 set and test; CPMGR's value must be set to the value in appropriate bytes 2-3 or 4-5, and the secondary end user (or NAU services manager) must compare that value against its own and respond accordingly bits 4-7, reserved
2-3	Secondary-to-primary sequence number data to support S—>P action code
4-5	Primary-to-secondary sequence number data to support P—>S action code

Note: For action codes 01 and 11, the appropriate bytes 2-3 or 4-5 contain the value to which the CPMGR's value is set and against which the secondary end user (or NAU services manager) tests its value for the respective flow. For action codes 00 and 10, the appropriate bytes 2-3 or 4-5 are reserved.

Byte(s) *Description*

TERM-OTHER; TLU—>SSCP, Norm; FMD NS(s)
(TERMINATE-OTHER)
TERM-OTHER from the TLU requests that the SSCP assist in deactivating session(s) between the two LUs named in the RU. The requester may be a third party or one of the two named LUs.

0-2 X'810682' NS header

3 bits 0-3, 0001 Format 1 (Only value defined)
bits 4-7, reserved

4 Type:
bits 0-1, 00 the request applies to active and pending-active sessions
01 the request applies to active, pending-active, and queued sessions
10 the request applies to queued sessions only
11 reserved
bit 2, 0 forced termination—session to be deactivated immediately and unconditionally
1 orderly termination—permitting an end-of-session procedure to be executed at the PLU before the session is deactivated
bit 3, 0 not last session for LU1
1 last session for LU1
bit 4, 0 not last session for LU2
1 last session for LU2
Note: The term "last session" is relative to the TLU's knowledge of the sessions that LU1 and LU2 have active.
bits 5-6, 00 LU1 is PLU
01 LU2 is PLU
10 SSCP determines PLU/SLU
11 reserved
bit 7, 0 not cleanup
1 cleanup

5 Reason:
bits 0-2, reserved

Byte(s)	*Description*
	bit 3, 0 network user requested the termination 1 network manager requested the termination
	bit 4, reserved
	bit 5, 0 normal termination 1 abnormal termination
	bits 6-7, reserved
6	NOTIFY specifications:
	bits 0-5, reserved
	bit 6, 0 do not notify TLU when the session takedown procedure is complete 1 notify the TLU when the session takedown procedure is complete (not allowed with Type = cleanup)
	bit 7, reserved
7	Reserved
8	Session key: X'06' uninterpreted name pair X'07' network address pair
9-n	*Session Key Content* •For session key X'06': uninterpreted name pair
9	Type: X'F3' logical unit
10	Length, in binary, of symbolic name of LU1
11-m	Symbolic name in EBCDIC characters
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name of LU2
m+3-n	Symbolic name in EBCDIC characters **Note:** If the length of one of the uninterpreted names (LU1 or LU2, but not both) is *zero,* then all sessions for the named LU, as specified by the Type byte, are terminated as a result of this TERM-OTHER request. •For session key X'07': network address pair
9-10	Network address of PLU
11-12(=n)	Network address of SLU
n+1-p	*Requester ID*
n+1	Length, in binary, of requester ID (**Note:** X'00' = no requester ID is present.)
n+2-p	Requester ID: the ID, in EBCDIC characters, of the end user initiating the request
p+1-q	*Password*

Byte(s)	*Description*
p+1	Length, in binary, of password (**Note:** X'00' = no password is present.)
p+2-q	Password used to verify the identity of the end user
q+1-r	*User Request Correlation (URC) Field*
q+1	Length, in binary, of the URC (**Note:** X'00' = no URC is present.)
q+2-r	URC: end-user defined identifier; this value can be returned by the SSCP in a subsequent NOTIFY or NSPE to correlate a given session to this terminating request

TERM-OTHER-CD; SSCP(TLU)—>SSCP(OLU), Norm;
FMD NS(s) (TERMINATE-OTHER CROSS-DOMAIN)
TERM-OTHER-CD transports a TERM-OTHER request from the SSCP(TLU) where it was received, to the SSCP(OLU), which manages at least one of the (LU1,LU2) pair participating in the session(s) to be terminated.

0-2	X'818642' NS header
3	bits 0-3, 0000 Format 0 (only value defined) bits 4-7, reserved
4	Type: bits 0-1, 00 the request applies to active and pending-active sessions 01 the request applies to active, pending-active, and queued sessions 10 the request applies to queued sessions only 11 reserved bit 2, 0 forced termination—session to be deactivated immediately and unconditionally 1 orderly termination—permitting an end-of-session procedure to be executed at the PLU before the session is deactivated bit 3, 0 not last session for LU1 1 last session for LU1

Byte(s)	*Description*
	bit 4, 0 not last session for LU2 1 last session for LU2 **Note:** The term "last session" is relative to the TLU's knowledge of the sessions that LU1 and LU2 have active. bits 5-6, 00 LU1 is PLU 01 LU2 is PLU 10 SSCP determines PLU/SLU 11 reserved bit 7, 0 not cleanup 1 cleanup
5-12	*PCID*
5-6	Network address of the SSCP(TLU)
7-12	A unique 6-byte value, generated by the SSCP(TLU), which is retained and used in all cross-domain requests dealing with the same procedure until it is completed
13	Reason: bits 0-2, reserved bit 3, 0 network user requested the termination 1 network manager requested the termination bit 4, reserved bit 5, 0 normal termination 1 abnormal termination bits 6-7, reserved
14-15	Reserved
16	Session key: X'06' network name pair X'07' network address pair
17-n	*Session Key Content* •For session key X'06': network name pair
17	Type: X'F3' logical unit
18	Length, in binary, of symbolic name of LU1
19-m	Symbolic name in EBCDIC characters
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name of LU2
m+3-n	Symbolic name in EBCDIC characters **Note:** If the length of one of the network names, but not both, is zero, then all sessions specified by the Type byte are terminated as a result of this TERM-OTHER-CD request.

Byte(s)	*Description*
	• For session key X'07': network address pair
17-18	Network address of PLU
19-20(=n)	Network address of SLU
n+1-p	*Requester ID*
n+1	Length, in binary, of requester ID (**Note:** X'00' = no requester ID is present.)
n+2-p	Requester ID: the ID, in EBCDIC characters, of the end-user initiating the request
p+1-q	*Password*
p+1	Length, in binary, of password (**Note:** X'00' = no password is present.)
p+2-q	Password used to verify the identity of the end-user

TERM-SELF; TLU—>SSCP, Norm; FMD NS(s)

(TERMINATE-SELF)

TERM-SELF from the TLU requests that the SSCP assist in deactivating a session between the sender of the request (TLU=OLU) and the DLU specified in the request. If no DLU is specified, the request applies to all sessions (in specified states) involving the TLU.

0-2	X'010683' NS header
3	Type: bits 0-1, 00 the request applies to active and pending-active sessions 01 the request applies to active, pending-active, and queued sessions 10 the request applies to queued only sessions 11 reserved bit 2, 0 forced termination—session to be deactivated immediately and unconditionally 1 orderly termination—permitting an end-of-session procedure to be executed at the PLU before the session is deactivated bit 3, 0 not last session for OLU 1 last session for OLU

Byte(s)	*Description*
	bit 4, 0 do not clean up 1 clean up bits 5-6, 00 DLU is PLU 01 DLU is SLU 10 SSCP determines PLU and SLU 11 reserved bit 7, 0 indicates that the format of the RU is Format 0 and that byte 3 is the Type byte.
4-m	*Uninterpreted Name of DLU*
4	Type: X'F3' logical unit
5	Length, in binary, of symbolic name **Note:** If the length value of the DLU name is zero, then the TERM-SELF applies to all sessions, as specified in the Type byte, where the TLU is a partner.
6-m	Symbolic name, in EBCDIC characters **Note 1:** Bits 2 and 4 of the Type byte (byte 3) together provide the following combinations: • Forced-not cleanup: requires the PLU to initiate session deactivation procedures immediately and unconditionally. The PLU user is notified. • Orderly-not cleanup: permits an end-of-session procedure to be executed at the PLU before the session is deactivated. • Cleanup-Orderly: requests the SSCP to initiate cleanup procedures for the PLU, boundary function, and SLU. The request notifies the SSCP(OLU) to clean up its LU-LU session-related information and send CDTERM(Cleanup-Orderly). • Cleanup-Forced: has the same meaning as Cleanup-Orderly for the TLU (OLU) and the SSCP(OLU) except that CDTERM is not sent. **Note 2:** The following defaults are supplied by the SSCP receiving a Format 0 TERM-SELF: • Type: do not clean up • Reason: network user, normal • Notify: do not notify • Requester ID, URC, and password are not used in mapping to subsequent requests.

Byte(s) *Description*

TERM-SELF; TLU—>SSCP, Norm; FMD NS(s)
(TERMINATE SELF) (See the description with Format 0 of TERM-SELF.)

0-2 X'810683' NS header

3 bits 0-3, format:
0001 Format 1 (only value defined)
bits 4-6, reserved
bit 7, 1 indicates that byte 3, bits 0-3, contain the format value

4 Type:
bits 0-1, 00 the request applies to active and pending-active sessions
01 the request applies to active, pending-active, and queued sessions
10 the request applies to queued sessions only
11 reserved
bit 2, 0 forced termination—session to be deactivated immediately and unconditionally
1 orderly termination—permitting an end-of-session procedure to be executed at the PLU before the session is deactivated
bit 3, 0 not last session for OLU
1 last session for OLU
bit 4, reserved
bits 5-6, 00 DLU is PLU
01 DLU is SLU
10 SSCP determines PLU and SLU
11 reserved
bit 7, 0 do not clean up
1 clean up

5 Reason:
bits 0-2, reserved
bit 3, 0 network user requested the termination
1 network manager requested the termination
bit 4, reserved
bit 5, 0 normal termination
1 abnormal termination

Byte(s)	*Description*
	bits 6-7, reserved
6	NOTIFY specifications: bits 0-5, reserved bit 6, 0 do not notify TLU when the session takedown procedure is complete 1 notify the TLU when the session takedown procedure is complete (not allowed with Type = Cleanup) bit 7, reserved
7	Reserved
8	Session key: X'01' uninterpreted name X'07' network address pair
9-n	*Session Key Content*
9	Type: X'F3' logical unit
10	Length, in binary, of symbolic name
11-n	Symbolic name in EBCDIC characters **Note:** If the length value is zero then the TERM-SELF applies to all sessions specified in the Type byte where the TLU is a partner. •For session key X'07': network address pair
9-10	Network address of PLU
11-12(=n)	Network address of SLU
n+1-p	*Requester ID*
n+1	Length, in binary, of requester ID (**Note:** X'00' = no requester ID is present.)
n+2-p	Requester ID: the ID, in EBCDIC characters, of the end user initiating the request
p+1-q	*Password*
p+1	Length, in binary, of password (**Note:** X'00' = no password is present.)
p+2-q	Password used to verify the identity of the end user
q+1-r	*User Request Correlation (URC) Field*
q+1	Length, in binary, of URC field (**Note:** X'00' = no URC is present.)
q+2-r	URC: end-user defined identifier; this value can be returned by the SSCP in a subsequent NOTIFY or NSPE to correlate a given session to this terminating request

Byte(s) *Description*

UNBIND; PLU—>SLU, Exp; SC (UNBIND SESSION)
UNBIND is sent from the PLU to the SLU to deactivate an active session between the two. UNBIND must always be performed when received by FI.SC; the positive response to UNBIND is accompanied by the resetting of the (PLU,SLU).(PRI | SEC).SESS.SUBTREEs and all session profile information.

0 X'32' request code

1 Type UNBIND:
X'01' normal end of session
X'02' BIND forthcoming; retain the node resources allocated to this session, if possible
X'03' talk: the session will be resumed by the sender of UNBIND after alternate use of the physical connection
X'04' restart mismatch: synch point records do not match; operator intervention is needed before the session can be established
X'05' LU not authorized: the secondary half-session has failed to supply an acceptable password or other authorization information in the User Data field
X'06' invalid session parameters: the BIND negotiation has failed due to an inability of the primary half-session to support parameters specified by the secondary

UNBINDF; PLU—>SSCP, Norm; FMD NS(s) (UNBIND FAILURE)
UNBINDF is sent by the PLU to notify the SSCP that the attempt to deactivate the session between the specified LUs has failed (for example, because of a path failure).

0-2 X'810687' NS header

Byte(s)	*Description*
3-6	Sense Data: 0801, 0803, 0804, 080A, 080E, 080F, 0810, and path, RH, and state error sense codes. (See the description of sense codes in the next section.)
7	Reason: bit 0, reserved bit 1, 1 UNBIND error in reaching SLU bit 2, 1 takedown reject at PLU bits 3-7, reserved
8	Session key: X'06' uninterpreted name pair X'07' network address pair
9-n	*Session Key Content* •For session key X'06': uninterpreted name pair
9	Type: X'F3' logical unit
10	Length, in binary, of symbolic name of PLU
11-m	Symbolic name in EBCDIC characters
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name of SLU
m+3-n	Symbolic name, in EBCDIC characters •For session key X'07': network address pair
9-10	Network address of PLU
11-12	Network address of SLU

Summary of Response RUs

Apart from the exceptions cited below, response RUs return the number of bytes specified in the following table; only enough of the request RU is returned to include the field-formatted request code.

RU Category of Response	*Number of Bytes in RU*
NC	1
SC	1
DFC	1
FMD NS (FI=1) (field-formatted)	3
FMD NS (FI=0) (character-coded)	0
FMD (LU,LU)	0

Twelve positive response RUs—RSP(ACTCDRM), RSP(ACTLU), RSP(ACTPU), RSP(BIND), RSP(CDINIT), RSP(CDTERM), RSP(DUMPINIT), RSP(DSRLST), RSP(DUMPTEXT), RSP(INIT-OTHER-CD), RSP(RNAA), and RSP(STSN)—return additional data. See "Positive Response RUs with Extended Formats."

All negative responses return four bytes of sense data in the RU, followed by the number of bytes specified in the table above; hence, negative response RU length is four greater than the number of bytes shown in the table. See the section, "Sense Codes," for sense data values and their corresponding meanings.

Positive Response RUs with Extended Formats

Byte(s)	*Description*
RSP(ACTCDRM); SSCP—>SSCP, Exp; SC	
0	X'14' request code
1	bits 0-3, format: X'0' (only value defined) bits 4-7, type activation performed: X'1' cold (only value defined)
2	FM profile
3	TS profile
4-11	Contents ID: eight-character EBCDIC symbolic name that represents implementation and installation dependent information about the SSCP issuing the response to ACTCDRM; eight blanks is the value used if no information is to be conveyed. (This field could be used to provide a check for a functional and configurational match between the SSCPs.)
12-17	SSCP ID: a six-byte field that includes the ID of the SSCP issuing the ACTCDRM response; the first four bits specify the format for the remaining bits: bits 0-3, 0000 bits 4-7, physical unit type of the node containing the SSCP

Byte(s)	*Description*
	bits 8-47, implementation- and installation-dependent binary identification
18	*TS Usage* bits 0-1, reserved bits 2-7, secondary CPMGR receive pacing count: *zero* means no pacing of requests flowing to the secondary
19-n	Control vector, as described in the topic "Control Vectors and Control Lists," later in this section **Note:** The following vector key is used in RSP(ACTCDRM): X'06'.

RSP(ACTLU); LU—>SSCP, Exp; SC

0	X'0D' request code
1	Type activation selected: X'01' cold X'02' ERP
2	bits 0-3, FM profile: same as the corresponding request bits 4-7, TS profile: same as the corresponding request
3	Reserved
4	Maximum RU size sent on the normal flow by either half-session: if bit 0 is set to *zero,* then no maximum is specified and the remaining bits 1-7 are ignored; if bit 0 is set to *one,* then the byte is interpreted as X'ab' = a•2**b. (Notice that, by definition, a≥8 and therefore X'ab' is a normalized floating point representation.) See a later topic in this section titled "RU Sizes Corresponding to Values X'ab' in BIND" for a chart listing all the possible RU sizes that result from this computation.
5-6	*LU Capabilities*
5	bit 0, character-coded capability: 0 the SSCP may not send unsolicited character-coded requests; a *solicited* request is a reply request or a request that carries additional error information

Byte(s)	*Description*
	to supplement a previously sent negative response 1 the SSCP may send unsolicited character-coded requests bit 1, field-formatted capability: 0 the SSCP may not send unsolicited field-formatted requests 1 the SSCP may send unsolicited field-formatted requests bit 2, LU readiness: 0 BIND can be received 1 BIND and other requests cannot yet be processed; LUSTAT will be sent to signal LU readiness
5-6	bits 3-15, reserved
7	Reserved **Note:** A two-byte response can be sent; it means maximum RU size = 256 bytes and bytes 5-7 = X'000000'.

RSP(ACTPU); PU—>SSCP, Exp; SC

0	X'11' request code
1	bits 0-1, reserved bits 2-3, format of response: 00 format 0 01 format 1 (defined only for PU.T1s and PU.T2s) bits 4-7, type activation selected: X'1' cold X'2' ERP
2-9	Contents ID: eight-character EBCDIC symbolic name of the load module currently operating in the node; eight blanks is the default value (**Note:** End of Format 0; Format 1 continues below.)
10-11	Reserved
12-20	Control vector as described in the topic "Control Vectors and Control Lists," later in this section **Note:** The following vector key is used in RSP(ACTPU): X'07'.

Byte(s)	*Description*
RSP(BIND); SLU—>PLU, Exp; SC	
0	X'31' request code The following bytes are returned for the extended nonnegotiable BIND response or for the negotiable BIND response. (The request code alone is sent if a nonnegotiable BIND request specifies no session-level crypto.)
1	bits 0-3, format 0000 (only value defined) bits 4-7, type (same value returned as received in the request): 0000 negotiable (cold) 0001 nonnegotiable (cold)
2-25	Bytes as received on BIND request, for nonnegotiable response; or bytes having the same format, but possibly with values changed from those received on the BIND request, for negotiable response
26-k	*Cryptographic Options*
26	bits 0-1, private or end-user crypto options: same value returned as received in the request, if present—see Note 3 bits 2-3, session-level crypto options: same value returned as received in the request, if present—see Note 3 bits 4-7, session-level and/or end user crypto options field length: same value returned as received in the request, if present—see Note 3. (Bytes 27-k are omitted if this length field is omitted or set to *zero*.)
27	bits 0-1, session crypto key encipherment mode: same value returned as received in the request, if present—see Note 3 bits 2-4, reserved bits 5-7, crypto cipher method: same value returned as received in the request, if present—see Note 3

Byte(s)	*Description*
28-k	An eight-byte implementation-chosen, nonzero, pseudo random crypto session-seed value enciphered under the session crypto key, if session-level crypto is specified; otherwise, same value as in BIND, if present—see Note 3
k+1	Length of primary LU name (**Note:** X'00' = no primary LU name is present.)
k+2-m	Primary LU name
m+1	Length of user data (**Note:** X'00' = no user data is present.)
m+2-n	User data
n+1	Length of URC field (**Note:** X'00' = no URC field is present.)
n+2-p	URC field
p+1	Length of secondary LU name (**Note:** X'00' = no secondary LU name present.)
p+2-r	Secondary LU name

Notes:

1. The extended format is required for the negotiable BIND response or if session-level crypto is specified in the BIND request; otherwise, only the short form (request code) is used.
2. On a response, if the last byte of a response is a length field and that field is *zero,* that byte may be dropped from the response. This applies also to byte 26 (where the count occupies only bits 4-7) if bits 0-3 are also *zero*—the entire byte may be dropped if no bytes follow.
3. The Crypto Options field is returned on the response for a nonnegotiable BIND only when session-level crypto was specified, or for a negotiable BIND.

RSP(CDINIT); SSCP—>SSCP, Norm; FMD NS(s)

0-2	X'818641' NS header
3	Format: bits 0-3, 0000 Format 0: used when Type is I, I/Q, or Q 0001 Format 1: used when Type is DQ bits 4-7, reserved

Byte(s)	*Description*
4	Procedure status: bits 0-3, reserved bits 4-7, status at SSCP receiving CDINIT: 0000 reserved 0001 initiate successful—proceed 0010 initiate successful—queued 0011 dequeued—successful 0100 dequeued—unsuccessful
5-6	Network address of DLU for CDINIT; for CDINIT(DQ), it is the network address of the LU associated with the SSCP receiving the CDINIT(DQ) request
7	LU status for LU associated with the SSCP receiving the CDINIT request: bit 0, reserved bit 1, 0 LU is unavailable 1 LU is available bits 2-3, (reserved if LU is available) 00 LU session count exceeded 01 reserved 10 LU is not enabled (not accepting new sessions) 11 reserved bit 4, 0 existing SSCP to LU path 1 no existing SSCP to LU path bit 5, reserved bits 6-7, 00 reserved 01 LU is PLU 10 LU is SLU 11 reserved

RSP(CDTERM); SSCP(DLU)—>SSCP(OLU), Norm; NS(s)

0-2	X'818643' NS header
3	bits 0-3, 0000 Format 0 (only value defined) bits 4-7, reserved

Byte(s)	*Description*
4	DLU status: bits 0-5, reserved bits 6-7, 00 not applicable (queue purge) 01 DLU is PLU 10 DLU is SLU 11 reserved
5-6	Network address of DLU

RSP(DSRLST); SSCP—>SSCP, Norm; NS(s)

0-2	X'818627' NS header
3-n	Control list entry data for list type: X'01' (only value defined) See the topic "Control Vectors and Control Lists" later in this section for the format of the control list.

RSP(DUMPINIT); PU—>SSCP, Norm; FMD NS(c)

0-2	X'010206' NS header
3-n	Dump data

RSP(DUMPTEXT); PPU—>SSCP, Norm; FMD NS(c)

0-2	X'010207' NS header
3-n	Dump data

RSP(INIT-OTHER-CD); SSCP—>SSCP, Norm; FMD NS(s)

0-2	X'818640' NS header
3	Format: bits 0-3, 0000 Format 0 (only value defined) bits 4-7, reserved
4	Procedure status: bits 0-3, status for SSCP(LU1) 0000 reserved 0001 initiate successful—proceed 0010 initiate successful—queued 0011 dequeued—successful 0100 dequeued—unsuccessful

Byte(s)	*Description*
	bits 4-7, status for SSCP(LU2) 0000 reserved 0001 initiate successful—proceed 0010 initiate successful—queued 0011 dequeued—successful 0100 dequeued—unsuccessful
5	LU1 status: bit 0, reserved bit 1, 0 LU1 is unavailable 1 LU1 is available bits 2-3, (reserved if LU1 is available) 00 LU1 session count exceeded 01 reserved 10 LU1 is not enabled (not accepting new sessions) 11 reserved bit 4, 0 existing SSCP to LU path 1 no existing SSCP to LU path bit 5, reserved bits 6-7, 00 reserved 01 LU1 is PLU 10 LU1 is SLU 11 reserved
6	LU2 status: bit 0, reserved bit 1, 0 LU2 is unavailable 1 LU2 is available bits 2-3, (reserved if LU2 is available) 00 LU2 session count exceeded 01 reserved 10 LU2 is not enabled (not accepting new sessions) 11 reserved bit 4, 0 existing SSCP to LU path 1 no existing SSCP to LU path bit 5, reserved bits 6-7, 00 reserved 01 LU2 is PLU 10 LU2 is SLU 11 reserved

Byte(s)	*Description*
RSP(RNAA); PPU—>SSCP, Norm; FMD NS(c)	
0-2	X'410210' NS header
3-5	Set to same value as bytes 3-5 in RNAA request:
3-4	Network address of target link or SPU
5	Assignment type
6	Number of network addresses returned
7-8	Network address: SPU address assigned (if bytes 3-4 of the RNAA request contained a link network address), or an LU network address assigned (if bytes 3-4 of the RNAA request contained an SPU network address)
9-n	Additional network addresses assigned (two-byte multiples) in the same format as bytes 7-8; the order of the network addresses returned corresponds to the order of the entries (bytes 7-n) in the RNAA request

RSP(STSN); SLU—>PLU, Exp; SC	
0	X'A2' request code
1	bits 0-1, result code for S—>P action code in the request (related data in bytes 2-3) bits 2-3, result code for P—>S action code in the request (related data in bytes 4-5)

Note 1: Values for either result code are:

- For set or ignore action code:
  01 ignore (other values reserved); appropriate bytes 2-3 or 4-5 reserved
- For sense action code:
  00 for LU type 0: user-defined meaning; for all other LU types: reserved (appropriate bytes 2-3 or 4-5 reserved)

Byte(s)	*Description*
	01 reserved 10 secondary end user (or NAU services manager) does not maintain user sequence numbers or cannot return a valid user sequence number (appropriate bytes 2-3 or 4-5 reserved) 11 user sequence number, as known at the secondary, in bytes 2-3 or 4-5, as appropriate • For set and test action code: 00 for LU type 0: user-defined meaning; for all other LU types: reserved (appropriate bytes 2-3 or 4-5 reserved) 01 value received in STSN request equals the user sequence number value as known at the secondary (appropriate bytes 2-3 or 4-5 return the secondary's value for the user sequence number) 10 secondary end user (or NAU services manager) does not maintain user sequence numbers or cannot perform the requested test on the user sequence number (appropriate bytes 2-3 or 4-5 reserved) 11 value received in STSN request does not equal the user sequence number value as known at the secondary (appropriate bytes 2-3 or 4-5 return the secondary's value for the user sequence number) bits 4-7, reserved
2-3	Secondary-to-primary normal-flow sequence number data to support S—>P result code, or reserved (see Note 1 above)
4-5	Primary-to-secondary normal-flow sequence number data to support P—>S result code or reserved (see Note 1 above)

Note 2: Where the STSN request specified as action codes two "sets," two "ignores," or a combination of "set" and "ignore," the positive response RU consists of one byte—X'A2' (the STSN request code).

Control Vectors and Control Lists

The following table shows, by key value, the requests and responses that carry the specific control vector:

Control Vector Key	*Requests or Responses Carrying the Vector*
X'01'	SETCV,ISETCV
X'02'	SETCV,ISETCV
X'03'	SETCV,ISETCV
X'04'	SETCV,ISETCV
X'05'	SETCV,ISETCV
X'06'	ACTCDRM,RSP(ACTCDRM)
X'07'	RSP(ACTPU)

The following table shows, by list type, the requests and responses that carry the specific control list:

Control List Type	*Requests or Responses Carrying the List*
X'01'	+RSP(DSRLST)

The *control vectors* are defined as follows (with zero-origin indexing of the vector bytes—see the individual RU description for the actual displacement within the RU):

Byte(s)	*Description*
Date-Time Control Vector	
0	Key: X'01'
1-12	Date, in EBCDIC: MM/DD/YY.ddd (MM = month; DD = day of month; YY = year; ddd = Nth day of year, 1-366)
13-20	Time, in EBCDIC: HH.MM.SS (HH = hours; MM = minutes; SS = seconds)
Subarea Routing Control Vector	
0	Key: X'02'
1	Subarea address (left-justified)

Byte(s)	*Description*
SDLC Secondary Station Control Vector	
0	Key: X'03'
1	Reserved
2	PU type identifier for SPU: bits 0-4, reserved bits 5-6, 01 PU.T2 10 PU.T1 bit 7, reserved
3	Type modifier: bit 0, if byte 2 identifies PU.T1: 0 ¬ TS Profile 2 1 TS Profile 2 if byte 2 identifies ¬ PU.T1: reserved bit 1, 0 discontinue link-level contact with adjacent PU.T1 | 2 node if PU.T4 initiates auto network shutdown procedure for SSCP controlling that PU.T1 | 2 node 1 continue link-level contact with adjacent PU.T1 | 2 node if PU.T4 initiates auto network shutdown procedure for SSCP controlling that PU.T1 | 2 node bits 2-7, reserved
4	SDLC BTU send limit
5	Maximum consecutive BTUs sent from the primary station to the specified secondary station without another secondary station on the link being polled or being sent BTUs
6	Error retry indicator
7-8	Link error recovery control information
9-10	Number of bytes in maximum segment length
LU Control Vector	
0	Key: X'04'
1	Local address form of LU network address
2	Secondary CPMGR's receive pacing count
3	Reserved, set to a value of 1

Byte(s)	*Description*
4	Scheduling priority to be used for the BF.TCs supporting secondary half-sessions involving the specified LU: X'01' low priority (batch) X'02' high priority (interactive)

Channel Control Vector

0	Key: X'05'
1-2	Channel delay: minimum interval between successive inbound transmissions (binary, in tenths of a second)

CDRM Control Vector

0	Key: X'06'
1	Length, in binary, of Description field (**Note:** X'00' = no Description field is present.)
2-n	*Description Field*
2	CDRM profile: X'00' (only value defined)
3	bit 0, 0 name pair session key (X'06') supported 1 name pair session key not supported bit 1, 0 address pair session key (X'07') not supported 1 address pair session key supported bit 2, reserved bit 3, 0 URC, cross-domain, not supported (that is, not included in CDCINIT BIND image) 1 URC, cross-domain, supported bits 4-7, reserved
4-n	Reserved

NS RU Usage Control Vector

0	Key: X'07'
1	Maintenance services profile: X'00' Profile 0: no maintenance services RUs are supported by the PU on the SSCP-to-PU flow X'01' Profile 1: the following maintenance services RU is supported by the PU on the SSCP-to-PU flow: REQMS

Byte(s)	*Description*
2-7	Reserved

The *control lists* are defined, by type, as follows (with zero-origin indexing of the list bytes; see the individual RU description for the actual displacement within the RU):

Type X'01': LU Status Control List Entry

0 LU status
- bit 0, reserved
- bit 1, 0 LU is unavailable
  - 1 LU is available
- bits 2-3, (if LU is unavailable)
  - 00 LU session count exceeded
  - 01 LU is being taken down (not accepting new sessions)
  - 10 LU is not enabled (not accepting new sessions)
  - 11 reserved
- bit 4, 0 existing SSCP to LU path
  - 1 no existing SSCP to LU path
- bits 5-7 reserved

1 LU information:
- bit 0, 0 LU does not reside in a PU.T5 node
  - 1 LU resides in a PU.T5 node
- bits 1-6, reserved
- bit 7, 0 LU is accepting INITIATEs/logons
  - 1 LU is temporarily not accepting INITIATEs/logons

2-3 Session count (range: 0-65535)

	Mantissa (a)							
Exponent (b)	8	9	A (10)	B (11)	C (12)	D (13)	E (14)	F (15)
0	8	9	10	11	12	13	14	15
1	16	18	20	22	24	26	28	30
2	32	36	40	44	48	52	56	60
3	64	72	80	88	96	104	112	120
4	128	144	160	176	192	208	224	240
5	256	288	320	352	384	416	448	480
6	512	576	640	704	768	832	896	960
7	1024	1152	1280	1408	1536	1664	1792	1920
8	2048	2304	2560	2816	3072	3328	3584	3840
9	4096	4608	5120	5632	6144	6656	7168	7680
A (10)	8192	9216	10240	11264	12288	13312	14336	15360
B (11)	16384	18432	20480	22528	24576	26624	28672	30720
C (12)	32768	36864	40960	45056	49152	53248	57344	61440
D (13)	65536	73728	81920	90112	98304	106496	114688	122880
E (14)	131072	147456	163840	180224	196608	212992	229376	245760
F (15)	262144	294912	327680	360448	393216	425984	458752	491520

Note: A value of X'ab' in byte 10 or byte 11 of BIND represents a • 2**b. For example, X'C5' represents (in deci 12 • 2**5=

Index of RUs by NS Headers and Request Codes

NS Headers (third byte is the request code)

X'010201' CONTACT
X'010202' DISCONTACT
X'010203' IPLINIT
X'010204' IPLTEXT
X'010205' IPLFINAL
X'010206' DUMPINIT
X'010207' DUMPTEXT
X'010208' DUMPFINAL
X'010209' RPO
X'01020A' ACTLINK
X'01020B' DACTLINK
X'01020C' CESLOW
X'01020D' CEXSLOW
X'01020E' CONNOUT
X'01020F' ABCONN
X'010211' SETCV
X'010214' ESLOW
X'010215' EXSLOW
X'010216' ACTCONNIN
X'010217' DACTCONNIN
X'010218' ABCONNOUT
X'010219' ANA
X'01021A' FNA
X'01021B' REQDISCONT
X'010280' CONTACTED
X'010281' INOP
X'010284' REQCONT
X'010301' EXECTEST
X'010302' ACTTRACE
X'010303' DACTTRACE
X'010331' DISPSTOR
X'010334' RECSTOR
X'010380' REQTEST
X'010381' RECMS
X'010382' RECTD
X'010383' RECTRD

X'010401'	STARTMEAS
X'010402'	STOPMEAS
X'010480'	RECMD
X'010604'	NSPE
X'010681'	INIT-SELF (Format 0)
X'010683'	TERM-SELF (Format 0)
X'410210'	RNAA
X'410222'	ISETCV
X'410285'	NSLSA
X'410304'	REQMS
X'410384'	RECFMS
X'810601'	CINIT
X'810602'	CTERM
X'810620'	NOTIFY (SSCP—>LU)
X'810629'	CLEANUP
X'810680'	INIT-OTHER
X'810681'	INIT-SELF (Format 1)
X'810682'	TERM-OTHER
X'810683'	TERM-SELF (Format 1)
X'810685'	BINDF
X'810686'	SESSST
X'810687'	UNBINDF
X'810688'	SESSEND
X'818620'	NOTIFY (SSCP—>SSCP)
X'818627'	DSRLST
X'818640'	INIT-OTHER-CD
X'818641'	CDINIT
X'818642'	TERM-OTHER-CD
X'818643'	CDTERM
X'818645'	CDSESSSF
X'818646'	CDSESSST
X'818647'	CDSESSTF
X'818648'	CDSESSEND
X'818649'	CDTAKED
X'81864A'	CDTAKEDC
X'81864B'	CDCINIT

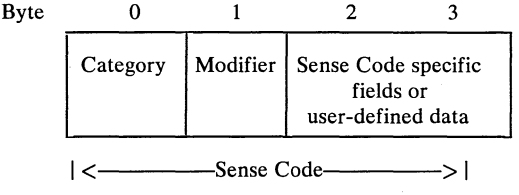
DFC, NC, and SC Request Codes

X'04'	LUSTAT
X'05'	RTR (DFC)
X'05'	LSA (NC)

X'07'	ANSC
X'0D'	ACTLU
X'0E'	DACTLU
X'11'	ACTPU
X'12'	DACTPU
X'14'	ACTCDRM
X'15'	DACTCDRM
X'31'	BIND
X'32'	UNBIND
X'70'	BIS
X'71'	SBI
X'80'	QEC
X'81'	QC
X'82'	RELQ
X'83'	CANCEL
X'84'	CHASE
X'A0'	SDT
X'A1'	CLEAR
X'A2'	STSN
X'A3'	RQR
X'C0'	CRV (SC)
X'C0'	SHUTD (DFC)
X'C1'	SHUTC
X'C2'	RSHUTD
X'C8'	BID
X'C9'	SIG

Sense Codes

The sense data included with an EXR or a negative response is a four-byte field that generally includes a one-byte category value, a one-byte modifier value, and two bytes of implementation- or end-user-defined data (hereafter referred to as user-defined data). For certain sense codes, a user-defined data cannot be included in the sense data; in its place is sense-code-specific information,, whose format is defined along with sense code definition, below.



Together, the category and modifier bytes hold the sense code (SNC) defined for the exception condition that has occurred.

The following categories are defined; all others are reserved:

Value	*Category*
X'80'	Path Error
X'40'	RH Usage Error
X'20'	State Error
X'10'	Request Error
X'08'	Request Reject
X'00'	User Sense Data Only

The category User Sense Data Only (X'00') allows the end users to exchange sense data in bytes 2-3 for conditions not defined by SNA within the other categories (and perhaps unique to the end users involved). The modifier value is also X'00'.

The sense codes for the other categories are discussed below. For these categories, a modifier value of X'00' can be used (as an implementation option) when no definition of the exception condition beyond the major category is to be identified.

Path Error (Category Code = X'80')

This category indicates that the request could not be delivered to the intended receiver, due to a path outage or an invalid sequence of activation requests or one of the listed transmission header errors. (Some TH errors, that is, SQN errors, are category X'20'.)

Modifier (in hexadecimal):

01 Intermediate Node Failure: Machine or program check in an intermediate PC (for example, PC.T4 of a PU.T4 node); request discarded. A response may or may not be possible.

02 Link Failure: Data link failure.

04 Unrecognized DAF: An intermediate or boundary PC has no routing information for the DAF, or an end node PC has no LU with indicated DAF(FID1), DAF'(FID2), or local address (FID3).

05 No Session: No half-session is active in the receiving end node for the indicated OAF-DAF pair, or no BF.SESS.RCV is active for the OAF-DAF pair in a node providing the boundary function. This exception does not apply to BIND, ACTCDRM, ACTPU, or ACTLU. (Note 1)

06 FID: Invalid FID for the receiving node. (Note 2)

07 Segmenting Error: First BIU segment had less than 10 bytes; or mapping field sequencing error, such as first, last, middle; or segmenting not supported and MPF not set to 11. (Note 3)

08 PU Not Active: The PU in the receiving node has not been activated and the request was not ACTPU for this half-session, or the request was ACTLU from an SSCP that does not have an active (SSCP,PU) session with the PU associated with the addressed LU. (Note 1)

09 LU Not Active: A DAF addresses an LU that has not been activated and the request was not ACTLU. (Note 1)

0A Too Long PIU: Transmission was truncated by the receiving link station because sufficient buffering was not available.

0B Incomplete TH: Transmission received was shorter than a TH. (Note 2)

0C DCF: Data Count Field inconsistent with transmission length.

0D Lost Contact: Contact with the link station for which the transmission was intended has been lost, but the link has not failed. If the difference between link failure and loss of contact is not detectable, link failure (X'8002') is sent.

0E Unrecognized OAF: The OAF (FID1) was not recognized.

0F Invalid Address Combination: The (DAF',OAF') (FID2) combination or the LSID (FID3) specified an invalid type of session, for example, a (PU,LU) combination.

10 Segmented RU Length Error: An RU was found to be too long during the segment reassembly process.

Notes:

1. This error is listed as a path error since the request cannot be delivered to the intended TC element.

2. It is generally not possible to send a response for this exception condition, since information (FID, addresses) required to generate a response is not available. It is logged as an error if this capability exists in the receiver.

3. If segmenting is not supported, a negative response is returned for the first segment only, since this contains the RH. Subsequent segments are discarded.

RH Usage Error (Category Code = X'40')

This category indicates that the value of a field or combination of fields in the RH violates architectural rules or previously selected BIND options. These errors prevent delivery of the request to the intended half-session protocol machine and are independent of the current states of the session. They may result from the failure of the sender to enforce session rules. Detection by the receiver of each of these errors is optional.

Modifier (in hexadecimal):

01 Invalid SC or NC RH: The RH of a SC or NC request was invalid. For example, an SC RH with pacing request indicator set to *one* is invalid.

03 BB Not Allowed: Begin Bracket (BB) was indicated with ¬BC.

04 EB Not Allowed: End Bracket (EB) was indicated with ¬BC, or by the primary when only the secondary may send EB, or by the secondary when only the primary may send EB.

05 Incomplete RH: Transmission shorter than full TH-RH.

06 Exception Response Not Allowed: Exception response was requested when not permitted.

07 Definite Response Not Allowed: Definite response was requested when not permitted.

08 Pacing Not Supported: The Pacing indicator was set on a request, but the receiving CPMGR does not support pacing for this session.

09 CD Not Allowed: Change Direction (CD) was indicated with ¬EC.

0A No-Response Not Allowed: No-response was specified on a request when not permitted. (Used only on EXR.)

0B Chaining Not Supported: Chaining bits indicated other than (BC, EC), but multiple-request chains are not supported for the session or for the category specified in the request header.

0C Brackets Not Supported: A bracket indicator was set, but brackets are not used for the session.

0D CD Not Supported: The Change-Direction indicator was set, but is not supported.

0F Format Indicator Not Allowed: The Format Indicator bit was set when not supported for the session, or when Begin-Chain (BC) was not set.

10 Alternate Code Not Supported: The Code Selection Indicator was set when not supported for the session.

State Error (Category Code = X'20')

This category indicates a sequence number error, or an RH or RU which is not allowed for the receiver's current session control or data flow control state. These errors prevent delivery of the request to the intended half-session protocol machine.

Modifier (in hexadecimal):

01 Sequence Number: Sequence number received on normal flow request was not one greater than the last.

02 Chaining: Error in the sequence of the chain indicator settings, such as first, middle, first.

03 Bracket: Error resulting from failure of sender to enforce bracket rules for session. (This error does not apply to contention or race conditions.)

04 Direction: Error resulting from a normal-flow request received while HDX-FF FSM state was (*S,¬R). (Contrast this sense code with X'081B', which signals a race condition.)

05 Data Traffic Reset: An FMD or normal-flow DFC request received by a half-session whose SESS.(SEND | RCV) was active, but whose data traffic (DT) FSM was not in the ACTIVE state.

06 Data Traffic Quiesced: An FMD or DFC request received from a half-session which has sent QUIESCE COMPLETE or SHUTDOWN COMPLETE and has not responded to RELEASE QUIESCE.

07 Data Traffic Not Reset: A session control request (for example, STSN), allowed only while the DT FSM is in the RESET state, was received while the DT FSM state was not RESET.

08 No Begin-Bracket: A BID or an FMD request specifying BB was received while SBI.SEND was in the NOBB state.

09 Session Control or Data Flow Control Protocol Violation: An SC or DFC protocol has been violated; a request, allowed only after a successful exchange of an SC or DFC request and its associated positive response, has been received before such successful exchange has occurred (for example, an FMD request has preceded a required CRV). The request code of the particular SC or DFC request or response required, or X'00' if undetermined, appears in the fourth byte of the sense data. The first bit of

the third byte indicates that the required request or response belongs to the DFC category if set to *one,* or to the SC categroy if set to *zero.* There is no user data *associated* with this sense code.

Request Error (Category Code = X'10')

This category indicates that the RU was delivered to the intended half-session, but could not be interpreted or processed. This condition represents a mismatch in half-session capabilities.

Modifier (in hexadecimal):

01 RU Data Error: Data in the request RU is not acceptable to the receiving FI.FMD; for example, a character code not in the set supported, or a formatted data field not acceptable to presentation services.

02 RU Length Error: The request RU was too long or too short.

03 Function Not Supported: The function requested is not supported. The function may have been specified by a formatted request code, a field in an RU, or a control character. (**Note:** This code can also be used instead of sense code X'0826').

05 Parameter Error: A parameter modifying a control function is invalid, or outside the range allowed by the receiver.

07 Category Not Supported: DFC, SC, NC, or FMD request received by a half-session not supporting any requests in that category; or an NS request with byte 0 not set to a defined value, or byte 1 not set to an NS category supported by the receiver.

08 Invalid FM Header: The FM header was not understood or translatable by the receiver, or an FM header was expected but not present. There is no user data associated with this sense code.

Request Reject (Category Code = X'08')

This category indicates that the request was delivered to intended half-session protocol machine and was understood and supported, but not executed.

Modifier (in hexadecimal):

01 Resource Not Available: The LU, PU, or link specified in an RU is not available.

02 Intervention Required: Forms or cards are required at an output device, or device is temporarily in local mode, or other conditions requiring intervention.

03 Missing Password: The required password was not supplied.

04 Invalid Password: Password was not valid.

05 Session Limit Exceeded: The requested session cannot be activated, as one of the NAUs is at its session limit. Applies to ACTCDRM, INIT, BIND, and CINIT commands.

06 Resource Unknown: The request contained a name or address not identifying a PU, LU, or link known to the receiver.

07 Resource Not Available—LUSTAT Forthcoming: A subsidiary device will be unavailable for an indeterminate period of time. LUSTAT will be sent when the device becomes available.

08 Invalid Contents ID: The contents ID contained on the ACTCDRM request was found to be invalid.

09 Mode Inconsistency: The requested function cannot be performed in the present state of the receiver.

0A Permission Rejected: The receiver has denied an implicit or explicit request of the sender; when sent in response to BIND, it implies that the secondary

half-session's LU will not notify the SSCP when a BIND can be accepted. (See the X'0845' sense code for a contrasting response.)

0B Bracket Race Error: Loss of contention within the bracket protocol. Arises when bracket initiation/termination by both NAUs is allowed.

0C Procedure Not Supported: A named procedure (Test, Measurement, Trace) specified in an RU is not supported by the receiver.

0D NAU Contention: A request to activate a session was received while the receiving half-session was awaiting a response to a previously sent activation request for the same session (for example, ACTCDRM was received when the (SSCP1,SSCP2).PRI.SESS.RCV-SEND FSM state was PEND.ACT.PRI) and the SSCPID in the received ACTCDRM was less than or equal to the SSCPID in the ACTCDRM previously sent.

0E NAU Not Authorized: The requesting NAU does not have access to the requested resource.

0F End User Not Authorized: The requesting end user does not have access to the requested resource.

10 Missing Requester ID: The required requester ID was missing.

11 Break: Asks the receiver of this sense code to terminate the present chain with CANCEL or with an FMD request carrying EC. The CHAIN.RCV FSM of the half-session sending the Break sense code enters PURGE state when Break is sent.

12 Insufficient Resource: Receiver cannot act on request because of a temporary lack of resources.

13 Bracket Bid Reject—No RTR Forthcoming: BID (or BB) was received while the BSM.FSP FSM state was

INB, or while the state was BETB and the first speaker denied permission. RTR will not be sent.

14 Bracket Bid Reject—RTR Forthcoming: BID (or BB) was received while the BSM.FSP FSM state was INB, or while the state was BETB and the first speaker denied permission. RTR will be sent.

15 Function Active: A request to activate a network element or procedure was received, but the element or procedure was already active.

16 Function Inactive: A request to deactivate a network element or procedure was received, but the element or procedure was not active.

17 Link Inactive: A request requires the use of a link, but the link is not active.

18 Link Procedure in Process: CONTACT, DISCONTACT, IPL or other link procedure in progress when a conflicting request was received.

19 RTR Not Required: Receiver of READY TO RECEIVE has nothing to send.

1A Request Sequence Error: Invalid sequence of requests.

1B Receiver in Transmit Mode: A race condition; normal-flow request received while the HDX-CONT FSM state was (*S,¬R) or the RES FSM state was UNAVL. (Contrast this sense code with X'2004', which signals a protocol violation.)

1C Request Not Executable: The requested function cannot be executed, due to a permanent error condition in the receiver.

1D Invalid Station/SSCP ID: The Station ID or SSCP ID in the request was found to be invalid.

1E Session Reference Error: The request contained reference to a half-session that was neither active nor in the process of being activated (generally applies to network services commands).

20 Control Vector Error: Invalid data for the control vector specified by the target network address and key.

21 Invalid Session Parameters: Session parameters were not valid or not supported by the half-session whose activation was requested.

22 Link Procedure Failure: A link-level procedure has failed due to link equipment failure, loss of contact with a link station, or an invalid response to a link command. (This is not a path error, since the request being rejected was delivered to its destination.)

23 Unknown Control Vector: The control vector specified by a network address and key is not known to the receiver.

24 Component Aborted: The LU component (a device indicated by an FM header) that was selected has been aborted, due to an error condition or resource depletion.

25 Component Not Available: The LU component (device indicated by an FM header) is not available.

26 FM Function Not Supported: Function requested in FMD RU is not supported by the receiver.

27 Intermittent Error—Retry Requested: An error at the receiver caused an RU to be lost. The error is not permanent and retry of the RU (or chain) is requested.

28 Reply Not Allowed: A request requires a normal-flow reply, but the outbound data flow for

this half-session is quiesced or shut down, and there is no delayed reply capability.

29 Change Direction Required: A request requires a normal-flow reply, but the HDX-FF FSM state implies (¬S,*R), CD was not set on the request, and there is no delayed reply capability.

2A Presentation Space Alteration: Presentation space altered by end user while the HDX FSM state was (¬S,*R).

2B Presentation Space Integrity Lost: Presentation space integrity lost (for example, cleared or changed) because of a transient hardware error or an end user to be used by the SSCP. (**Note:** the end-user action described under X'082A' and X'084A' is excluded here.)

2C Resource-Sharing Limit Reached: The request received from an SSCP was to activate a half-session, a link, or a procedure, when that resource was at its sharing limit.

2D LU Busy: The LU resources needed to process the request are being used; for example, the LU resources needed to process the request received from the SSCP are being used for the (LU,LU) session.

2E Intervention Required at LU Subsidiary Device: A condition requiring intervention, such as out of paper, or power-off, or cover interlock open, exists at a subsidiary device.

2F Request Not Executable because of LU Subsidiary Device: The requested function cannot be executed, due to a permanent error condition in one or more of the receiver's subsidiary devices.

30 TERM-OTHER (Cleanup-Forced) Unsuccessful: The SSCP(TLU) received a negative response to at least one of the TERM-OTHER-CD

(Cleanup-Forced) requests that it sent to the SSCP(LU1) and SSCP(LU2). Bytes 2 and 3 following the sense code are not used for user-defined data; they contain a binary count that indexes (zero-origin) the first byte of the name of the LU (in the TERM-OTHER request) which did not get cleaned up. Zeros in bytes 2 and 3 mean neither LU1 nor LU2 was cleaned up.

31 LU Component Disconnected: An LU component is not available because of power-off or some other disconnecting condition.

32 Invalid Count Field: A count field contained in the request indicates a value too long or too short to be interpreted by the receiver, or the count field is inconsistent with the length of the remaining fields. Bytes 2 and 3 following the sense code are not used for user-defined data; they contain a binary count that indexes (zero-origin) the first byte of the invalid count field.

33 Invalid Parameter (with pointer and complemented byte): One or more parameters contained in fixed- or variable-length fields of the request are invalid or not supported by the NAU that received the request. Bytes 2 and 3 following the sense code are not used for user-defined data. Byte 2 contains a binary value that indexes (zero-origin) the first byte that contained an invalid parameter. Byte 3 contains a transform of the first byte that contained an invalid parameter: the bits that constitute the invalid parameter(s) are complemented and all other bits are copied.

34 RPO Not Initiated: A power-off procedure for the specified SPU node was not initiated because one or more other SSCPs have contacted the SPU node, or because a CONTACT, DUMP, IPL, or DISCONTACT procedure is in progress for that SPU node.

35 Invalid Parameter; Pointer only: The request contained a fixed- or variable-length field whose contents are invalid or not supported by the NAU that received the request. Bytes 2 and 3 following the sense code are not used for user-defined data; they contain a binary count that indexes (zero-origin) the first byte of the fixed- or variable-length field having invalid contents.

36 PLU/SLU Specification Mismatch: For a specified (LU,LU) session, both the OLU and DLU have only the primary capability or have only the secondary capability.

37 Queuing Limit Exceeded: For an (LU,LU) session initiation request (INIT, CDINIT, or INIT-OTHER-CD) specifying (1) Initiate or Queue (if Initiate not possible) or (2) Queue Only, the queuing limit of either the OLU or the DLU, or both, was exceeded.

38 Queuing Not Supported: For an (LU,LU) session initiation request specifying (1) Initiate or Queue (if initiate not possible) or (2) Queue Only, either an SSCP(ILU) cannot support initiate-queuing, or an SSCP(OLU) or an SSPC(DLU) cannot support setup-queuing.

39 (LU,LU) or (SSCP,LU) Session Being Taken Down: At the time an (LU,LU) session initiation or termination request is received, the SSCP of at least one of the LUs is processing a CDTAKED request or is in the process of deactivating the associated (SSCP,LU) session.

3A LU Not Enabled: At the time an (LU,LU) session initiation request is received at the SSCP, at least one of the two LUs, although having an active session with its SSCP, is not ready to accept CINIT or BIND requests.

3B Invalid PCID: An invalid PCID, one containing an invalid network address of the SSCP(ILU | TLU), has been received in CDINIT, INIT-OTHER-CD, CDTERM, or TERM-OTHER-CD; or a PCID that does not identify a previously queued request has been received in CDINIT (Dequeue) or INIT-OTHER-CD (Dequeue); or, a PCID that cannot be associated with the PCID of any previously processed CDINIT has been received on CDCINIT.

3C Domain Takedown Contention: While waiting for a response to a CDTAKED a CDTAKED request is received by the SVC.MGR.SSCP (primary). Contention is resolved by giving preference to the CDTAKED sent by the primary SSCP.

3D Dequeue Retry Unsuccessful—Removed from Queue: The SSCP cannot successfully honor a CDINIT(Dequeue) request, which specifies "leave on queue if dequeue-retry is unsuccessful," to dequeue and process a previously queued CDINIT request (for example, the LU in its domain is still not available for the specified session), and removes the queued CDINIT request from its queue.

3E Network Name Resolution Problem: An SSCP receiving a CDTERM request (with Session Key X'06') does not have the capability to resolve the OLU network name to a network address; it requires Session Key X'08', which carries the network address of the OLU.

3F Terminate Contention: While waiting for a response to a CDTERM, a CDTERM is received by the SVC.MGR.SSCP(SLU). Contention is resolved by giving preference to the CDTERM sent by the SSCP(SLU).

40 Procedure Invalid for Resource: The named procedure is not supported in the receiver for this type of resource (for example, (1) SETCV specifies BF.PU.T1 but BF.PU.T1 is not supported by the

receiving node, (2) the PU receiving an EXECTEST is not the PPU for the target link).

41 Duplicate Network Address: In a cross-domain (LU,LU) session initiation request the SSCP (DLU) determines that the OLU network address specified in the CDINIT request is a duplicate of an LU network address assigned to a different LU name.

42 (SSCP,SSCP) Session Not Active: At the time an (LU,LU) session initiation or termination request is received, at least one of the following conditions exists:

- The SSCP(ILU) and SSCP(OLU) do not have an active session with each other, and therefore INIT-OTHER-CD cannot flow.
- The SSCP(TLU) and SSCP(OLU) do not have an active session with each other, and therefore TERM-OTHER-CD cannot flow.
- The SSCP(OLU) and SSCP(DLU) do not have an active session with each other, and therefore CDINIT or CDTERM cannot flow.

43 Required FI.FMD Synchronization Not Supplied: For example, an SLU (LU Type 2 or 3) received a request with Write Control Code= Start Print, along with RQE and ¬CD.

44 Initiation Dequeue Contention: While waiting for a response to a CDINIT(Dequeue), a CDINIT(Dequeue) is received by the SVC.MGR.SSCP(SLU). Contention is resolved by giving preference to the CDINIT(Dequeue) sent by the SSCP(SLU).

45 Permission Rejected—SSCP Will Be Notified: The receiver has denied an implicit or explicit request of the sender; when sent in response to BIND, it implies that the secondary half-session's LU will notify the SSCP (via LUSTAT) when a BIND can be accepted. (See the X'080A' sense code for a contrasting response.)

46 ERP Message Forthcoming: The received request was rejected for a reason to be specified in a forthcoming request.

47 Restart Mismatch: Sent in response to STSN or SDT or BIND to indicate that the secondary half-session is trying to execute a resynchronizing restart but has received insufficient or incorrect information.

48 Crypto Function Inoperative: The receiver of a request was not able to decipher the request because of a malfunction in its crypto facility.

49 Invalid Requested Procedure: The procedure requested is invalid for the resource named in the request.

4A Presentation Space Alteration: Presentation space altered by end user while HDX FSM state was (¬S,*R); request not executed.

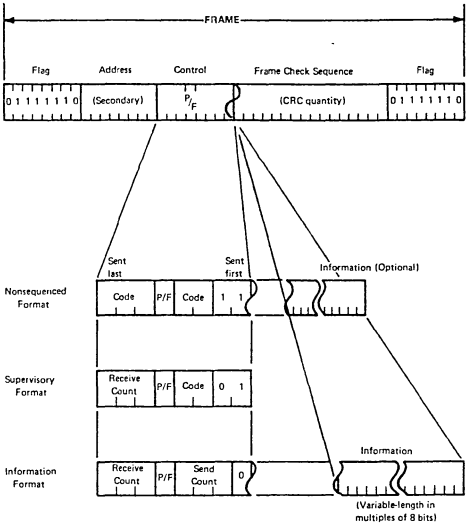
4B Requested Resources Not Available: Resources named in the request, and required to honor it, are not currently available. It is not known when the resources will be made available.

4C Permanent Insufficient Resource: Receiver can not act on request because resources required to honor the request are permanently unavailable.

4D Invalid Session Parameters—BF: Session parameters were not valid or were unacceptable by the boundary function. Bytes 2 and 3 following the sense code contain a binary count that indexes (zero origin) the first byte of the fixed- or variable-length field having invalid contents.

4E Invalid Session Parameters—PRI: A positive response to an activation request (for example, BIND) was received and was changed to a negative response due to invalid session parameters. The services manager receiving the response will send a deactivation request for the corresponding session.

SDLC COMPONENTS



For further information, see *IBM Synchronous Data Link Control General Information*, GA27-3093-1.

SDLC COMMANDS AND RESPONSES IN HEXADECIMAL

Nonsequenced Commands (See Note)

	P	¬P
SNRM	'93'	'83'
DISC	'53'	'43'
SIM	'17'	'07'
UI (NSI)	'13'	'03'
UP (NSP)	'33'	'23'
XID	'BF'	
TEST	'F3'	'E3'

Nonsequenced Responses (See Note)

	F	¬F
UA (NSA)	'73'	'63'
DM (ROL)	'1F'	'0F'
FRMR (CMDR)	'97'	'87'
RIM (RQI)	'17'	'07'
UI (NSI)	'13'	'03'
XID	'BF'	
TEST	'F3'	'E3'
RD	'53'	'43'

Note: The acronyms in parentheses have been superseded by ISO terminology.

Supervisory Commands/Responses (See Legend)

RR	'–1'
RNR	'–5'
REJ	'–9'

Information Commands/Responses (See Legend)

I	'–*'

Hexadecimal digit for "–"

Nr=	*P/F*	*¬(P/F)*
0	1	0
1	3	2
2	5	4
3	7	6
4	9	8
5	B	A
6	D	C
7	F	E

Hexadecimal digit for "*"

Ns=	*Hex*
0	0
1	2
2	4
3	6
4	8
5	A
6	C
7	E

Abbreviations and Symbols

A	address (SDLC)
BBI	Begin Bracket indicator
BCI	Begin Chain indicator
BF	boundary function
BIU	basic information unit
BLU	basic link unit
BTU	basic transmission unit
C	control (SDLC)
CDI	Change Direction indicator
CDRM	cross-domain resource manager
CMDR	Command Reject (SDLC)
CPMGR	connection point manager
CSI	Code Selection indicator
DAF	destination address field
DCF	data count field
DFC	data flow control
DISC	Disconnect (SDLC)
DLC	data link control
DLU	destination logical unit
DM	Disconnected Mode (SDLC)
DR1/2I	Definite Response 1 or 2 indicator
EBI	End Bracket indicator
ECI	End Chain indicator
ED	enciphered data
EDI	Enciphered Data indicator
EFI	Expedited Flow indicator
ERI	Exception Response indicator
ERP	error recovery procedures
Exp	expedited flow
EXR	Exception Request
F	flag (SDLC)
FCS	frame check sequence (SDLC)
FDX	full duplex data flow
FF	flip-flop direction control

FI	Format indicator; function interpreter
FID	format identification
FMD	function management data
FRMR	Frame Reject (SDLC)
HDX	half-duplex data flow
HSID	half-session identification
ID	identification
ILU	initiating logical unit
ISO	International Organization for Standardization
LSID	local session identification
LU	logical unit
MPF	mapping field (BIU segments)
NAU	network addressable unit
NC	network control
Norm	normal flow
NS	network services
NSA	Nonsequenced Acknowledgment (SDLC)
NSI	Nonsequenced Information (SDLC)
NSP	Nonsequenced Poll (SDLC)
OAF	origin address field
OLU	originating logical unit
P	primary
PC	path control
PDI	Padded Data indicator
PI	Pacing indicator
PIU	path information unit
PLU	primary logical unit
PPU	physical unit for primary link station
PU	physical unit
QRI	Queued Response indicator
RD	Request Disconnect (SDLC)
RH	request/response header
RIM	Request Initialization Mode (SDLC)

ROL	Request Online (SDLC)
RQ	request
RQI	Request Initialization (SDLC)
RSP	response
RTI	Response Type indicator (+/-)
RU	request/response unit
S	secondary
SC	session control
SDI	Sense Data Included indicator
SDLC	Synchronous Data Link Control
SIM	Set Initialization Mode (SDLC)
SLU	secondary logical unit
SNF	sequence number field
SNRM	Set Normal Response Mode (SDLC)
SPU	physical unit for secondary link station
SQN	sequence number
SSCP	system services control point
TC	transmission control
TEST	Test (SDLC)
TH	transmission header
TLU	terminating logical unit
TS	transmission subsystem
UA	Unnumbered Acknowledgment (SDLC)
UI	Unnumbered Information (SDLC)
UP	Unnumbered Poll (SDLC)
XID	Exchange Station Identification (SDLC)
X'n...n'	hexadecimal digits
|	or
*	any value
¬	not
:	is in the state
**	exponential operator

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