Systems Network Architecture Reference Summary

GA27-3136-5
File No. GENL-30 (SNA)

IBM Corporation, Information and Interface Development Support, Dept. E01, P. O. Box 12195, Research Triangle Park, N. C. 27709

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This is a major revision of, and obsoletes, GA27-3136-4. This edition includes a new request unit, NMVT (Network Management Vector Transport) and makes minor corrections and clarifications. The NMVT RU format appears in Chapter 4 under "Request RU Formats." Information herein is extracted from GA27-3093, GC20-1868, GC30-3072, and SC30-3112.

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Preface

This handbook contains summary material about the structure and use of SNA and SDLC (Synchronous Data Link Control). The information included here is intended to supplement the information contained in various manuals on specific IBM SNA products.

A handbook binder for this publication may be purchased through your IBM representative (order number S229-4124 or part number 453559).

For further information on SNA, refer to:

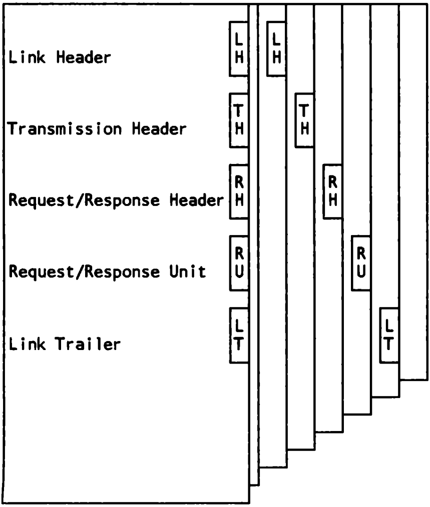
- IBM Synchronous Data Link Control General Information (GA27-3093)
- Systems Network Architecture Concepts and Products (GC30-3072)
- Systems Network Architecture--Technical Overview (GC30-3073)
- Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic (SC30-3112)

HOW TO USE THIS BOOK

The information in this manual is divided into two parts: "Part 1, The Basic Link Unit" and "Part 2, Diagnostic Aids."

Part 1 presents a Basic Link Unit, byte by byte, in the order it would appear on a link connection. The following figure, Organization of Part 1, shows how you can quickly find this information using the blind tabs on the page edges.

Part 2 is a collection of other diagnostic aids. Use chapter headings to locate the information you need.



Organization of Part 1

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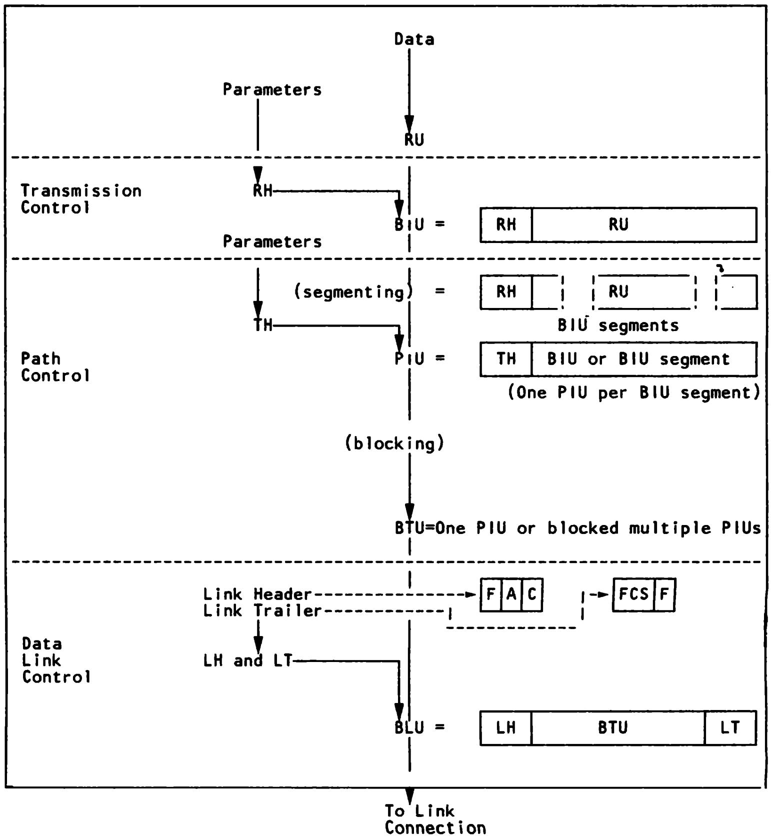
DATA UNITS

As information passes through various layers of SNA, more information is added to it in the form of headers and trailers. The following figure illustrates this procedure.



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PART 1

The Basic Link Unit

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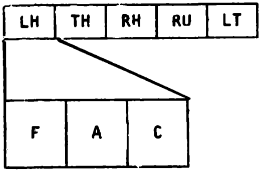
CHAPTER 1. LINK HEADER



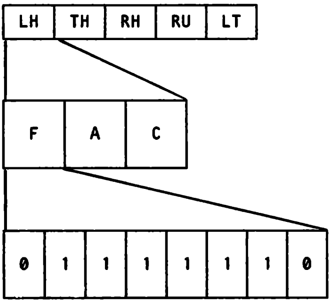
This chapter summarizes information from **IBM Synchronous Data Link Control General Information** (GA27-3093).

Because some transmissions contain no SDLC Information field (TH,RH,RU), you may wish to clip, mark, or otherwise identify Chapter 5 in order to easily refer between Chapter 1 and Chapter 5. As an alternative, you may move Chapter 5, in its entirety, to follow Chapter 1.

The link header described here is from IBM's Synchronous Data Link Control (SDLC).

The basic link unit (BLU) starts with the link header (LH), which has three fields: the flag, address, and control fields. Each is one byte long.

FLAG



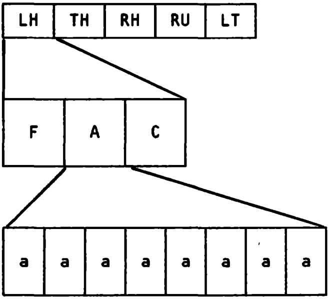
Flag (F)   X'7E'   B'01111110'

All BLUs begin with a flag. The configuration of the flag is always 01111110 (X'7E'). Because BLUs also end with flags, the trailing flag of one BLU may serve as the leading flag of the next BLU. Alternatively, the last 0 in the trailing flag may also be the first 0 in the next leading flag. See Figure 1-1.

```
               |--leading flag-|
0 1 1 1 1 1 1 0 1 1 1 1 1 1 0
|-trailing flag--|
```

Figure 1-1. Shared Trailing/Leading 0 in SDLC Flags

ADDRESS

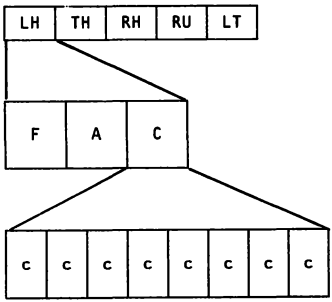


Address (A) B'aaaaaaaa'

The second byte of the link header is the address field. This address can be (1) a specific station address -- to only one station, (2) a group address -- to two or more stations but not all stations, (3) a broadcast address (X'FF', B'11111111') -- to all stations, or (4) a "no stations" address (X'00'). Note: The "no stations" address is reserved and should not be used for any station or group of stations.

This address is **always** the address of the secondary, regardless of whether the transmission is going from primary to secondary or secondary to primary.

CONTROL



Control (C) B'cccccccc'

The third byte of the link header is the control field. This field contains any one of a number of SDLC commands or responses. There are three categories of SDLC commands and responses: unnumbered format, supervisory format, and information transfer format.

Each of the commands and responses in the **unnumbered format** has a poll/final bit that is set to 1 when it is in the last SDLC frame of a transmission. In a command, it is called a poll bit; in a response, a final bit. Therefore, each of the unnumbered commands and responses has two hex values: a value for when this poll/final bit is 0 and a value for when it is 1.

Each of the group of **supervisory format** commands and responses has a number of possible hex values corresponding to the receive sequence number assigned to the frame containing the command or response. These commands and responses also have a poll/final bit.

A command or response in the **information transfer format** similarly has a number of possible hex values depending on the send and receive sequence numbers assigned to the frame containing the command or response. These frames also have a poll/final bit.

Figure 1-2 contains a listing of the various SDLC commands and responses.

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Format	Binary Configuration	Hex Equivalent P/F off,P/F on	Command Name	Acro-nym
Unnumbered Format	000 P/F 0011	X'03', X'13'	Unnumbered Information	UI
	000 F 0111	X'07', X'17'	Request Initialization Mode	RIM
	000 P 0111	X'07', X'17'	Set Initialization Mode	SIM
	000 F 1111	X'0F', X'1F'	Disconnect Mode	DM
	001 P 0011	X'23', X'33'	Unnumbered Poll	UP
	010 F 0011	X'43', X'53'	Request Disconnect	RD
	010 P 0011	X'43', X'53'	Disconnect	DISC
	011 F 0011	X'63', X'73'	Unnumbered Acknowledgment	UA
	100 P 0011	X'83', X'93'	Set Normal Response Mode	SNRM
	100 F 0111	X'87', X'97'	Frame Reject	FRMR
	101 P/F 1111	X'AF', X'BF'	Exchange Identification	XID
	110 P/F 0111	X'C7', X'D7'	Configure	CFGR
	111 P/F 0011	X'E3', X'F3'	Test	TEST
	111 F 1111	X'EF', X'FF'	Beacon	BCN
Supervisory Format	RRR P/F 0001	X'x1', X'x1'	Receive Ready	RR
	RRR P/F 0101	X'x5', X'x5'	Receive Not Ready	RNR
	RRR P/F 1001	X'x9', X'x9'	Reject	REJ
Information Transfer Format	RRR P/F SSS0	X'xx', X'xx'	Numbered Information Present	

Notes: P = poll bit
F = final bit
RRR = Nr (receive count)
SSS = Ns (send count)

Figure 1-2. SDLC Commands and Responses

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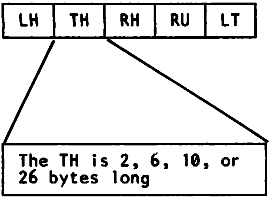
CHAPTER 2. TRANSMISSION HEADER



This chapter summarizes information from **Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic** (SC30-3112).

The transmission header (TH) immediately follows the link header (LH). The TH consists of 2, 6, 10, or 26 bytes. There are six TH configurations, which vary according to Format Identifier type (FID type). The FID type depends on the type(s) of nodes involved in the transmission.

FID type 0 is used for traffic involving non-SNA devices between adjacent subarea nodes when either or both nodes do not support explicit route and virtual route protocols. (TH=10 bytes)

FID type 1 is used for traffic between adjacent subarea nodes when either or both nodes do not support explicit route and virtual route protocols. (TH=10 bytes)

FID type 2 is used for traffic between a subarea node and an adjacent PU type 2 peripheral node. (TH=6 bytes)

FID type 3 is used for traffic between a subarea node and an adjacent PU type 1 peripheral node. (TH=2 bytes)

FID type 4 is used for traffic between adjacent subarea nodes when both nodes support explicit route and virtual route protocols. (TH=26 bytes)

FID type F is used for certain commands (for example, for transmission group control) sent between adjacent subarea nodes when both nodes support explicit route and virtual route protocols. (TH=26 bytes)

The following figures show the formats and meanings of the transmission header (TH) bytes.

TRANSMISSION HEADERS FOR FID TYPES 0-3

0	1	2	3	4	5	6	7	8	9

Byte 0:

Format Identification (FID)	Mapping Field (MPF)	reserved	Expedited Flow Indicator (EFI)	
0000=FID0 0001=FID1 0010=FID2 0011=FID3	Segmenting 00=middle 01=last 10=first 11=only	0=normal flow 1=expedited flow		

Byte 1:

FID0 → reserved
FID1 → reserved
FID2 → reserved
FID3 → local session identification (LSID)
0000 0000 = SSCP-PU session
01XX XXXX = SSCP-LU session
10XX XXXX = reserved
11XX XXXX = LU-LU session

0	1	2	3	4	5	6	7	8	9

byte 2	byte3	byte 4	byte 5	byte 6	byte 7	byte 8	byte 9	
Destination Address Field (DAF)		Origin Address Field (OAF)		Sequence Number Field (SNF)		Data Count Field (DCF)		FID0 and FID1
Desti- nation Address Field (DAF')	Origin Address Field (OAF')	Sequence Number Field (SNF)		←--				FID2

FID3 is two bytes long

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

byte 0					byte 1	byte 2	
0100	TG Sweep Indicator	ER & VR Support Indicator	VR Pacing Count Indicator	Network Priority	Reserved (R*)	IERN	ERN
FID4	0=PIU may pass PIUs 1=PIU may not pass PIUs	0=Each node supports ER & VR 1= one does not	0=VR Pacing Count not=0 1=VR Pacing count does = 0	0=Flow is less than network priority 1=Flow is Network Priority	R*=Reserved	Initial Explicit Route Number	Explicit Route Number
4bit	1 bit	1 bit	1 bit	1 bit	8 bits	4 bits	4 bits

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

byte 3			byte 4				byte 5
V R N	RR*	TPF	VR Change Window Indicator	TG non-FIFO Indicator	VR Sequence & Type Indicator	Transmission Group Sequence Number Field	
Virtual Route Number	Transmission Priority 00=Low 01=Medium 10=High		0=Increment Window Size 1=Decrement Window Size	0=TG FIFO Required 1=TG FIFO Not Required	00=Non-Sequenced Non-Supervisory 01=Non-Seq, Supervisory 10=Singly Sequenced	TGSNF	
4 bits	2 bits		1 bit	1 bit	2 bits	12 bits	

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

byte 6					byte 7	bytes 8-11
VR Pacing Request (VRPRQ)	VR Pacing Response (VRPRS)	VR Change Window Reply Indicator	VR Reset Window Indicator	VR Send Sequence Number	VR Send Sequence Number	Destination Subarea Field (DSAF)
0=No VR Pacing Response Requested 1=VR Pacing Response Requested	0=No VR Pacing Response 1=VR Pacing Response Sent	Reserved 0=Increment Window Size by1 1=Decrement Window Size by1	0=Do not Reset Window Size 1=Reset Window Size to Minimum	First 4 bits of VRSSNF	Last 8 bits of VRSSNF	
1 bit	1 bit	1 bit	1 bit	4 bits	8 bits	4 bytes

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

bytes 12-15	byte 16						
Origin Subarea Field (OSAF)	R*	R*	R*	SNAI	Mapping Field (MPF)	Reserved	Expedited Flow Indicator
	*Reserved			SNA Indicator 0=Not SNA 1=SNA	Segment of BIU: 00=Middle 01=Last 10=First 11=Only		0=Normal Flow 1=Expedited Flow
4 bytes	3 bits			1 bit	2 bits	1 bit	1 bit

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

byte17	byte18-19	byte20-21	byte22-23	byte24-25
Reserved	DEF	OEF	SNF	DCF
1 byte	Destination Element Field 2 bytes	Origin Element Field 2 bytes	Sequence Number Field 2 bytes	Data Count Field 2 bytes

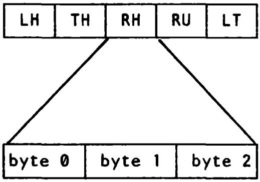
TRANSMISSION HEADER FOR FID TYPE F

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

byte 0		byte 1	byte 2	byte 4	bytes 4-5	bytes 6-23	byte24-25
1111	R*	Reserved	Command Format	Command Type	Command Sequence Number	R e s e r v e d	Data Count Field
*Reserved			X'01'	X'01'*			
4bit	4bit	8 bits	8 bits	8 bits	2 bytes	18 bytes	2 bytes

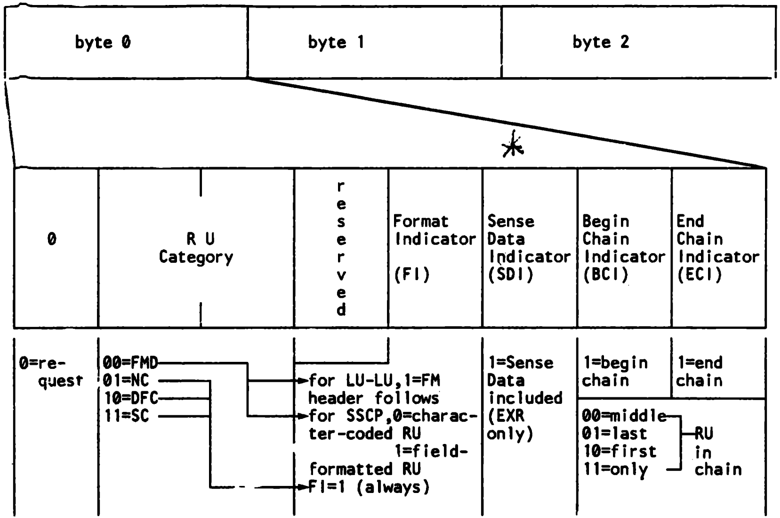
*TG SNF Wrap Acknowledgment (only value defined)

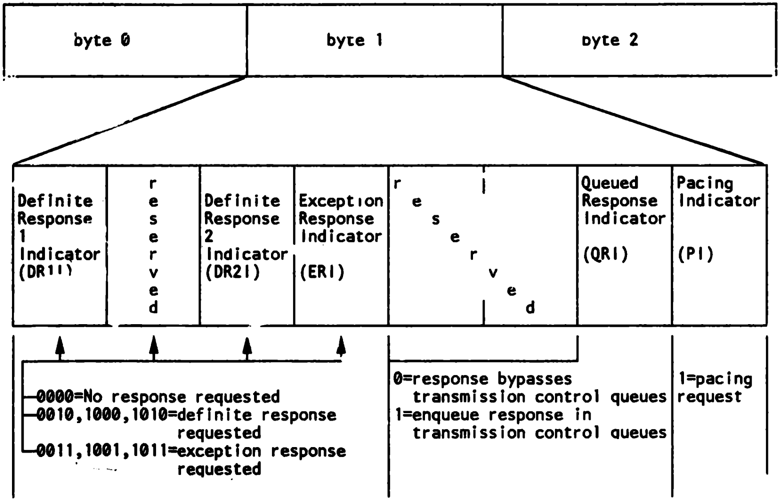
CHAPTER 3. REQUEST/RESPONSE HEADER



This chapter summarizes information from the Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic (SC30-3112).

The request or response header (RH), when present, follows the transmission header (TH). In a request it is a request header; in a response, a response header. In either case, the RH is three bytes long.


byte 0
byte 1
byte 2
0
R U Category
reserved
Format Indicator (FI)
Sense Data Indicator (SDI)
Begin Chain Indicator (BCI)
End Chain Indicator (ECI)
0=request
00=FMD
01=NC
10=DFC
11=SC
for LU-LU, 1=FM header follows
for SSCP, 0=character-coded RU
1=field-formatted RU
FI=1 (always)
1=Sense Data included (EXR only)
1=begin chain
1=end chain
00=middle
01=last
10=first
11=only
RU in chain


byte 0
byte 1
byte 2
Definite Response 1 Indicator (DR1I)
reserved
Definite Response 2 Indicator (DR2I)
Exception Response Indicator (ERI)
reserved
Queued Response Indicator (QRI)
Pacing Indicator (PI)
0000=No response requested
0010,1000,1010=definite response requested
0011,1001,1011=exception response requested
0=response bypasses transmission control queues
1=enqueue response in transmission control queues
1=pacing request

REQUEST HEADER

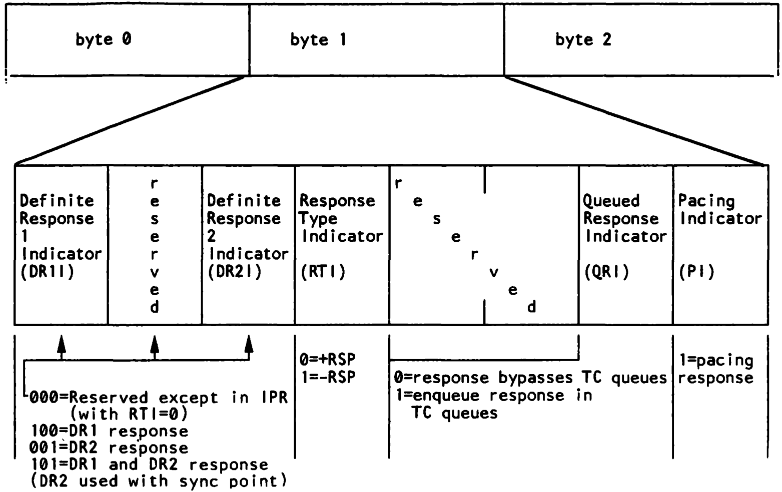
byte 0	byte 1	byte 2

Begin Bracket Indicator (BBI)	End Bracket Indicator (EBI)	Change Direction Indicator (CDI)	reserved	Code Selection Indicator (CSI)	Enciphered Data Indicator (EDI)	Padded Data Indicator (PDI)	reserved
1=begin bracket	1=end bracket	1=change direction		0=code 0 1=code 1	1=RU is Enciphered	1=RU was padded before encipherment	

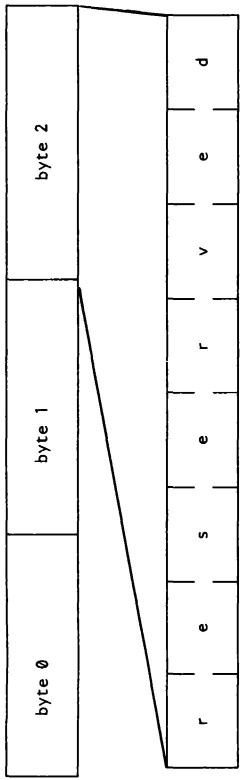
RESPONSE HEADER

byte 0	byte 1	byte 2

1	R U Category	reserved	Format Indicator (FI)	Sense Data Indicator (SDI)	1	1
1=response	00=FMD 01=NC 10=DFC 11=SC		for LU-LU, for positive rsp, FI=0 for SSCP, 0=character-coded RU 1=field-formatted RU FI=1 (always)	1=sense data included (-RSP only)	11=only RU in chain	



byte 0
byte 1
byte 2
Definite Response 1 Indicator (DR1I)
reserved
Definite Response 2 Indicator (DR2I)
Response Type Indicator (RTI)
reserved
Queued Response Indicator (QRI)
Pacing Indicator (PI)
000=Reserved except in IPR (with RTI=0)
100=DR1 response
001=DR2 response
101=DR1 and DR2 response
(DR2 used with sync point)
0=+RSP
1=-RSP
0=response bypasses TC queues
1=enqueue response in TC queues
1=pacing response


byte 0
byte 1
byte 2
reserved

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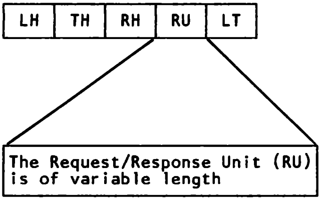
CHAPTER 4. REQUEST/RESPONSE UNIT



This chapter summarizes information from the Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic (SC30-3112).

The request/response unit (RU) follows the request/response header (RH). As with the RH, the RU can be either a request RU or a response RU. This chapter presents information in this order:

- A categorized list of abbreviated RU names
- An alphabetic index of request RUs
- An index of RUs by NS (Network Services) headers and request codes
- An alphabetic list of request RU format descriptions
- The RU NS header and request code index repeated (on a foldout page for the reader who is looking up a number of RUs)
- A summary of response RUs
- A list of response format descriptions for response RUs returning data
- A list of control vectors and control lists referred to in various RUs
- The XID command and response information-field formats

REQUEST-RESPONSE UNIT (RU) FORMATS

The initial line for each RU in the two RU 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(mn)	function management data, network services, management services
FMD NS(no)	function management data, network services, network operator services
FMD NS(s)	function management data, network services, session services

2. The formats of character-coded FMD NS RUs are implementation dependent; LU-->LU FMD RUs (for example, FM headers) are described in SNA--Sessions Between Logical Units.

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.

5. Throughout this section, a "symbolic name in EBCDIC characters" is defined in general accordance with the System/360 or System/370 Assembler Language definition of an "ordinary symbol": the name must begin with any one of the EBCDIC letters--A through Z, $, #, or @--and be followed by zero or more EBCDIC letters or numerics (0-9).

SUMMARY OF REQUEST RU'S BY CATEGORY

NC

+LSA	NC-ER-TEST
NC-ACTVR	NC-ER-TEST-REPLY
NC-DACTVR	NC-IPL-ABORT
NC-ER-ACT	NC-IPL-FINAL
NC-ER-ACT-REPLY	NC-IPL-INIT
NC-ER-INOP	NC-IPL-TEXT
NC-ER-OP	

SC

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

DFC

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

FMD NS(c)

ABCONN	EXSLOW
ABCONNOUT	FNA
ACTCONNIN	INITPROC
ACTLINK	INOP
*ADDLINK	IPLFINAL
*ADDLINKSTA	IPLINIT
+ANA	IPLTEXT
CONNOUT	LCP
CONTACT	LDREQD
CONTACTED	NS-IPL-ABORT
DACTCONNIN	NS-IPL-FINAL
DACTLINK	NS-IPL-INIT
DISCONTACT	NS-IPL-TEXT
DELETENR	+NS-LSA
DUMPFINAL	PROCSTAT
*DUMPINIT	REQACTLU
*DUMPTEXT	REQCONT
ER-INOP	REQDISCONT
ESLOW	REQFNA

*RNAA	SETCV
RPO	VR-INOP

FMD NS(ma)

ACTTRACE	RECTD
DACTTRACE	RECTR
DISPSTOR	RECTRD
ECHOTEST	REQECHO
ER-TESTED	REQMS
EXECTEST	REQTEST
| NMVT	*ROUTE-TEST
RECFMS	SETCV
RECMS	TESTMODE
RECSTOR	

FMD NS(mn)

DELIVER	FORWARD

FMD NS(s)

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

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

\+ These RUs are supported only for subarea nodes that are not at the current level of SNA.

REQUEST RU'S IN ALPHABETIC ORDER

DACTCONNIN	DEACTIVATE CONNECT IN	4-59
DACTLINK	DEACTIVATE LINK	4-60
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DELIVER	DELIVER	4-63
DISCONTACT	DISCONTACT	4-65
DISPSTOR	DISPLAY STORAGE	4-65
DSRLST	DIRECT SEARCH LIST	4-66
DUMPFINAL	DUMP FINAL	4-66
DUMPINIT	DUMP INITIAL	4-66
DUMPTEXT	DUMP TEXT	4-66
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ESLOW	ENTERING SLOWDOWN	4-70
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EXSLOW	EXITING SLOWDOWN	4-71
FNA	FREE NETWORK ADDRESSES	4-71
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INIT-OTHER	INITIATE OTHER	4-73
INIT-OTHER-CD	INITIATE-OTHER CROSS-DOMAIN	4-79
INITPROC	INITIATE PROCEDURE	4-85
INIT-SELF	INITIATE-SELF (format 0)	4-86
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INOP	INOPERATIVE	4-92
IPLFINAL	IPL FINAL	4-94
IPLINIT	IPL INITIAL	4-94
IPLTEXT	IPL TEXT	4-95
LCP	LOST CONTROL POINT	4-95
LDREQD	LOAD REQUIRED	4-96
LSA	LOST SUBAREA	4-96
LUSTAT	LOGICAL UNIT STATUS	4-97
NC-ACTVR	ACTIVATE VIRTUAL ROUTE	4-100
NC-DACTVR	DEACTIVATE VIRTUAL ROUTE	4-101
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INDEX OF RU'S BY NS HEADERS AND REQUEST CODES

Within DFC, NC, SC, or any specific FMD NS category, the request code is unique. However, while a request code has only one meaning in a specific category, a given code (for example, X'05') can represent different requests in separate categories (for example, DFC, NC, and configuration services). DSRLST, NOTIFY, and SETCV are exceptions: these three requests have request codes--X'27', X'20', and X'11', respectively--that are unique across all the FMD NS categories.

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REQUEST RU FORMATS

ABCONN; SSCP-->PU_T4|5, PUCP-->PU, Norm; FMD NS(c) (ABANDON CONNECTION)

ABCONN requests the PU to deactivate the link connection for the specified link.

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

ABCONNOUT; SSCP-->PU_T4|5, PUCP-->PU, Norm; FMD NS(c) (ABANDON CONNECT OUT)

ABCONNOUT requests the PU to terminate a connect-out procedure on the designated link.

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 X'2' ERP
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 space (X'40') characters 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 window size (0 means no pacing of requests flowing to the primary)
19-n	One or more control vectors, as described in the section "Control Vectors and Control Lists," later in this section Note: The following vector keys may be used in ACTCDRM: X'06' CDRM control vector X'09' activation request/response sequence identifier control vector

ACTCONNIN; SSCP-->PU_T4|5, PUCP-->PU, Norm; FMD NS(c) (ACTIVATE CONNECT IN)

ACTCONNIN requests the PU to enable the specified link to accept incoming calls.

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_T4|5, PUCP-->PU, Norm; FMD NS(c) (ACTIVATE LINK)

ACTLINK initiates a procedure at the PU to activate the protocol boundary between a link station in the node (as specified by the link network address parameter in the request) and the link connection attached to it.

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

ACTLU; SSCP-->LU, Exp; SC (ACTIVATE LOGICAL UNIT)

ACTLU is sent from an SSCP to an LU 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|PUCP-->PU, Exp; SC (ACTIVATE PHYSICAL UNIT)

ACTPU is sent by the SSCP to activate a session with the PU, and to obtain certain information about the PU.

0	X'11' request code
1	bits 0-3, format: X'0' Format 0 X'3' Format 3; same as Format 0, except that it includes one or more control vectors in bytes 9-n (sent only to PU_T4|5s that support ERs and VRs) bits 4-7, type activation requested: X'1' cold X'2' ERP
2	bits 0-3, FM profile bits 4-7, TS profile
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 Note: End of Format 0; Format 3 continues below

9-n	One or more control vectors, as described in the section "Control Vectors and Control Lists," later in this section Note: The following vector keys may be used in ACTPU: X'09' activation request/response sequence identifier control vector X'0B' SSCP-PU session capabilities control vector

ACTTRACE; SSCP-->PU_T4|5, 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	Selected trace: bit 0, transmission group trace bits 1-6, reserved bit 7, link trace
6-n	Data to support trace

ADDLINK; SSCP-->PU_T4|5, Norm; FMD NS(c) (ADD LINK)
ADDLINK is sent from the SSCP to the PU to obtain a link network address that will be mapped to the locally-used link identifier specified in the request.

0-2	X'41021E' NS header
3-4	Network address of target PU
5-6	Reserved
7	Length of local link identifier
8-n	Local link identifier

ADDLINKSTA; SSCP-->PU_T4|5, Norm; FMD NS(c) (ADD LINK STATION)
ADDLINKSTA is sent from the SSCP to the PU to obtain an adjacent link station network address to be associated with the locally-used link station identifier specified in the request.

0-2	X'410221' NS header
3-4	Network address of target PU or link

5 FID types supported:
bit 0, 1 FID0 support
bit 1, 1 FID1 support
bit 2, 1 FID2 support
bit 3, 1 FID3 support
bit 4, 1 FID4 support
bits 5-7, Reserved
6 Reserved
7 Length of link station identifier
Note: When assigning an address for a link station on a point to point link, this field can be 0, the link station identifier is omitted, and the target network address in bytes 3 and 4 indicates the link to which the link station belongs.
8-n Link station identifier

ANA; SSCP-->PU_T4|5, Norm; FMD NS(c) (ASSIGN NETWORK ADDRESSES)
ANA updates the path control routing algorithm in the PU_T4|5 node, such that PIUs with the specified LU network addresses (one or more) will be routed to the specified PU_T1|2 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)

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 brackets.
0 X'C8' request code

BIND; PLU-->SLU, Exp; SC (BIND SESSION)
BIND is sent from a primary LU to a secondary LU to activate a session between the LUs. The secondary LU uses the BIND parameters to help determine whether it will respond positively or negatively to BIND.

0 X'31' request code

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

2 FM profile

3 TS profile

<u>FM Usage--Primary LU Protocols for FM Data</u>

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
bit 4, 2-phase commit for sync point (reserved if sync point protocol not used, that is, a TS profile other than 4 is used):
0 2-phase commit not supported
1 2-phase commit supported
bit 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 requests; chains from secondary will ask for:
- 00 no response
- 01 exception response
- 10 definite response
- 11 definite or exception response

bit 4, 2-phase commit for sync point (reserved if sync point protocol not used, that is, a TS profile other than 4 is used):
- 0 2-phase commit not supported
- 1 2-phase commit supported

bit 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

bit 5, sequence number availability for sync point resynchronization (reserved if sync point protocol not used, that is, a TS profile other than 4 is used):

- 0 sequence numbers not available
- 1 sequence numbers available

Note: Sequence numbers are transaction processing program sequence numbers from the previous activation of the session with the same session name; they are associated with the last acknowledged requests and any pending requests to commit a unit of work. If there was no previous activation, the numbers are 0, and this bit is set to 0.

bit 6, BIS sent (reserved if sync point protocol not used, that is, a TS profile other than 4 is used):
- 0 BIS not sent
- 1 BIS sent

bit 7, reserved

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 is INB (byte 6, bit 2 = 0)):

- 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 normal-flow requests first after session activation)

TS Usage TRANSMISSION SRVCS

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 window size: 0 means no pacing of requests flowing from the secondary

9 bits 0-1, reserved
bits 2-7, secondary CPMGR's receive window size: a value of 0 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 0 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 0 then no maximum is specified and the remaining bits 1-7 are ignored; if bit 0 is set to 1, 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 RU Sizes Corresponding to Values X'ab' in BIND for all possible values.

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

<u>Note</u>: 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 window size: a value of 0 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 0, 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 window size--see byte 9, bits 2-7, above.)
13	bits 0-1,	reserved
	bits 2-7,	primary CPMGR's receive window size: a value of 0 means no pacing of requests flowing 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 window size--see byte 8, bits 2-7, above.)
	<u>PS Profile</u>	
14	bit 0, PS Usage field format: 0 basic format; 1 reserved	
	bits 1-7, LU-LU session type	
	<u>PS Usage</u>	
15-25	PS characteristics	
	<u>Note</u>: For information on PS usage, see <u>SNA--Sessions Between Logical Units</u>.	
	<u>End of PS Usage Field</u>	
26-k	<u>Cryptography Options</u>	
26	bits 0-1,	private cryptography options:

00 no private cryptography supported
01 private cryptography supported: the session cryptography key and cryptography protocols are privately supplied by the end user

bits 2-3, session-level cryptography options:
00 no session-level cryptography supported
01 session-level selective cryptography supported; all cryptography key management is supported by SSCP.SVC_MGR and LU.SVC_MGR; exchange (via +RSP(BIND)) and verification (via CRV) of the cryptography session-seed value is supported by the LU.SVC_MGRs for the session; all FMD requests carrying ED are enciphered/deciphered by the CPMGRs
10 reserved
11 session-level mandatory cryptography supported; same as session-level selective cryptography except all FMD requests are enciphered/deciphered by the CPMGRs

bits 4-7, session-level cryptography options field length:
X'0' no session-level cryptography specified; following additional cryptography options fields (bytes 27-k) omitted

```
                    X'9'  session-level
                          cryptography speci-
                          fied; additional
                          options follow in
                          next nine bytes
27        bits 0-1, session cryptography key
                    encipherment method:
                     00  session cryptography
                         key enciphered under
                         SLU master cryptography
                         key using a seed value
                         of 0 (only value defined)
          bits 2-4, reserved
          bits 5-7, cryptography cipher method:
                     000  block chaining with
                          seed and cipher text
                          feedback, using the
                          Data Encryption
                          Standard (DES)
                          algorithm (only value
                          defined)
28-k      Session cryptography key enciphered
          under secondary LU master cryptography
          key; an eight-byte value that, when
          deciphered, yields the session
          cryptography key used for enciphering
          and deciphering FMD requests
k+1       Length of primary LU name--see Note,
          below, concerning the BIND RU length
k+2-m     Primary LU network name or, if the
          secondary LU issued the INITIATE(-SELF
          or -OTHER), the uninterpreted name as
          carried in that RU (and also in CDINIT
          for a cross-domain session)
m+1       Length of user data (X'00' = no user
          data field present)--see Note, below,
          concerning the BIND RU length
m+2-n     User data
m+2       User data key
           X'00'  structured subfields follow
          ¬X'00'  first byte of unstructured
                  user data
                  Note:  Individual structured
                  subfields may be omitted
                  entirely.  When present, they
                  appear in ascending field
                  number order.
```

- For unstructured user data

m+3-n Remainder of unstructured user data

- For structured user data

m+3-n Structured subfields (For detailed definitions, see the structured user data section on page 4-168.)
n+1 Length of user request correlation (URC) field
<u>Note</u>: X'00' = no URC present
n+2-p URC: end user defined identifier (present only if carried in INIT from SLU)
p+1 Length of secondary LU network name--see Note, below, concerning the BIND RU length
<u>Note</u>: X'00' = no secondary LU name present
p+2-r Secondary LU network name (present only in negotiable BIND)
<u>Note</u>: 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, with no-response requested, 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
7 Reason
bit 0, reserved
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
8 Session key
X'06' uninterpreted name pair
X'07' network address pair
9-m <u>Session Key Content</u>

- 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 sent BB or BID. It is used only when using brackets.
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.
0 X'83' request code

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.
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), that 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: bytes 1-p of the BIND RU (see BIND format description), that is, through the URC field Notes on BIND image: • If the length of the URC field is 0, the length field itself is excluded from the BIND image. • For SLUs not in the sending SSCP's node, the session cryptography key is enciphered under the SLU master cryptography key; for SLUs in the SSCP's node, the sending SSCP enciphers the session cryptography key under a dummy SLU master cryptography key.
n+1-n+2	Length, in binary, of LU or non-SNA device characteristics field and format--that is, bytes n+3 - p (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 specifications (See CINIT for the format of this field.)
p+1	Length, in binary, of session cryptography key Note: X'00' = no Session Cryptography Key field is present
p+2-q	Session cryptography key for primary: the session cryptography key, enciphered under the cross-domain cryptography key defined for the SSCP(SLU) to SSCP(PLU) direction (a different cross-domain cryptography key is defined for the opposite direction) and using a seed value of 0

CDINIT; SSCP-->SSCP, Norm; FMD NS(s)
(CROSS-DOMAIN INITIATE)
CDINIT from the SSCP(OLU) requests that the SSCP(DLU) assist in initiating an LU-LU session for the specified (OLU,DLU) pair.

0-2	X'818641' NS header		
3	Format		
	bits 0-3,	0000	Format 0: used when Type = I, I/Q, or Q; bytes 17-18 are reserved and no COS fields are specified for Format 0; Format 0 includes bytes 0 through s
		0001	Format 1: used when Type = DQ and specifies a subset of the parameters; Format 1 includes bytes 0 through 18
		0010	Format 2: specifies COS fields and an additional OLU status (byte 6, bit 5) in addition to the parameters in Format 0; Format 2 includes bytes 0 through s+9
	bits 4-7, reserved		
4-(s|s+9)	Formats 0 and 2 Continue (See Format 1 continuation below.)		
4	Type:		
	bits 0-1,	00	reserved
		01	initiate only (I)
		10	queue only (Q)
		11	initiate or queue (I/Q)
	bits 2-5, reserved		
	bit 6,	0	DLU is PLU
		1	OLU is PLU
	bit 7, reserved		
5	Queuing Conditions For DLU		
	bit 0,	0	do not queue if session limit exceeded
		1	queue if session limit exceeded

bit 1, 0 do not queue if DLU is not currently able to comply with the PLU/SLU specification (as given in byte 4, bit 6)
1 queue if DLU is not currently able to comply with the PLU/SLU specification
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, (used if LU is not available; otherwise, reserved)
00 LU session limit exceeded
01 reserved
10 LU is not currently able to comply with the PLU/SLU specification
11 reserved
bit 4, 0 existing SSCP to LU path
1 no existing SSCP to LU path (connectivity is lost)
bit 5, (reserved in format 0)
0 UNBIND and SESSEND cannot be sent by the LU or by its boundary function (if any)
1 UNBIND and SESSEND may be sent by the LU or by its boundary function (if any)
bits 6-7, 01 OLU is PLU
10 OLU is SLU

7-14 PCID
7-8 The network address of SSCP(ILU)
9-14 A unique 6-byte value, generated by the SSCP (ILU), that 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
bits 1-2, reserved
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 CDINIT request is queued 11 reserved
	bits 2-7, reserved
21-28	Mode name: 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 to be used by the SSCP(PLU) to build the CINIT request
29-m	Network Name of DLU
29	Type: X'F3' logical unit
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 passed to the primary LU on the CINIT request
p+2	User data key X'00' structured subfields follow ¬X'00' first byte of unstructured user data Note: Individual structured subfields may be omitted

	entirely. When present, they appear in ascending field number order.
	• For unstructured user data
p+3-q	Remainder of unstructured user data
	• For structured user data
p+3-q	Structured subfields (For detailed definitions, see the structured user data section on page 4-168.)
q+1-r	<u>Network Name of OLU</u>
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	<u>Uninterpreted Name of DLU</u>
r+1	Type: X'F3' logical unit
r+2	Length, in binary, of DLU name <u>Note</u>: X'00' = no uninterpreted name is present.
r+3-s	EBCDIC character string; when present, this name is obtained from the preceding INIT-SELF or INIT-OTHER (when ILU=OLU) <u>Note</u>: End of Format 0; Format 2 continues below.
s+1	COS name initialization indicators: bit 0, 0 COS name not received from ILU (see bits 1-2) 1 COS name received from ILU bits 1-2, (reserved if byte s+1, bit 0 = 1) 01 SSCP(DLU) is to initialize COS name (DLU is SLU) 10 SSCP(OLU) has initialized COS name (OLU is SLU) bits 3-7, reserved
s+2-s+9	COS name (this field reserved if byte s+1, bits 1-2 = 01): symbolic name of class of service in EBCDIC characters
4-18	<u>Format 1</u>
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	<u>Queuing Status</u> (For LU associated with SSCP sending CDINIT(DQ))
	bits 0-4, reserved
	bits 5-6, 00 request on bottom of queue
	01 enqueued request FIFO
	10 enqueued request LIFO
	11 reserved
	bit 7, reserved
6	<u>LU Status</u> (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 limit exceeded
	01 reserved
	10 LU is not currently able to comply with the PLU/SLU specification
	11 reserved
	bit 4, 0 existing SSCP to LU path
	1 no existing SSCP to LU path
	bit 5, reserved
	bits 6-7, 01 LU is PLU
	10 LU is SLU
7-14	<u>PCID</u>
7-8	The network address of SSCP(ILU)
9-14	A unique 6-byte value, generated by the SSCP(ILU), that 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 that the LU-LU session identified by the Session Key Content field and the specified PCID for the termination procedure has been successfully deactivated.

0-2	X'818648' NS header
3-10	PCID
3-4	Network address of SSCP(TLU) Note: A network address value of 0 indicates that no PCID is present in bytes 5 through 10; bytes 5-10 are reserved when bytes 3-4 are 0.
5-10	A unique 6-byte value, generated by the SSCP(TLU), that is retained and used in all cross-domain requests dealing with the same procedure until it is completed.
11	bits 0-3, format: 0000 Format 0 0010 Format 2 bits 4-7, reserved
12-n	Format 0
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
12-n Format 2
12 Cause: indicates the reason for deactivation of the identified LU-LU session

- X'01' normal deactivation
- X'02' BIND forthcoming; retain the node resources allocated to this session, if possible
- X'04' restart mismatch; synch point records do not match; operator intervention is needed before the session can be activated
- 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
- X'07' virtual route inoperative: the virtual route used by the (LU,LU) session has become inoperative, thus forcing the deactivation of the identified (LU,LU) session
- X'08' route extension inoperative: the route extension used by the (LU,LU) session has become inoperative thus forcing the deactivation of the identified (LU,LU) session
- X'09' hierarchical reset: the identified (LU,LU) session had to be deactivated because of a +RSP(ACTPU|ACTLU,cold)
- X'0A' SSCP gone: the identified (LU,LU) session had to be deactivated because of a forced deactivation of the (SSCP,PU) or (SSCP,LU) session

	(for example, DACTPU, DACTLU, or DISCONTACT)
	X'0B' virtual route deactivated: the identified (LU,LU) session had to be deactivated because of a forced deactivation of the virtual route being used by the (LU,LU) session
	X'0C' PLU failure: the identified (LU,LU) session had to be deactivated because of an abnormal termination of the PLU
13	Action (reserved for cause codes X'01' through X'06'):
	X'01' normal, no resultant automatic action
	X'02' primary half-session will restart
	X'03' secondary half-session will restart
14-15	Reserved
16	Session key:
	X'06' network name pair
	X'07' network address pair
17-n	<u>Session</u> <u>Key</u> <u>Content</u>
	• 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
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

CDSESSSF; SSCP(PLU)-->SSCP(SLU), Norm; FMD NS(s)
(CROSS-DOMAIN SESSION SETUP FAILURE)
CDSESSSF notifies the SSCP(SLU) that the LU-LU session initiation identified by the Session Key Content field and the specified PCID for the initiation procedure has failed.

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), that is retained and used in all cross-domain requests dealing with the same procedure until it is completed
11-14	Sense data
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
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 LU-LU session identified by the Session Key Content field and the specified PCID for the initiation 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

CDSESSTF; SSCP(PLU)-->SSCP(SLU), Norm; FMD NS(s)
(CROSS-DOMAIN SESSION TAKEDOWN FAILURE)
CDSESSTF notifies the SSCP(SLU) that the LU-LU session identified by the Session Key Content field and the specified PCID for the termination procedure has failed.

0-2	X'818647' NS header
3-10	PCID
3-4	The network address of SSCP(TLU) Note: A network address value of 0 indicates that no PCID is present; bytes 5-10 are reserved when bytes 3-4 are 0.

5-10	A unique 6-byte value, generated by the SSCP(TLU), that is retained and used in all cross-domain requests dealing with the same procedure until it is completed
11-14	Sense data
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	<u>Session Key Content</u>
	• 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
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 (active, pending-active, and queued) involving the domains of both the sending and receiving SSCP. It also prevents the initiation of new LU-LU sessions between these domains.

0-2	X'818649' NS header
3-10	<u>PCID</u>
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:
        bits 0-1,  00  active and
                       pending-active sessions
                   01  active, pending-active,
                       and queued sessions
                   10  queued only 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
                           (only value
                           defined)
      • 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
```

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, that 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 termination 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 termination processing that relates to the LU in its domain.

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 01 request applies to active, pending-active, and queued sessions

```
                 10  request applies to
                     queued sessions only
                 11  reserved
          bit 2, reserved if byte 4, bit 7 = 1;
                 otherwise:
                  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  do not send DACTLU to DLU;
                     another session initiation
                     request will be sent for DLU
                  1  send DACTLU to DLU when
                     appropriate; no further
                     session initiation request
                     will be sent (from this
                     sender) for DLU
          bits 4-6, reserved
          bit 7,  0  orderly or forced (see byte
                     4, bit 2)
                  1  cleanup
5-12      PCID
5-6       The network address of the SSCP(TLU)
7-12      A unique 6-byte value, generated by
          the SSCP(TLU), that 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
```

	• 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'05' PCID 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'05': PCID
17-18	Network address of the SSCP(ILU)
19-24(=n)	A unique six-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 Note: This PCID is different from the one in bytes 5-12, which is generated by the SSCP(TLU).
	• 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
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

CHASE; LU-->LU, Norm; DFC (CHASE)
CHASE is sent by a half-session to request the receiving half-session to return all outstanding normal-flow responses to 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 requests received before the CHASE.
0 X'84' request code

CINIT; SSCP-->PLU, Norm; FMD NS(s) (CONTROL INITIATE)
CINIT requests the PLU to attempt to activate, via a BIND request, a session with the specified SLU.
0-2 X'810601' NS header
3 Format
bits 0-3, 0000 Format 0 (only value defined)
Note: CINIT format 0 may carry control vectors at the end of the basic RU (which

	ends with the Session Cryptography Key field).
	bits 4-7, reserved
4	INITIATE Origin:
	bit 0, 0 ILU is OLU
	1 ILU is not OLU
	bit 1, reserved
	bit 2, 0 SLU is OLU
	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: bytes 1-p of the BIND RU, that is, through the URC field (see BIND format description)
	<u>Note</u>: If the length of the URC field is 0, the Length field itself is excluded from the BIND image.
m+1-n	<u>Name of SLU</u>
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	<u>Requester ID</u>
n+1	Length, in binary, of requester ID
	<u>Note</u>: X'00' = no requester ID
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	<u>Password</u>
p+1	Length, in binary, of password
	<u>Note</u>: X'00' = no password is present
p+2-q	Password used to verify the identity of the end user

q+1-r	<u>User Field</u> (from INITIATE RU)
q+1	Length, in binary, of user data <u>Note</u>: X'00' = no user data is present
q+2-r	User data: user-specific data
q+2	User data key X'00' structured subfields follow ¬X'00' first byte of unstructured user data <u>Note</u>: Individual structured subfields may be omitted entirely. When present, they appear in ascending field number order.
	• For unstructured user data
q+3-r	Remainder of unstructured user data
	• For structured user data
q+3-r	Structured subfields (For detailed definitions, see the structured user data section on page 4-168.)
r+1-s	<u>LU or Non-SNA Device Specifications</u>
r+1-r+2	Length of characteristics field, including both format and characteristics fields--that is, bytes r+3 - s <u>Note</u>: X'0000' = no Format and no Characteristics fields are present.
r+3	Characteristics format: X'01' device characteristics (only value defined)
r+4-s	<u>LU or Non-SNA Device Characteristics</u>
	• <u>Format X'01'</u>: (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 <u>on</u>) X'01' specific poll= <u>on</u>; general poll= <u>off</u>

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'91'	3780
	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 <u>on</u>)
	X'40'	non-SNA application program interface (always <u>off</u>)
	X'20'	buffered
	X'10'	continue mode
	X'08'	contention mode
	X'04'	inhibit mode (text timeout)
	X'02'	end-to-end control
	X'01'	3270 extended data stream requiring BSC transparency

r+10	Device data stream compatibility characteristics: (This field is used in conjunction with the Device Type field, r+5, when that field is set to X'6D': SNA logical unit; otherwise, it is reserved.) X'00' no data stream characteristics defined here 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'91' 3780 X'A0'-X'FF' available for installation-defined use
r+11	Reserved
r+12-r+16	Screen size (see the PS Usage field in the BIND RU for format)
r+17-s	<u>Work Area</u> (This field is optional--if not present, s = r+16.)
r+17	Work area format: X'00' unformatted X'01' TCAM format
r+18-s	Work area excluding format
s+1	Length of Session Cryptography Key field <u>Note</u>: X'00' = no Session Cryptography Key field present
s+2-t	Session Cryptography Key field: session cryptography key enciphered under PLU master cryptography key <u>Note</u>: End of base RU
t+1-u	Control vector, as described in the section, "Control Vectors and Control lists," later in this section <u>Note</u>: The following vector key is used in CINIT: X'0D' Mode/Class of Service/Virtual Route List

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

CLEANUP is sent by the SSCP to the SLU (in a subarea node only) requesting that the SLU attempt to deactivate the session for the specified (PLU,SLU) network address pair.

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 • 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 the 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 <u>Session Key Content</u>

- For session key X'06': uninterpreted name pair

7 Type: X'F3' logical unit
8 Length, in binary, of PLU name
9-m EBCDIC character string
m+1 Type: X'F3' logical unit
m+2 Length, in binary, of SLU name
m+3-n EBCDIC character string

- For session key X'07': network address pair

7-8 Network address of PLU
9-10(=n) Network address of SLU

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 the primary and secondary half-sessions (and boundary function, if any).
0 X'A1' request code

CONNOUT; SSCP-->PU_T4|5, PUCP-->PU, Norm; FMD NS(c) (CONNECT OUT)
CONNOUT requests the PU to initiate a connect-out procedure on the specified link.
0-2 X'01020E' NS header
3-4 Network address of link
5 SDLC link station identifier
6 bit 0, type: 0 (only value defined)
bits 1-2, connect-out feature:
00 automatic connect out (dial digits are provided)
01 reserved
10 manual connect out (no dial digits are provided); this bit setting does not apply to CCITT X.21 connections

11 CCITT X.21 direct connect out (no dial digits are provided)

bits 3-7, reserved

Note: Bytes 7-n are not included on manual connect calls (bits 1-2 = 10).

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

8 Number of dial digits (0 for X.21 direct connect out)

9-n Dial digits: EBCDIC characters representing decimal digits and control information, as appropriate to the link connection

CONTACT; SSCP-->PU_T4|5, PUCP-->PU, Norm; FMD NS(c) (CONTACT)

CONTACT requests the initiation of a procedure at the PU to activate DLC-level contact with the adjacent link station specified in the request. The DLC-level contact must be activated before any PIUs can be exchanged with the adjacent node over the link.

0-2 X'010201' NS header

3-4 Network address of adjacent link station of the node to be contacted

CONTACTED; PU_T4|5-->SSCP, PU-->PUCP, 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 node load is required or whether an error occurred on the contact procedure.

0-2 X'010280' NS header

3-4 Network address of adjacent link station of the node being contacted

5 Status of adjacent link station or node associated with adjacent link station:

	X'01'	loaded (no field follows)
	X'02'	load required (no field follows)
	X'03'	error on CONTACT (no field follows)
	X'04'	loaded (additional field, bytes 6-p, follows)
	X'05'	exchanged parameters in XID Format 2 I-field not compatible (additional field, bytes 6-p, follows)
	X'07'	no routing capability to adjacent node (additional field, bytes 6-p, follows)
	X'08'	incompatible parameters in XID Format 2 I-field for addition of link station to currently active TG (additional field, bytes 6-p, follows)

6-p	<u>Additional fields</u> for status bytes <u>X'04', X'05', X'07'</u>, and X'08'
	• For status byte X'04'
6	Resolved TG number
7-10	Adjacent node subarea address (right-justified with leading 0's.)
11-18	IPL load module ID received from the adjacent node: an eight-character EBCDIC symbolic name of the IPL load module currently operating in the adjacent node <u>Note</u>: X'40...40' = no information conveyed.
	• For status bytes X'05', X'07', and X'08'
6	Length, in binary, of XID Format 2 I-field received
7-n	XID Format 2 I-field received (See the later section, "DLC XID Information-Field Format," for format details.)
n+1	Length, in binary, of XID Format 2 I-field sent
n+2-p	XID Format 2 I-field sent (See the later section, "DLC XID Information-Field Format," for format details.)

CRV; PLU-->SLU, Exp; SC (CRYPTOGRAPHY VERIFICATION)
CRV, a valid request only when session-level cryptography was selected in BIND, is sent by the primary LU session control to verify cryptography security and thereby enable sending and receiving of FMD requests by both half-sessions.

0	X'C0' request code
1-8	A transform of the (deciphered) cryptography session-seed value received (enciphered) in bytes 28-k of +RSP(BIND), re-enciphered under the session cryptography key using a seed value of 0; the transform is the cryptography session-seed value with the first four bytes inverted Note: The cryptography session-seed is used as the seed for all session-level cryptography 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 identified by the specified (PLU,SLU) network address pair.

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)
- 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

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	<u>Requester ID</u>
13	Length, in binary, of requester ID <u>Note</u>: X'00' = no requester ID
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	<u>Password</u>
n+1	Length, in binary, of password <u>Note</u>: X'00' = no password is present
n+2-p	Password used to verify the identity of the end user

DACTCDRM; SSCP-->SSCP, Exp; SC (DEACTIVATE CROSS-DOMAIN RESOURCE MANAGER)
DACTCDRM is sent to deactivate an SSCP-SSCP session.

0 X'15' request code
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
    X'3' session outage notification (SON)

• End of Type 1; Type 2 Continues

2-5 Reason code (included only if type deactivation requested is invalid activation parameter, that is, byte 1, bits 4-7 = X'2'): sense data (see Chapter 8) corresponding to the error

• Type 3 Continues

2 Cause of session outage notification:
  X'07' virtual route inoperative: the virtual route being used by the SSCP-SSCP session has become inoperative, thus forcing the deactivation of the SSCP-SSCP session
  X'0B' virtual route deactivated: the identified SSCP-SSCP session is being deactivated because of a forced deactivation of the virtual route being used by the session
  X'0C' SSCP failure--unrecoverable: the identified (SSCP,SSCP) session had to be deactivated because of an abnormal

termination of one of the SSCPs of the session; recovery from the failure was not possible

X'0D' session override: the subject session has to be deactivated because of a more recent session activation request for the same session over a different virtual route

X'0E' SSCP failure--recoverable: the identified (SSCP,SSCP) session had to be deactivated because of an abnormal termination of one of the SSCPs of the session; recovery from the failure may be possible

X'0F' cleanup: the SSCP is resetting its half-session before it receives the response from the partner SSCP receiving the DACTCDRM

X'10' SSCP contention: two SSCPs have sent each other an ACTCDRM request over different virtual routes; the SSCP receiving the ACTCDRM from the SSCP with the greater SSCP ID sends DACTCDRM, with this SON code, to the other SSCP over the same virtual route on which the contention-losing ACTCDRM was sent

3 Reserved

DACTCONNIN; SSCP-->PU_T4|5, PUCP-->PU, Norm; FMD NS(c) (DEACTIVATE CONNECT IN)

DACTCONNIN requests the PU to disable the specified link from accepting incoming calls.

0-2 X'010217' NS header

3-4 Network address of link

DACTLINK; SSCP-->PU_T4|5, PUCP-->PU, Norm; FMD NS(c) (DEACTIVATE LINK)
DACTLINK initiates a procedure at the PU to deactivate the protocol boundary between a link station in the node (as specified by the link network address parameter in the request) and the link connection attached to it. It is used after all adjacent link 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 <u>Note</u>: End of short (one-byte) request
1	Type of deactivation requested: X'01' normal deactivation X'03' session outage notification (SON)
2	Cause (reserved if byte 1 ¬= X'03'): X'07' virtual route inoperative: the virtual route serving the (SSCP,LU) session has become inoperative, thus forcing the deactivation of the session X'08' route extension inoperative: the route extension serving the (SSCP,LU) session has become inoperative, thus forcing the deactivation of the session X'09' hierarchical reset: the identified session is being deactivated because of a +RSP(ACTPU, Cold) X'0B' virtual route deactivated: the identified (SSCP,LU) session is being deactivated because of a forced deactivation of the virtual route being used by the session X'0C' SSCP or LU failure--unrecoverable: the

subject session had to be reset because of an abnormal termination; recovery from the failure was not possible

X'0E' SSCP or LU failure--recoverable: the identified (SSCP,LU) session had to be deactivated because of an abnormal termination of the SSCP or LU of the session; recovery from the failure may be possible

X'0F' cleanup: the SSCP is resetting its half-session before receiving the response from the LU being deactivated

DACTPU; SSCP|PUCP-->PU, PU-->SSCP, 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
- X'03' session outage notification (SON)

2 Cause (not present if byte 1 ¬= X'03'):

- X'07' virtual route inoperative: the virtual route for the (SSCP,PU) session has become inoperative, thus forcing the deactivation of the (SSCP,PU) session
- X'08' route extension inoperative: the route extension serving the (SSCP,PU) session has become inoperative, thus forcing the deactivation of the (SSCP,PU) session
- X'09' hierarchical reset: the identified session is being deactivated because of a +RSP(ACTPU, Cold)

X'0B' virtual route deactivated: the identified (SSCP,PU) session is being deactivated because of a forced deactivation of the virtual route being used by the session

X'0C' SSCP or PU failure--unrecoverable: the identified (SSCP,PU) session had to be deactivated because of an abnormal termination of the SSCP or PU of the session; recovery from the failure was not possible

X'0D' session override: the subject session has to be deactivated because of a more recent session activation request for the same session over a different virtual route

X'0E' SSCP or PU failure--recoverable: the identified (SSCP,PU) session had to be deactivated because of an abnormal termination of the SSCP or PU of the session; recovery from the failure may be possible

X'0F' cleanup: the SSCP is resetting its half-session before receiving the response from the PU that is being deactivated.

DACTTRACE; SSCP-->PU_T4|5, 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
bit 0, transmission group trace
bits 1-6, reserved
bit 7, link trace

6-n Data to support trace deactivation

DELETENR; SSCP-->PU_T4|5, Norm; FMD NS(c)
(DELETE NETWORK RESOURCE)
DELETENR is sent to free a network address assigned to a link or adjacent link station.

0-2	X'41021C' NS header
3-4	Network address of resource being deleted

DELIVER; SSCP-->LU, Norm; FMD NS(mn) (DELIVER)
DELIVER contains an embedded NS RU. A flag in the DELIVER RU indicates whether the NS RU contains a CNM header. An embedded NS RU is either a reply request corresponding to an NS RU embedded in a FORWARD request, or it is an unsolicited request.

0-2	X'810812' NS header
3	Format: X'00' format 0 (only value defined)
4	Flags: bits 0-6, reserved bit 7, format of embedded NS RU: 0 embedded NS RU contains a CNM header 1 embedded NS RU does not contain a CNM header
5	Reserved
6-7	Length, in binary, of embedded NS RU
8-n	Embedded NS RU
n+1-p	<u>Network Name of Origin PU</u>
n+1	Type: X'F1' PU
n+2	Length, in binary, of symbolic name
n+3-p	Symbolic name in EBCDIC characters
p+1-q	<u>Network Name of Target PU, LU, Adjacent Link Station, or Link</u>
p+1	Type: X'F1' PU X'F3' LU X'F7' adjacent link station X'F9' link
p+2	Length, in binary, of symbolic name
p+3-q	Symbolic name in EBCDIC characters • If the target is a PU in a PU_T1|2 node or is an adjacent link station attached to a PU_T4|5 node

q+1-s+1	<u>Configuration Hierarchy Network Name List</u>
q+1	Type: X'F9' link connecting the PU_T1|2 node to the PU_T4| 5 node containing the boundary function for the target PU or connecting the adjacent link station to the PU_T4|5 node
q+2	Length, in binary, of symbolic name
q+3-r	Symbolic name in EBCDIC characters
r+1	Type: X'F1' PU in the PU_T4|5 node containing the boundary function for the target PU or attaching the target adjacent link station
r+2	Length, in binary, of symbolic name
r+3-s	Symbolic name in EBCDIC characters
s+1	X'00' (end of configuration hierarchy network name list)
	• If the target is an LU in a PU_T1|2 node:
q+1-t+1	<u>Configuration Hierarchy Network Name List</u>
q+1	Type: X'F1' PU in the PU_T1|2 node containing the target L U
q+2	Length, in binary, of symbolic name
q+3-r	Symbolic name in EBCDIC characters
r+1	Type: X'F9' link connecting the PU_T1|2 node to the PU_T4| 5 node containing the boundary function for the target LU
r+2	Length, in binary, of symbolic name
r+3-s	Symbolic name in EBCDIC characters
s+1	Type: X'F1' PU in the PU_T4|5 node containing the boundary function for the target LU
s+2	Length, in binary, of symbolic name
s+3-t	Symbolic name in EBCDIC characters
t+1	X'00' (end of configuration hierarchy network name list)
	• If the target is a link attached to, or a PU or LU in, a PU_T4|5 node:
q+1-q+1	<u>Configuration Hierarchy Network Name List</u>
q+1	X'00' (end of configuration hierarchy network name list)

DISCONTACT; SSCP-->PU_T4|5, PUCP-->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 at the primary link station of the specified link.

0-2	X'010202' NS header
3-4	Network address of adjacent link station to be discontacted

DISPSTOR; SSCP-->PU_T4|5, Norm; FMD NS(ma) (DISPLAY STORAGE)

DISPSTOR requests the PU to send a RECSTOR RU containing a specified number of bytes of storage beginning at a specified location.

0-2	X'010331' NS header
3-4	Network address of resource to be displayed
5	Display target and type: bits 0-3, target address space to be displayed Note: Refer to implementation documentation for description of these values. bits 4-7, display type: 0001 nonstatic storage display 0010 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.

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-->PU_T4|5, Norm; FMD NS(c) (DUMP FINAL)
DUMPFINAL terminates the dump sequence, whether DUMPTEXT is used or not. A positive response to DUMPFINAL indicates that the dump sequence is complete.

0-2	X'010208' NS header
3-4	Network address of adjacent link station of the node being dumped

DUMPINIT; SSCP-->PU_T4|5, Norm; FMD NS(c) (DUMP INITIAL)
DUMPINIT requests the PU_T4|5 to initiate a DLC-level dump from an adjacent PU_T4 node to the PU_T4|5, for eventual transmission to the SSCP. The node to be dumped is identified by the adjacent link station address contained in the request.

0-2	X'010206' NS header
3-4	Network address of adjacent link station of the node to be dumped

DUMPTEXT; SSCP-->PU_T4|5, 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 PU_T4|5 obtains the dump data from the PU_T4 node, using a DLC-level interchange.

0-2	X'010207' NS header

3-4	Network address of adjacent link station of the node to be dumped
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

ECHOTEST; SSCP-->LU, Norm; FMD NS(ma) (ECHO TEST)

ECHOTEST carries test data to the target LU; the test data is the same as that carried in the corresponding REQECHO.

0-2	X'810389' NS header
3-n	Echo data field: same as bytes 4-m in the soliciting REQECHO
3	Number of data bytes
4-n	Data

ER-INOP; PU_T4|5-->SSCP, PU_T4-->PUCP, Norm; FMD NS(c) (EXPLICIT ROUTE INOPERATIVE)

ER-INOP notifies the CP when an explicit route has become inoperative as the result of a transmission group having become inoperative somewhere in the network.

0-2	X'41021D' NS header
3	Format: X'01' (only value defined)
4	Reason code for INOP: X'01' unexpected routing interruption over a transmission group, for example, the last active link on a TG has failed X'02' controlled routing interruption such as the result of a DISCONTACT
5-8	Address of the subarea that originated the corresponding NC-ER-INOP
9-12	Subarea address on the other end of the transmission group that had the routing interruption
13	TGN of the transmission group that had routing interruption
14	Number of destination subareas that are on the ERs using the above TG
15-20	<u>Inoperative ER Field</u>

15-18	Subarea address of a destination that is routed to over an ER using the above TG
19-20	Inoperative explicit route mask: a bit is on if the ER of the corresponding ERN is inoperative (Bit 0 corresponds to ERN 0, bit 1 to ERN 1, and so forth.)
21-n	Any additional six-byte entries in the same format as bytes 15-20

ER-TESTED; PU_T4|5-->SSCP, Norm; FMD NS(ma) (EXPLICIT ROUTE TESTED)

ER-TESTED is sent by a subarea node to one or more SSCPs to provide the status of an ER as determined by explicit route test procedures.

0-2 X'410386' NS header

3 Format:
- X'1' Format 1
- X'2' Format 2; same as Format 1, except that it includes bytes 48-52

4 Type:
- X'00' the corresponding NC-ER-TEST reached its destination subarea
- X'02' ER not reversible since there is no reverse ERN defined
- X'03' encountered a PU that does not support ER and VR protocols
- X'04' ER length exceeded that specified in the NC-ER-TEST request
- X'05' ER requires a TG that is not active
- X'06' ER is not defined in the NC-ER-TEST-REPLY originating node

5 Explicit route length, in terms of the number of transmission groups in the explicit route, as accumulated in NC-ER-TEST

6 Maximum ER length, as specified in the NC-ER-TEST request

7-10 Subarea address of the destination PU of the corresponding NC-ER-TEST

11	Reserved
12	bits 0-3, reserved bits 4-7, ERN of the ER tested
13-16	Subarea address of the originating PU of the corresponding NC-ER-TEST
17-18	Reverse ERN mask: A bit is on if the corresponding ERN can be used to route from the NC-ER-TEST-REPLY originating subarea to the NC-ER-TEST originating subarea (Bit 0 corresponds to ERN 0, bit 1 to ERN 1, and so forth.)
19-20	Maximum PIU length allowed on the reverse ERN specified in byte 17-18: X'00' no restriction (only value defined)
21-22	Maximum PIU size accumulated by the corresponding NC-ER-TEST: X'00' no restriction (only value defined)
23-28	Network address of the SSCP originating the test request
29-38	Request Correlation field, as specified in the corresponding ROUTE-TEST
39-42	Subarea address of the PU that originated the corresponding NC-ER-TEST-REPLY
43-46	Subarea address depending on the Type field (Byte 4) as follows:

Type	Contents of this field
X'00'	reserved
X'02'	subarea on the ER prior to that with no reverse ERN defined
X'03'	subarea that does not support ER and VR protocols
X'04'	subarea on the ER preceding the subarea where the explicit route length (byte 5 of NC-ER-TEST) is incremented to a value one more than the maximum ER length limit (byte 6)
X'05'	subarea on the other end of the TG that is not active

X'06' subarea on the ER from which the PU (that does not have the ER defined) received the corresponding NC-ER-TEST

47 TGN of the TG between the subareas specified in bytes 39-42 and 43-46; reserved if Type is X'00'.
Note: End of Format 1; Format 2 continues below
48-51 Subarea address of the adjacent node through which the tested explicit route flows from this node
52 Transmission group number of the TG (to the node identified in bytes 48-51) over which the tested explicit route flows from this node

ESLOW; PU_T4-->SSCP, Norm; FMD 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 selectively reduced or suspended.
0-2 X'010214' NS header
3-4 Network address of PU

EXECTEST; SSCP-->PU_T4|5, 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_T4-->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-->PU_T4|5, Norm; FMD NS(c) (FREE NETWORK ADDRESSES)
FNA is sent from an SSCP to request the PU_T4|5 to remove the appropriate entries from the node resource list, thereby freeing the network addresses associated with the corresponding resources in the node.

0-2	X'01021A' NS header
3-4	Network address of target link, SPU, or LU (X'0000' indicates that the network addresses in bytes 7-n are to be freed without verification of their attachment to a specific target link, SPU, or LU.)
5	Number of SPU (if bytes 3-4 specify a link), BF.LU (if bytes 3-4 specify an SPU), or LU (if bytes 3-4 specify an LU network address used for the SSCP-LU session) network addresses to be freed (X'00' = all--and 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) Note: All the network addresses specified in bytes 7-n are associated with the same target link, SPU, or LU. See the following table for the relation of target resources to resources to free.

Target resource	Resources to free
PU	LUs identified by network addresses associated with SSCP-LU sessions
LU (identified by the network address associated with an SSCP-LU session)	LU network addresses used as primary network addresses in parallel sessions
Link	BF.PUs and adjacent link stations
BF.PU	BF.LUs

FORWARD; LU-->SSCP, Norm; FMD NS(mn) (FORWARD)
FORWARD requests the SSCP to send the embedded NS RU to the named destination PU|LU, using the corresponding SSCP-PU|LU session. The FORWARD RU contains a flag that specifies whether the embedded NS RU contains a partially initialized CNM header or no CNM header at all.

0-2 X'810810' NS header
3 Format: X'00' format 0 (only value defined)
4 Flags:
  bits 0-5, reserved
  bit 6, solicitation indicator:
    0 embedded NS RU solicits a reply request
    1 embedded NS RU does not solicit a reply request
  bit 7, format of embedded NS RU:
    0 embedded NS RU contains a (partially initialized) CNM header
    1 embedded NS RU does not contain a CNM header
5 Reserved
6-7 Length, in binary, of embedded NS RU
8-n Embedded NS RU
n+1-p Network Name of Destination PU
n+1 Type:
  X'F1' PU

n+2 Length, in binary, of symbolic name
n+3-p Symbolic name in EBCDIC characters
p+1-q Network Name of Target PU, LU, Adjacent Link Station, or Link
p+1 Type:
X'F1' PU
X'F3' LU
X'F7' adjacent link station
X'F9' link
p+2 Length, in binary, of symbolic name
p+3-q Symbolic name in EBCDIC characters

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

0-2 X'810680' NS header
3 Format:
bits 0-3, 0001 Format 1
0010 Format 2: specifies the COS name field in addition to the parameters in Format 1
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
bit 7, reserved

5 Queuing conditions for LU1 (when Type = DQ, bits 0-7 are reserved):
bit 0, 0 do not enqueue if session limit will be exceeded
1 enqueue if session limit will be exceeded
bit 1, 0 do not enqueue if the LU is not currently able to comply with the PLU/SLU specification (as given in byte 4, bits 5-6)
1 enqueue even though the LU might not be currently able to comply with the PLU/SLU specification
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 limit will be exceeded
		1	enqueue if session limit will be exceeded
	bit 1,	0	do not enqueue if the LU is not currently able to comply with the PLU/SLU specification (as given in byte 4, bits 5-6)
		1	enqueue even though the LU might not be currently able to comply with the PLU/SLU specification
	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 on Bytes 5-6:

- If enqueuing for recovery is desired, 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 SSCPs try to set up a session between the same LUs at the same time.)
- Enqueueing 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
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 name: 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 Name field is reserved.)

17-m	Uninterpreted name of LU1
17	Type: X'F3' logical unit
18	Length, in binary, of LU1 name
19-m	EBCDIC character string
m+1-n	Uninterpreted name of LU2
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of LU2 name
m+3-n	EBCDIC character string
n+1-p	Requester ID
n+1	Length, in binary, of requester ID Note: X'00' = no requester ID
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
q+2	User data key X'00' structured subfields follow ¬X'00' first byte of unstructured user data Note: Individual structured subfields may be omitted entirely. When present, they appear in ascending field number order.
	• For unstructured user data
q+3-r	Remainder of unstructured user data
	• For structured user data
q+3-r	Structured subfields (For detailed definitions, see the structured user data section on page 4-168.)
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
r+2-s	URC: end-user defined identifier; this value can be returned by the SSCP in a subsequent NOTIFY to correlate a given session to the initiating request
	End of Format 1; Format 2 Continues
s+1-s+8	COS name: symbolic name of class of service in EBCDIC characters (A value of eight space (X'40') characters may be specified; in this case, the COS name is derived from the mode name table, using the mode name received in bytes 9-16.)

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 initiated 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).

0-2	X'818640' NS header		
3	Format:		
	bits 0-3,	0000	Format 0
		0010	Format 2: specifies COS name field in addition to the parameters in Format 0
	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

bit 7, reserved

5 Queuing conditions for LU1 (When Type = DQ, bits 0-7 are reserved.):

bit 0,
- 0 do not enqueue if session limit will be exceeded
- 1 enqueue if session limit will be exceeded

bit 1,
- 0 do not enqueue if the LU is not currently able to comply with the PLU/SLU specification (as given in byte 4, bits 5-6)
- 1 enqueue if the LU is not currently able to comply with the PLU/SLU specification

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,
- 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 limit will be exceeded
1 enqueue if session limit will be exceeded

bit 1, 0 do not enqueue if the LU is not currently able to comply with the PLU/SLU specification (as given in byte 4, bits 5-6)
1 enqueue even though the LU might not be currently able to comply with the PLU/SLU specification

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 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 on Bytes 5-6:

- If enqueuing for recovery is desired, it is indicated in both LU1 and LU2 Queuing Conditions bytes (bit 7 = 1).
- Bit 2 (CDINIT contention) has 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.

7-14 PCID (When Type = DQ, the PCID is the same as in the original INIT-OTHER-CD request.)
7-8 Network address of SSCP(ILU)

9-14	A unique 6-byte value, generated by the SSCP(ILU), that 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 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 name: 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 Name 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 passed to the primary LU on the CINIT request
q+2	User data key X'00' structured subfields follow ¬X'00' first byte of unstructured user data Note: Individual structured subfields may be omitted entirely. When present, they appear in ascending field number order.

• For unstructured user data

q+3-r Remainder of unstructured user data

• For structured user data

q+3-r Structured subfields (For detailed definitions, see the structured user data section on page 4-168.)
Note: With the exception of the NS header and PCID, all the fields in the INIT-OTHER-CD RU are derived from its corresponding INIT-OTHER RU.

• End of Format 0; Format 2 Continues

r+1 COS name field initialization indicator:
bit 0, 0 ILU did not specify COS name
1 ILU did specify COS name
bits 1-7, reserved

r+2-r+9 COS name (reserved if byte r+1, bit 0 = 0): symbolic name of class of service in EBCDIC characters (A value of eight space (X'40') characters may be specified; in this case, the COS name is derived from the mode name table using the mode name received in bytes 17-24.)

INITPROC; SSCP-->PU_T4|5, Norm; FMD NS(c)
(INITIATE PROCEDURE)
INITPROC is sent to the subarea PU adjacent to a PU_T2 in order to initiate a PU_T4|5-PU_T2 load operation.

0-2 X'410235' NS header

3-6 Reserved

7-8 Network address of PU_T2 for which the procedure is to be initiated

9 Procedure type:
X'00' load (only value defined)

• For procedure type = load

10-17 IPL load module: an eight-character EBCDIC symbolic name of the IPL load module to be sent to the PU identified in bytes 7-8

INIT-SELF (format 0)

INIT-SELF; ILU-->SSCP, Norm; FMD NS(s)
(INITIATE-SELF)
INIT-SELF from the ILU requests that the SSCP authorize and assist in the initiation of 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, 00 DLU is PLU 01 DLU is SLU 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 name: 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	<u>Uninterpreted Name of DLU</u>
12	Type: X'F3' logical unit
13	Length, in binary, of DLU name
14-m	EBCDIC character string
m+1-p	<u>Requester ID</u>
m+1	Length, in binary, of requester ID <u>Note</u>: X'00' = no requester ID

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   <u>Password</u>

p+1   Length, in binary, of password
<u>Note</u>: X'00' = no password is present

p+2-q   Password used to verify the identity of the end user

q+1-r   <u>User Field</u>

q+1   Length, in binary, of user data
<u>Note</u>: X'00' = no user data is present

q+2-r   User data: user-specific data that is passed to the primary LU on the CINIT request

q+2   User data key
- X'00' structured subfields follow
- ¬X'00' first byte of unstructured user data
<u>Note</u>: Individual structured subfields may be omitted entirely. When present, they appear in ascending field number order.

• For unstructured user data

q+3-r   Remainder of unstructured user data

• For structured user data

q+3-r   Structured subfields (For detailed definitions, see the structured user data section on page 4-168.)
<u>Note</u>: 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 (format 1)

INIT-SELF; ILU-->SSCP, Norm; FMD NS(s)
(INITIATE-SELF)
INIT-SELF from the ILU requests that the SSCP authorize and assist in the initiation of 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'810681' NS header		
3	bits 0-3, format:	0001	Format 1: specifies queuing, initiate origin, NOTIFY, and URC in addition to the parameters in Format 0
		0010	Format 2: specifies the COS name field in addition to the parameters in Format 1
	bits 4-7, reserved		
4	Type:		
	bits 0-1,	00	dequeue (DQ) a previously enqueued initiate request (Note: Value 00 is reserved if not Format 1.) (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.)
		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

bit 7, reserved

5 Queuing conditions for DLU (When Type = DQ, bits 0-7 are reserved.):

bit 0,
- 0 do not enqueue if session limit exceeded
- 1 enqueue if session limit exceeded

bit 1,
- 0 do not enqueue if DLU is not currently able to comply with the PLU/SLU specification (as given in byte 4, bits 5-6)
- 1 enqueue if DLU is not currently able to comply with the PLU/SLU specification

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
- 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 limit 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 name: 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 Name field is reserved.)
16-n	<u>Uninterpreted Name of DLU</u>
16	Type: X'F3' logical unit
17	Length, in binary, of DLU name
18-n	EBCDIC character string
n+1-p	<u>Requester ID</u>
n+1	Length, in binary, of requester ID <u>Note</u>: X'00' = no requester ID
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	<u>Password</u>
p+1	Length, in binary, of password <u>Note</u>: X'00' = no password is present
p+2-q	Password used to verify the identity of the end user
q+1-r	<u>User Field</u> (When Type = DQ, User field is reserved)
q+1	Length, in binary, of user data <u>Note</u>: X'00' = no user data is present
q+2-r	User data: user-specific data that is passed to the primary LU on the CINIT request
q+2	User data key X'00' structured subfields follow ¬X'00' first byte of unstructured user data <u>Note</u>: Individual structured subfields may be omitted entirely. When present, they appear in ascending field number order.

• For unstructured user data
q+3-r Remainder of unstructured user data
• For structured user data
q+3-r Structured subfields (For detailed definitions, see the structured user data section on page 4-168.)
r+1-s <u>User Request Correlation</u> (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
<u>Note</u>: X'00' = no URC
r+2-s URC: end-user defined identifier; this value can be returned by the SSCP in a subsequent NOTIFY to correlate a given session to this initiating request
<u>End of Format 1; Format 2 Continues</u>
s+1-s+8 COS name: symbolic name of class of service in EBCDIC characters (A value of eight space characters may be specified; in this case, the COS name is derived from the mode name table using the mode name received in bytes 8-15.)

INOP; PU_T4|5-->SSCP, PU-->PUCP, 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 an inoperative (1) link or (2) adjacent link station
5	bits 0-3, format: X'0' (only value defined) <u>Note</u>: The value X'F' is set aside for implementation use and will not be further defined in SNA.
	bits 4-7, reason: X'1' adjacent link station: loss of contact, unexpected loss of connection, or connection establishment failure

X'2'	link: link failure
X'3'	adjacent link station: discontact--loss of synchronization
X'4'	adjacent link station: incomplete discontact--loss of synchronization
X'5'	adjacent link station: request resynchronization -- unexpected request for resynchronization
X'6'	adjacent link station (IPL or DUMP in progress)
X'7'	adjacent link station (RPO in progress)
X'A'	link: CCITT X.21 call establishment failure; X.21 call progress signals were received but are not included in bytes 6-7
X'B'	link: CCITT X.21 outgoing call establishment failure because of DCE signalling DCE clear condition
X'C'	link: CCITT X.21 outgoing call establishment failure because of expiration of time-out on changing DCE conditions
X'D'	link: unexpected loss of connection during the CCITT X.21 call phase
X'E'	link: failure during the CCITT X.21 call clearing phase

	X'F'	link: CCITT X.21 outgoing call establishment failure; X.21 call progress signals were received--the signal is included in bytes 6-7

6-7 The CCITT X.21 call progress signal last received--included only if byte 5, bits 4-7 = X'F'; otherwise, these bytes are omitted (The codes and meanings of these X.21 call progress signals are as described in the CCITT recommendation X.21.)

IPLFINAL; SSCP-->PU_T4|5, Norm; FMD NS(c) (IPL FINAL)

IPLFINAL completes an IPL sequence and supplies the load-module entry point to the PU_T4 node. A positive response to IPLFINAL indicates that the PU_T4 node is successfully loaded.

0-2	X'010205' NS header
3-4	Network address of adjacent link station associated with the node being loaded
5-8	Entry point location within load module

IPLINIT; SSCP-->PU_T4|5, Norm; FMD NS(c) (IPL INITIAL)

IPLINIT initiates a DLC-level load of an adjacent PU_T4 node from the PU_T4|5 node. The node to be loaded is identified by the adjacent link station address contained in the request.

0-2	X'010203' NS header
3-4	Network address of adjacent link station associated with the node to be loaded

IPLTEXT; SSCP-->PU_T4|5, Norm; FMD NS(c) (IPL TEXT)
IPLTEXT transfers load module information to the PU_T4|5, which passes it in a DLC-level load to the PU_T4 node. Following an IPLINIT, any number of IPLTEXT commands are valid.

0-2	X'010204' NS header
3-4	Network address of adjacent link station associated with the node to be loaded
5-n	Text: a variable-length byte-string in the form required by the node being loaded

LCP; PU_T4|5-->SSCP, PU_T4-->PUCP, Norm; FMD NS(c) (LOST CONTROL POINT)
LCP notifies the SSCP that a subarea PU's session with another SSCP has failed. The SSCP displays this information for the network operator.

0-2	X'410287' NS header
3	Reason code, specifying why LCP was generated: X'07' virtual route inoperative: VR-INOP received for the virtual route used by the (SSCP,PU) session (where the SSCP is the lost control point identified later, and the PU is the originator of the LCP) X'0A' forced deactivation of the (SSCP,PU) session (DACTPU(¬SON) received by the PU) X'0B' virtual route deactivated: NC-DACTVR(Forced) received for the virtual route used by the (SSCP,PU) session (where the SSCP is the lost control point identified later and the PU is the originator of the LCP) X'0C' SSCP failure: the session between this PU and the identified SSCP was reset because of an abnormal termination of the SSCP

	(DACTPU(SON,Cause = X'0C') was received by the PU)
4	Reserved
5-10	<u>Network address of the lost control point (SSCP)</u>
5-8	Subarea address of the lost control point
9-10	Element address of the lost control point

LDREQD; PU_T2-->SSCP, Norm; FMD NS(c) (LOAD REQUIRED)
The LDREQD request enables the PU_T2 to request a specific load module be moved to its node.

0-2	X'410237' NS header
3-10	IPL load module: an eight-character EBCDIC symbolic name of the IPL load module requested: X'4040...40' any load module will be accepted ¬X'4040...40' specific load module specified
11	bits 0-6, reserved bit 7, adjacent PU load capability (initialized to 0 by the PU_T2): 0 the adjacent PU is unable to load the PU_T2 1 the adjacent PU can load the PU_T2 (set by the boundary function in the adjacent subarea node)

LSA; PU_T4\|5-->PU_T4\|5, Exp; NC (LOST SUBAREA)
When LSA is received from a node that does not support ER-VR protocols, the ER manager converts it to an NC-ER-INOP and processes it accordingly. If the node to which an NC-ER-INOP is to be sent does not support ER-VR protocols, the ER manager transforms the NC-ER-INOP into LSA. The LSA includes the list of destination subarea addresses included in the NC-ER-INOP, but no ERN values.

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 one half-session to send four bytes of 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 0, the low-order two bytes carry end-user information and may be set to any value. In general, LUSTAT is used to report about failures and error recovery conditions for a local device of an LU.

0	X'04' request code
1-4	Status value + status extension field (two bytes each):

X'0000'+'uuuu'	user status (no system-defined status) + user-defined field
X'0001'+'ccdd'	component now available + component identification (see Note)
X'0002'+'rrrr'	sender will have no (more) FMD requests to transmit during the time that this session remains

	active + reserved field
X'0003'+'ccdd'	component entering attended mode of operation + component identification (see Note)
X'0004'+'ccdd'	component entering unattended mode of operation + component identification (see Note)
X'0005'+'iiii'	prepare to commit all resources required for the unit of work + information field: X'0001' request End Bracket be sent on next chain (only value defined)
X'0006'+'rrrr'	no-op (used to allow an RH to be sent when no other request is available or allowed) + reserved field
X'0007'+'rrrr'	sender currently has no FMD requests to transmit (but may have later during the time that this session remains active) + reserved field
X'0801'+'ccdd'	component not available (for example, not configured) + component identification (see Note)
X'0802'+'ccdd'	component failure (intervention required) + component identification (see Note)

X'081C'+'ccdd'	component failure (permanent error) + component identification (see Note)
X'0824'+'rrrr'	function canceled + reserved field
X'082B'+'ccdd'	component available, but presentation space integrity lost + component identification (see Note)
X'0831'+'ccdd'	component disconnected (power off or some other disconnecting condition) + component identification (see Note)
X'0848'+'rrrr'	cryptography 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 (For this cc value, dd=X'00'.)
X'FF'	The dd byte specifies the LU component medium class and device address. (See SNA--Sessions Between Logical Units for definitions of these terms and usage of the values according to LU-LU session type.)
¬X'(00|FF)'	LU component medium class and device address (For these cc values, dd=X'00'.)

NC-ACTVR; PU_T4|5-->PU_T4|5, Exp; NC (ACTIVATE VIRTUAL ROUTE)

NC-ACTVR initializes the state and attributes of the VR at each of its end nodes.

0	X'0D' request code
1-2	Reserved
3	Format: X'01' (only value defined)
4	Reserved
5-6	Receive ERN mask: a bit is <u>on</u> if that ERN can be used to send PIUs to NC-ACTVR originator; multiple bits may be set to 1 (bit 0 corresponds to reverse ERN 0, bit 1 to reverse ERN 1, and so forth)
7-8	Send ERN mask: a bit is <u>on</u> if that ERN can be used to send PIUs from the NC-ACTVR originator: exactly one bit is set to 1 (bit 0 corresponds to ERN 0, bit 1 to ERN 1, and so forth)
9-10	bits 0-3, reserved bits 4-15, initial VR send sequence number
11	Reserved
12	Maximum window size permitted on the VR
13	Reserved
14	Minimum window size permitted on the VR
15-16	Maximum PIU size permitted to be sent by the NC-ACTVR originator: X'0000' no restriction (only value defined)
17-18	Maximum PIU length permitted to be received by the NC-ACTVR originator: X'0000' no restriction (only value defined) <u>Note</u>: The NC-ER-ACT and NC-ER-ACT-REPLY RUs accumulate the maximum PIU size permitted to flow in each direction of the ER. NC-ACTVR communicates these limits to the other end of the VR.

NC-DACTVR; PU_T4|5-->PU_T4|5, Exp; NC (DEACTIVATE VIRTUAL ROUTE)

NC-DACTVR deactivates a virtual route.

0	X'0E' request code
1-2	Reserved
3	Format: X'01'
4	Type X'01' orderly: receiver of NC-DACTVR to deactivate the VR if there are no sessions on the VR X'02' forced: receiver of NC-DACTVR to deactivate the VR even if there are sessions on the VR; it also results in session outage notification for sessions using the VR

NC-ER-ACT; PU_T4|5-->PU_T4|5, Exp; NC (EXPLICIT ROUTE ACTIVATE)

NC-ER-ACT is sent by the ER manager in a subarea node in order to activate an explicit route.

0	X'0B' request code
1-2	Reserved
3	Format: X'01' (only value defined)
4	Reserved
5	Explicit route length: initially set to 0 at the originating PU, incremented by 1 at each receiver of the original or propagated NC-ER-ACT
6	Maximum ER length, as specified by the request originator
7-10	Subarea address of the destination PU corresponding to the ERN specified in byte 12, bits 4-7
11	bit 0, route definition capability of RU sender: 0 RU sender does not allow route usage except by explicit installation definition 1 RU sender allows route usage without requiring explicit installation definition bits 1-7, reserved

12 bits 0-3, reserved
bits 4-7, ERN of the explicit route being activated
13-16 Subarea address of the PU that originated the NC-ER-ACT request
17-18 Reverse ERN mask: a bit is on if the corresponding ERN can be used to route to the originating subarea (bit 0 corresponds to ERN 0, bit 1 to ERN 1 and so forth)
19-20 Maximum PIU length allowed on the ER in the direction of flow of this NC-ER-ACT:
X'0000' no restriction (only value defined)
21-28 Reserved
29-36 Activation request sequence identifier: an 8-byte binary value, generated by the originator of NC-ER-ACT, and included by the destination node in NC-ER-ACT-REPLY to correlate an NC-ER-ACT with its corresponding NC-ER-ACT-REPLY (The 8-byte field has the following characteristic: If n1 was generated at time t1, and n2 was generated at time t2, then t1 < t2 implies n1 < n2.)

NC-ER-ACT-REPLY; PU_T4|5-->PU_T4|5, Exp; NC (EXPLICIT ROUTE ACTIVATE REPLY)
NC-ER-ACT-REPLY is returned to signal the successful or unsuccessful completion of the NC-ER-ACT.
0 X'0C' request code
1-2 Reserved
3 Format: X'01' (only value defined)
4 Type
X'00' explicit route activated
X'01' race condition resulting from NC-ER-ACT being sent by both nodes, each of which allows routing usage without requiring explicit installation definition; this condition is resolved in favor

	of the NC-ER-ACT from the PU having the greater subarea address (thus, this Type code is sent by the PU having the larger subarea address)
	X'02' ER is not reversible since there is no reverse ERN defined
	X'03' encountered a PU that does not support ER and VR protocols
	X'04' ER length exceeded the maximum specified in NC-ER-ACT
	X'05' ER requires a TG that is not active
	X'06' ER is not defined in the NC-ER-ACT-REPLY originating node
5	Explicit route length, in terms of the number of transmission groups in the explicit route as accumulated by NC-ER-ACT
6	Maximum ER length, as specified in NC-ER-ACT request
7-10	Subarea address of the destination PU of corresponding NC-ER-ACT
11	Reserved
12	bits 0-3, reserved bits 4-7, ERN of the ER being activated
13-16	Subarea address of the PU originating the corresponding NC-ER-ACT
17-18	Reverse ERN mask: a bit is <u>on</u> if the corresponding ERN can be used to route to the NC-ER-ACT originating subarea (bit 0 corresponds to ERN 0, bit 1 to ERN 1, and so forth)
19-20	Maximum size of PIU allowed to flow on the reverse ERNs specified in bytes 17-18: X'0000' no restriction (only value defined)
21-22	Maximum PIU length accumulated by the NC-ER-ACT: X'0000' no restriction (only value defined)
23-28	Reserved

29-36 Activation request sequence identifier: same value as specified in the corresponding NC-ER-ACT
37-38 Reserved
39-42 Subarea address of the node that originated this NC-ER-ACT-REPLY
43-46 Subarea address depending on the Type field (byte 4), as follows:

Type	Contents of this field
X'00'	reserved
X'01'	reserved
X'02'	subarea on the ER prior to that with no reverse ERN defined
X'03'	subarea that does not support ER and VR protocols
X'04'	subarea on the ER preceding the subarea where the explicit route length (byte 5 of NC-ER-ACT) is incremented to a value one more than the maximum ER length limit (byte 6)
X'05'	subarea on the other end of the TG that is not active
X'06'	subarea on the ER from which the PU (that does not have the ER defined) received the corresponding NC-ER-ACT

47 TGN of the TG between the subareas specified in bytes 39-42 and 43-46; reserved if Type is X'00'or X'01'
48 Reserved

NC-ER-INOP; PU_T4|5-->PU_T4|5, Exp; NC (EXPLICIT ROUTE INOPERATIVE)

NC-ER-INOP is initiated when the last remaining link of the transmission group has failed or is discontacted via a link-level procedure.

0 X'06' request code
1-2 Reserved
3 Format: X'01' (only value defined)
4 Reason code:

	X'01'	unexpected routing interruption over a transmission group, such as the failure of the last active link in the TG
	X'02'	controlled routing interruption, such as the result of a DISCONTACT

5-8	Subarea address of the PU that originated the NC-ER-INOP
9-12	Subarea address on other end of the transmission group that had the routing interruption
13	TG number of the transmission group that had the routing interruption
14	Number of destination subareas that are on the ERs using the above TG
15-20	Inoperative ER Field
15-18	Subarea address of a destination that is routed to using an ER requiring the TG that had the routing interruption
19-20	Inoperative explicit route mask: a bit is on if the ER of the corresponding ERN is inoperative (bit 0 corresponds to ERN 0, bit 1 corresponds to ERN 1, and so forth)
21-n	Any additional six-byte entries in the same format as bytes 15-20

NC-ER-OP; PU_T4|5-->PU_T4|5, Exp; NC (EXPLICIT ROUTE OPERATIVE)

NC-ER-OP is generated when a link of an inoperative transmission group becomes operative.

0	X'0F' request code
1-2	Reserved
3	Format: X'01' (Only value defined)
4	Reserved
5-8	Subarea address of the PU that originated the NC-ER-OP
9-12	Subarea address on other end of the operational TG
13	TG number of the operational TG
14	Number of destination subareas that are routed to using the ERs requiring the above TG

15-20	Operative ER Field Note: This field is included if at least one operative ER exists for the subarea in bytes 15-18.
15-18	Subarea address of a destination that is routed to using an ER requiring the above TG
19-20	Operative explicit route mask: a bit is on if the ER for the corresponding ERN is operative (bit 0 corresponds to ERN 0, bit 1 to ERN 1, and so forth)
21-n	Any additional six-byte field entries in the same format as bytes 15-20

NC-ER-TEST; PU_T4|5-->PU_T4|5, Exp; NC
(EXPLICIT ROUTE TEST)
NC-ER-TEST is sent by a subarea node that requires testing of an explicit route to a specified destination subarea.

0	X'09' request code
1-2	Reserved
3	Format: X'01' (only value defined)
4	Reserved
5	Explicit route length: initially set to 0 by the PU that originated the NC-ER-TEST, incremented by 1 at each receiver of the original or propagated NC-ER-TEST
6	Maximum ER length (number of TGs comprising the ER), specified by the request originator
7-10	Subarea address of the destination of ER corresponding to the ERN specified in byte 12, bits 4-7
11	Reserved
12	bits 0-3, reserved bits 4-7, ERN of the explicit route being tested
13-16	Subarea address of the PU that originated the NC-ER-TEST
17-18	Reverse ERN mask: a bit is on if the corresponding ERN can be used to route to the originating subarea (Bit 0 corresponds to ERN 0, bit 1, to ERN 1 and so forth.)

19-20	Maximum size of PIU allowed on the ERN specified in byte 12, bits 4-7: X'00' no restriction (only value defined)
21-22	Reserved
23-28	Network address of the SSCP that originated the corresponding NS request
29-38	Request correlation field: an implementation defined value, which is returned in NC-ER-TEST-REPLY for correlation of reply to request

NC-ER-TEST-REPLY; PU_T4|5-->PU_T4|5, Exp; NC (EXPLICIT ROUTE TEST REPLY)

NC-ER-TEST-REPLY is returned to signal the successful or unsuccessful completion of the NC-ER-TEST.

0	X'0A' request code
1-2	Reserved
3	Format: X'01' (only value defined)
4	Type: X'00' The corresponding NC-ER-TEST reached its destination subarea X'02' ER not reversible since there is no reverse ERN defined X'03' encountered a PU that does not support ER and VR protocols X'04' ER length exceeded the limit specified in the NC-ER-TEST request X'05' ER requires a TG that is not active X'06' ER is not defined in the NC-ER-TEST-REPLY originating node
5	Explicit route length, in terms of number of the transmission groups in the explicit route as accumulated in NC-ER-TEST.
6	Maximum ER length, as specified in the NC-ER-TEST request
7-10	Subarea address of the destination PU for corresponding NC-ER-TEST
11	Reserved

12	bits 0-3, reserved bits 4-7, ERN of the ER being tested
13-16	Subarea address of the PU that originated the corresponding NC-ER-TEST
17-18	Reverse ERN mask: a bit is <u>on</u> if the corresponding ERN can be used to route to the originating subarea
19-20	Maximum PIU size permitted on the reverse ERN specified in bytes 17-18: X'0000' no restriction (only value defined)
21-22	Maximum PIU size accumulated by the NC-ER-TEST: X'0000' no restriction (only value defined)
23-28	Network address of the SSCP originating the corresponding NS test request
29-38	Request correlation field: same value as specified in the corresponding NC-ER-TEST
39-42	Subarea address of the PU that originated this NC-ER-TEST-REPLY
43-46	Subarea address depending on the type field (byte 4) as follows:

Type	Contents of this field
X'00'	reserved
X'02'	subarea on the ER prior to that with no reverse ERN defined
X'03'	subarea that does not support ER and VR protocols
X'04'	subarea on the ER preceding the subarea where the explicit route length (byte 5 of NC-ER-TEST) is incremented to a value one more than the maximum ER length limit (byte 6)
X'05'	subarea on the other end of the TG that is not active
X'06'	subarea on the ER from which the PU (that does not have the

ER defined), received the corresponding NC-ER-TEST

47	TGN of the TG between the subareas specified in bytes 39-42 and 43-46; reserved if Type is X'00'

NC-IPL-ABORT; PU_T4|5-->PU_T2, Exp; NC (NC IPL ABORT)
NC-IPL-ABORT contains sense data indicating the reason for a failure during IPL.

0	X'46' request code
1-4	Sense data

NC-IPL-FINAL; PU_T4|5-->PU_T2, Exp; NC (NC IPL FINAL)
NC-IPL-FINAL contains the entry point location of the IPL module.

0	X'02' request code
1-4	Entry point location (hexadecimal address) within load module

NC-IPL-INIT; PU_T4|5-->PU_T2, Exp; NC (NC IPL INITIAL)
NC-IPL-INIT is sent from a PU_T4|5 to a PU_T2|4 after the PU_T4|5 processes an INITPROC(Type=IPL) RU.

0	X'03' request code
1	Reserved
2-9	IPL load module: an eight-character EBCDIC symbolic name of the IPL load module to be transmitted

NC-IPL-TEXT; PU_T4|5-->PU_T2, Exp; NC (NC IPL TEXT)
NC-IPL-TEXT contains the IPL data.

0	X'04' request code
1-n	Text: a variable-length byte-string of IPL data, where the maximum value of n is 255

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NMVT; SSCP<-->PU_T2|4|5 Norm; FMD NS(ma)
(NETWORK MANAGEMENT VECTOR TRANSPORT)

NMVT carries CNM requests and replies between a control point and a PU.

```
0-2          X'41038D' NS header
3-4          Retired:  set to target network
             address by subarea node sender; set to
             0, the PU local address, by peripheral
             node sender; ignored by current level
             receivers
5-6          bits 0-1, reserved
             bits 2-3, retired:  set to 01 by subarea
                       PU sender; set to 00 by
                       peripheral node sender;
                       ignored by current level
                       receivers
             bits 4-15, procedure related
                        identifier (PRID)
                        Note:  For unsolicited
                        replies (byte 7, bit 0 = 0),
                        the PRID field contains
                        X'000'.  For solicited replies
                        (byte 7, bit 0 = 1), the PRID
                        field echoes the PRID from the
                        NMVT RU request.  For requests
                        that need no replies, this
                        field contains X'000'.
7            Flags:
             bit  0, solicitation indicator:  used
                    only for PU-to-SSCP flow
                    (reserved for SSCP-to-PU flow):
                    0 unsolicited NMVT
                    1 solicited NMVT
             bits 1-2, sequence field:
                       00 only NMVT for this PRID
                       01 last NMVT for this PRID
                       10 first NMVT for this PRID
                       11 middle NMVT for this PRID
             bit  3, SNA Address List subvector
                     indicator:
                    0 CNM major vector in this NMVT
                      does not contain an SNA Address
                      List subvector
```

1 CNM major vector in this NMVT contains an SNA Address List subvector as the first subvector in the major vector

bits 4-7, reserved

8-m One CNM major vector, as described in "CNM Major Vectors"

Note: The following keys are supported:

X'0000' Alert: provides immediate notification of incidents

CNM Major Vectors

Alert (X'0000') CNM Major Vector

The function of this major vector is to provide notification of incident, type of incident, identification of the cause, and devices affected by the incident.

0-1 Length field:

bit 0, concatenation flag:

0 the last NMVT of a sequence of concatenated NMVTs comprising one major vector or not a concatenated NMVT

1 first or middle NMVT of a sequence of concatenated NMVTs comprising one major vector

bits 1-15, length (n+1), in binary, of this CNM major vector

2-3 Key: X'0000'

4-n CNM subvectors, as described in "CNM Common Subvectors" on page 4-109.12 for subvector keys X'00' - X'7F', and in "CNM Subvectors used in Alert" on page 4-109.3 for subvector keys X'80' - X'FE'.

Note: The following subvector keys may be used as indicated:

X'00' CNM Text Message subvector: optional, used when needed

X'01'	CNM Date/Time subvector: always present, if CNM Relative Time subvector (X'42') not used; not present if CNM Relative Time subvector (X'42') used
X'03'	CNM Hierarchy Name List subvector: conditionally present
X'04'	CNM SNA Address List subvector: conditionally present; always first if present
X'10'	CNM Product Set ID subvector: always present
X'42'	CNM Relative Time subvector: always present if CNM Date/Time subvector (X'01') not used; not present if CNM Date/Time subvector (X'01') used
X'43'	CNM Correlation subvector: conditionally present
X'91'	CNM Basic Alert subvector: always present
X'A0'	CNM Detail Qualifier (EBCDIC) subvector: optional, used when needed
X'A1'	CNM Detail Qualifier (hexadecimal) subvector: optional, used when needed
X'A2'	CNM User Action Qualifier (EBCDIC) subvector: optional, used when needed
X'A3'	CNM User Action Qualifier (hexadecimal) subvector: optional, used when needed

CNM Subvectors used in Alert

Basic Alert (X'91') CNM Subvector

The Basic Alert subvector, the principal subvector of the Alert major vector, is used to transport the Alert information.

0	Length (p+1), in binary, of the Basic Alert subvector

1 Key: X'91'

2 Alert classification:

bits 0-3, category of the reporting PU:

- X'0' IBM product with an IBM serial number or Program Information Department (PID) order number or an IBM supplied component of an IBM product
- X'1' customer provided component
- X'2' third-party OEM provided component

bits 4-7, category of the component being reported about:

- X'0' IBM product--as above, bits 0-3
- X'1' customer provided component
- X'2' third-party OEM provided component
- X'3' undetermined component

3 Alert type:

- X'01' permanent error: an error that is not recovered from by the initiating component without intervention external to the reporting product
- X'02' temporary error: an error that is recovered from by the detecting component, yet is recurring at a rate that may degrade operation
- X'03' performance: a recognized measurement of network performance has exceeded a predetermined threshold
- X'04' operator intervention required: the intervention of an operator is required to restore proper operational capability to the resource
- X'05'-X'08' reserved
- X'09' unavailable: a network component has become unavailable

when its services have been required and there is no information to classify the unavailable condition as a more specific error

X'0A' status change notification: a change of component or network status, requiring network operator notification, has occurred

X'0B' environmental problem: a physical environment problem

X'0C' installation consistency problem: a system definition or other incompatibility problem between components that typically requires other than an operator procedure to correct

X'0D' operational procedural error: the inability to access a logical or physical resource, the loss of a resource, or the inability to perform requested function because of operational or procedural error

X'0E' security: used to report system detected incidents that indicate exposure to security problems

X'0F' delayed recovery: the sender is reporting recovery from a previously detected Alert condition that occurred earlier but has now been recovered from

X'10' permanently affected resource: the originator of this Alert has determined that the target resource is lost because of a persistent error in a resource other than the target

4 General cause code indicating the general classification and cause of the exception condition:

X'01' hardware or microcode (not distinguished)

X'02' software: any code other than microcode
X'03' link connection component
X'04'-X'05' reserved
X'06' medium (e.g., tape, disk, diskette)
X'07' hardware or software (not distinguished)
X'08' logical
X'09' operator: initiated as a result of a node operator entering a status message
X'0A' medium or hardware (not distinguished)
X'0B' hardware
X'0C' microcode
X'0D' protocol above link level
X'0E' link-level protocol
X'0F' unclassified
X'10' external facilities change or restriction
X'11' operator error
X'12' system generation or customizing parameter inconsistent or incorrectly defined
X'13' component off-line
X'14' component busy
X'15' external power failure
X'16' thermal problem

5-6 Specific component code: indicates the generic type of component, subcomponent, or logical resource that can be most closely related to the exception condition. The component indicated may be the generic type of the "target" or it may be a subcomponent of the target. The terms "local" and "remote" used below, refer to the perspective of the Alert originator. Defined codes are:
X'0001' base processor
X'0002' service processor
X'0003' reserved
X'0004' main storage
X'0005' DASD device
X'0006' printer

X'0007'	card reader and/or punch
X'0008'	tape device
X'0009'	keyboard
X'000A'	selector pen
X'000B'	magnetic stripe reader
X'000C'	display/printer
X'000D'	display device
X'000E'	remote product: used when a product to which the Alert generator is linked (in any form) has caused an Alert condition and the generic product type cannot be determined
X'000F'	power supply internal to this product
X'0010'	I/O attached controller
X'0011'	communication controller scanner
X'0012'	communication link adapter
X'0013'	reserved
X'0014'	channel adapter
X'0015'	loop adapter
X'0016'	adapter for directly attaching devices
X'0017'	reserved
X'0018'	channel (direct memory access channel)
X'0019'	link: used only when common-carrier equipment cannot be distinguished from customer equipment
X'001A'	link: common-carrier equipment
X'001B'	link: customer equipment
X'001C'	loop: used only when common-carrier equipment cannot be distinguished from customer equipment
X'001D'	loop: common-carrier equipment
X'001E'	loop: customer equipment
X'001F'	X.21 link connection external to this product
X'0020'	X.25 network connection external to this product
X'0021'	local X.21 interface: (DTE-DCE)
X'0022'	local X.25 interface: (DTE-DCE)

X'0023' local modem
X'0024' remote modem
X'0025' local modem interface (DTE-DCE)
X'0026' remote modem interface (DTE-DCE)
X'0027' local modem link monitor
X'0028' remote modem link monitor
X'0029' local modem link monitor interface
X'002A' remote modem link monitor interface
X'002B'-X'0031' reserved
X'0032' remote modem, modem interface, or remote product
X'0033' transmission medium or remote modem
X'0034' SDLC data link control component
X'0035' BSC data link control component
X'0036' start/stop data link control component
X'0037'-X'0043' reserved
X'0044' cluster controller or device
X'0045' local link monitor or modem interface
X'0046' reserved
X'0047' card reader/punch or display/printer
X'0048' controller application program
X'0049' keyboard or display
X'004A' storage control unit
X'004B' storage control unit or storage control unit channel
X'004C' storage control unit or controller
X'004D' control unit (other than storage control unit)
X'004E'-X'0051' reserved
X'0052' maintenance device
X'0053' maintenance device interface
X'0054' reserved
X'0055' control program
X'0056' application subsystem on top of control program
X'0057' telecommunication access method
X'0058' application program (other than application subsystem)

	X'0059' communication controller program
	X'005A'-X'005F' reserved
	X'0060' X.25 network interface: DCE to first interface node in X.25 network
	X'0061' DASD device with nonremovable medium
	X'0062' DASD device with removable medium
	X'0063' control-tailed modem
	X'0064' reserved
	X'0065' remote-tailed modem
	X'0066' remote-tailed modem interface
	X'0067' sensor I/O unit
	X'0068' magnetic stripe reader/encoder
	X'0069' check (bank) reader
	X'006A' document feed mechanism
	X'006B' coin feed mechanism
	X'006C' envelope depository
	X'006D' timer adapter
	X'006E' encryption/decryption adapter
	X'006F' outboard, user-programmable processor
	X'0070' cable connecting local device to local adapter
	X'0071'-X'00FE' reserved
	X'00FF' undetermined (the problem cannot be isolated to one of the above generic component types)
7-8	Alert description code: a product-defined code that provides an index to predefined text that explains the condition causing the Alert
9-10	User Action Code: a product-defined code that provides an index to predefined screens that can include predefined text and variable fields for CNM User Action Qualifier subvectors
11-12	Detail text reference code: a product-defined code that provides an index to predefined screens that can include predefined text and variable fields for CNM Detail Qualifier subvectors

13(=p)	Alert repetition count: the number, in binary, of instances of consecutive identical Alert conditions that have occurred since the last identical Alert was sent

Detail Qualifier (EBCDIC) (X'A0') CNM Subvector

The Detail Qualifier (EBCDIC) subvector is a unique CNM subvector that is used for the Alert function to supply variables, in EBCDIC form, that can be inserted on the Alert Detail screens. This subvector and the Detail Qualifier (hexadecimal) subvector (X'A1') are identical in function and format except that this subvector contains EBCDIC codes.

0	Length (p+1), in binary, of the Detail Qualifier subvector
1	Key: X'A0'
2-p	Detail qualifier: a symbol-string type AE that qualifies a reference on the Alert Detail screen Note: Each qualifier is p-1 bytes in length and only one qualifier is used per Detail Qualifier subvector. All qualifiers include only codes, numbers, or internationally recognized terms that do not require translation. The coding is not interpreted by the Alert display mechanism.

Detail Qualifier (Hexadecimal) (X'A1') CNM Subvector

The Detail Qualifier (hexadecimal) subvector is a unique CNM subvector that is used for the Alert function to supply variables, in hexadecimal form, that can be inserted on the Alert Detail screens. This subvector and the Detail Qualifier (EBCDIC) subvector (X'A0') are identical in function and format except that this subvector contains codes in hexadecimal.

0	Length (p+1), in binary, of the Detail Qualifier subvector
1	Key: X'A1'
2-p	Detail qualifier (in symbol-string type G) Note: Each qualifier is p-1 bytes in length and only one qualifier is used per Detail Qualifier subvector.

User Action Qualifier (EBCDIC) (X'A2') CNM Subvector

The User Action Qualifier (EBCDIC) subvector is a unique CNM subvector that is used for the Alert function to supply variables that can be inserted on the User Action screens displayed to an operator. This subvector and the User Action Qualifier (hexadecimal) subvector (X'A3') are identical in function and format except that this subvector contains EBCDIC codes.

0	Length (p+1), in binary, of the User Action Qualifier subvector
1	Key: X'A2'
2-p	User action qualifier: a symbol-string type AE that qualifies a reference in the text identified by the user action code Note: Each qualifier is p-1 bytes in length and only one qualifier is used per User Action Qualifier subvector. All qualifiers include only codes, numbers, or internationally recognized terms that do not require translation. The coding is not interpreted by the Alert display mechanism.

User Action Qualifier (hexadecimal) (X'A3') CNM Subvector

The User Action Qualifier subvector (hexadecimal) is a unique CNM subvector that is used for the Alert function to supply variables that can be inserted on the User Action screens displayed to an operator. This subvector and the User Action Qualifier (EBCDIC) subvector (X'A2') are identical in function and format except that this subvector contains codes in hexadecimal.

0	Length (p+1), in binary, of the User Action Qualifier subvector
1	Key: X'A3'
2-p	User Action Qualifier: a value in symbol-string type G Note: Each qualifier is p-1 bytes in length and only one qualifier is used per User Action Qualifier subvector.

CNM Common Subvectors

The following table shows, by key value, the common CNM subvectors and the message-unit structures that can carry the subvector.

Key	Subvector	Applicable Message-Unit Structures
X'00'	Text Message	Alert CNM major vector
X'01'	Date/Time	Alert CNM major vector
X'03'	Hierarchy Name List	Alert CNM major vector
X'04'	SNA Address List	Alert CNM major vector
X'10'	Product Set ID	Alert CNM major vector
X'11'	Product ID	Product Set ID CNM common subvector
X'42'	Relative Time	Alert CNM major vector
X'43'	Correlation	Alert CNM major vector

The common CNM subvectors are defined as follows (with zero-origin indexing of the vector bytes--see the specific major vector for the actual displacement within the RU):

Text Message (X'00') CNM Common Subvector

The Text Message subvector is a common CNM subvector that is used for the transport of only customer-defined data.

0	Length (p+1), in binary, of the Text Message subvector
1	Key: X'00'
2-p	Text message (using symbol-string type G)

Date/Time (X'01') CNM Common Subvector

The Date/Time subvector is a common CNM subvector that is assembled by the PU and used by the control point for time-stamping the request in which it is carried.

0	Length (p+1), in binary, of the Date/Time subvector
1	Key: X'01'
2-3	Time zone adjustment to Greenwich Mean Time: an interval of time to be added to, or subtracted from, the local time given in this vector to adjust that time to Greenwich Mean Time bit 0, positive or negative adjustment indicator: 0 adjustment to be added to the local time (i.e., all time zones westward, between the Greenwich time zone and the international date line)

	1 adjustment to be subtracted from the local time (i.e., all time zones eastward, between Greenwich time zone and the international date line)
	bits 1-3, reserved
	bits 4-7, number of hours of adjustment, in binary (X'0'-X'C')
	bits 8-15, number of minutes of adjustment, in binary (X'00' - X'3B')
4-6	<u>Local date</u>
4	Year, in binary, consisting of the last two digits of the year
5	Month, in binary (X'01'-X'0C')
6	Day, in binary (X'01'-X'1F')
7-9	<u>Local time</u>
7	Hours, in binary (X'00'-X'17')
8	Minutes, in binary (X'00'-X'3B')
9	Seconds, in binary (X'00'-X'3B')
10-p	Optional extension of time: a binary value to provide finer granularity than seconds

Hierarchy Name List (X'03') CNM Common Subvector

The Hierarchy Name List subvector is a common CNM subvector that is used to specify target resources, other than the reporting PU, that are within the same domain as the origin PU, but cannot be represented in the SNA Address List subvector.

0	Length (p+1), in binary, of the Hierarchy Name List subvector
1	Key: X'03'
2	Reserved
3	Number, in binary, of name entries in the hierarchy name list.
4-p	<u>Hierarchy Name List Entries</u> (1 to 5 entries may be present)

Note: Each entry contains a Name field and a Resource Type field, and has the following form (shown zero-origin):

0	Length (q+1), in binary, of the following name plus this Length field
1-q	Name of resource in upper-case alphanumeric EBCDIC characters Note: Resource name never exceeds eight characters.
q+1-q+4	Resource type identifier: category in which the resource (named in bytes 1-q) belongs: X'C1C4C1D7' adapter X'C3E3D9D3' controller X'C4C9E2D2' disk X'C4E2D2E3' diskette X'C4C5E540' unspecified device X'D3C9D5C5' communication link X'D3D6D6D7' loop X'E3C1D7C5' tape

SNA Address List (X'04') CNM Common Subvector

The SNA Address List subvector is a common CNM subvector that has two functions. The first function is to provide the target for an NMVT command when the target of the NMVT command is not the PU addressed in the TH. An example is a target LU associated with the destination PU. Its second function is to identify a session, by means of session partners.

If present, this subvector appears first.

0	Length (p+1), in binary, of the SNA Address List subvector
1	Key: X'04'
2	Number, in binary, of Target Address fields that follow
3-p	One or more 7-byte Target Address fields as defined below (shown zero-origin)

Note: One or more 7-byte target address fields are present. The first target address field is the CNM target. Any additional target address fields contain addresses related to the target address and/or additional target addresses. The target address field content is different depending on whether the addresses are in network address or local address format, as indicated by the address type, byte 0, bit 0 of each Target Address field.

0 Flags:

bit 0, address type indicator:
- 0 address is a local address
- 1 address is a network address

bit 1, session relation indicator:
- 0 the Target Address field following this one is not explicitly related to this Target Address field by a session
- 1 the Target Address field entry following this one contains the address of a session partner

Note: This bit is not set to 1 for two adjacent Target Address fields; it alternates to delimit the session partners: 1,0,1,0,1,0 is possible; 1,0,1,1,1,0 is not.

- If byte 0, bit 0 = 1 (address is a network address):

bits 2-7, reserved

1-4 Subarea address

5-6(=p) Element address

Note: Each target resource, or at least one of the targets in a session resource pair, is in the reset hierarchy of the sending PU.

- If byte 0, bit 0 = 0 (address is a local address):

	bit 2, OAF/DAF assignment indicator (ODAI) for local address form: 0 ODAI = 0 or ODAI not used 1 ODAI = 1
	bits 3-7, reserved
1-5	Reserved
6(=p)	Target-resource local address or, if this Target Address field is preceded by a session partner Target Address field, a session index Note: A session partner Target Address field always precedes this Target Address field when a session index is used here.

Product Set ID (X'10') CNM Common Subvector

The Product Set ID subvector is a common CNM subvector that identifies one or more products that implement a network component being referenced.

0	Length (p+1), in binary, of the Product Set ID subvector
1	Key: X'10'
2	Component implemented by the product set identified by the network product ID in bytes 3-p: X'C1' non-SNA product node X'F1' PU X'F3' LU X'F7' SNA link component remote from the sender X'F9' SNA link component local to the sender
3-p	Network product ID consisting of one or more Product ID (X'11') CNM Common Subvectors, as described below, one for each product in the product set implementing the network component indicated in byte 2. Each Product ID (X'11') CNM Common Subvector uniquely identifies a product instance and, optionally, gives its characteristics,

such as EC level, release level, or product being emulated.

Product ID (X'11') CNM Common Subvector

The Product ID CNM Common Subvector uniquely identifies a product instance and, optionally, gives its characteristics.

0	Length (q+1), in binary, of the Product ID subvector
1	Key: X'11'
2	bits 0-3, reserved bits 4-7, product classification: X'1' IBM machine X'3' IBM or non-IBM machine (nøt distinguished) X'4' IBM programming X'9' non-IBM machine X'C' non-IBM programming X'E' IBM or non-IBM programming (not distinguished)
3-q	One or more subfields containing product- and installation-specific information on hardware, microcode, and programming (listed by Key value below and described in detail following): X'00' Product Instance Identifier X'01' Emulated Product Identifier (hardware) X'03' Software Product Version and Release-Level Identifier X'04' EC-Level Data (hardware) X'05' PTF-Level Data X'09' Component or Subassembly Identifier X'0E' Installation-Specified Data X'0F' Product Common Name X'10' Feature Code List X'9E' Product-Specific Data Note: If byte 2, bits 4-7 (product classification) = X'1', X'3', or X'9', subfields X'03' and X'05' are not supported. If byte 2, bits 4-7 (product

classification) = X'4', X'C', or X'E', subfields X'01', X'04', X'09', and X'10' are not supported.

Product Instance Identifier (X'00') Product ID Subfield

This subfield provides sufficient data to identify the product instance uniquely. For hardware, this normally describes the machine type, plant of manufacture, and serial number. For software, this normally is the program number.

0	Length (r+1), in binary, of the Product Instance Identifier subfield
1	Key: X'00'
2	Format type: X'10' product instance is identified by a serial number unique by machine type and IBM plant of manufacture X'11' product instance is identified by a serial number, unique by machine type, model number, and IBM plant of manufacture. X'12' product instance is identified by a serial number, unique by machine type and IBM plant of manufacture (as in Format X'10' above). This format provides the model number for the purpose of additional information only. X'13' product instance is identified by a serial number, unique by machine type, model number, and a 3-digit Corporate Accounting Instruction Code X'40' product instance software identified by the Program Number X'41' product instance software identified by the Program Number that contains a 3-byte product modifier

Note: Formats X'10', X'11', X'12', and X'13' are applicable only to hardware, while formats X'40' and X'41' are applicable only to software. One and only one format can be used in a Product Instance Identifier (X'00') subfield.

3-r Product identification
Note: The originator of a message unit (e.g., NMVT) reporting for another product that does not supply information required for the Product Instance Identifier subfield inserts binary 0's into the appropriate fields (except for the Machine Type field, where EBCDIC 0's [X'F0'] are inserted) of the Product Identification field to indicate that no identification information is available.

- Format X'10'

3-6 Machine type: four numeric EBCDIC characters

7-8 Serial number modifier--plant of manufacture: two numeric EBCDIC characters

9-15(=r) Serial number: seven upper-case alphanumeric EBCDIC characters, right justified, with EBCDIC 0's (X'F0') fill on the left

- Format X'11'

3-6 Machine type: four numeric EBCDIC characters

7-9 Machine model number: three upper-case alphanumeric EBCDIC characters

10-11 Serial number modifier--IBM plant of manufacture: two numeric EBCDIC characters

12-18(=r) Serial number: seven upper-case alphanumeric EBCDIC characters, right justified, with EBCDIC 0's (X'F0') fill on the left

- Format X'12'

3-6	Machine type: four numeric EBCDIC characters
7-9	Machine model number: three upper-case alphanumeric EBCDIC characters
10-11	Serial number modifier--IBM plant of manufacture: two numeric EBCDIC characters
12-18(=r)	Serial number: seven upper-case alphanumeric EBCDIC characters, right justified, with EBCDIC 0's (X'F0') fill on the left

- Format X'13'

3-6	Machine type: four numeric EBCDIC characters
7-9	Machine model number: three upper-case alphanumeric EBCDIC characters
10-12	Serial number modifier--Corporate Accounting Instruction Code: three upper-case alphanumeric EBCDIC characters
13-19(=r)	Serial number: seven upper-case alphanumeric EBCDIC characters, right justified, with EBCDIC 0's (X'F0') fill on the left

- Format X'40'

3-9	Program Number: seven upper-case alphanumeric EBCDIC characters identifying the software Program Information Department (PID) order number as documented in the IBM product announcement documentation
10-r	Customer-specified identifier (symbol-string type G) to allow differentiation among system-definition options, configurations, or capabilities

- Format X'41'

3-9	Program Number: seven upper-case alphanumeric EBCDIC characters identifying the software Program Information Department (PID) order number as documented in the IBM product announcement documentation

10-12	A product-specified modifier to bytes 3-9 to allow unique product instance identification: three upper-case alphanumeric EBCDIC characters
13-r	Customer-specified identifier (in symbol-string type G) to allow differentiation among system-definition options, configurations, or capabilities

Emulated Product Identifier (X'01') Product ID Subfield

This subfield describes the hardware of the product being emulated in sufficient detail to allow problem determination.

0	Length (r+1), in binary, of the Emulated Product ID subfield
1	Key: X'01'
2-5	Machine type of product being emulated: four numeric EBCDIC characters
6-8(=r)	Model number of product being emulated: three upper-case alphanumeric EBCDIC characters

Software Product Version and Release Level Identifier (X'03') Product ID Subfield

This subfield provides the version and release-level number of the software running in the product.

0	Length (r+1), in binary, of the Software Product Release or Level Identifier subfield
1	Key: X'03'
2-r	Software version and release-level identifier (upper-case alphanumeric EBCDIC characters) identifying the software version and release-level number as documented in the IBM product announcemen documentation for IBM products

EC-Level Data (X'04') (hardware) Product ID Subfield

This subfield provides the EC-level related data for the product (hardware).

0	Length (r+1), in binary, of the EC-Level Data subfield
1	Key: X'04'
2-r	EC-level product-defined data for the hardware (in symbol-string AE)

PTF-Level Data (X'05') Product ID Subfield

This subfield provides the PTF-level related data for the product (software).

0	Length (r+1), in binary, of the PTF-Level Data subfield
1	Key: X'05'
2-r	PTF-level product-defined data for the software (in symbol-string type AE) identifying the software PTF level data as documented in the IBM product announcement documentation for IBM products

Component or Subassembly Identifier (X'09') Product ID Subfield

This subfield provides sufficient data to identify the component or subassembly involved in the failure.

0	Length (r+1), in binary, of the Component or Subassembly ID subfield
1	Key: X'09'
2-r	Component or subassembly product-defined data (in symbol-string type G)

Installation-Specified Data (X'0E') Product ID Subfield

This subfield provides information, specified by installation management, about the installation of a product (both hardware and software).

0	Length (r+1), in binary, of the Installation-Specified Data subfield
1	Key: X'0E'
2-r	Installation-defined data (in symbol-string type G)

Product Common Name (X'0F') Product ID Subfield

This subfield provides the common name for the product specified. The common name is a short user-defined representation of a product's name, usually the initials of the product (that is, CICS, IMS, NPDA).

0	Length (r+1), in binary, of the Product Common Name subfield
1	Key: X'0F'
2-r	Common name consisting of upper-case alphanumeric EBCDIC characters identifying the product as documented in the IBM product announcement documentation

Feature Code List (X'10') Product ID Subfield

This subfield provides the product-dependent feature codes.

0	Length (r+1), in binary, of the Feature Code List subfield
1	Key: X'10'
2-r	One or more product-defined feature codes (four numeric EBCDIC characters per feature code) Note: Feature codes with less than four bytes are right-justified and padded with space (X'40') characters.

Product-Specific Data (X'9E') Product ID Subfield

This function provides a transport for product-specific data.

0	Length (r+1), in binary, of the Product-Specific Data subfield
1	Key: X'9E'
2-r	Product-specific data (in symbol-string type G)

Relative Time (X'42') CNM Common Subvector

The Relative Time subvector is a common CNM subvector assembled by the PU to indicate when a record was created relative to other records created by the originating component.

0	Length (p+1), in binary, of the Relative Time subvector
1	Key: X'42'
2	Time increment of measure: X'00' tenths of a second X'01'-X'7F' a number that, when divided into the timer data, converts the value to seconds X'90' microseconds X'A0' milliseconds X'C0' minutes (not used in Alerts) X'D0' hours (not used in Alerts) X'EF' indicates time value is purely a sequence indicator showing relative order only
3-6(=p)	Time, in binary, having the measure defined by byte 2

Correlation (X'43') CNM Common Subvector

The Correlation subvector is a common CNM subvector used to correlate multiple CNM request codes and/or other data records originating from a single source for a single incident.

0	Length (p+1), in binary, of the Correlation subvector
1	Key: X'43'
2	Correlation type: X'00' correlator is related to a set of CNM traffic statistics or other CNM major vectors related to this major vector X'01' correlator is related to trace data X'02' correlator is related to a storage dump
3-p	Correlation data (in symbol-string type G)

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NOTIFY; SSCP-->SSCP|LU, LU-->SSCP, Norm; FMD
NS(s) (NOTIFY)
NOTIFY is used to send information from an SSCP to another SSCP or to an LU, or from an LU to an SSCP. Notify carries information in the form of a (vector key, vector data) pair.

0-2 X'810620' NS header (for SSCP-->LU and LU-->SSCP)
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'03' ILU/TLU or third-party SSCP notification:
  - ILU/TLU notification: used to send NOTIFY to the issuer of an INIT or TERM request to give the status of the session
  - third-party SSCP notification: used to send NOTIFY to a third-party SSCP (the SSCP whose LU issued an INIT-OTHER or TERM-OTHER request) to give the status of the setup/takedown procedure
- X'04' LU notification: used to send NOTIFY to an LU informing it of the completed deactivation of the identified LU-LU session
- X'0C' LU-LU session services capabilities: used to send NOTIFY to the SSCP having an active session with the sending LU, to convey the current LU-LU session services capability of that LU

4-p <u>NOTIFY Vector Data</u>
- For NOTIFY vector key X'01':

4-m <u>Network name of requested LU</u>
4 Type: X'F3' logical unit

5	Length, in binary, of symbolic name of LU
6-m	Symbolic name in EBCDIC characters
m+1-p	Network name of requesting LU
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of symbolic name
m+3-p	Symbolic name in EBCDIC characters
	• 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
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), that 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)
18	Session key: X'05' PCID X'06' network name pair X'07' network address pair X'0A' URC
19-n	Session Key Content
	• For session key X'05': PCID
19-20	Network address of the SSCP(ILU)
21-26(=n)	A unique 6-byte value, generated by the SSCP(ILU), that is retained and used in all cross-domain requests dealing with the same procedure until it is completed Note: This session key is applicable within a NOTIFY only for SSCP-to-SSCP(TLU); it differs from the PCID carried in the NOTIFY Vector Data field (bytes 5-12) for NOTIFY vector key X'03'.
	• 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
	• For session key X'0A': URC
19	Length, in binary, of the URC
20-n	URC: end user defined identifier Note: This session key is applicable within a NOTIFY only for SSCP-to-TLU; it is the URC carried as the session key in TERM, and differs from the URC in bytes n+1 through p.
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 Note: The URC length is 0 for SSCP-to-SSCP.
	• For NOTIFY Vector key X'04'
4	Type: X'01' session count decremented; no corresponding INIT-SELF X'02' session count decremented; corresponding INIT-SELF
5	Cause: cause of deactivating the (LU,LU) session, as specified in byte 4 of SESSEND
6	Action: any reactivation of the (LU,LU) session to be performed by either the PLU or SLU as specified in SESSEND or CDSESSEND
7	Session key: X'06' network name pair X'07' network address pair
8-n	Session Key Content
	• For session key X'06': network name pair
8	Type: X'F3' logical unit
9	Length, in binary, of symbolic name of PLU (or OLU or LU1)
10-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

8-9	Network address of PLU
10-11(=n)	Network address of SLU
n+1-p	<u>User Request Correlation</u> (<u>URC</u>) <u>Field</u>
n+1	Length, in binary, of the URC
n+2-p	URC (from INIT-SELF, if Type = X'02'; otherwise, not included)
	• <u>For</u> NOTIFY Vector Key X'0C':
4	Length, in binary, of vector data field
5	bits 0-3, primary LU capability: 0000 cannot ever act as primary LU 0001 cannot currently act as primary LU 0010 reserved 0011 can now act as primary LU
	bits 4-7, secondary LU capability: 0000 cannot ever act as secondary LU 0001 cannot currently act as secondary LU 0010 reserved 0011 can now act as secondary LU
6-7	LU-LU session limit (where a value of 0 means that no session limit is specified)
8-9	LU-LU session count: the number of LU-LU sessions that are not reset, for this LU, and for which SESSEND will be sent to the SSCP
10	bit 0, parallel session capability: 0 parallel sessions not supported 1 parallel sessions supported
	bits 1-7, reserved
11-18(=p)	Mode table name: a symbolic name in EBCDIC characters <u>Note</u>: A value of all space (X'40') characters means that the mode table name is to be selected by the SSCP.

NS-IPL-ABORT; SSCP-->PU_T2, Norm; FMD NS(c) (NS IPL ABORT)
NS-IPL-ABORT indicates to the PU_T2 that the load operation has been halted. Sense data is included in NS-IPL-ABORT indicating the cause of the failure.

0-2	X'410246' NS header
3-6	Sense data

NS-IPL-FINAL; SSCP-->PU_T2, Norm; FMD NS(c) (NS IPL FINAL)
NS-IPL-FINAL contains the entry-point location for the PU_T2 node to begin execution of the load module.

0-2	X'410245' NS header
3-6	Entry point location (hexadecimal address) within load module

NS-IPL-INIT; SSCP-->PU_T2, Norm; FMD NS(c) (NS IPL INITIAL)
NS-IPL-INIT is sent from the SSCP to the PU_T2 to indicate that a particular load module is about to be transmitted to the PU_T2's node.

0-2	X'410243' NS header
3	Reserved
4-11	IPL load module: eight-character EBCDIC symbolic name of the IPL load module to be transmitted

NS-IPL-TEXT; SSCP-->PU_T2, Norm; FMD NS(c) (NS IPL TEXT)
NS-IPL-TEXT contains the IPL data.

0-2	X'410244' NS header
3-n	Text: a variable-length byte-string of IPL data

NS-LSA; PU_T4|5-->SSCP, Norm; FMD NS(c) (NS LOST SUBAREA)
NS-LSA is sent by a PU_T4|5 (after originating or propagating an LSA) to every SSCP with which it has an active session to report the interruption of routing capability to a set of subareas. The list of subareas in the NS-LSA *request* is identical to the list sent by the PU_T4|5 in the LSA request.

0-2	X'010285' 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
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) (NS PROCEDURE ERROR)

NSPE is used by the SSCP to inform an ILU or TLU that a session initiation or termination attempt has failed after a positive response has been sent to the corresponding initiation or termination request. (NSPE is used only if Format 0 of INIT-SELF or TERM-SELF was issued. Otherwise, NOTIFY is used.)

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.

<u>Setup Procedure Error</u>

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, 1 comprehensive format of Reason byte

<u>Takedown Procedure Error</u>

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

<u>Note</u>: 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
8 Session key:
X'06' uninterpreted name pair
9-n <u>Session Key Content</u>
- For session key X'06': uninterpreted name pair

9 Type: X'F3' logical unit
10 Length, in binary, of the PLU name
11-m EBCDIC character string
m+1 Type: X'F3' logical unit
m+2 Length, in binary, of the SLU name
m+3-n EBCDIC character string

	<u>Condensed Format</u>		
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 PLU name		
6-m	EBCDIC character string		
m+1-n	Uninterpreted name of SLU		
m+1	Type: X'F3' logical unit		
m+2	Length, in binary, of SLU name		
m+3-n	EBCDIC character string		

PROCSTAT; PU_T4|5-->SSCP, Norm; FMD NS(c)
(PROCEDURE STATUS)
PROCSTAT reports to the SSCP either the successful completion or the failure of the load operation. If the procedure failed, the request code of the failing RU and sense data are included as parameters in the PROCSTAT RU.

0-2	X'410236' NS header		
3-6	Reserved		
7-8	Network address of PU for which the procedure was initiated		
9	Procedure type		
		X'00'	load (only value defined)
10	Procedure status:		
		X'00'	successful (bytes 13-17 set to 0's)
		X'01'	reserved
		X'02'	failure occurred--procedure failure; bytes 13-17 contain additional information
11-12	Reserved		
13-17	<u>Status Qualifier</u>		
13	Request code of failing NC RU		
14-17	Sense data returned in the -RSP for the failing NC RU		

QC; LU-->LU, Norm; DFC (QUIESCE COMPLETE)
QC is sent by a half-session after receiving QEC, to indicate that it has quiesced.

0 X'81' request code

QEC; LU-->LU, Exp; DFC (QUIESCE AT END OF CHAIN)
QEC is sent by a half-sesison to quiesce its partner half-session after it (the partner) finishes sending the current chain (if any).

0 X'80' request code

RECFMS; PU-->SSCP|PUCP, Norm; FMD NS(ma) (RECORD FORMATTED MAINTENANCE STATISTICS)
RECFMS permits the passing of maintenance related information from a PU to maintenance services at the SSCP.

0-2 X'410384' NS header

3-7 CNM Header

3-4 CNM target ID, as specified in bytes 5-6, bits 2-3

5-6 bits 0-1, reserved
bits 2-3, CNM target ID descriptor:
- 00 byte 4 contains a local address for a PU or LU in a PU_T2 node or an LSID for a PU or LU in a PU_T1 node; byte 3 is reserved
- 01 bytes 3-4 contain a network address identifying a link, adjacent link station, PU, or LU in the origin subarea

bits 4-15, procedure related identifier (PRID) (see Note below)

7 Request-Specific Information
bit 0, solicitation indicator:
- 0 unsolicited request
- 1 reply request

bit 1, not last request indicator:
- 0 last request in a series of related unsolicited or reply requests, for example, last reply request in a series corresponding to a single soliciting request
- 1 not last request

bits 2-7, request-specific type code (see below)

Note: For reply (in other words, solicited) requests, bytes 3-6 and byte 7, bits 2-7, echo the corresponding fields in the CNM header received in the request that solicited the reply request(s).

For unsolicited requests, these fields--the CNM target ID descriptor, the CNM target ID, the PRID, and the request-specific information--are generated by the request sender. For unsolicited requests, the PRID field contains X'000'.

7-n	Alert
7	bit 0, reserved bit 1, not last request indicator (see above) bits 2-7, type code: 000000; any defined CNM target id is valid
8-13	Node Identification bits 0-11, block number bits 12-31, ID number
12-13	Reserved
14-19	Alert Classification
14	bits 0-1, reserved bits 2-7, alert classification code: valid values are the same as the valid Type codes for RECFMS (byte 7, bits 2-7), with the exception of 000000
15	Subclassification identifier: the subclassification for the classification indicated in byte 14; if the RECFMS type identified by byte 14, bits 2-7, has a further qualification (for example, RECFMS types 000011 and 000110 have qualifiers in byte 14 of their formats), this byte contains the qualifying value; if not, the byte is reserved
16-19	Alert reason mask: a mask field selecting the item(s) that caused the alert event to be originated; a bit value of 1 indicates that the

	corresponding data item was a reason for the alert event; if the RECFMS type identified by byte 14, bits 2-7, and byte 15 has a validity mask field, the format of the Alert Reason Mask field is the same as the format of the Validity Mask field (for example, RECFMS 000011 bytes 15-17); if the identified RECFMS does not contain a validity mask, the i'th bit of this field corresponds to the i'th data item in the identified RECFMS
20-n	Appended RECFMS vector(s): zero or more RECFMS vectors may be appended to the request to convey data available to the CNMS when the alert event was originated, including data represented in RECFMS types; inclusion of RECFMS vectors is optional; appended vectors must be ordered according to the binary value of the Vector Type field (lowest value first)
20	Vector length: a binary count of the length in bytes of this RECFMS vector (bytes 21-m)
21	bit 0, criticality indicator: for certain vector types, an indication of the urgency of the event being reported; if bits 2-7 of this byte are not 000000, this bit is reserved; if bits 2-7 of this byte are 000000, the bit has the following values: 0 the event cited is noncritical 1 the event cited is potentially terminal; if the CNMA is unavailable, the SSCP will display this text Note: When the criticality indicator is set to 1 in an appended vector, the appended vector (vector type 000000) contains a message formatted for display at an operator

console and must occur as the first appended vector. Only one vector of type 000000 with the criticality indicator equal to 1 may be appended.

bit 1, reserved

bits 2-7, vector type: an identifier of the information contained in this RECFMS vector; valid values are:

000000 the vector contains a text message, composed of SCS characters

¬000000 any valid type code for RECFMS (byte 7, bits 2-7), with the exception of 000000; these values indicate that the balance of the vector contains the information specified in bytes 14-n for the identified RECFMS type

Note: The sending of information in appended RECFMS vectors does not cause reset of any counters.

22-m Bytes 14-n of the indicated RECFMS type or the SCS text message

m+1-(n-1) Additional vectors (if required) having the same format as bytes 20-m

n X'00' indicating end of appended vectors

7-17 SDLC Test Command/Response Statistics

7 bit 0, solicitation indicator (see above)

bit 1, not last request indicator (see above)

bits 2-7, type code: 000001; the CNM target ID identifies a PU_T1|2

8-13	Node identification: bits 0-11, block number bits 12-31, ID number
12-13	Reserved
14-15	Counter: the number of times the secondary SDLC station has received an SDLC Test command with or without a valid FCS
16-17	Counter: the number of times the secondary SDLC station has received an SDLC Test command with a valid FCS and has transmitted an SDLC Test response Note: All counters are in binary.
7-22	Summary error data
7	bit 0, solicitation indicator (see above) bit 1, not last request indicator (see above) bits 2-7, type code: 000010; the CNM target ID identifies a PU
8-13	Node identification: bits 0-11, block number bits 12-31, ID number
12-13	Reserved
14-16	Summary counter validity mask:
14	bit 0, set to 1 if product error counter is valid bit 1, set to 1 if communication adapter error counter is valid bit 2, set to 1 if SNA negative response counter is valid bits 3-7, reserved
15-16	Reserved
17-18	Product error counter: a count for the product identified by the Node Identification field (bytes 8-13) of certain product-detected hardware errors whose origins are failures designated as internal by that product's own logic capability (The identified product has the responsibility for further isolation of these failures using its own product-specific problem determination and maintenance procedures.)

19-20 Communication adapter error counter for communication adapter errors whose source is either external or internal to the product identified by the block number

21-22 Count of SNA negative responses originating at this node

Note: All counters are in binary.

7-30|31 Communication Adapter Error Statistics: counts of selected errors, useful for problem determination, that have been supplied by the communication adapter (For these errors, the RECFMS Type 000010 communication adapter error counter is always incremented; the RECFMS Type 000010 product error counter is also incremented for those errors classified as internal errors by the product identified by the block number.)

7 bit 0, solicitation indicator (see above)

bit 1, not last request indicator (see above)

bits 2-7, type code: 000011; the CNM target ID identifies a PU_T1|2

8-13 Node identification:

bits 0-11, block number

bits 12-31, ID number

12-13 Reserved

14 Communication adapter error counter sets:

X'01' counter set 1

X'02' counter set 2

X'03' counter set 3

15-30 Data for Counter Sets 1 and 2

15-17 Communication adapter counter validity mask bytes

15 Mask byte 1:

bit 0, set to 1 if nonproductive time-out or receive overrun 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
	bit 6, set to 1 if FCS error counter is valid
	bit 7, set to 1 if primary station abort counter is valid
16	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 bit 3, set to 1 if invalid status counter is valid bit 4, set to 1 if communication adapter machine check counter is valid bits 5-7, reserved
17	Reserved
18	Nonproductive time-out counter: no valid SDLC frames have been received within the time interval specified by the communication adapter; or receive overrun counter: the line is "hung" or insufficient buffer space has been allocated Note: Receive overrun applies only to counter set 2.
19	Idle time-out counter: no SDLC Flag octets received for *n* seconds, where *n* is specified by the communication adapter
20	Write retry counter: the number of retransmissions of one or more SDLC I-frames
21	Overrun counter: the number of times one or more received characters have been overlaid

22	Underrun counter: the number of times one or more characters have been transmitted more than once
23	Connection problem counter: incremented by 1 for every n retries of commands that establish connection with a station, when RLSD drops, or whenever write retry is updated-- n is specified by the communication adapter
24	FCS error counter: tne number of times a received SDLC frame had an invalid FCS
25	Primary station abort counter: number of times eight or more consecutive 1 bits have been received
26	SDLC command reject counter
27	DCE error counter: number of DCE interrupts or other unexpected conditions (for example, "data set ready" drops)
28	Write time-out counter: number of time-outs during write operations, for example, because of transmit clock failures
29	Invalid status counter: number of times status generated by the adapter was not meaningful
30	Communication adapter machine check counter: number of times the communication adapter has been identified as causing a machine check Note: All counters are in binary.
15-31	Data for Counter Set 3
15-17	Communication adapter counter validity mask:
15	bit 0, set to 1 if total transmitted frames counter is valid bit 1, set to 1 if write retry counter is valid bit 2, set to 1 if total received frames counter is valid bit 3, set to 1 if FCS error counter is valid bit 4, set to 1 if command reject counter is valid

bit 5, set to 1 if DCE error counter is valid
bit 6, set to 1 if nonproductive time-out counter is valid
bit 7, reserved

16-17 Reserved

18-19 Total transmitted frames counter: the total number of SDLC I-frames transmitted successfully

20-21 Write retry counter: the number of retransmissions of one or more SDLC I-frames

22-23 Total received frames counter: the number of SDLC I-frames successfully received

24-25 FCS error counter: the number of SDLC frames received with FCS errors

26-27 SDLC command reject counter

28-29 DCE error counter: the number of DCE interrupts and other unexpected conditions (for example, "data set ready" drops)

30-31 Nonproductive time-out counter: the number of times an SDLC frame has not been received within the time interval specified by the adapter

Note: All counters are in binary.

15-33 Data for Counter Set 4 (Note: For a definition of adapter, control unit, and System/370 channel commands, and orders see implementation documentation.)

15-17 Adapter counter validity mask bytes

15 Mask byte 1: bit is set to 1 if the counter is valid
bit 0, command-reject-while-not-initialized counter
bit 1, command-not-recognized counter
bit 2, sense-while-not-initialized counter
bit 3, channel-parity-check-during-selection-sequence counter
bit 4, channel-parity-check-during-data-write-sequence counter
bit 5, output-parity-check-at-control-unit counter

	bit 6, input-parity-check-at-control-unit counter
	bit 7, input-parity-check-at-adapter counter
16	Mask byte 2:
	bit 0, data-error-at-adapter counter
	bit 1, data-stop-sequence counter
	bit 2, short-frame-or-length-check counter
	bit 3, connect-received-when-already-connected counter
	bit 4, disconnect-received-while-PU-active counter
	bit 5, long-RU counter
	bit 6, connect-parameter-error counter
	bit 7, Read-Start-Old-received counter
17	Reserved
18	Command-reject-when-not-initialized counter: an initial Control command containing a valid Connect order was not received prior to a Restart Reset, Read Start 0/1, Write Start 0/1, Read, Write, or Write Break command
19	Command-not-recognized counter: control unit channel adapter received a command code that it did not recognize (invalid or not supported)
20	Sense-when-not-initialized counter: Sense command was received in response to the initial asynchronous interrupt (device-end,unit check), or Sense command was received without a preceding unit check ending status
21	Channel-parity-check-during-selection-sequence counter: control unit channel adapter detected a parity error from the channel during the selection sequence from the channel
22	Channel-parity-check-during-data-write-sequence counter: control unit channel adapter detected a parity error on channel bus-out during a channel Write operation
23	Output-parity-check-at-control-unit counter: control unit channel adapter detected a control unit parity error during a channel Write operation

24 Input-parity-check-at-control-unit counter: control unit detected a control unit parity error during a channel Read operation

25 Input-parity-check-at-adapter counter: control unit channel adapter detected that it transmitted bad parity on channel bus-in during a channel Read operation

26 Data-error-at-adapter counter: control unit detected a channel adapter error during an internal channel adapter cycle-steal operation

27 Data-stop-sequence counter: the number of data bytes accepted by the System/370's Read command was less than that specified in Connect

28 Short-frame-or-length-check counter: a minimum four bytes have not been transferred as a link header; or the byte count specified in the first two bytes of the header did not equal the number of bytes received during a Control, Write, or Write Break operation

29 Connect-received-when-already-connected counter: a Connect was received when the control unit was already connected; this is an error condition and the PU is deactivated

30 Disconnect-received-while-PU-active counter: a Disconnect order was received from the System/370 while the PU is active (that is, with no DACTPU preceding the Disconnect); this is an error condition

31 Long-RU counter: primary link station has sent an RU greater than the secondary link station can accept

32 Connect-parameter-error counter: the Connect was rejected because it specified an odd-number buffer length, or it specified a buffer size insufficient to hold the link header, TH, RH, and at least a 64-byte RU

33 Read-Start-Old-received counter: the secondary link station received a Read Start Old command
Note: All counters are in binary.

7-n PU/LU Dependent Data

7 bit 0, solicitation indicator (see above)
bit 1, not last request indicator (see above)
bits 2-7, type code: 000100; the CNM target ID identifies a PU|LU

8-13 Node identification
bits 0-11, block number
bits 12-31, ID number

12-13 Reserved

14-n PU/LU dependent data

7-n Engineering Change Levels

7 bit 0, solicitation indicator (see above)
bit 1, not last request indicator (see above)
bits 2-7, type code: 000101; the CNM target ID identifies a PU

8-13 Node identification
bits 0-11, block number
bits 12-31, ID number

12-13 Reserved

14-n Implementation defined data describing hardware, microcode, and programming levels

7-n Link Connection Subsystem Data

7 bit 0, solicitation indicator (see above)
bit 1, not last request indicator (see above)
bits 2-7, type code: 000110; the CNM target ID identifies an adjacent link station in the origin subarea

8-13 Node identification
bits 0-11, block number
bits 12-31, ID number

12-13 Reserved

14 Data selection:
X'01' available data (only value defined)

15	Link connection subsystem type: X'01' IBM 3863, 3864, or 3865 modem (only value defined)
16-n	Link connection subsystem data: product defined data

RECMS; PU_T4|5-->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 supported links, or for adjacent link stations, 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

RECSTOR; PU_T4|5-->SSCP, Norm; FMD NS(ma) (RECORD STORAGE)
RECSTOR carries the storage dump as requested by a DISPSTOR RU.

0-2	X'010334' NS header
3-4	Network address of resource to be displayed
5	Display source and type: bits 0-3, source (address space) of storage display Note: Refer to implementation documentation for description of these values. bits 4-7, display type: 0001 nonstatic storage display 0010 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_T4|5-->SSCP, Norm; FMD NS(ma) (RECORD TEST DATA)
RECTD returns the status and results of a test requested by EXECTEST 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

RECTR; PU_T4|5-->SSCP, Norm; FMD NS(ma) (RECORD TEST RESULTS)
RECTR is the reply request corresponding to a TESTMODE request. It returns the results and status for the test. Multiple reply requests may be sent in answer to a single soliciting TESTMODE request. When TESTMODE initiates a continuous test, the RECTR(s) is sent in reply to the TESTMODE request that terminates the test. However, the PRID that is echoed in the CNM header of the replying RECTR is the PRID received in the TESTMODE that initiated the test.

0-2 X'410385' NS header
3-7 CNM Header
3-4 CNM target ID, as specified in bytes 5-6, bits 2-3
5-6 bits 0-1, reserved
bits 2-3, CNM target ID descriptor:
- 00 byte 4 contains a local address for a PU or LU in a PU_T2 node or an LSID for a PU or LU in a PU_T1 node; byte 3 is reserved
- 01 bytes 3-4 contain a network address identifying a link, adjacent link station, PU, or LU in the origin subarea

bits 4-15, procedure related identifier (PRID) (see Note below)

7 Request-Specific Information
bit 0, solicitation indicator:
0 unsolicited request
1 reply request
bit 1, not last request indicator:
0 last request in a series of related unsolicited or reply requests, for example, last reply request in a series corresponding to a single soliciting request
1 not last request
bits 2-7, request-specific type code (see below)

Note: For reply (in other words, solicited) requests, bytes 3-6 and byte 7, bits 2-7, echo the corresponding fields in the CNM header received in the request that solicited the reply request(s).

For unsolicited requests, these fields--the CNM target ID descriptor, the CNM target ID, the PRID, and the request-specific information--are generated by the request sender. For unsolicited requests, the PRID field contains X'000'.

Link Level 2 Test Statistics
7 bit 0, solicitation indicator (see above)
bit 1, not last request indicator (see above)
bits 2-7, type code: 000001; the CNM target ID specifies an adjacent link station attached to a PU_T4|5 node (Note: When the attached adjacent link station is in a PU_T1|2 node, the PU CNM ID is used as the adjacent link station CNM ID.)
8 Reserved
9-10 Number of DLC link test frames transmitted
11-12 Number of DLC link test frames received with or without link errors

13-14	Number of DLC link test frames received without link errors
15-16	Reason for test termination: X'0000' test completed without error X'0001' test completed with error--see bytes 9-14 X'0002' test ended because of link inoperative condition X'0003' test initialization failure; bytes 9-14 contain 0's

RECTRD; PU_T4|5-->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	Trace data type
	bit 0, transmission group trace
	bits 1-4, reserved
	bits 5-6, trace data format 10 fixed-length data segments 11 variable-length data segments
	bit 7, link trace
6-n	Trace data

RELQ; LU-->LU, Exp; DFC (RELEASE QUIESCE)
RELQ is used to release a half-session from a quiesced state.

0	X'82' request code

REQACTLU; PU_T4|5-->SSCP, Norm; FMD NS(c) (REQUEST ACTIVATE LOGICAL UNIT)
REQACTLU is sent from the PU to an SSCP to request that ACTLU be sent to the LU named in the RU.

0-2	X'410240' NS header
3-4	Network address of LU to be sent ACTLU
5-m	Network Name of LU
5	Type: X'F3' logical unit
6	Length, in binary, of network name
7-m	Symbolic name in EBCDIC characters

REQCONT; PU_T4|5-->SSCP, PU-->PUCP, Norm; FMD NS(c) (REQUEST CONTACT)
REQCONT notifies the SSCP that a connection with an adjacent secondary link station (in a PU_T1|2 node) has been activated via a successful connect-in or connect-out procedure. A DLC-level identification exchange (XID) is required before issuing REQCONT.

0-2	X'010284' NS header
3-4	Network address of link
5-n	XID I-field image: the bytes received in the information field of the SDLC XID response; see the later section, "DLC XID Information-Field Formats," for format details

REQDISCONT; PU_T1|2-->SSCP, Norm; FMD NS(c) (REQUEST DISCONTACT)
With REQDISCONT, the PU_T1|2 requests the SSCP to start a procedure that will ultimately discontact the secondary station in the PU_T1|2 node.

0-2	X'01021B' NS header
3	bits 0-3, type: X'0' normal X'8' immediate bits 4-7, CONTACT information: X'0' do not send CONTACT immediately X'1' send CONTACT immediately

REQECHO; LU-->SSCP, Norm; FMD NS(ma) (REQUEST ECHO TEST)
REQECHO requests that the SSCP return to the LU via ECHOTEST the data included in REQECHO.

0-2	X'810387' NS header
3	Repetition factor: number of times the test data is to be echoed to the target LU <u>Note</u>: X'00' is not a valid repetition factor.
4-m	<u>Echoed Data Field</u>
4	Number of data bytes to be echoed
5-m	Echoed data

REQFNA; PU_T4|5-->SSCP, Norm; FMD NS(c) (REQUEST FREE NETWORK ADDRESS)
REQFNA is sent from a PU_T4|5 to an SSCP to request the SSCP to send FNA to the PU_T4|5 in order to free all addresses for the specified LU.

0-2	X'410286' NS header
3-4	Network address of LU to be deleted
5	Reserved
6	Type of request: X'01' request X'02' normal X'03' forced X'04' cleanup

REQMS; SSCP|PUCP-->PU, Norm; FMD NS(ma) (REQUEST MAINTENANCE STATISTICS)

REQMS requests the CNM services associated with the PU to provide maintenance statistics for the resource indicated by the CNM target ID in the CNM header.

0-2 X'410304' NS header

3-7 CNM Header

3-4 CNM target ID, as specified in bytes 5-6, bits 2-3

5-6 bits 0-1, reserved

bits 2-3, CNM target ID descriptor:

- 00 byte 4 contains a local address for a PU or LU in a PU_T2 node or an LSID for a PU or LU in a PU_T1 node; byte 3 is reserved
- 01 bytes 3-4 contain a network address identifying a link, adjacent link station, PU, or LU in the destination subarea

bits 4-15, procedure related identifier (PRID): a CNM application program generated value for CNM application program correlation, or an SSCP generated value for SSCP routing

7 Request-Specific Information

bit 0, reset indicator (or reserved, as shown below for each Type code):

- 0 do not reset data when RECFMS is sent in reply
- 1 reset data when RECFMS is send in reply

bit 1, reserved

bits 2-7, request-specific type code (see below)

Note: For reply (in other words, solicted) requests, bytes 3-6 and byte 7, bits 2-7, echo *the corresponding* fields in the CNM header received in the request that solicited the reply request(s). For unsolicited requests, the PRID field contains X'000'.

7	SDLC Test Command/Response Statistics bit 0, reset indicator bit 1, reserved bits 2-7, type code: 000001; the CNM target ID identifies a PU_T1|2
7	Summary Error Data bit 0, reset indicator bit 1, reserved bits 2-7, type code: 000010; the CNM target ID identifies a PU
7	Communication Adapter Data bits 0-1, reserved bits 2-7, type code: 000011; the CNM target ID identifies a PU_T1|2
7-n	PU- or LU-Dependent Data
7	bit 0, reset indicator bit 1, reserved bits 2-7, type code: 000100; the CNM target ID identifies a PU|LU
8-n	PU- or LU-dependent request parameters: implementation dependent information (See CNM application product specifications for details.)
7	Engineering Change Levels bits 0-1, reserved bits 2-7, type code: 000101; the CNM target ID identifies a PU
7-8	Link Connection Subsystem Data
7	bit 0, reset indicator bit 1, reserved bits 2-7, type code: 000110; the CNM target ID identifies an adjacent link station in the destination subarea
8	Data selection requested: X'01' available data (only value defined)

REQTEST; LU-->SSCP, PU_T4|5-->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 (X'00' = no symbolic name 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 (X'00' = no symbolic name present)
m+3-n	Symbolic name, in EBCDIC characters, of resource to be tested
n+1-p	*Procedure Name*
n+1	Type: X'F5' test procedure name
n+2	Length: binary number of bytes in symbolic name (X'00' = no symbolic name present)
n+3-p	Symbolic name, in EBCDIC characters, of test procedure to be executed
p+1-q	*Requester ID*
p+1	Length: binary number of bytes in requester ID (X'00' = no requester ID 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.)
q+1-r	*Password*
q+1	Length: binary number of bytes in password (X'00' = no password present)
q+2-r	Password, field used to verify the identity of an end user
r+1-s	*User Field*
r+1	Length: binary number of bytes of user data (X'00' = no user data present)
r+1-s	User data

RNAA; SSCP-->PU_T4|5, Norm; FMD NS(c) (REQUEST NETWORK ADDRESS ASSIGNMENT)

RNAA requests the PU to update its path control routing table and to assign network addresses: (1) to one or more adjacent link stations and their BF.PUs, as identified in the RNAA request by a link network address and secondary link station link-level addresses (2) to one or more BF.LUs, where the BF.LUs are identified in the RNAA request by an adjacent link station network address and the LU local addresses (3) to an LU that supports parallel sessions, where the LU is identified in the RNAA request by the LU network address used for the SSCP-LU session, in order to assign an additional network address. The PU returns the network addresses in the RNAA response.

0-2	X'410210' NS header
3-4	Network address of target link, adjacent link station, or LU
5	Assignment type: X'00' request is for network address assignment of adjacent link station(s) associated with target link X'01' request is for network address assignment of BF.LU(s) associated with the target adjacent link station X'02' request is for an additional network address assignment for the target LU; bytes 3-4 contain the LU network address used in the SSCP-LU session
6	Number of network addresses to be assigned
7-8	<u>DLC Header Link Station Address, LU Local Address, or LU Network Address Entry</u> For Assignment Type 0
7	*Reserved*
8	DLC header link station address associated with the adjacent link station for which a network address is requested

- For Assignment Type 1

7 Reserved

8 Local address of a BF.LU for which a network address is requested, where the local address has either the one-byte format of FID2 or the six-bit local address format of FID3 (in which case, bits 0-1 of byte 8 are reserved)

- For Assignment Type 2

7-8 Reserved

9-n Any additional two-byte entries in the same format as bytes 7-8 for assignment types 0 and 1 (not present for assignment type 2)

ROUTE-TEST; SSCP-->PU_T4|5, Norm; FMD NS(ma)
(ROUTE TEST)
ROUTE-TEST requests the PC_ROUTE_MGR component of PU.SVC_MGR to return the status (for example, active, operative, not defined), as known in the control blocks in the node, of various explicit and/or virtual routes.

0-2 X'410306' NS header

3 Format: X'01' (only value defined)

4 Test code:
- X'01' test regardless of the states of ERs
- X'02' test each ER that is not inoperative
- X'03' test each ER that is inoperative
- X'04' do not test the ER; respond with the current ER state (See RSP(ROUTE-TEST))

5 Type of route to be tested:
- X'01' test the ERs corresponding to the ERNs specified in bytes 11-12
- X'02' test the VRs corresponding to the VRNs specified in bytes 11-12; Byte 4 applies to the underlying ERs for the VRs
- X'03' test the ERs corresponding to the defined TG for the ERNs specified in bytes 11-12

6 Maximum expected ER length of any ER being tested
7-10 Subarea address of destination PU for the NC-ER-TEST request
11-12 A bit is on if the corresponding ERN or VRN (depending on the route type specified in byte 5) is to be tested (Bit 0 corresponds to ERN or VRN 0, bit 1 to ERN or VRN 1, and so forth.)
13-22 Request correlation field: an implementation defined value that is returned in ER-TESTED for correlation of reply to request

RPO; SSCP-->PU_T4|5, Norm; FMD NS(c) (REMOTE POWER OFF)
RPO causes the receiving PU_T4|5 to initiate a DLC-level power-off sequence to the PU_T4 node specified by the adjacent link station address conveyed in the request. The PU_T4|5 node being powered off does not need to have an active SSCP-PU half-session nor be contacted.
0-2 X'010209' NS header
3-4 Network address of adjacent link station associated with the node to be powered off

RQR; SLU-->PLU, SSCP-->SSCP, Exp; SC (REQUEST RECOVERY)
RQR is sent by the secondary to request the primary to initiate recovery for the session by sending CLEAR or to deactivate the session.

0	X'A3' request code

RSHUTD; SLU-->PLU, Exp; DFC (REQUEST SHUTDOWN)
RSHUTD is sent from the secondary to the primary to indicate that the secondary is ready to have the session 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 brackets.

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 by continued sending of BB and the BID request.

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 the sending and receiving of FMD and DFC requests and responses by both half-sessions.

0	X'A0' request code

SESSEND; LU-->SSCP, Norm; FMD NS(s) (SESSION ENDED)
SESSEND is sent, with no-response requested, to notify the SSCP that the session between the specified LUs has been successfully deactivated.

	Note: SESSEND is generated by the BF.LU.SVC_MGR on behalf of the SLU in a PU_T1|2 node.
0-2	X'810688' NS header

3	bits 0-3, format:
	0000 format 0
	0010 format 2
	bits 4-7, reserved
	Format 0
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 PLU name
7-m	EBCDIC character string
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of SLU name
m+3-n	EBCDIC character string
	• For session key X'07': network address pair
5-6	Network address of PLU
7-8(=n)	Network address of SLU
	Format 2
4	Cause: indicates the reason for the deactivation of the identified (LU,LU) session (see UNBIND for values)
5	Action: indicates if any resultant action is to be taken and by whom:
	X'01' normal, no resultant automatic action
	X'02' primary half-session will restart
	X'03' secondary half-session will restart
6	Session key:
	X'06' network name pair
	X'07' network address pair
7-n	Session Key Content
	• For session key X'06': network 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(=n) Network address of SLU

SESSST; PLU-->SSCP, Norm; FMD NS(s) (SESSION STARTED)
SESSST is sent, with no-response requested, 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 PLU name
7-m EBCDIC character string
m+1 Type: X'F3' logical unit
m+2 Length, in binary, of SLU name
m+3-n EBCDIC character string
- For session key X'07': network address pair

5-6 Network address of PLU
7-8(=n) Network address of SLU

SETCV; SSCP-->PU_T4|5, 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.

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 section "Control Vectors and Control Lists," later in this section
Note: The following combinations are used in SETCV (configuration services):

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)

SETCV; SSCP-->PU_T4|5, Norm; FMD NS(ma) (SET CONTROL VECTOR)

SETCV sets the intensive mode (X'08') 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'010311' 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 section "Control Vectors and Control Lists," later in this section

Note: The following combination is used in SETCV (maintenance services):

Vector Key (Byte 5)	Resource (Bytes 3-4)
X'08'	Adjacent link station

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

SHUTC is sent by a secondary to indicate that it is in the shutdown (quiesced) state.

0	X'C1' request code

SHUTD; PLU-->SLU, Exp; DFC (SHUTDOWN)
SHUTD is sent by the primary to request that the secondary shut down (quiesce) as soon as convenient.

0	X'C0' request code

SIG; LU-->LU, Exp; DFC (SIGNAL)
SIG is an expedited request that can be sent between half-sessions, regardless of the status of the normal flows. It carries a four-byte value, of which the first two bytes are the signal code and the last two bytes are the signal extension value. These 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'+'uuuu'	request to send + user-defined field
X'0002'+'uuuu'	assistance requested + user defined field
X'0003'+'uuuu'	intervention required (no data loss) + user-defined field

STSN; PLU-->SLU, Exp; SC (SET AND TEST SEQUENCE NUMBERS)
STSN is sent by the primary half-session sync point manager to resynchronize the values of the half-session 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; the half-session value is set to the value in bytes 2-3 or 4-5, as appropriate
10 sense; secondary half-session's sync point manager returns the transaction processing program's sequence number for this flow in the response RU
11 set and test; the half-session value is set to the value in appropriate bytes 2-3 or 4-5, and the secondary half-session's sync point manager compares that value against the transaction processing program's number and responds 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 half-session value is set and against which the secondary half-session's sync point manager tests the transaction processing program's value for the respective flow. For action codes 00 and 10, the appropriate bytes 2-3 or 4-5 are reserved.

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

0-2	X'810682' NS header
3	bits 0-3, Format: 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 available only for implementation use bit 2, reserved if byte 4, bit 7 = 1; otherwise: 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 do not send DACTLU to LU1; another session initiation request will be sent for LU1 1 send DACTLU to LU1 when appropriate; no further session initiation request will be sent (from this sender) for LU1 bit 4, 0 do not send DACTLU to LU2; another session initiation request will be sent for LU2

		1	send DACTLU to LU2 when appropriate; no further session initiation request will be sent (from this sender) for LU2
	bits 5-6,	00	select session(s) for which LU1 is PLU
		01	select session(s) for which LU2 is PLU
		10	select session(s) regardless of whether LU is PLU or SLU
		11	reserved
	bit 7,	0	orderly or forced (see byte 4, bit 2)
		1	cleanup
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
	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.
	bit 7, reserved		
7	Reserved		
8	Session key:		
	X'06'		uninterpreted name pair
	X'07'		network address pair
	X'0A'		URC
9-n	<u>Session Key Content</u>		
	• For session key X'06': uninterpreted name pair		
9	Type: X'F3' logical unit		
10	Length, in binary, of LU1 name		

11-m	EBCDIC character string
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of LU2 name
m+3-n	EBCDIC character string Note: If the length of one of the uninterpreted names (LU1 or LU2, but not both) is 0 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
	• For session key X'0A': URC
9	Length, in binary, of the URC
10-n	URC: end user defined identifier Note: This URC is the one carried in the INIT issued previously by the same LU (that is, ILU = TLU), and differs from the one in bytes q+1 through r.
n+1-p	Requester ID
n+1	Length, in binary, of requester ID Note: X'00' = no requester ID
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 the URC Note: X'00' = no URC
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, reserved if byte 4, bit 7 = 1; otherwise:
	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 do not send DACTLU to LU1; another session initiation request will be sent for LU1
	1 send DACTLU to LU1 when appropriate; no further session initiation request will be sent (from this sender) for LU1
	bit 4, 0 do not send DACTLU to LU2; another session initiation request will be sent for LU2

		1 send DACTLU to LU2 when appropriate; no further session initiation request will be sent (from this sender) for LU2
	bits 5-6,	00 select session(s) for which LU1 is PLU
		01 select session(s) for which LU2 is PLU
		10 select session(s) regardless of whether LU is SLU or PLU
		11 reserved
	bit 7,	0 orderly or forced (see byte 4, bit 2)
		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), that 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'05' PCID	
	X'06' network name pair	
	X'07' network address pair	
17-n	Session Key Content	
	• For session key X'05': PCID	
17-18	Network address of the SSCP(ILU)	
19-24(=n)	A unique six-byte value, generated by the SSCP(ILU), that is retained and used in all cross-domain requests dealing with the same procedure until it is completed	

	Note: This is a PCID generated by the SSCP(ILU), and differs from the one in bytes 5-12.
	• 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
	• 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
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 the termination of one or more sessions between the sender of the request (TLU = OLU) and the DLU.

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, reserved if byte 3, bit 4 = 1;
                 otherwise:
                  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  do not send DACTLU to OLU;
                     another session initiation
                     request will be sent for
                     OLU
                  1  send DACTLU to OLU when
                     appropriate; no further
                     session initiation request
                     will be sent (from this
                     sender) for OLU
          bit 4,  0  orderly or forced (see byte
                     3, bit 2)
                  1  clean up
          bits 5-6,  00  select session(s) for
                         which DLU is PLU
                     01  select session(s) for
                         which DLU is SLU
                     10  select session(s)
                         regardless of whether
                         LU is SLU or PLU
                     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 DLU name
Note: If the length value of the DLU name is 0, then the TERM-SELF applies to all sessions, as specified in the Type byte, where the TLU is a partner.

6-m EBCDIC character string
Note: The following defaults are supplied by the SSCP receiving a Format 0 TERM-SELF:

- Reason: network user, normal
- Notify: do not notify
- Requester ID, URC, and password are not used in mapping to subsequent requests.

TERM-SELF; TLU-->SSCP, Norm; FMD NS(s) (TERMINATE-SELF)

TERM-SELF from the TLU requests that the SSCP assist in the termination of one or more sessions between the sender of the request (TLU = OLU) and the DLU.

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 available only for implementation use
 bit 2, reserved if byte 4, bit 7 = 1; otherwise:
 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 do not send DACTLU to OLU; another session initiation request will be sent for OLU

1 send DACTLU to OLU when appropriate; no further session initiation request will be sent (from this sender) for OLU

bit 4, reserved

bits 5-6, 00 select session(s) for which DLU is PLU

01 select session(s) for which DLU is SLU

10 select session(s) regardless of whether LU is SLU or PLU

11 reserved

bit 7, 0 orderly or forced (see byte 4, bit 2)

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

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

bit 7, reserved

7 Reserved

TERM-SELF (format 1)

8	Session key: X'01' uninterpreted name X'07' network address pair X'0A' URC
9-n	Session Key Content
•	For session key X'01': uninterpreted name
9	Type: X'F3' logical unit
10	Length, in binary, of name
11-n	EBCDIC character string Note: If the length value is 0, 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
•	For session key X'0A': URC
9	Length, in binary, of the URC
10-n	URC: end user defined identifier Note: This URC is the one carried in the INIT issued previously by the same LU (that is, ILU = TLU), and differs from the one in bytes q+1 through r.
n+1-p	Requester ID
n+1	Length, in binary, of requester ID Note: X'00' = no requester ID
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
q+2-r	URC: end-user defined identifier; this value can be returned by the SSCP in a subsequent NOTIFY to correlate a given session to this terminating request

TESTMODE; SSCP-->PU_T4|5, Norm; FMD NS(ma) (TEST MODE)

TESTMODE requests the CNM services associated with the PU to manage a test procedure. The test procedure begins with the TESTMODE request that initiates a test and ends when the test results and status are returned in a RECTR reply request corresponding to the initial TESTMODE request.

0-2	X'410305' NS header
3-7	CNM Header
3-4	CNM target ID, as specified in bytes 5-6, bits 2-3
5-6	bits 0-1, reserved bits 2-3, CNM target ID descriptor: 00 byte 4 contains a local address for a PU or LU in a PU_T2 node or an LSID for a PU or LU in a PU_T1 node; byte 3 is reserved 01 bytes 3-4 contain a network address identifying a link, adjacent link station, PU, or LU in the destination subarea bits 4-15, procedure related identifier (PRID): a CNM application program generated value for CNM application program correlation, or an SSCP generated value for SSCP routing
7	Request-Specific Information bits 0-1, reserved bits 2-7, request-specific type code (see below)

Note: For reply (in other words, solicited) requests, bytes 3-6 and byte 7, bits 2-7, echo the corresponding fields in the CNM header received in the request that solicited the reply request(s). For unsolicited requests, the PRID field contains X'000'.

7-n	Link Level 2 Test Statistics
7	bits 0-1, reserved bits 2-7, type code: 000001; the CNM target ID specifies an adjacent link station attached to a PU_T4|5 node (Note: When the attached adjacent link station is in a PU_T1|2 node, the PU CNM ID is used as the adjacent link station CNM ID.)
8	Reserved
9-10	Test initiation/termination code: X'0000'(=n1) terminate an ongoing link test previously initiated X'FFFF'(=n2) initiate a link test and run it continuously n=¬(n1|n2) initiate a link test and transmit n test frames
11-12	For point-to-point links this field is reserved; for multipoint links, this field specifies the number of test frame transmissions to be sent each time the secondary link station is serviced, for example, in SDLC the time interval during which frames are being sent and received from a single secondary link station without another secondary link station on the link being polled or being sent frames
13-n	Data to be sent in the data field of the link test frame

UNBIND; LU-->LU, Exp; SC (UNBIND SESSION)
UNBIND is sent to deactivate an active session between the two LUs.

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: sync 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
	X'07'	virtual route inoperative: the virtual route used by the (LU,LU) session has become inoperative, thus forcing the deactivation of the identifed (LU,LU) session
	X'08'	route extension inoperative: the route extension used by the (LU,LU) session has become inoperative, thus forcing the deactivation of the identified (LU,LU) session
	X'09'	hierarchical reset: the identified (LU,LU) session is being deactivated because of a +RSP((ACTPU | ACTLU), Cold)

X'0A'	SSCP gone: the identified (LU,LU) session had to be deactivated because of a forced deactivation of the (SSCP,PU) or (SSCP,LU) session (for example, DACTPU, DACTLU, or DISCONTACT)
X'0B'	virtual route deactivated: the identified (LU,LU) session had to be deactivated because of a forced deactivation of the virtual route being used by the (LU,LU) session
X'0C'	LU failure--unrecoverable: the identified (LU,LU) session had to be deactivated because of an abnormal termination of the PLU or SLU; recovery from the failure was not possible
X'0E'	LU failure--recoverable: the identified (LU,LU) session had to be deactivated because of an abnormal termination of one of the LUs of the session; recovery from the failure may be possible
X'0F'	cleanup: the LU sending UNBIND is resetting its half-session before receiving the response from the partner LU
X'FE'	invalid session protocol: the session has failed because a protocol violation has been detected

2-5 Sense data (included only when Type = X'FE'; otherwise, this field is omitted): same value as generated at the time the error was originally detected (for example, for a negative response, receive check, or EXR)

UNBINDF; PLU-->SSCP, Norm; FMD NS(s) (UNBIND FAILURE)

UNBINDF is sent, with no-response requested, 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
3-6	Sense data
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	<u>Session Key Content</u>
	• For session key X'06': uninterpreted name pair
9	Type: X'F3' logical unit
10	Length, in binary, of PLU name
11-m	EBCDIC character string
m+1	Type: X'F3' logical unit
m+2	Length, in binary, of SLU name
m+3-n	EBCDIC character string
	• For session key X'07': network address pair
9-10	Network address of PLU
11-12(=n)	Network address of SLU

VR-INOP; PU_T4|5-->SSCP, PU_T4-->PUCP, Norm; FMD NS(c) (VIRTUAL ROUTE INOPERATIVE)

VR-INOP notifies the CP when a virtual route has become inoperative as the result of a transmission group having become inoperative somewhere in the network.

0-2	X'410223' NS header
3	Format: X'01' (only value defined)
4	Reason code: X'01' unexpected routing interruption over a transmission group, for example, the last active link in a TG has failed

	X'02' controlled routing interruption such as the result of DISCONTACT
5-8	Subarea address of the PU that originated the NC-ER-INOP
9-12	Subarea address on other end of the transmission group that had the routing interruption
13	TGN of the transmission group that had the routing interruption
14	Number of VRs that map to an ER using the above TG
15-22	<u>VR Field</u>
15-18	Subarea address of a destination that is routed to over the VR that uses the failed TG
19	Reserved
20	Virtual route identifier: bits 0-3, VRN bits 4-5, reserved bits 6-7, transmission priority field
21-22	ER INOP mask: a bit is <u>on</u> for the ER used by the VRID (Bit 0 corresponds to ERN 0, bit 1 to ERN 1, and so forth.)
23-n	Any additional eight-byte entries in the same format as bytes 15-22

USER DATA STRUCTURED SUBFIELD FORMATS

The structured subfields of the User Data field are defined as follows (shown with zero-origin indexing of the subfield bytes--see the individual RU description for the actual displacement within the RU):

	• Structured subfield X'00': unstructured data
0	Length of unstructured data field (if 0, this field may be omitted entirely)
1	X'00'
2-n	Unstructured data
	• Structured subfield X'01': session qualifier
0	Length of session qualifier field (if 0, this field may be omitted entirely)
1	X'01'
2	Length of primary resource qualifier (X'00' means no primary resource qualifier is present: values 0 to 8 are valid)
3-n	Primary resource qualifier
n+1	Length of secondary resource qualifier (X'00' means no secondary resource qualifier is present: values 0 to 8 are valid)
n+2-m	Secondary resource qualifier

SUMMARY OF RESPONSE RU'S

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 or 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

Various positive response RUs return additional data. See "Positive Response RUs with Extended Formats."

All negative responses return four bytes of sense data in the RU, followed by either (1) the number of bytes specified in the table above or (2) three bytes (or the entire request RU, if shorter than three bytes). The second option applies to PU.SVC_MGR.CSC_MGR and PC (where a sensitivity to SSCP-based sessions versus LU-LU sessions does not necessarily exist) and can be chosen for other layers for implementation simplicity. Refer to Chapter 8 for sense data values and their corresponding meanings.

POSITIVE RESPONSE RU'S WITH EXTENDED FORMATS

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 X'2' ERP
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 space (X'40') characters 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 bits 8-47, implementation and installation dependent binary identification
18	<u>TS Usage</u> bits 0-1, reserved bits 2-7, secondary CPMGR receive window size (0 means no pacing of requests flowing to the secondary)
19-n	Control vector, as described in the section "Control Vectors and Control lists," later in this section <u>Note</u>: The following vector keys may be used in RSP(ACTCDRM):

X'06'	CDRM control vector
X'09'	activation request/response sequence identifier control vector
X'FE'	one or more control vector keys not recognized in the corresponding request

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
3-7	SSCP-LU session capabilities control vector (See the section, "Control Vectors and Control Lists," later in this section, for control vector X'00'.)
8-23	LU-LU session services capabilities control vector (See the section "Control Vectors and Control Lists," later in this section, for control vector X'0C'.) Note: A two-byte response can be sent; it means maximum RU size = 256 bytes, LU-LU session limit = 1, LU can act as a secondary LU, and all other fields in control vectors X'00' and X'0C' are defaulted to 0's, except Mode Table Name in control vector X'0C', which is defaulted to eight space (X'40') characters.

RSP(ACTPU); PU-->SSCP|PUCP, 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)

10 format 2 (this format requires that bits 4-7 be set to X'3')
11 format 3 (only for PU_T4|5s)

Note: If format 0 is used on a RSP(ACTPU) from a PU_T1|2, it implies that the PU cannot receive FMD requests from the SSCP; for format 1, a control vector specifies this capability--see the control vector with Key = X'07'. A PU_T4|5 does not use format 1, since it can receive FMD requests.

bits 4-7, type activation selected:
X'1' cold, IPL not required
X'2' ERP
X'3' cold, IPL required

2-9 Contents ID: eight-character EBCDIC symbolic name of the load module currently operating in the node; eight space (X'40') characters is the default value

Note: End of Format 0; Formats 1-3 continue below.

10-n Format 1 Continues

10-11 Reserved

12-n Control vector as described in the section "Control Vectors and Control Lists," later in this section

Note: The following control vectors may be used in RSP(ACTPU):
X'07' PU FMD-RU-Usage
X'FE' vector key not recognized in the corresponding request

10-n Format 2 Continues

10-17 Load module ID: an eight-character EBCDIC symbolic name of the requested IPL load module:
X'4040...40' any load module will be accepted
¬X'4040...40' identifies specific load module name

18-19 Reserved

20-n	Control vector as described in the section "Control Vectors and Control lists," later in this section Note: The following control vectors may be used in RSP(ACTPU): X'07' PU FMD-RU-Usage X'FE' vector key not recognized in the corresponding request
10-n	Format 3 Continues
10-n	Control vector as described in the section "Control Vectors and Control Lists," later in this section Note: The following control vectors may be used in RSP(ACTPU): X'09' activation request/response sequence identifier control vector X'FE' vector keys not recognized in the corresponding request

RSP(ADDLINK); PU_T4|5-->SSCP, Norm; FMD NS(c)

0-2	X'41021E' NS header
3-4	Link network address

RSP(ADDLINKSTA); PU_T4|5-->SSCP, Norm; FMD NS(c)

0-2	X'410220' NS header
3-4	Adjacent link station network address

RSP(BIND); SLU-->PLU, Exp; SC

0	X'31' request code Note: 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 cryptography.)
1	bits 0-3, format: 0000 (only value defined) bits 4-7, type: 0000 negotiable 0001 nonnegotiable
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	Cryptography Options
26	bits 0-1, private cryptography options: for nonnegotiable case, same value returned as received in the request, if present--see Note 3
	bits 2-3, session-level cryptography options: for nonnegotiable case, same value returned as received in the request, if present--see Note 3
	bits 4-7, session-level cryptography 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 0.)
27	bits 0-1, session cryptography key encipherment method: same value returned as received in the request, if present--see Note 3
	bits 2-4, reserved
	bits 5-7, cryptography cipher method: same value returned as received in the request, if present--see Note 3
28-k	An eight-byte implementation-chosen, nonzero, pseudo random session-seed cryptography value enciphered under the session cryptography key, if session-level cryptography is specified; otherwise, same value as in BIND, if present--see Note 3
k+1-r	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

Note 1: The extended format is required for the negotiable BIND response or if session-level cryptography is specified in the BIND request; otherwise, only the short form (request code) is used.
Note 2: On a response, if the last byte of a response is a length field and that field is 0, 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 0--the entire byte may be dropped if no bytes follow.
Note 3: The Cryptography Options field is returned on the response for a nonnegotiable BIND only when session-level cryptography was specified, or for a negotiable BIND.

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

0-2	X'818641' NS header
3	Format: same value as received in corresponding request bits 4-7, reserved
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 limit exceeded
01 reserved
10 LU is not currently able to comply with the PLU/SLU specification
11 reserved
bit 4, 0 existing SSCP to LU path
1 no existing SSCP to LU path
bit 5, (reserved in formats 0 and 1)
0 UNBIND and SESSEND cannot be sent by the LU or by its boundary function (if any)
1 UNBIND and SESSEND will be sent by the LU or by its boundary function (if any)
bits 6-7, 00 reserved
01 LU is PLU
10 LU is SLU
11 reserved

End of Formats 0 and 1; Format 2 continues below

8 COS origin:
bit 0, 0 no COS name from ILU
1 COS name from ILU
bits 1-2, (reserved if byte 8, bit 0 ¬= 0)
01 SSCP(DLU) chose COS name (DLU is SLU)
10 SSCP(OLU) chose COS name (OLU is SLU)
bits 3-7, reserved

9-16 COS name (if byte 8, bits 1-2 ¬= 01, this field carries unpredictable values and is not used): symbolic name of class of service in EBCDIC characters

17-24 Mode name (if byte 8, bits 1-2 ¬= 01, this field carries unpredictable values and is not used): an eight-byte symbolic name (implementation and installation dependent) that identifies the set of rules and protocols to be used for the session (included here for use in reactivating the (LU,LU) session, if necessary; see CINIT and SESSEND for other details)

RSP(CDSESSEND); SSCP-->SSCP, Norm; FMD NS(s)

0-2	X'818648' NS header
3	bits 0-3, format: 0010 Format 2 (only value defined) __Note__: The extended form of RSP(CDSESSEND,Format 2) is used only in conjunction with CDSESSEND(Format 2). For CDSESSEND(Format 0), RSP(CDSESSEND,Format 0) includes only bytes 0-2. bits 4-7, reserved
4	Cause: cause of deactivation the (LU,LU) session, as specified in byte 12 of CDSESSEND
5	Action: any reactivation of the (LU,LU) session to be performed by either the PLU or SLU, as specified in SESSEND and CDSESSEND and resolved by the SSCPs

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
4	Reserved
5-6	Network address of DLU

RSP(CINIT); PLU-->SSCP, Norm; FMD NS(s)

0-2	X'810601' NS header
3-n	Control vectors as described in the section "Control Vectors and Control Lists," later in this section __Note__: The following control vector key is used in RSP(CINIT): X'FE' control vector keys not recognized

RSP(DSRLST) RSP(DUMPINIT) RSP(DUMPTEXT)
RSP(INIT-OTHER-CD)

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
                  section "Control Vectors and
                  Control Lists" for the format
                  of the control list.
```

RSP(DUMPINIT); PU_T4|5-->SSCP, Norm; FMD NS(c)

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

RSP(DUMPTEXT); PU_T4|5-->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
          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 limit
                         exceeded
                     01  reserved
                     10  LU1 is not currently
                         able to comply with the
                         PLU/SLU specification
                     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 limit
                         exceeded
                     01  reserved
                     10  LU2 is not currently
                         able to comply with the
                         PLU/SLU specification
                     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
```

RSP(RNAA); PU_T4|5-->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,
          adjacent link station, or LU
5         Assignment type: same as in
          corresponding RNAA
```

6	Number of network addresses returned
7-8	Network address assigned: adjacent link station address for assignment type 0; BF.LU network address for assignment type 1; LU address for assignment type 2
9-n	Any 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(ROUTE-TEST); PU_T4|5-->SSCP, Norm; FMD NS(ma)

0-2	X'410306' NS header
3	Format: X'01'
4	Count of the number of Route Data fields
5-13	Route Data: information about the ERs or VRs that were tested.
5	Virtual route identifier: bits 0-3, VRN of the VR tested bits 4-5, reserved bits 6-7, transmission priority field of the VR tested
6	VR status: X'00' VR is not defined X'01' VR is in reset state X'02' activation of the VR is pending notification of the activation of the underlying ER X'03' an NC-ACTVR was sent to activate the VR, but no RSP(NC-ACTVR) has been received X'04' an NC-ACTVR was received to activate the VR, but no RSP(NC-ACTVR) has been sent X'05' an NC-DACTVR(Orderly) has been sent, but no RSP(NC-DACTVR) has been received X'06' an NC-DACTVR(Orderly) was received, but no RSP(NC-DACTVR) has been sent

X'07' an NC-DACTVR(Forced) was received, but no RSP(NC-DACTVR) has been sent
X'08' an NC-DACTVR(Forced) was sent but no RSP(NC-DACTVR) has been received
X'09' VR is active

bits 0-3, reserved
bits 4-7, ERN of the ER tested
ER status:

X'00' ER is not defined and not currently operative
X'01' ER is defined but not currently operative
X'02' ER is defined and operative, but not currently active
X'03' an NC-ER-ACT was sent, but no NC-ER-ACT-REPLY has been received
X'04' an NC-ER-ACT was received, but no NC-ER-ACT-REPLY has been sent
X'05' an NC-ER-ACT was received and an NC-ER-ACT-REPLY was sent; an NC-ER-ACT was sent, but no NC-ER-ACT-REPLY has been received
X'06' an NC-ER-ACT was received but no ER is defined; should the ER subsequently become defined, an NC-ER-ACT will be sent
X'07' an NC-ER-ACT was received and an NC-ER-ACT-REPLY was sent (no NC-ER-ACT has been sent from this end)
X'08' ER is active and each node on the ER supports ER-VR protocols
X'09' ER is operative but not currently defined
X'0A' ER is active and traverses a node that does not support ER-VR protocols

9-12 Subarea address of the adjacent node through which the ER being tested flows from this node

13 Transmission group number of the TG (to the node identified in bytes 9-12) over which the ER being tested flows from this node

14-n Any additional 9-byte entries in the same format as bytes 5-13

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)

<u>Note 1</u>: 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-LU session type 0: user-defined meaning; for all other LU-LU session types: reserved (appropriate bytes 2-3 or 4-5 reserved)
  - 01 reserved
  - 10 secondary half-session's sync point manager does not maintain or cannot return a valid transaction processing program sequence number (appropriate bytes 2-3 or 4-5 reserved)

11 transaction processing program sequence number, as known at the secondary, is returned in bytes 2-3 or 4-5, as appropriate

- For set and test action code:

00 for LU-LU session type 0: user-defined meaning; for all other LU-LU session types: invalid sequence numbers have been detected by the secondary (appropriate bytes 2-3 or 4-5 return the secondary transaction processing program sequence number)

Note 2: invalid determination results when the sequence number indicated could not have occurred. For example, the mounting of an incorrect sync point log tape by the operator at one of the LUs would cause this condition.

01 value received in STSN request equals the transaction processing program sequence number value as known at the secondary (appropriate bytes 2-3 or 4-5 return the secondary's value for the transaction processing program sequence number)

10 secondary half-session's sync point manager does not maintain or cannot return a valid

transaction processing program sequence number (appropriate bytes 2-3 or 4-5 reserved)

11 value received in STSN request does not equal the transaction processing program sequence number value as known at the secondary (appropriate bytes 2-3 or 4-5 return the secondary's value for the transaction processing program 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 optionally may consist of one byte--X'A2' (the STSN request code)--rather than all six bytes.

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'00'	RSP(ACTLU)
X'01'	SETCV (NS(c))
X'02'	SETCV (NS(c))
X'03'	SETCV (NS(c))
X'04'	SETCV (NS(c))
X'05'	SETCV (NS(c))
X'06'	ACTCDRM, RSP(ACTCDRM)
X'07'	RSP(ACTPU)
X'08'	SETCV (NS(ma))
X'09'	ACTCDRM, ACTPU, RSP(ACTCDRM|ACTPU)
X'0B'	ACTPU
X'0C'	RSP(ACTLU)
X'0D'	CINIT
X'FE'	RSP(ACTCDRM|ACTPU|ACTLU|CINIT)

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

SSCP-LU Session Capabilities Control Vector

0	Key: X'00'
1	Maximum RU size sent on the normal flow by either half-session: if bit 0 is set to 0, then no maximum is specified and the remaining bits 1-7 are ignored; if bit 0 is set to 1, 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 RU Sizes Corresponding to X'ab' in BIND for all possible values.
2-3	LU Capabilities
2	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 to supplement a previously sent negative response or error information after a positive response has already been sent 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
2-3	bits 2-15, reserved
4	Reserved

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)

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 the PU_T4 initiates an auto network shutdown procedure for the SSCP controlling that PU_T1|2 node 1 continue link-level contact with adjacent PU_T1|2 node if the PU_T4 initiates an auto network shutdown procedure for the 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	Byte count of maximum BTU size permitted to be sent to the adjacent link station represented by the specified SPU

<u>LU Control Vector</u>

0	Key: X'04'
1	Local address form of LU network address
2	bits 0-1, reserved bits 2-7, secondary CPMGR's receive pacing count
3	Reserved, set to a value of 1
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)

<u>Channel Control Vector</u>

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

<u>CDRM Control Vector</u> (Carries information on the capabilities of the SSCP sending the control vector.)

0	Key: X'06'
1	Length, in binary, of Description field (X'00' = no Description field present)
2-n	<u>Description Field</u>
2	CDRM profile: X'00' (only value defined)
3	CDRM usage: 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,	0	parallel sessions not supported
		1	parallel sessions supported
	bit 3,	0	URC not supported by SSCP (and all PLUs within its domain) in cross-domain session initiation
		1	URC supported by SSCP (and all PLUs within its domain) in cross-domain session initiation
	bit 4, reserved		
	bit 5,	0	PCID session key (X'05') not supported
		1	PCID session key supported
	bit 6,	0	CDSESSEND from SSCP(SLU) and CDINIT(Format 2) not supported; requires NS-LSA to reset session knowledge; therefore, all sessions managed by the SSCP use virtual routes mapping to ER0 from the subarea of the SLU to the subarea of the PLU
		1	CDSESSEND from SSCP(SLU) and CDINIT(Format 2) supported; NS-LSA is not used to reset session knowledge; therefore, no ER restrictions exist for sessions managed by this SSCP
	bit 7,	0	Format 2 CDSESSEND not supported
		1	Format 2 CDSESSEND supported
	Note: If the control vector is omitted or the length is 0, the corresponding request or response implicitly specifies that the name pair session key is supported and the others are not.		
4-n	Reserved		

PU FMD-RU-Usage Control Vector

0	Key: X'07'
1	bits 0-5, reserved bit 6, adjacent PU load capability (initialized to 0 by the PU_T2): 0 adjacent PU cannot load the PU_T2 node 1 adjacent PU can load the PU_T2 node (set by the boundary function in the adjacent subarea node) bit 7, FMD request capability of the node: 0 PU cannot receive FMD requests from the SSCP 1 PU can receive FMD requests from the SSCP
2-7	Reserved

Intensive Mode Control Vector

0	Key X'08'
1	bit 0, 0 reset intensive mode 1 set intensive mode bits 1-7, reserved
2-3	Maximum number of intensive mode records (IMRs)

Activation Request/Response Sequence Identifier Control Vector

0	Key: X'09'
1	Length, in binary, of Vector Data field
2-9	Vector Data Field
2-9	Activation request/response sequence identifier: an eight-byte binary value, generated by the sender of ACTCDRM, RSP(ACTCDRM), ACTPU, and echoed in RSP(ACTPU), and used by the receiver to determine whether the current RU supersedes a previously received RU from the same sender (If the current RU has an activation request/response sequence identifier value greater than the corresponding activation request/response sequence

identifier value of the earlier ACTPU, ACTCDRM, or RSP(ACTCDRM), the current RU is accepted and processed, while the earlier RU is superseded. The eight-byte field has the following characteristic: If n1 was generated at time t1, and n2 was generated at time t2, and t1 < t2, then n1 < n2.)

<u>SSCP-PU Session Capabilities Control Vector</u>

0	Key: X'0B'		
1	Length, in binary, of Vector Data field		
2	<u>Vector Data Field</u>		
2	bit 0,	0	NS-LSA required
		1	NS-LSA not required
	bit 1,	0	adjacent link station network address not supported
		1	adjacent link station network address supported
	bits 2-7, reserved		

<u>LU-LU Session Services Capabilities Control Vector</u>

0	Key: X'0C'		
1	Length, in binary, of vector data field		
2-15	<u>Vector Data Field</u>		
2	bits 0-3, primary LU capability:		
		0000	cannot ever act as primary LU
		0001	cannot currently act as primary LU
		0010	reserved
		0011	can now act as primary LU
	bits 4-7, secondary LU capability:		
		0000	cannot ever act as secondary LU
		0001	cannot currently act as secondary LU
		0010	reserved
		0011	can now act as secondary LU

3-4	LU-LU session limit (where a value of 0 means that no session limit is specified)
5-6	LU-LU session count: the number of LU-LU sessions that are not reset, for this LU, and for which SESSEND will be sent to the SSCP
7	bit 0, parallel session capability: 0 parallel sessions not supported 1 parallel sessions supported bit 1, 0 do not send NOTIFY at the completion of (LU,LU) session deactivation 1 send NOTIFY at the completion of the (LU,LU) session deactivation bits 2-7, reserved
8-15	Mode table name: an eight-character symbolic name (implementation and installation dependent) that identifies the mode table that contains the mode name (A value of eight space (X'40') characters means that the mode table name is to be selected by the SSCP.)

<u>Mode/Class-of-Service/Virtual-Route-Identifier-List Control Vector</u>

0	Key: X'0D'
1	Length, in binary, of vector data field
2-n	<u>Vector Data Field</u>
2-9	Mode name: 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
10-17	COS name: symbolic name of class of service in EBCDIC characters
18-n	Virtual Route Information

18	Length (in bytes)--including format, type, number of entries, and entries of Virtual Route Information field
19	Format of virtual route identifier list: X'00' format 0 (only value defined)
20	Type of virtual route required: X'00' only virtual routes mapping to ERO from the subarea of the SLU to the subarea of the PLU may be used X'01' virtual routes mapping to any ERN may be used
21	Number of entries in the virtual route identifier list
22-n	Virtual route identifier list: two-byte (VRN, TPF) entries where VRN is one byte and TPF is one byte

<u>Control Vector Keys Not Recognized Control Vector</u>

0	Key: X'FE'
1	Length, in binary, of vector data field
2-n	Vector data: one or more one-byte control vector key values that were not recognized in the corresponding request

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 currently
                          able to comply with the
                          PLU/SLU specification
                      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)
```

DLC XID INFORMATION-FIELD FORMATS

This section describes the formats of the information field of the XID command (sent by a primary link station) and response (sent by a secondary link station); XID Formats 0, 1, and 2 apply to SDLC, and Format 2 applies also to the System/370 channel DLC. The response format for Formats 0 and 1 is also carried in the REQCONT request RU, which is sent from the PPU to the SSCP or PUCP. The contents of XID Format 2 sent and received are also included in the CONTACTED RU, which is sent from the PU to the SSCP or PUCP.

0	bits 0-3, format of XID I-field: X'0' fixed format: only bytes 0-5 are included X'1' variable format (for PU_T1|2 to PU_T4|5 node exchanges): bytes 0-p are included X'2' variable format (for PU_T4|5 to PU_T4|5 node exchanges): bytes 0-p are included bits 4-7, type of the XID-sending node: X'1' PU_T1 X'2' PU_T2 X'3' reserved X'4' subarea node (PU_T4 or PU_T5)
1	Length, in binary, of variable-format XID I-field; reserved for fixed-format XID I-field
2-5|7	Node Identification
2-5	bits 0-11, Block number: an IBM product specific number; see the individual product specifications for the specific values used

bits 12-31, ID number: a binary value that, together with the block number, identifies a specific station uniquely within a customer network installation; the ID number can be assigned in various ways, depending on the product; see the individual product specifications for details

- End of Format 0

6-p <u>Format 1 Continuation</u>

6-7 Reserved

8 <u>Link Station and Connection Protocol Flags</u>

8 bits 0-1, reserved

bit 2, link-station role of XID sender:
- 0 sender is a secondary link station
- 1 sender is a primary link station

bit 3, reserved

bits 4-7, link-station transmit-receive capability:
- X'0' two-way alternating
- X'1' two-way simultaneous

9 Characteristics of the node of the XID sender:

bits 0-1, reserved

bits 2-3, segment assembly capability of the path control element of the node:
- 00 the Mapping field is ignored and PIUs are forwarded unchanged
- 01 segments are assembled on a link-station basis
- 10 segments are assembled on a session basis
- 11 only whole BIUs are allowed

bits 4-7, reserved

10-11 Maximum I-field length that the XID sender can receive:
bit 0, format flag:
0 bits 1-15 contain the maximum I-field length (only value defined)
bits 1-15, maximum I-field length, in binary

12 bits 0-3, reserved
bits 4-7, SDLC command/response profile:
X'0' SNA link profile (only value defined)

Note: This profile refers to the mandatory command/response support on a SDLC link, as follows:

- For an SDLC link, having a point-to-point or multipoint configuration, the support required is:

Commands	Responses
I-frames	I-frames
RR	RR
RNR	RNR
Test	Test
XID	XID
SNRM	UA
Disconnect	DM
-	RD (Note 1)
-	Frame Reject
Reject (Note 2)	Reject (Note 2)

Note 1: The RD response is sent by the secondary station if and only if the SPU in its node receives a DISCONTACT request from its SSCP or PUCP.
Note 2: Reject is required only if both sender and receiver have two-way simultaneous transmit-receive capability.

- For an SDLC link having a loop configuration, the support required is:

Commands	Responses
I-frames	I-frames
RR	RR
RNR	RNR
Test	Test
XID	XID
SNRM	UA
Disconnect	DM
UP	-
-	Frame Reject
Configure	Configure
-	Beacon
-	RD (Note)

Note: The RD response is sent by the secondary station if and only if the SPU in its node receives a DISCONTACT request from its SSCP or PUCP.

13	bits 0-1, reserved bit 2, SDLC initialization mode options: 0 SIM and RIM not supported 1 SIM and RIM supported bits 3-7, reserved
14-15	Reserved
16	bit 0, reserved bits 1-7, maximum number of I-frames that can be received by the XID sender before an acknowledgment is sent, with an implied modulus for the send and receive sequence counts--less than 8 implies a modulus of 8, 8 or greater implies a modulus of 128
17	Reserved

18-m	SDLC Address Assignment Field
18	Length in bytes (or octets) of the SDLC address to be assigned (bytes 19-m)
19-m	Secondary station address to be assigned
m+1-p	Dial Digits of XID Sender
m+1	Number of dial digits
m+2-p	Dial digits: any byte value of the form X'Fn' (0≤n≤F) is valid
	• End of Format 1
8-p	Format 2 Continuation
8	bit 0, TG status: 0 TG inactive 1 TG active bit 1, multiple-link TG support: 0 multiple-link TG not supported 1 multiple-link TG supported bits 2-3, segment assembly capability of the path control element of the node: 00 segments are ignored and passed through 01 segments are assembled on a link station basis 10 segments are assembled on a session basis 11 segments are not allowed bits 4-7, reserved
9	FID types supported: bit 0, 0 FID 0 not supported 1 FID 0 supported bit 1, 0 FID 1 not supported 1 FID 1 supported Note: Neither bit 0 nor bit 1 is set to 1 when XID Format 2 is exchanged, but can be set by PU.SVC_MGR when the contents of XID Format 2 is carried in the CONTACTED RU. bits 2-3, reserved bit 4, 0 FID 4 not supported 1 FID 4 supported bits 5-7, reserved

10	Reserved
11-12	Length, in binary, of maximum PIU that the XID sender can receive
13	Transmission group number (TGN)
14-17	Subarea address of the XID sender (right-justified with leading 0's)
18	bit 0, reserved bits 1-4, error status (set in reply to a previously received XID): X'8' exchanged parameters in the XIDs are not compatible X'9' incompatible parameters in the XID received for addition of the link station to currently active multiple-link TG (for example, maximum PIU length) X'A' TG is not defined (that is, no routing found) X'C' multiple-link TG support (byte 8, bit 1) or DLC type (byte 30) specified in the XIDs is incompatible with a link in the associated active TG bits 5-7, reserved
19	CONTACT or load status of XID sender: X'00' CONTACT has been received by an XID command sender X'07' XID response sender is already loaded
20-27	IPL load module name: an 8-character EBCDIC symbolic name of the IPL load module of the XID sender Note: X'40...40' = no information conveyed
28-29	Reserved

```
30       DLC type:
          X'01'  SDLC
          X'02'  System/370
                 channel--communication
                 controller is the secondary
31-p     DLC-Dependent Parameters
       • For SDLC
31       bits 0-1, reserved
         bits 2-3, link-station role of XID
                   sender:
         bit 2,  0  XID sender cannot be
                    secondary
                 1  XID sender can be secondary
         bit 3,  0  XID sender cannot be
                    primary
                 1  XID sender can be primary
               Note:  A combination of 00 in
               bits 2-3 is reserved.
         bits 4-5, reserved
         bits 6-7, link station
                   transmit-receive capability:
                    00  two-way alternating
                    01  two-way simultaneous
32-33    Maximum I-field length, in binary,
         that the XID sender can receive
34       bits 0-3, reserved
         bits 4-7, SDLC command/response
                   profile:
                    X'0'  SNA link profile
                          (only value defined)
                   Note:  See the Notes
                   described in Format 1, byte
                   12, for this profile.
35       bits 0-1, reserved
         bits 2-3, SDLC initialization mode
                   options:
         bit 2,  0  XID sender cannot send SIM
                    nor receive RIM (or RQI)
                 1  XID sender can send SIM and
                    receive RIM (or RQI)
         bit 3,  0  XID sender cannot receive
                    SIM nor send RIM (or RQI)
                 1  XID sender can receive SIM
                    and send RIM (or RQI)
         bits 4-7, reserved
36-37    Reserved
```

38	bit 0, reserved bits 1-7, maximum number of I-frames that can be received by the XID sender before an acknowledgment is sent, with an implied modulus for the send and receive sequence counts--less than 8 implies a modulus of 8, 8 or greater implies a modulus of 128
39-43(=p)	Reserved
31-p	For System/370 Channel DLC
31	Number of initial buffers suggested by the primary link station for the secondary link station to use for data transfer from primary to secondary (primary sets and secondary echoes) Note: X'00' = no suggestion made. If byte 31 = X'00' in the XID received, secondary uses the value defined by optional implementation and installation specific parameters and sends it to the primary
32-33	Number of Read channel command words that primary issues to secondary in a channel program (primary sets and secondary echoes) Note: If secondary does not agree with the received value, secondary sends the value defined by implementation- and installation-specific parameters; byte 18, bit 1, is set to 1.
34-35	Number of data bytes allocated per Read channel command at primary (primary sets and secondary echoes) Note: If secondary does not agree with the received value, secondary sends the value defined by implementation- and installation-specific parameters; byte 18, bit 1, is set to 1.
36	Number of pad (X'00') characters secondary transmits to primary immediately preceding each PIU to be sent (primary sets and secondary echoes)

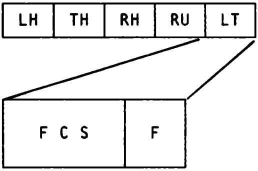
	Note: If secondary does not agree with the received value, secondary sends the value defined by implementation- and installation-specific parameters; byte 18, bit 1, is set to 1.
37	bit 0, reserved for primary; for secondary: 0 secondary does not use the status modifier option for data transfer to primary 1 secondary uses the status modifier option for data transfer to primary
	bit 1, reserved
	bit 2, reserved for secondary; for primary: 0 if the TG specified in this XID is active, the secondary is to send an XID response with error status X'C' in byte 18 1 if the TG specified in this XID is active and associated with another System/370 channel, INOP is to be sent for the previously activated System/370 channel and the requested System/370 channel is to be activated
	bits 3-7, reserved
38-39	Reserved for primary; for secondary: the maximum interval (in tenths of a second) that the secondary delays between the time it has a PIU for the primary and the time it presents an Attention signal to the primary
40-41(=p)	Reserved for primary; for secondary: the maximum interval (in tenths of a second) that the secondary awaits a response to an Attention signal that has been sent to the primary before initiating inoperative link processing

RU SIZES CORRESPONDING TO VALUES X'ab' IN BIND

Exponent (b)	Mantissa (a)							
	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 decimal) 12·2**5 = 384.*

CHAPTER 5. LINK TRAILER

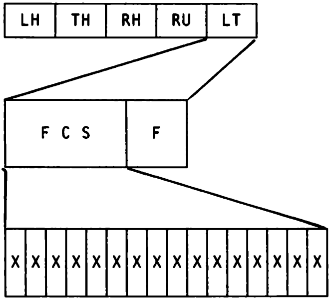


This chapter summarizes information from **Synchronous Data Link Control General Information** (GA27-3093).

The link trailer described here is from IBM's Synchronous Data Link Control (SDLC).

The link trailer (LT) follows the request/response unit (RU) and is three bytes long. The first two bytes make up the frame check sequence; the last byte, the closing flag.

FRAME CHECK SEQUENCE

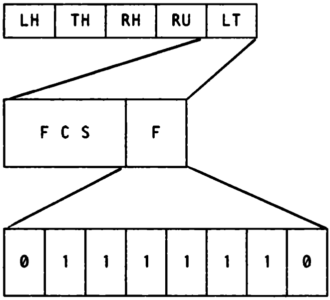


Frame Check Sequence (FCS)

The frame check sequence carries information that the receiver uses to check the received BLU for errors that may have been introduced by the communication channel. This field contains a 16-bit check sequence that is the result of a computation on the contents of the LH (with the exception of the flag), TH, RH, and RU fields at the transmitter. cyclic redundancy checking (CRC) is used to perform this calculation.

The receiver performs a similar computation and checks its results.

FLAG



Flag (F) X'7E' B'01111110'

All BLUs end with a flag. The configuration of the ending (trailing) flag is the same as that of the beginning (leading) flag: 01111110 (X'7E'). See Chapter 1, "Link Header," for information on shared leading/trailing flags.

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PART 2

Diagnostic Aids

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CHAPTER 6. FM PROFILES

This chapter summarizes information from **Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic** (SC30-3112).

This chapter describes the function management (FM) profiles and their use by the various sessions defined in SNA. Profile numbers not shown are reserved.

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.
- 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 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 usage and reset state
- 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.
- Primary LU half-session and secondary LU half-session support the

following DFC functions:

CANCEL
SIG
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 usage and reset state
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.
Primary LU half-session and secondary LU half-session support the following DFC functions:

CANCEL
SIG
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 usage and reset state
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 or definite response.
No compression.
No DFC RUs.
No FM headers.
No brackets.
No alternate code.
Normal-flow send/receive mode is FDX.

FM PROFILE 6

Profile 6 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 may indicate definite response, exception response, or no response.
Primary half-session sends no DFC RUs.
Secondary half-session may send LUSTAT.
No FM headers.
No compression.
No brackets.
No alternate code.
Normal-flow send/receive mode is FDX.

FM PROFILE 7

Profile 7 specifies the following session rules:

Primary LU half-session and secondary LU half-session use immediate response mode.

Primary LU half-session and secondary LU half-session support the following DFC functions:

- CANCEL
- SIG
- LUSTAT
- RSHUTD

The FM Usage fields defining the options for Profile 7 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 usage and reset state
- Bracket termination rule
- Alternate Code Set Allowed indicator
- Normal-flow send/receive mode
- Recovery responsibility
- Contention winner/loser
- Half-duplex flip-flop reset rules

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.
- 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.
- Primary LU half-session and secondary LU half-session support the following DFC functions:
  - CANCEL
  - SIG
  - 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 usage and reset state
- 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	Session Type(s)
0	SSCP-PU, SSCP-LU
2	LU-LU
3	LU-LU
4	LU-LU
5	SSCP-PU
6	SSCP-LU
7	LU-LU
17	SSCP-SSCP
18	LU-LU

Figure 6-1. FM Profiles and Session Types

CHAPTER 7. TS PROFILES

This chapter summarizes information from **Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic** (SC30-3112).

This chapter describes the transmission services (TS) profiles and their uses for the various sessions defined in SNA. Profile numbers not shown are reserved.

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

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 cryptography 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 cryptography 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 cryptography 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 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 on 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

TS Profile	Session Type(s)
1	SSCP-PU, SSCP-LU
2	LU-LU
3	LU-LU
4	LU-LU
5	SSCP-PU
7	LU-LU
17	SSCP-SSCP

Figure 7-1. TS Profiles and Session Types

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CHAPTER 8. SENSE CODES

This chapter summarizes information from Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic (SC30-3112).

The sense data included with an EXCEPTION REQUEST (EXR), a negative response, or a send or receive check is a four-byte field (see Figure 8-1) 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, user-defined data cannot be included in the sense data (it is never carried in send-check sense data); in its place is sense code specific information, whose format is defined along with the sense code definition, below.

0	1	2	3
Category	**Modifier**	**Sense code specific fields or user-defined data**	

|←——Sense Code——→| (bytes 0–1)

Figure 8-1. Sense Code and Sense Data

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

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.

REQUEST REJECT (CATEGORY CODE = X'08')

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

08 01 Resource Not Available: The LU, PU, or link specified in an RU is not available.

08 02 Intervention Required: Forms or cards are required at an output device, or a device is temporarily in local mode, or other conditions require intervention.

08 03 Missing Password: The required password was not supplied.

08 04 Invalid Password: Password was not valid.

08 05 Session Limit Exceeded: The requested session cannot be activated, as one of the NAUs is at its session limit. Applies to ACTCDRM, ACTPU, INIT, BIND, AND CINIT requests.

08 06 Resource Unknown: The request contained a name or address not identifying a PU, LU, link, or link station known to the receiver.

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

08 09 Mode Inconsistency: The requested function cannot be performed in the present state of the receiver.

08 0A Permission Rejected: The receiver has

denied an implicit or explicit request of the sender; when sent in response to BIND, it implies either that the secondary LU will not notify the SSCP when a BIND can be accepted, or that the SSCP does not recognize the NOTIFY vector key X'0C'. (See the X'0845' sense code for a contrasting response.)

08 0B Bracket Race Error: Loss of contention within the bracket protocol. Arises when bracket initiation/termination by both NAUs is allowed.

08 0C Procedure Not Supported: A procedure (Test, Trace, IPL, REQMS type) specified in an RU is not supported by the receiver.

08 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, the SSCP receives an ACTCDRM from the other SSCP before it receives the response for an ACTCDRM that it sent to the other SSCP and the SSCP ID in the received ACTCDRM was less than or equal to the SSCP ID in the ACTCDRM previously sent.

08 0E NAU Not Authorized: The requesting NAU does not have access to the requested resource.

08 0F End User Not Authorized: The requesting end user does not have access to the requested resource.

08 10 Missing Requester ID: The required requester ID was missing.

08 11 Break: Asks the receiver of this sense code to terminate the present chain with CANCEL or with an FMD request carrying EC. The half-session sending the Break sense code enters chain-purge state when Break is sent.

08 12 Insufficient Resource: Receiver cannot

act on the request because of a temporary lack of resources.

08 13 Bracket Bid Reject--No RTR Forthcoming: BID (or BB) was received while the first speaker was in the in-bracket state, or while the first speaker was in the between-brackets state and the first speaker denied permission. RTR will not be sent.

08 14 Bracket Bid Reject--RTR Forthcoming: BID (or BB) was received while the first speaker was in the in-bracket state, or while the first speaker was in the between-brackets state and the first speaker denied permission. RTR will be sent.

08 15 Function Active: A request to activate a network element or procedure was received, but the element or procedure was already active.

08 16 Function Inactive: A request to deactivate a network element or procedure was received, but the element or procedure was not active.

08 17 Link Inactive: A request requires the use of a link, but the link is not active.

08 18 Link Procedure in Process: CONTACT, DISCONTACT, IPL, or other link procedure in progress when a conflicting request was received.

08 19 RTR Not Required: Receiver of READY TO RECEIVE has nothing to send.

08 1A Request Sequence Error: Invalid sequence of requests.

08 1B Receiver in Transmit Mode: A race condition: normal-flow request received while the half-duplex contention state was not-receive, (*S,¬R), or while resources (such as buffers) necessary for handling normal-flow data were unavailable.

(Contrast this sense code with X'2004', which signals a protocol violation.)

08 1C Request Not Executable: The requested function cannot be executed, because of a permanent error condition in the receiver.

08 1D Invalid Station/SSCP ID: The Station ID or SSCP ID in the request was found to be invalid.

08 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 requests).

08 1F Reserved.

08 20 Control Vector Error: Invalid data for the control vector specified by the target network address and key.

08 21 Invalid Session Parameters: Session parameters were not valid or not supported by the half-session whose activation was requested.

08 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.)

08 23 Unknown Control Vector: The control vector specified by a network address and key is not known to the receiver.

08 24 Unit of Work Aborted: The current unit of work has been aborted; when sync point protocols are in use, both sync point managers are to revert to the previously committed sync point.

08 25 Component Not Available: The LU component (a device indicated by an FM header) is not available.

08 26 FM Function Not Supported: A function requested in an FMD RU is not supported by the receiver.

08 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.

08 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.

08 29 Change Direction Required: A request requires a normal-flow reply, but the half-duplex flip-flop state is not-send, (¬S,*R), CD was not set on the request, and there is no delayed reply capability.

08 2A Presentation Space Alteration: Presentation space altered by the end user while the half-duplex state was not-send, (¬S,*R); request executed.

08 2B Presentation Space Integrity Lost: Presentation space integrity lost (for example, cleared or changed) because of a transient condition--for example, because of a transient hardware error or an end user action such as allowing presentation services to be used by the SSCP. (**Note**: The end-user action described under X'082A' and X'084A' is excluded here.)

08 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 share limit.

08 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.

08 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.

08 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.

08 30 Reserved

08 31 LU Component Disconnected: An LU component is not available because of power off or some other disconnecting condition.

08 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.

08 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 one or more invalid parameters are complemented, and all other bits are copied.

08 34 RPO Not Initiated: A power-off procedure for the specified node was not initiated because one or more other SSCPs have contacted the node, or because a CONTACT, DUMP, IPL, or DISCONTACT procedure is in progress for that node.

08 35 Invalid Parameter (with 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 two-byte binary count that indexes (zero-origin) the first byte of the fixed- or variable-length field having invalid contents.

08 36 PLU/SLU Specification Mismatch: For a specified LU-LU session, both the origin LU (OLU) and the destination LU (DLU) have only the primary capability or have only the secondary capability.

08 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.

08 38 Reserved

08 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 either processing a CDTAKED request or is in the process of deactivating the associated SSCP-LU session.

08 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.

08 3B Invalid PCID: An invalid PCID (procedure correlation identifier) was received, for example, one containing an invalid network address of the SSCP of the initiating LU (ILU) or terminating LU (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.

08 3C Domain Takedown Contention: While waiting for a response to a CDTAKED, a CDTAKED request is received by the SSCP containing the SSCP-SSCP primary half-session. Contention is resolved by giving preference to the CDTAKED sent by the primary half-session.

08 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, because the LU in its domain is still not available for the specified session), and removes the queued CDINIT request from its queue.

08 3E Reserved

08 3F Terminate Contention: While waiting for a response to a CDTERM, a CDTERM is received by the SSCP of the SLU. Contention is resolved by giving preference to the CDTERM sent by the SSCP of the SLU.

08 40 Procedure Invalid for Resource: The named procedure is not supported in the receiver for this type of resource (for example, (1) SETCV specifies boundary function support for a type 1 node but the capability is not supported by the

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

08 41 Duplicate Network Address: In a cross-domain LU-LU session initiation request, the SSCP of the 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.

08 42 SSCP-SSCP Session Not Active: The SSCP-SSCP session, which is required for the processing of a network services request, is not active; for example, at the time an LU-LU session initiation or termination request is received, at least one of the following conditions exists:

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

08 43 Required FMDS Synchronization Not Supplied: For example, a secondary LU (LU-LU session type 2 or 3) received a request with Write Control Code = Start Print, along with RQE and ¬CD.

08 44 Initiation Dequeue Contention: While waiting for a response to a CDINIT(Dequeue), a CDINIT(Dequeue) is received by the SSCP of the SLU. Contention is resolved by giving preference to the CDINIT(Dequeue) sent by the SSCP of the SLU.

08 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 LU will notify the SSCP (via NOTIFY vector key X'0C') when a BIND can be accepted, and the SSCP of the SLU supports the notification. (See the X'080A' sense code for a contrasting response.)

08 46 ERP Message Forthcoming: The received request was rejected for a reason to be specified in a forthcoming request.

08 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.

08 48 Cryptography Function Inoperative: The receiver of a request was not able to decipher the request because of a malfunction in its cryptography facility.

08 49 Reserved

08 4A Presentation Space Alteration: The presentation space was altered by the end user while the half-duplex state was not-send, (¬S,*R); request not executed.

08 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.

Bytes 2 and 3 following the sense code are not used for user-defined data; they contain sense-code specific information. Settings allowed are:

0000 Requested resources are not available.

6002 The resource identified by the destination program name (DPN) is not supported.

6003 The resource identified by the primary resource name (PRN) is not supported.

08 4C Permanent Insufficient Resource: Receiver cannot act on the request because resources required to honor the request are permanently unavailable.

08 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.

08 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 carried in the response. The services manager receiving the response will send a deactivation request for the corresponding session.

08 4F Reserved

08 50 Link-Level Operation Cannot Be Performed: An IPL, dump, or RPO cannot be performed through the addressed link station because the system definition or current state of the hardware configuration does not allow it.

08 51 Session Busy: Another session that is needed to complete the function being requested on this session (for example, to forward an NS RU embedded in a FORWARD request) is temporarily unavailable.

08 52 Session with Larger Activation Request Sequence Identifier Already Active: A session has already been activated for the subject destination-origin pair by a session activation request that carried a larger activation request identifier than the current request; the current request (ACTPU or ACTCDRM) is refused.

08 53 TERMINATE(Cleanup) Required: The SSCP cannot process the termination request, as it requires cross-domain SSCP-SSCP services that are not available. (The corresponding SSCP-SSCP session is not active.) TERMINATE(Cleanup) is required.

08 54 through 08 55 Reserved

08 56 SSCP-SSCP Session Lost: Carried in the Sense Data field in a NOTIFY or NSPE sent to an ILU or SSCP(ILU) to indicate that the activation of the LU-LU session either cannot be completed or is uncertain because the SSCP-SSCP session between the two domains has been lost. (This sense code appears only in NOTIFY or NSPE, not in a negative response. Another sense code, X'0842', is used on a negative response to signal the condition when the condition is known at the time the response, for example, to INIT, is prepared.)

08 57 SSCP-LU Session Not Active: The SSCP-LU session, required for the processing of a request, is not active; for example, in processing REQECHO, the SSCP did not have an active session with the target LU named in the REQECHO RU.

08 58 Reserved

08 59 REQECHO Data Length Error: The specified length of data to be echoed (in REQECHO) violates the maximum RU size limit for the target LU.

08 5A
through Reserved
08 5F

08 60 Function Not Supported--Continue Session: The function requested is not supported; the function may have been specified by a request code or some other field, control character, or graphic character in an RU. Bytes 2-3 following the sense code are not used for user defined data; they contain a two-byte binary count that indexes (zero-origin) the first byte in which an error was detected. This sense code is used to request that the session continue, thereby ignoring the error.

08 61 Invalid COS Name: The class of service (COS) name, either specified by the ILU or generated by the SSCP of the SLU from the mode table is not in the "COS name to VR identifier list" table used by the SSCP of the PLU. Bytes 2 and 3 following the sense code contain X'0000' if the COS name was generated by the SSCP or X'0001' if specified by the ILU.

08 62 Medium Presentation Space Recovery: An error has occurred on the current presentation space. Recovery consists of restarting at the top of the current presentation space. The sequence number returned is of the RU in effect at the top of the current presentation space. Bytes 2 and 3 following the sense code contain the byte offset from the beginning of the RU to the first byte of the RU that is displayed at the top of the current presentation space.

08 63 Referenced Local Character Set Identifier (LCID) Not Found: A referenced character set does not exist.

08 64 Function Abort: A loop will occur upon reexecution; the request sender should not send the same data.

08 65 Function Abort: Sender is responsible to detect the loop.

08 66 Function Abort: Receiver is responsible to detect the loop.

08 67 Sync Event Response: Indicates a negative response to a sync event.

08 68 No Panels Loaded: Referenced format not found because no panels are loaded for the display.

08 69 Panel Not Loaded: The referenced panel is not loaded for the display.

08 70 Reserved

08 71 Read Partition State Error: A Read Partition structured field was received while the display was in the retry state.

08 72 Orderly Deactivation Refused: An NC-DACTVR(Orderly) request has been received, but sessions are assigned to the VR and it will not be deactivated.

08 73 Virtual Route Not Defined: There is no ERN designated to support this VRN.

08 74 ER Not in a Valid State: The ER supporting the requested VR is not in a state allowing VR activation.

08 75 Incorrect or Undefined Explicit Route Requested: The reverse ERNs specified in the NC-ACTVR do not contain the ERN defined to be used for the VR requested, or the ERN designated to be used for the VR is not defined.

08 76 Nonreversible Explicit Route Requested: The ERN used by the NC-ACTVR does not use the same sequence of transmission groups (in reverse order) as the ERN that should be used for the RSP(NC-ACTVR).

08 77 Reserved

08 78 Insufficient Storage: The storage resource required for a data format is not available.

08 79 Storage Medium Error: A permanent error has occurred involving a storage medium.

08 7A Format Processing Error: A processing error occurred during data formatting.

REQUEST ERROR (CATEGORY CODE = X'10')

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

10 01 RU Data Error: Data in the request RU is not acceptable to the receiving FMDS component; for example, a character code is not in the set supported, a formatted data field is not acceptable to presentation services, or a required name in the request has been omitted.

10 02 RU Length Error: The request RU was too long or too short.

10 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'.)

Bytes 2 and 3 following the sense code are not used for user-defined data; they contain sense-code specific information. Settings allowed are:

0000 Function requested is not supported.

6002 The resource identified by the destination program name (DPN) is not supported.

6003 The resource identified by the primary resource name (PRN) is not supported.

10 04 Reserved.

10 05 Parameter Error: A parameter modifying a control function is invalid, or outside the range allowed by the receiver.

10 06 Reserved.

10 07 Category Not Supported: DFC, SC, NC, or FMD request was received by a half-session not supporting any requests in that category; or an NS request with byte 0 was not set to a defined value, or byte 1 was not set to an NS category supported by the receiver.

10 08 Invalid FM Header: The FM header was not understood or translatable by the receiver, or an FM header was expected but not present.

Bytes 2 and 3 following the sense code are not used for user-defined data; they contain sense-code specific information, as described in chapter 9.

10 09 Format Group Not Selected: No format group was selected before issuing a Present Absolute or Present Relative Format structured field to a display.

STATE ERROR (CATEGORY CODE = X'20')

This category indicates a sequence number error, or an RH or RU that 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 component.

20 01 Sequence Number: Sequence number received on normal-flow request was not 1 greater than the last.

20 02 Chaining: Error in the sequence of the chain indicator settings (BCI, ECI), such as first, middle, first.

20 03 Bracket: Error resulting from failure of sender to enforce bracket rules for session. (This error does not apply to contention or race conditions.)

20 04 Direction: Error resulting from a normal-flow request received while the half-duplex flip-flop state was not-receive, (*S,¬R). (Contrast this sense code with X'081B', which signals a race condition.)

20 05 Data Traffic Reset: An FMD or normal-flow DFC request received by a half-session whose session activation state was active, but whose data traffic state was not active

20 06 Data Traffic Quiesced: An FMD or DFC request received from a half-session that has sent QUIESCE COMPLETE or SHUTDOWN COMPLETE and has not responded to RELEASE QUIESCE.

20 07 Data Traffic Not Reset: A session control request (for example, STSN), allowed only while the data traffic state is reset, was received while the data traffic state was not reset.

20 08 No Begin Bracket: A BID or an FMD request specifying BBI=BB was received after the receiver had previously sent a positive response to BRACKET INITIATION STOPPED.

20 09 Session Control Protocol Violation: An SC protocol has been violated; a request, allowed only after a successful exchange of an SC request and its associated positive response, has been received before such successful exchange has occurred (for example, an FMD request has preceded a required CRYPTOGRAPHY VERIFICATION request). The request code of the particular SC request or response required, or X'00' if undetermined, appears in the fourth byte of the sense data. There is no user data associated with this sense code.

20 0A Immediate Request Mode Error: The immediate request mode protocol has been violated by the request.

20 0B Queued Response Error: The Queued Response protocol has been violated by a request, that is, QRI=¬QR when an outstanding request had QRI=QR.

20 0C ERP Sync Event Error: The ERP sync event protocol has been violated.

20 0D Response Owed Before Sending Request: An attempt has been made in half-duplex (flip-flop or contention) send/receive mode to send a normal-flow request when a response to a previously received request has not yet been sent.

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 component 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.

40 01 Invalid SC or NC RH: The RH of a session control (SC) or network control (NC) request was invalid. For example, an SC RH with pacing request indicator set to 1 is invalid.

40 02 Reserved.

40 03 BB Not Allowed: The Begin Bracket indicator (BBI) was specified incorrectly, for example, BBI=BB with BCI=¬BC.

40 04 EB Not Allowed: The End Bracket indicator (EBI) was specified incorrectly, for example, EBI=EB with BCI=¬BC, or by the primary half-session when only the secondary may send EB, or by the secondary when only the primary may send EB.

40 05 Incomplete RH: Transmission shorter than full TH-RH.

40 06 Exception Response Not Allowed: Exception response was requested when not permitted.

40 07 Definite Response Not Allowed: Definite response was requested when not permitted.

40 08 Pacing Not Supported: The Pacing indicator was set on a request, but the receiving half-session or boundary function

half-session does not support pacing for this session.

40 09 CD Not Allowed: The Change Direction indicator (CDI) was specified incorrectly, for example, CDI=CD with ECI=¬EC, or CDI=CD with EBI=EB.

40 0A No-Response Not Allowed: No-response was specified on a request when not permitted. (Used only on EXR.)

40 0B Chaining Not Supported: The chaining indicators (BCI and ECI) were specified incorrectly, for example, 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.

40 0C Brackets Not Supported: The bracket indicators (BBI and EBI) were specified incorrectly, for example, a bracket indicator was set (BBI=BB or EBI=EB), but brackets are not used for the session.

40 0D CD Not Supported: The Change-Direction indicator was set, but is not supported.

40 0E Reserved.

40 0F Incorrect Use of Format Indicator: The Format indicator (FI) was specified incorrectly, for example, FI was set with BCI=¬BC, or FI was not set on a DFC request.

40 10 Alternate Code Not Supported: The Code Selection indicator (CSI) was set when not supported for the session.

40 11 Incorrect Specification of RU Category: The RU Category indicator was specified incorrectly, for example, an expedited-flow request or response was specified with RU Category indicator = FMD.

40 12 Incorrect Specification of Request Code: The request code on a response does

not match the request code on its corresponding request.

40 13 Incorrect Specification of (SDI, RTI): The Sense Data Included indicator (SDI) and the Response Type indicator (RTI) were not specified properly on a response. The proper value pairs are (SDI=SD, RTI=negative) and (SDI=¬SD, RTI=positive).

40 14 Incorrect Use of (DR1I, DR2I, ERI): The Definite Response 1 indicator (DR1I), Definite Response 2 indicator (DR2I), and Exception Response indicator (ERI) were specified incorrectly, for example, a CANCEL request was not specified with DR1I=DR1, DR2I=¬DR2, and ERI=¬ER.

40 15 Incorrect Use of QRI: The Queued Response indicator (QRI) was specified incorrectly, for example, QRI=QR on an expedited-flow request.

40 16 Incorrect Use of EDI: The Enciphered Data indicator (EDI) was specified incorrectly, for example, EDI=ED on a DFC request.

40 17 Incorrect Use of PDI: The Padded Data indicator (PDI) was specified incorrectly, for example, PDI=PD on a DFC request.

PATH ERROR (CATEGORY CODE = X'80')

This category indicates that the request could not be delivered to the intended receiver, because of a path outage, an invalid sequence of activation requests, or one of the listed path information unit (PIU) errors. (Some PIU errors fall into other categories, for example, sequence number errors are category X'20'.) A path error received while the session is active generally indicates that the path to the session partner has been lost. In this case, the NAU services manager receiving the -RSP(Path Error) may deactivate the affected half-session.

80 01 Intermediate Node Failure: Machine or program check in a node providing intermediate function. A response may or may not be possible.

80 02 Link Failure: Data link failure.

80 03 NAU Inoperative: The NAU is unable to process requests or responses, for example, the NAU has been disrupted by an abnormal termination.

80 04 Unrecognized Destination Address: A node in the path has no routing information for the destination specified by the TH.

80 05 No Session: No half-session is active in the receiving end node for the indicated origination-destination pair, or no boundary function half-session component is active for the origin-destination pair in a node providing the boundary function. A session activation request is needed.

80 06 Invalid FID: Invalid FID for the receiving node. (Note 1)

80 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 2)

80 08 PU Not Active: The SSCP-PU secondary half-session in the receiving node has not been activated and the request was not ACTPU for this half-session; for example, the request was ACTLU from an SSCP that does not have an active SSCP-PU session with the PU associated with the addressed LU.

80 09 LU Not Active: The destination address specifies an LU for which the SSCP-LU secondary half-session has not been activated and the request was not ACTLU.

80 0A Too-Long PIU: Transmission was truncated by a receiving node because the PIU exceeded a maximum length or sufficient buffering was not available.

80 0B Incomplete TH: Transmission received was shorter than a TH. (Note 1)

80 0C DCF Error: Data Count field inconsistent with transmission length.

80 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.

80 0E Unrecognized Origin: The origin address specified in the TH was not recognized.

80 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.

80 10 Segmented RU Length Error: An RU was found to exceed a maximum length, or required buffer allocation that might cause future buffer depletion.

80 11 ER Inoperative or Undefined: A PIU was received from a subarea node that does not support ER and VR protocols, and the explicit route to the destination is inoperative or undefined.

80 12 Subarea PU Not Active or Invalid Virtual Route: A session activation request for a peripheral PU or LU cannot be satisfied because there is no active SSCP-PU session for the subarea node providing boundary function support, or the virtual route for the specified SSCP-PU_T1|2 or SSCP-LU session is not the same as that used for the SSCP-PU session of the PU_T1|2's or LU's subarea PU.

80 13 COS Not Available: A session activation request cannot be satisfied because none of the virtual routes requested for the session is available. This condition may arise because each of the specified virtual routes cannot be activated for one of the following reasons:

- oThe specified virtual route cannot be mapped to an explicit route to the destination subarea, or the explicit route it is mapped to is not defined.

- oThe underlying explicit route is not operative.

- oThe underlying explicit route is operative but cannot be activated.

- oThe underlying explicit route is active but the virtual route cannot be activated.

- oThe session must be assigned to a virtual route with an underlying reverse explicit route number of 0, but the virtual route does not meet this criterion.

Notes:

1. 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.

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

CHAPTER 9. FM HEADERS

The following figure shows some instances where FM headers are used.

TH	RH	FMH

TH	RH	FMH	Data

TH	RH	FMH	FMH	Data

TH	RH	FMH	SCB	Data	SCB	Data

Note: SCB = String Control Byte

FMH-1 - This header is used to select a destination within an LU. A destination may be represented by a device, a data set residing on a device, or merely a data stream. The LU initiates, interrupts, resumes, and concludes data traffic for the half-session using the FMH-1.

FMH-2 - Once a destination has been selected using an FMH-1, this header handles the data management tasks for that destination.

FMH-3 - This header handles data management tasks that are common to all destinations in the LU-LU session.

FMH-4 - This header carries a logical block command and its parameters, together with information, that applies to a logical block within a logical message as defined for Logical Message Service.

FMH-5 - This header flows from the program using the sending half-session to the attach manager of the receiving half-session. This header identifies the program at the receiving LU that it wishes to have attached. An FMH-5 can be followed by other FMHs (for example, FMH-6, FMH-8, and FMH-4), a logical record header (LRH), and FM data. Optionally it can be sent with CD or EB.

FMH-6 - This header flows with an architected command from a currently active transaction program using a sending half-session to a currently active transaction program using a receiving half-session.

FMH-7 - This header is sent after a negative response (0846) to provide further information about an error.

FMH-10 - This header is sent to prepare the session for a sync point. It may be sent with data. The RU chain must have CD set on so that the receiver may, on the next flow, request a sync point or abort the unit of work.

FORMATS OF FM HEADERS

FM Header Type 1

BYTE	BIT	CONTENT	MEANING
0		Length	Length of header including length byte
1	0	FMHC	FMH Concatenation. B'0' No FMH follows this FMH-1 B'1' Another FMH follows this FMH-1
	1-7	B'0000001'	FMH-1 Identifier
2	0-3	Medium Select	Desired medium for data:
		X'0'	Console
		X'1'	Exchange
		X'2'	Card
		X'3'	Document
		X'4'	Nonexchange disk
		X'5'	Extended Document
		X'6'	Extended Card
		X'7'	Data Set Name Selects Destination (see Note 3)
		X'8'	WP Media 1
		X'9'	WP Media 2
		X'A'	WP Media 3
		X'B'	Reserved
		X'C'	WP Media 4
			All other values reserved.
	4-7		Logical Subadddress
		X'0'...X'E'	Specific device in medium class
		X'F'	Any device in medium class

NOTE 1:
The DSP defaults for the Medium Select field are:

FMH-1 MEDIUM SELECT	DEFAULT DSP
Console, X'0'	Base
Exchange, X'1'	DST field of FMH-1
Card, X'2'	SCS (IRS, TRN)
Document, X'3'	Subset 2 (RJE)
Nonexchange Disk, X'4'	DST field of FMH-1
Extended Document, X'5'	Subset 2 (RJE)
Extended Card, X'6'	SCS (IRS, TRN)
WP Medium 1, X'8'	WP Raw Form
WP Medium 2, X'9'	WP Raw Form
WP Medium 3, X'A'	WP Raw Form
WP Medium 4, X'C'	WP Raw Form

An LU requiring any other DSP value associated with Medium Select must do so by specifying the desired DSP in byte 3, bits 4-7 of the FMH-1. This selection must adhere to those DSPs allowed on the session as specified in the BIND parameters.

NOTE 2: Media and logical subaddress values are reserved when DSSEL field is set to B'110' (Continue Destination Selection), B'001' (End), B'100' (Suspend), or B'101' (End Abort).

NOTE 3: If Medium = X'7' and Logical Subaddress = X'F', DSNAME field is used to select destination.

BYTE	BIT	CONTENT	MEANING
3	0	SRI	Stack Reference Indicator
		B'0'	Stack to be used is the sender's send stack.
		B'1'	Stack to be used is the receiver's send stack.
	1		Demand Select
		B'0'	Receiver may direct data to alternate medium/subaddress.
		B'1'	Receiver must

			direct data to specified medium/subaddress (spooling is prohibited).
	2-3		Reserved
	4-7	DSP Select	Data Stream Profile
			Profiles are:
		X'0'	Default DSP
		X'1'	Base DSP
		X'2'	General DSP
		X'3'	Job DSP
		X'4'	WP Raw-Form Text DSP
		X'5'	WP Exchange Diskette DSP
		X'6'	Reserved
		X'7'	OII Level 2 DSP
		X'8'	Reserved
		X'9'	Reserved
		X'A'	Document Interchange DSP
		X'B'	Structured Field DSP
			All other values reserved.

Note: If DSP select is X'0', the DSP is implied by the Medium Select field.

BYTE	BIT	CONTENT	MEANING
4			FMH-1 Properties
	0-2	DSSEL	Destination Selection
		B'000'	Resume Destination Selection
		B'001'	End Destination Selection
		B'010'	Begin Destination Selection
		B'011'	Begin/End Destination Selection
		B'100'	Suspend Destination Selection
		B'101'	End-Abort Destination Selection

	B'110'	Continue Destination Selection
	B'111'	Reserved
3	DST	Data Set Transmission
	B'0'	Transmission Exchange Format
	B'1'	Basic Exchange Format
		When Medium Select ¬= Exchange Medium, this field is reserved. Receiver may do spooling and exchange-medium creation locally.
		When Medium Select = Exchange Medium (see byte 2), specifying B'0' preserves chain boundaries while spooling, but nonsequential allocation techniques may be used. Specifying B'1' does not preserve chain boundaries, but uses sequential medium allocation. See "Field Definitions" below.
4		Reserved
5	CMI	Compression Indicator (see "Notes" below)
	B'0'	No compression
	B'1'	Compression
6	CPI	Compaction Indicator (see "Notes" below)
	B'0'	No compaction

		B'1'	Compaction
	7		Reserved
5	0-7	ERCL	Exchange Record Length if Medium = Exchange Medium or Card; otherwise reserved. For Medium = Card, a hexadecimal value indicates maximum card length. The value X'00' indicates an 80-column length.
6-7			Reserved (Optional)
8		DSLEN	Length of Destination Name (Optional)
9-n		DSNAME	Destination Name (Optional) (Reserved when DSSEL = Continue)

NOTES:

1. CMI/CPI/ERCL information received when DSSEL = Continue overlays the settings of the BEGIN FMH-1 or the last-received CONTINUE FMH-1.

2. CMI, CPI, and ERCL indicators are meaningful and valid only when specified in a BEGIN, BEGIN/END, or CONTINUE FMH-1.

3. If CMI or CPI is on, the first byte following the FMH (or FMHs) is a string control byte (SCB).

(General Format)

BYTE	BIT	CONTENT	MEANING
0		Length	Length of header including length byte
1	0	FMHC	FMH Concatenation.
		B'0'	No FMH follows this FMH-2
		B'1'	Another FMH follows this FMH-2
	1-7	B'0000010'	FMH-2 Identifier
2	0	SRI	Stack reference indicator.
		B'0'	FMH-2 pertains to the active destination of the sending half-session's send stack and the receiving half-session's receive stack.
		B'1'	FMH-2 pertains to the active destination of the receiving half-session's send stack and the sending half-session's receive stack.
	1-7	Function	FMH-2 function to be performed.
		B'nnnnnnn'	Identifies the function that this FMH-2 is to perform. Note: The FMH-2s listed in Figure 9-1 combine the SRI

		and function settings, and show valid settings for these fields.
3-n	Parms	Parameter fields. These fields provide the information needed to perform the selected function. They are different for each FMH-2 function, and are described in _SNA -- Sessions Between Logical Units_.

FUNCTION CODE	FUNCTION
X'01'	Peripheral Data Information Record (PDIR)
X'02'	Compaction Table
X'04'	Prime Compression Character
X'07'	Execute Program Offline
X'20'	Create Data Set
X'21'	Scratch Data Set
X'22'	Erase Data Set
X'23'	Password
X'24'	Add
X'25'	Replace
X'26'	Add Replicate
X'27'	Replace Replicate
X'28'	Query for Data Set
X'29'	Note
X'2B'	Record ID
X'2C'	Erase Record
X'2D'	Scratch All Data Sets
X'2E'	Volume ID
X'AA'	Note Reply (SRI is always on)

Figure 9-1. FMH-2 functions and their function codes.

FM Header Type 3

(General Format)

The FMH-3 format is identical to the FMH-2 format except that FMH-3s do not have a stack reference indicator (SRI) in byte 2.

An FMH-3 is used when information is needed or used by all destinations managed by the half-session. By contrast, an FMH-2 is used for a specific destination.

Two functions, the COMPACTION TABLE FMH and the PRIME COMPRESSION CHARACTER FMH, can be sent as FMH-2s or FMH-3s. They should be sent as FMH-2s when they apply to a specific destination at the half-session and as FMH-3s when they apply to all destinations at the half-session.

Figure 9-2 shows the FMH-3 functions.

FUNCTION CODE	FUNCTION
X'02'	Compaction Table
X'03'	Query for Compaction Table
X'04'	Prime Compression Character
X'05'	Status
X'06'	Series ID

Figure 9-2. FMH-3 functions and their function codes.

FM Header Type 4

BYTE	BIT	CONTENT	MEANING

0		Length	Length of header including length byte
1	0	FMHC	FMH Concatenation (must be B'0').
	1-7	B'0000100'	FMH-4 Identifier
2		FMH4FXCT	Length of fixed length parameters excluding the length of FMH4FXCT. The first nonfixed parameter position is FMH4LBN. The minimum value of FMH4FXCT is 3, the maximum is 4.
3		FMH4TT1	Block transmission type
		X'00'	Inherit code (from MM-TT register)
		X'00'-X'3F'	Reserved
		X'40'	FFR-FNI Record
		X'41'	FFR-FS Record
		X'42'	FFR-FS2 Record
		X'42'-X'4F'	Reserved
		X'50'-X'FE'	Reserved
		X'FF'	Derivative code

Note: FFR=Field Formatted Record, FNI=Fixed Fields without field separators, FS=Fixed Fields with field separators, FS2=Fixed Fields with or without field separators

4		FMH4TT2	Block transmission type qualifier. Reserved except for FMH4TT1=X'41' or X'42', in which case it holds the separator value.
5		FMH4CMD	Command
		X'00'	CRT-NU-BLK
		X'02'	CRT-SU-BLK
		X'03'	CRT-SN-BLK
		X'10'	CONT-NU-BLK
		X'12'	CONT-SU-BLK

		X'13'	CONT-SN-BLK
		X'23'	DEL-SN-BLK
		X'32'	UPD-SU-BLK
		X'33'	UPD-SN-BLK
		X'42'	RPL-SU-BLK
		X'43'	RPL-SN-BLK
		Other	Reserved

Note: NU=Nonshared, Unnamed; SU=Shared, Unnamed; SN=Shared, Named; NN=Nonshared, Named

6		FMH4FLAG	Flags. If omitted, X'00' is assumed.
	0-1		Reserved
	2-3	F4RDESCR	Record Descriptor Flag
		B'00'	No LRHs in transmission block
		B'01'	LRHs present, with implicit lengths
		B'10'	Reserved
		B'11'	Reserved

Note: LRH=Logical Record Header

	4-5		Reserved
	6	FMH4BDTF	Block Data Transform Flag
		B'0'	FMH4BDT absent
		B'1'	FMH4BDT present
	7	FMH4RDTF	Reserved
m		FMH4LBN	Length of FMH4BN. 0, or omitted, if unnamed block.
m+1		FMH4BN	Name of Block
n		FMH4LBDT	Length of FMH4BDT. 0 if FMH4BDTF is B'0'.
n+1		FMH4BDT	Block Data Transform
p		FMH4LVID	Length of FMH4VID
p+1		FMH4VID	Version Identifier

FM Header Type 5

(General Format)

BYTE	BIT	CONTENT	MEANING
0		Length	Length of header including length byte
1	0	FMHC B'0' B'1'	FMH Concatenation. No FMH follows Another FMH follows
	1-7	B'0000101'	FMH-5 Identifier
2-3		FMH5CMD X'0202' X'0204' X'0206'	Command Code Attach Transaction Program RAP Data Descriptor
4		FMH5MOD	Modifier
5		FMH5FXCT	Fixed-length parameters X'00' for RAP X'02' for ATT, DD
6		ATTDSP	
7		ATTDBA	
8-n		Resource Names	

Note: If bytes 2-3 = X'0204' (Reset Attached Process), bytes n-m are omitted.

FM Header Type 6

BYTE	BIT	CONTENT	MEANING
0		Length	Length of header

			including length byte
1	0	FMHC	FMH Concatenation.
		B'0'	No FMH follows
		B'1'	Another FMH follows
	1-7	B'0000110'	FMH-6 Identifier
2-3		Code	Command Code (CC2)
			For architected transaction programs, the first byte of the command code identifies a transaction program and the second byte identifies a function within a transaction program.
4		FMH6MOD	Modifier
	0	FMH6LNSZ	Length of parameter length fields
		B'0'	One-byte parameter length field
		B'1'	Two-byte parameter length field
	1-7		Reserved
5-n		Fixed	Total Length of fixed length parameters (LF). This field contains the sum of the lengths of all fixed length parameters which are mandatory for the particular command code located in bytes 2 and 3. This field is either one byte or two bytes in length based on the

		setting of FMH6LNSZ (0 = one byte, 1 = two bytes).
n+1-m		Fixed Length Parameters (FDy). The fixed length parameters are positional by command code.
m+1-p	Variable	Length field of first, positional variable-length parameter (LV1). This field is either one byte or two bytes in length based on the setting of FMH6LNSZ (0 = one byte, 1 = two bytes). If the Length Field (LVx) is equal to 0, then the variable parameter is omitted. The next positional variable-length parameter length (LV2) occurs in byte q+1.
p+1-q		Variable-Length Positional Parameter (VD). The LV and VD fields are replicated to represent x number of variable-length parameters according to command code.

FM Header Type 7

BYTE	BIT	CONTENT	MEANING
0		Length	Length of header including length byte
1	0	FMHC B'0' B'1'	FMH Concatenation. No FMH follows Reserved
	1-7	B'0000111'	FMH-7 Identifier
2-5		ERPSENSE	SNA sense code, which would appear on error response
6-7		ERPSEQ	Sequence number of RU chain in which error was detected

FM Header Type 10

BYTE	BIT	CONTENT	MEANING
0		Length	Length of header including length byte
1	0	FMHC B'0' B'1'	FMH Concatenation. No FMH follows Another FMH follows
	1-7	B'0001010'	FMH-10 Identifier
2-3		SPCCMD X'0202'	 Prepare command (other values reserved)
4-5		SPCMOD	Modifier. For a Prepare command

	(FMH-10), the modifier indicates DFC settings to be returned on the first RU chain sent by the FMH-10 receiver.
X'0000'	*CD,*EB. The sender of FMH-10 does not care what DFC settings are returned on the reply.
X'0001'	EB. The sender of FMH-10 requires an EB on the reply.
X'0002'	CD,¬EB. The sender of FMH-10 requires a CD on the reply.

SENSE DATA TO ACCOMPANY SENSE CODE X'1008'

The sense code X'1008' (Invalid FM Header) may carry with it two bytes of sense data. The following list gives the reasons for the error and the assigned sense data.

DATA PROCESSING ERRORS (X'100808XX')

0801	Invalid Function Code Parameters
0803	Forms Function Cannot Be Performed
0805	Unable to Perform Copy Function
0806	Compaction Table Outside Supported Set
0807	Invalid PDIR (Peripheral Data Information Record) Identifier
0808	Printer Train Function Cannot Be Performed
0809	FCB (Forms Control Block) Load Function Cannot Be Performed
080A	FCB (Forms Control Block) Load Function Not Supported
080B	Invalid Compaction Table Name
080C	Invalid ACCESS

080D	Invalid RECLEN
080E	Invalid NUMRECS
080F	Data Set In Use
0810	Data Set Not Found
0811	Invalid Password
0812	Function Not Allowed For Destination
0813	Record Too Long
0814	Data Set Full
0815	Invalid RECID
0817	Invalid VOLID Format
0818	Number of Logical Records Per Chain Exceeded
0819	Data Set Exists
081A	No Space Available
081B	Invalid VOLID
081C	Invalid DSACCESS
081D	Invalid RECTYPE
081E	Insufficient Resolution Space
081F	Invalid Key Technique
0820	Invalid Key Displacement
0821	Invalid Key
0822	Invalid N (number of records)
0823	Invalid KEYIND
0824	Invalid SERID
0826	Invalid RECID Format
0827	Password Not Supplied
0828	Record ID Not Supplied
0829	Volume ID Not Supplied
082A	Invalid PGMNAME

FM HEADER PROTOCOL ERRORS (X'100820XX')

2001	Invalid Destination -- Active
2002	Invalid Destination -- Inactive
2003	Invalid Destination -- Suspended
2004	Invalid Suspend-Resume Sequence
2005	Interruption Level Violation
2006	Invalid Resume Properties
2007	Destination Not Available
2008	Invalid End Sequence
2009	Invalid FM Header Length
200A	Invalid Field Setting -- Reserved Field Set to One or Setting Not Defined
200B	Invalid Destination -- Destination Does Not Exist

200C	Invalid ERCL
200D	Invalid DST
200E	Invalid Concatenation -- Header Cannot Be Concatenated
200F	FM Data Not Allowed For Header
2010	BIND FM Header Set Violation
2014	FM Header Not Sent Concatenated
2019	Stack Reference Indicator Invalidly Set To One For Begin, Suspend, Resume, Or End FMH-1 Or For FMH-2
201A	Unable To Accept CMI Modification
201B	Unable To Accept CPI Modification
201C	Unable To Accept ERCL Modification

SESSION ERRORS (X'100840XX')

4001	Invalid FMH Type
4002	Invalid FMH Code
4003	Compression Not Supported
4004	Compaction Not Supported
4005	Basic Exchange Not Supported
4006	Only Basic Exchange Supported
4007	Medium Not Supported
4008	Code Selection Compression Violation
4009	FMHC Not Supported
400A	Demand Select Not Supported
400B	DSNAME Not Supported
400C	Invalid Medium Subaddress Field
400D	Insufficient Resources To Perform FMH Function
400E	DSP Select not supported

FMH PROTOCOL ERRORS UNIQUE TO LU-LU SESSION TYPE 6 (X'100860XX')

6001	Invalid Deblocking Algorithm (DBA)
6004	Invalid Queue Name Length
6006	Invalid Data Stream Profile (DSP)
6007	FMH-7 not preceded by -RSP 0846
6008	Invalid Attach access code.
6009	FMH-5 fixed length parm count not equal to 2
600A	Not first FMH-5 and the Interchange

	Unit Type is not the same as the old and the Interchange Unit End indicator is not on
600B	FMH-5 command invalid
600C	Null Sequence field required
600D	User to user program not allowed.
600E	User to architected program not allowed
600F	FMH-5 Reset Attached Program (RAP) not sent properly
6010	FMH-5 RAP sent with inactive Attach register

NOTE: The words that are in all capital letters (except BIND) are Type 1, 2, or 3 FM header parameters.

CHAPTER 10. LU-LU SESSION TYPES

LU-LU SESSION TYPE DESCRIPTIONS

0 A type of session between two LU half-sessions using SNA-defined protocols for transmission control and data flow control, but using end-user or product-defined protocols to augment or replace FMD services protocols: for example, a session that involves an application program using IMS/VS and an IBM 3600 Finance Communication System, in which the operator of the 3600 terminal is updating the passbook balance for a customer's savings account.

1 A type of session between an application program and single- or multiple-device data processing terminals, in an interactive, batch data transfer, or distributed processing environment. For example, a session involving an application program using IMS/VS and an IBM 3767 Communication Terminal in which the 3767 operator is correcting a data base that is maintained using the application program. The data stream is the SNA character string (SCS).

2 A type of session between an application program and a single display terminal in an interactive environment, using the SNA 3270 data stream; for example, an application program using IMS/VS and an IBM 3277 Display Station, in which the 3277 operator is creating data and sending it to the application program.

3 A type of session between an application program and a single printer, using the SNA 3270 data stream; for example, an application program using CICS/VS to send data to an IBM 3284 Printer attached to an IBM 3791 Controller.

4 A type of session between: (1) an application program and a single- or multiple-device data processing or word processing terminal in an interactive batch data transfer, or distributed processing environment; for example, a session between an application program using CICS/VS and an IBM 6670 Information Distributor; or (2) logical units (LUs) in peripheral nodes; for example, two 6670s. The data stream is the SNA character string (SCS) for data processing environments and Office Information Interchange (OII) Level-2 for word processing environments.

6 A type of session between two application programs in a distributed processing environment, using the SNA character string (SCS), a structured-field data stream, an SNA 3270 data stream, a Logical Messages Services (LMS) data stream, or a user-defined data stream; for example, an application program using CICS/VS communicating with an application program using IMS/VS.

7 A type of session between an application program and a single display terminal in an interactive environment; for example, a session involving an application program in a System/34 and an IBM 5251 Display Station, where the 5251 operator is creating data and sending it to the application program. The data stream is the 5250 data stream.

Session partners must use the same LU-LU session type. SNA does not permit, for example, one half-session to use session type 1 and the other to use session type 4.

LU-LU SESSION CHARACTERISTICS

LU-LU Session Type 0

Half-Session Characteristics
- TS Profile 2, 3, 4, 7
- FM Profile 2, 3, 4, 7, 18
- PS Characteristics: Any option desired
- Sense Codes: Any SNA sense codes plus codes defined by session partners

LU-LU Session Type 1

Half-Session Characteristics
- TS Profile 3, 4
- FM Profile 3, 4
- PS Characteristics: SNA character string, FM headers (none, or one or more of FMH-1, FMH-2, FMH-3), Data processing media support
- Sense Codes
  - Request Reject (X'08xx')

0802	Intervention Required
0805	Session Limit Exceeded
080A	Permission Rejected
080B	Bracket Race Error
0811	Break
0812	Insufficient Resource
0813	Bracket Bid Reject -- No RTR Forthcoming
0814	Bracket Bid Reject -- RTR Forthcoming
081B	Receiver in Transmit Mode
081C	Request Not Executable
0821	Invalid Session Parameters
0825	Component Not Available
082B	Presentation Space Integrity Lost
0831	LU Component Disconnected
0845	Permission Rejected -- SSCP Will Be Notified
0860	Function Not Supported -- Continue Session
0862	Medium Presentation Space Recovery
0863	Referenced LCID Not Found
0871	Read Partition State Error

Request Error (X'10xx')

1001 RU Data Error
1002 RU Length Error
1003 Function Not Supported
1005 Parameter Error
1008 Invalid FM Header

State Error (X'20xx')

2001 Sequence Number
2002 Chaining
2003 Bracket
2004 Direction
2005 Data Traffic Reset
2006 Data Traffic Quiesced
2007 Data Traffic Not Reset
2008 No Begin Bracket
2009 Session Control or Data Flow Control Protocol Violation

LU-LU Session Type 2

Half-Session Characteristics

TS Profile 3
FM Profile 3
PS Characteristics: SNA 3270 data stream, No FM Headers, Display support

Sense Codes

Request Reject (X'08xx')

0801 Resource Not Available
0802 Intervention Required
0807 Resource Not Available -- LUSTAT Forthcoming
080A Permission Rejected
080B Bracket Race Error
0813 Bracket Bid Reject -- No RTR Forthcoming
0814 Bracket Bid Reject -- RTR Forthcoming
081B Receiver in Transmit Mode
081C Request Not Executable
0821 Invalid Session Parameter
0829 Change Direction Required
082A Presentation Space Alteration
082B Presentation Space Integrity Lost
082D LU Busy
082E Intervention Required at LU Subsidiary Device
082F Request Not Executable because of LU Subsidiary Device

0831 LU Component Disconnected
0833 Invalid Parameter (with pointer and complemented byte)
0843 Required FMD Synchronization Not Supplied
0845 Permission Rejected -- SSCP Will Be Notified
084A Presentation Space Alteration
084C Permanent Insufficient Resource
0863 Referenced LCID Not Found
0868 No Panels Loaded
0869 Panel Not Loaded
0871 Read Partition State Error

Request Error (X'10xx')

1001 RU Data Error
1003 Function Not Supported
1005 Parameter Error
1007 Category Not Supported
1009 Format Group Not Selected

State Error (X'20xx')

2001 Sequence Number
2002 Chaining
2003 Bracket
2004 Direction
2005 Data Traffic Reset
2006 Data Traffic Quiesced
2007 Data Traffic Not Reset
2008 No Begin Bracket
2009 Session Control or Data Flow Control Protocol Violation

LU-LU Session Type 3

Half-Session Characteristics

TS Profile 3

FM Profile 3

PS Characteristics: SNA 3270 data stream, No FM headers, Display Support

Sense Codes

Request Reject (X'08xx')

0801 Resource Not Available
0802 Intervention Required
080A Permission Rejected
0814 Bracket Bid Reject -- RTR Forthcoming
081B Receiver in Transmit Mode
081C Request Not Executable
0821 Invalid Session Parameters

082B Presentation Space Integrity Lost
082D LU Busy
0831 LU Component Disconnected
0843 Required FMD Synchronization Not Supplied
0845 Permission Rejected -- SSCP Will Be Notified
084C Permanent Insufficient Resource
0863 Referenced LCID Not Found

Request Error (X'10xx')
1001 RU Data Error
1003 Function Not Supported
1005 Parameter Error
1007 Category Not Supported

State Error (X'20xx')
2001 Sequence Number
2002 Chaining
2003 Bracket
2004 Direction
2005 Data Traffic Reset
2006 Data Traffic Quiesced
2007 Data Traffic Not Reset
2008 No Begin Bracket
2009 Session Control or Data Flow Control Protocol Violation

LU-LU Session Type 4

Half-Session Characteristics

TS Profile 7

FM Profile 7

PS Characteristics: SNA character string or OII Level-2, FM headers (none, or one or more of FMH-1, FMH-2, FMH-3), Data processing and word processing media support

Sense Codes

Request Reject (X'08xx')
0801 Resource Not Available
0802 Intervention Required
0809 Mode Inconsistency
080A Permission Rejected
080D NAU Contention
080E NAU Not Authorized
080F End User Not Authorized
0811 Break
0812 Insufficient Resource
0813 Bracket Bid Reject -- No RTR Forthcoming

0815 Function Active
081C Request Not Executable
0821 Invalid Session Parameter
0824 Component Aborted
0825 Component Not Available
0827 Intermittent Error -- Retry Requested
0829 Change Direction Required
082D LU Busy

Request Error (X'10xx')

1001 RU Data Error
1002 RU Length Error
1005 Parameter Error
1008 Invalid FM Header

State Error (X'20xx')

2001 Sequence Number
2002 Chaining
2003 Bracket
2004 Direction
2005 Data Traffic Reset
2006 Data Traffic Quiesced
2007 Data Traffic Not Reset
2008 No Begin Bracket
2009 Session Control or Data Flow Control Protocol Violation

LU-LU Session Type 6

Half-Session Characteristics

TS Profile 4

FM Profile 18

PS Characteristics: SNA character string, SNA 3270 data stream, structured fields, Logical Message Services data stream, or user-defined data stream; FM headers (FMH-4 through FMH-8 and FMH-10); Program-to-program support for programs, queues, files, and data bases

Sense Codes

Request Reject ('08xx')

080F End User Not Authorized
0812 Insufficient Resource
0813 Bracket Bid Reject
0814 Bracket Bid Reject -- RTR Forthcoming
0819 RTR Not Required
081C Request Not Executable
0824 Component Aborted

0826 FM Function Not Supported
0829 Change Direction Required
0846 ERP Message Forthcoming
084B Requested Resources Not Available
0864 Function Abort: Loop will occur upon re-execution
0865 Function Abort: Sender responsible to detect loop
0866 Function Abort: Receiver responsible to detect loop

Request Error (X'10xx')
1003 Function Not Supported
1008 Invalid FM Header

State Error (X'20xx')
2001 Sequence Number
2002 Chaining
2003 Bracket
2004 Direction
2005 Data Traffic Reset
2006 Data Traffic Quiesced
2007 Data Traffic Not Reset
2008 No Begin Bracket
2009 Session Control or Data Flow Control Protocol Violation

LU-LU Session Type 7

Half Session Characteristics

TS Profile 7

FM Profile 7

Sense Codes

Request Reject (X'08xx')
0801 Resource Not Available
0813 Bracket Bid Reject -- No RTR Forthcoming
0815 Function Active
081C Request Not Executable
0821 Invalid Session Parameters
0829 Change Direction Required
082D LU Busy
0831 LU Component Disconnected

Request Error (X'10xx')
1003 Function Not Supported
1005 Parameter Error

State Error (X'20xx')
2001 Sequence Number
2002 Chaining
2003 Bracket

2004 Direction
2005 Data Traffic Reset
2006 Data Traffic Quiesced
2007 Data Traffic Not Reset
2008 No Begin Bracket
2009 Session Control or Data Flow Control Protocol Violation

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CHAPTER 11. PU AND NODE TYPES

This chapter summarizes information from **Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic** (SC30-3112).

Node types correspond to the PU type used in the node.

Peripheral Node Types

PU Type 1 (PU_T1)

For all PIUs sent to and received from a PU_T1 node, the transmission header (TH) format is FID3.

PU Type 2 (PU_T2)

For all PIUs sent to and received from a PU_T2 node, the transmission header (TH) format is FID2.

Subarea Node Types

PU Type 4 (PU_T4)

A PU_T4 node has intermediate function, boundary function, or both.

The TH format is either:

- FID0 or FID1 for all PIUs transmitted between the PU_T4 and adjacent PU_T4|5 node, if either or both nodes do not support ER and VR protocols.
- FID2 for all PIUs transmitted between the PU_T4 and an adjacent PU_T2 node.
- FID3 for all PIUs transmitted between the PU_T4 and an adjacent PU_T1 node.
- FID4 or FIDF for all PIUs transmitted between the PU_T4 and and adjacent PU_T4|5 node, if both nodes support ER and VR

protocols.

PU Type 5 (PU_T5)

A PU_T5 is at a node that has intermediate function, boundary function, or both, and also contains an SSCP.

The TH format is either:

- FID0 or FID1 for all PIUs transmitted between the PU_T5 and adjacent PU_T4|5 node, if either or both nodes do not support ER and VR protocols.
- FID2 for all PIUs transmitted between the PU_T5 and an adjacent PU_T2 node.
- FID3 for all PIUs transmitted between the PU_T5 and an adjacent PU_T1 node.
- FID4 or FIDF for all PIUs transmitted between the PU_T5 and and adjacent PU_T4|5 node, if both nodes support ER and VR protocols.

Row	Bit Pat.	0 (00 00)	1 (00 01)	2 (00 10)	3 (00 11)	4 (01 00)	5 (01 01)	6 (01 10)	7 (01 11)	8 (10 00)	9 (10 01)	A (10 10)	B (10 11)	C (11 00)	D (11 01)	E (11 10)	F (11 11)
0	0000					SP	&	-						{	}	\	0
1	0001							/		a	j	~		A	J		1
2	0010									b	k	s		B	K	S	2
3	0011									c	l	t		C	L	T	3
4	0100									d	m	u		D	M	U	4
5	0101									e	n	v		E	N	V	5
6	0110									f	o	w		F	O	W	6
7	0111									g	p	x		G	P	X	7
8	1000									h	q	y		H	Q	Y	8
9	1001								`	i	r	z		I	R	Z	9
A	1010					¢	!	¦	:								
B	1011					.	$	,	#								
C	1100					<	*	%	@								
D	1101					(	)	_	'								
E	1110					+	;	>	=								
F	1111					|	¬	?	"								

Column (high order), Row (low order); for example, A = "C1"

- 94-character set, only
- 63- or 94-character set
- 48-, 63-, or 94-character set

Note: *This table applies only to US EBCDIC character sets; international sets may vary.*

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CHAPTER 13. PRODUCTS AND SNA

This chapter summarizes information from Systems Network Architecture Concepts and Products (GC30-3072). It also contains additional information to assist people interested in a specific SNA product.

HARDWARE

Product	PU/ Node Type	LU-LU Session Type
Series/1	2	0,1,2
S/32	2	1
S/34	2	0,1,2,3,4,7
S/38	1,2	1,4,7
3270	2	0,1,2,3
3600	2	0,1,2
3614	2	0
3624	2	0
3630	2	0,1
3640	1,2	0,1
3650	2	0
3660	2	0
3767	1	1
3770	2	1
3790	1,2	0,1,2,3
5250	1	4,7
6670	1	4
8775	2	2

SOFTWARE

Product	PU/ Node Type	LU-LU Session Type
ACP	5	0,1,2,3,6
CICS/VS	5	0,1,2,3,4,6
DPCX	2	0,1,2,3,4
DPPX	2	0,1,2
IMS/VS	5	0,1,2,4,6
JES2	5	0,1
JES3	5	0,1
NCCF	5	0,1,2
POWER/VS	5	1
RES	5	1,4
TCAM	5	0,1,2,3,4
TSO	5	1,2
VM/370	5	1,2
VSPC	5	1,2

CHAPTER 14. COMMON SEQUENCES

Key	
————→	Request Unit
← — —	Response Unit
--------→	SDLC Command or Response
═════	Channel
‾‾‾Z___	SDLC Link
(XXX)	Network Resource Associated With the RU
ER	Explicit Route
Host	Host Processor
Link	Data Link
LS	Link Station
LU	Logical Unit
NCP	Network Control Program
PNODE	Peripheral Node
PU	Physical Unit
PUCP	Physical Unit Control Point
SA	Subarea
SSCP	Systems Services Control Point
TG	Transmission Group
VR	Virtual Route

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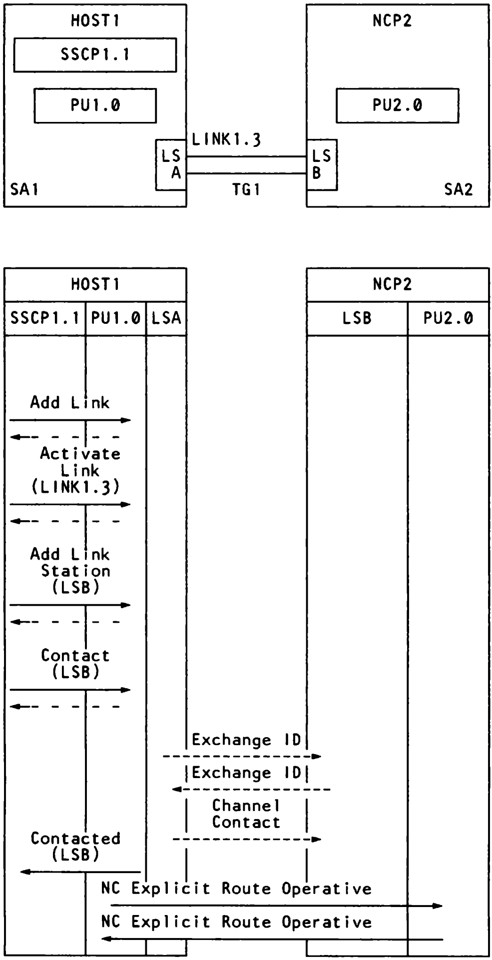
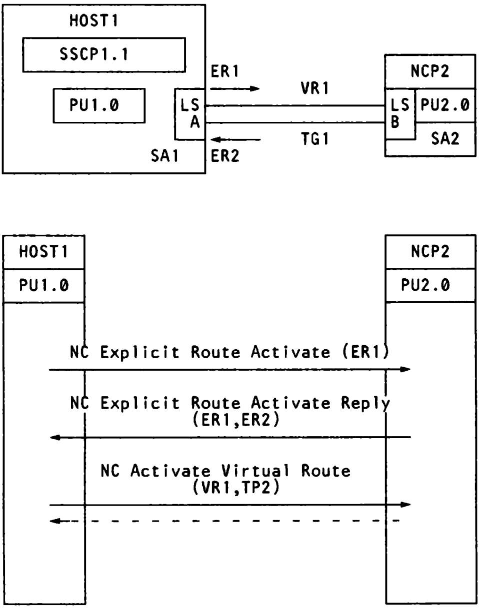
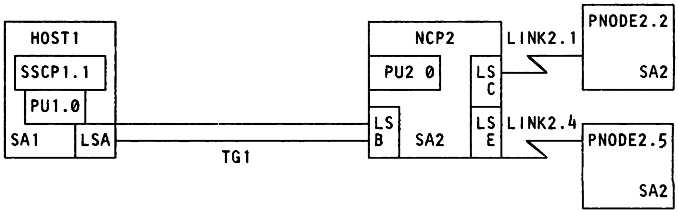


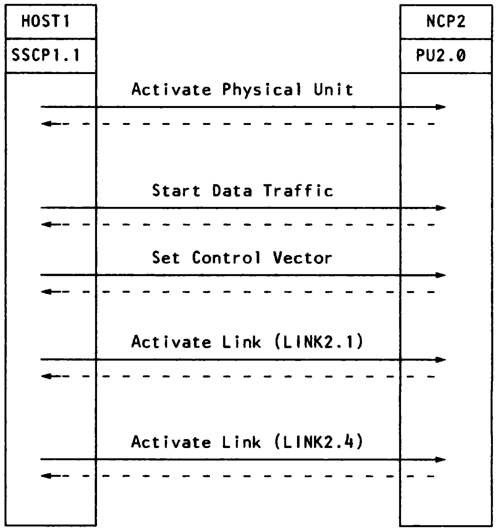
Activating a Host Node, a Channel-Attached Subarea Node, and the Channel Between Them
Figure 14-1.



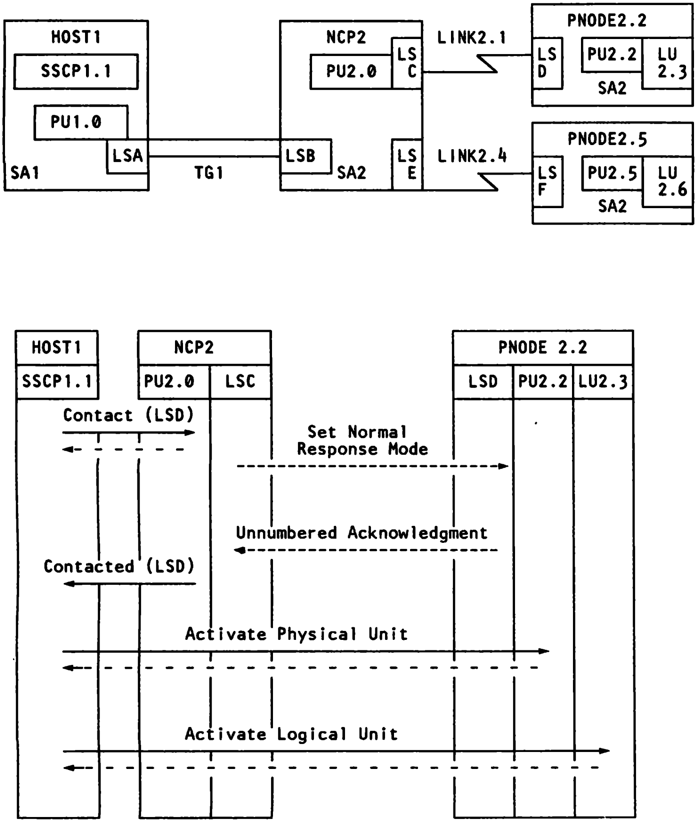
Activating Explicit and Virtual Routes
Between Adjacent Subarea Nodes

Figure 14-2.

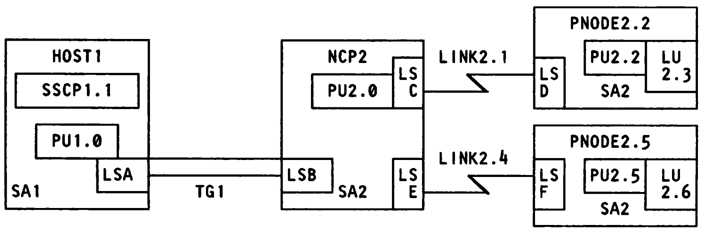


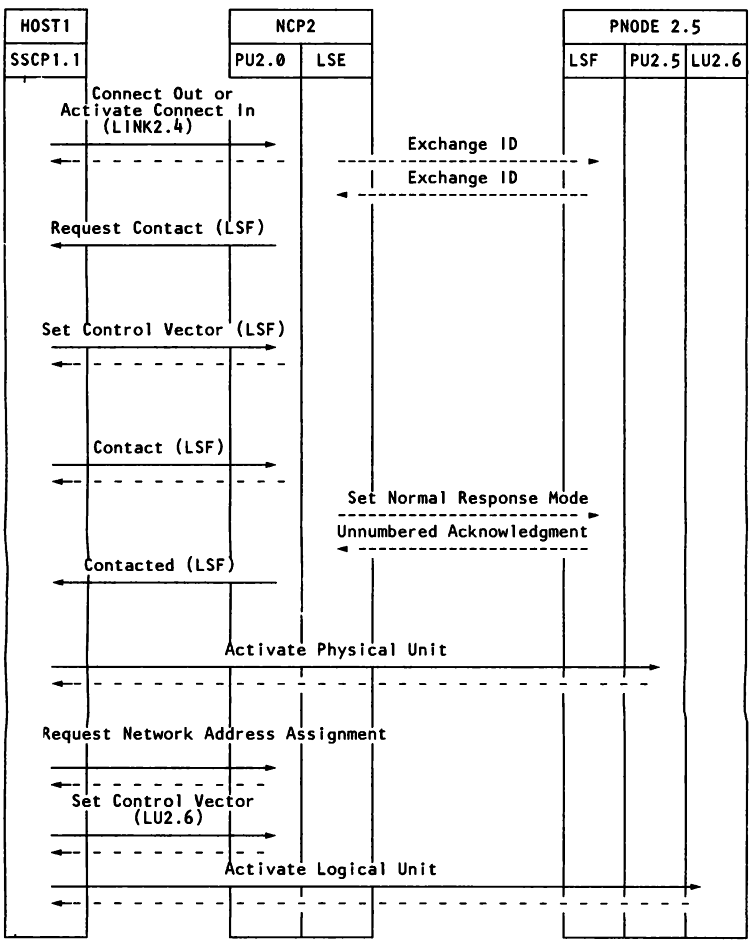


Activating a Channel-Attached Subarea Node and Attached Links
Figure 14-3.

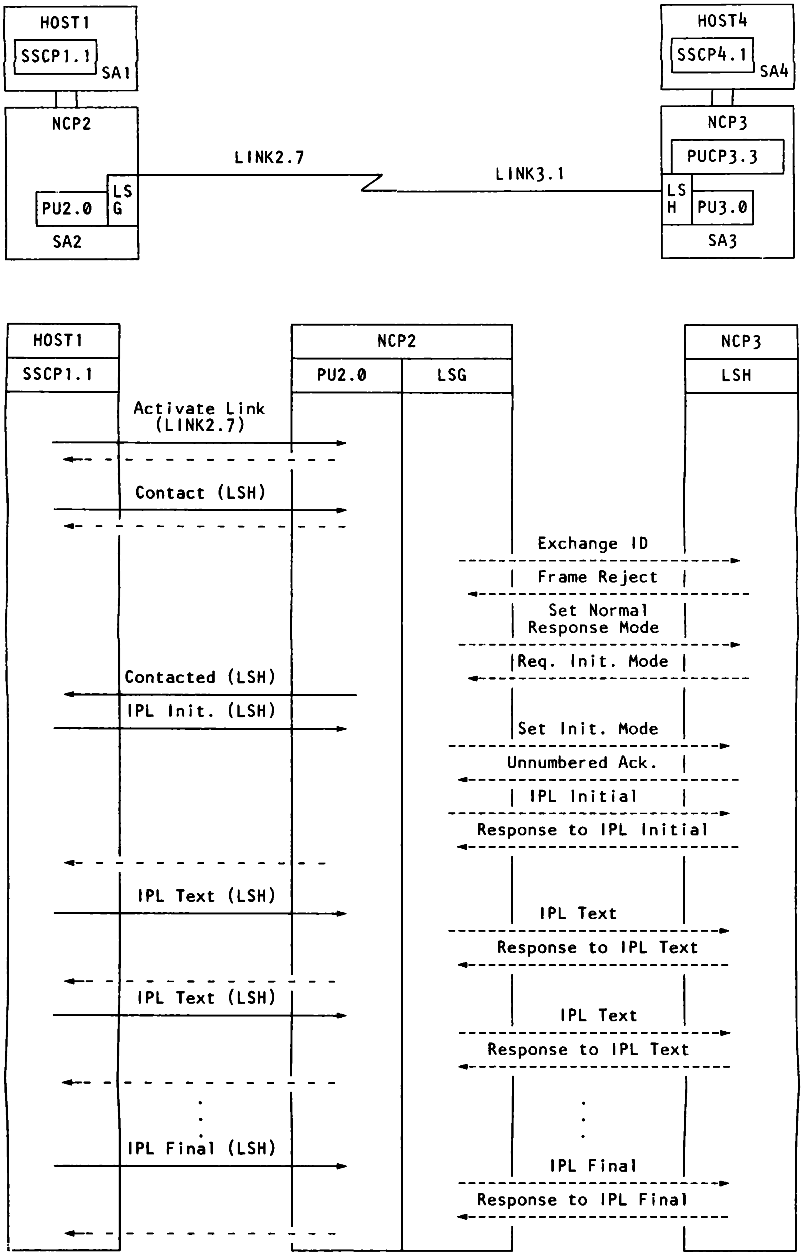


Activating a Peripheral Node Attached via a Nonswitched SDLC Link
Figure 14-4.

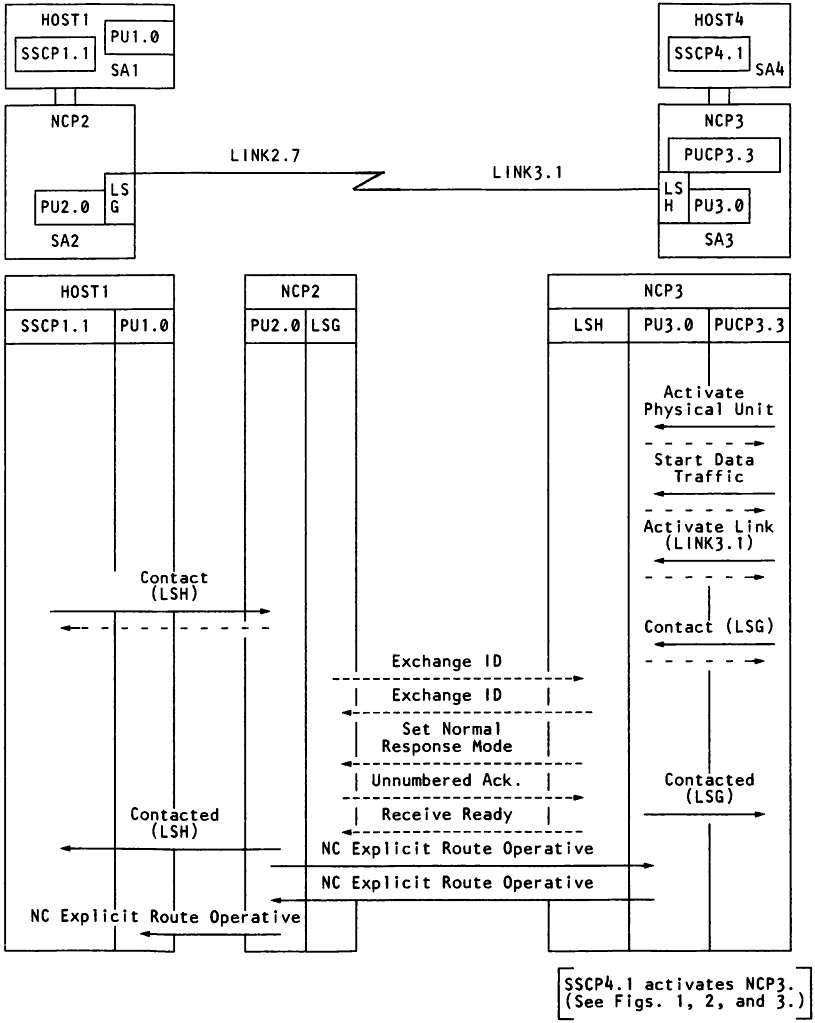




Activating a Peripheral Node Attached via a Switched SDLC Link
Figure 14-5.

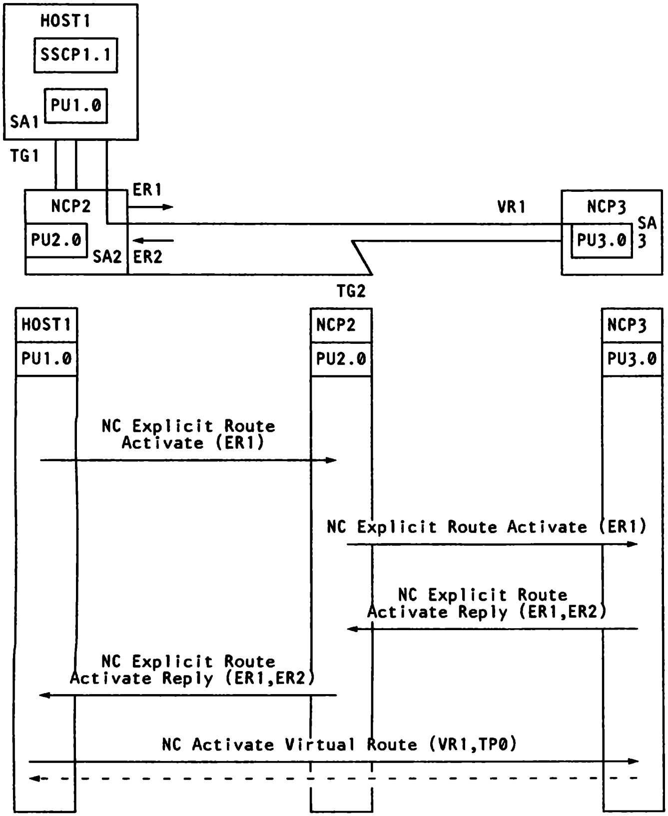


Loading a 3705 Communications Controller with an NCP
Figure 14-6.



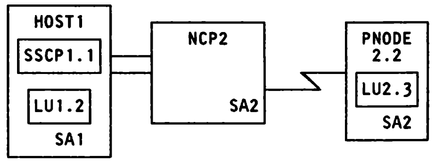
Activating an SDLC Link Between Subarea Nodes

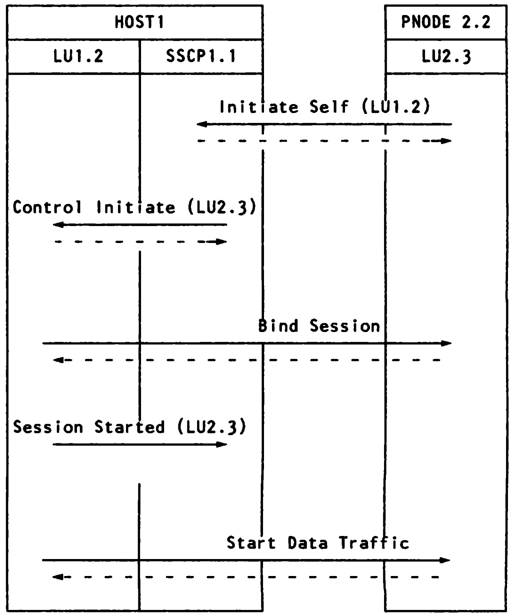
Figure 14-7.



Activating Explicit and Virtual Routes Between Nonadjacent Subarea Nodes

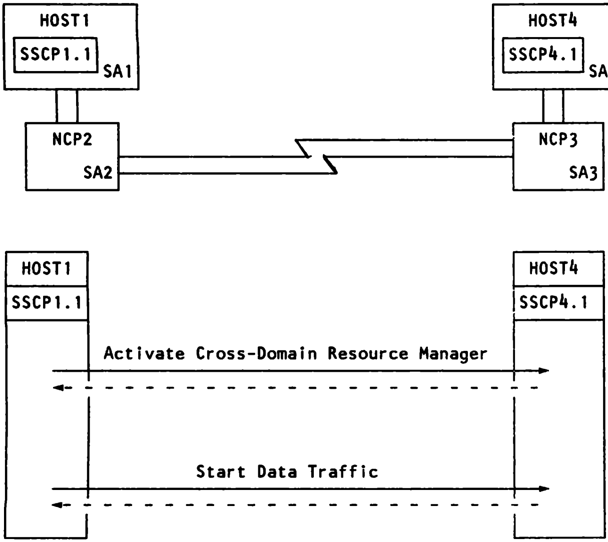
Figure 14-8.





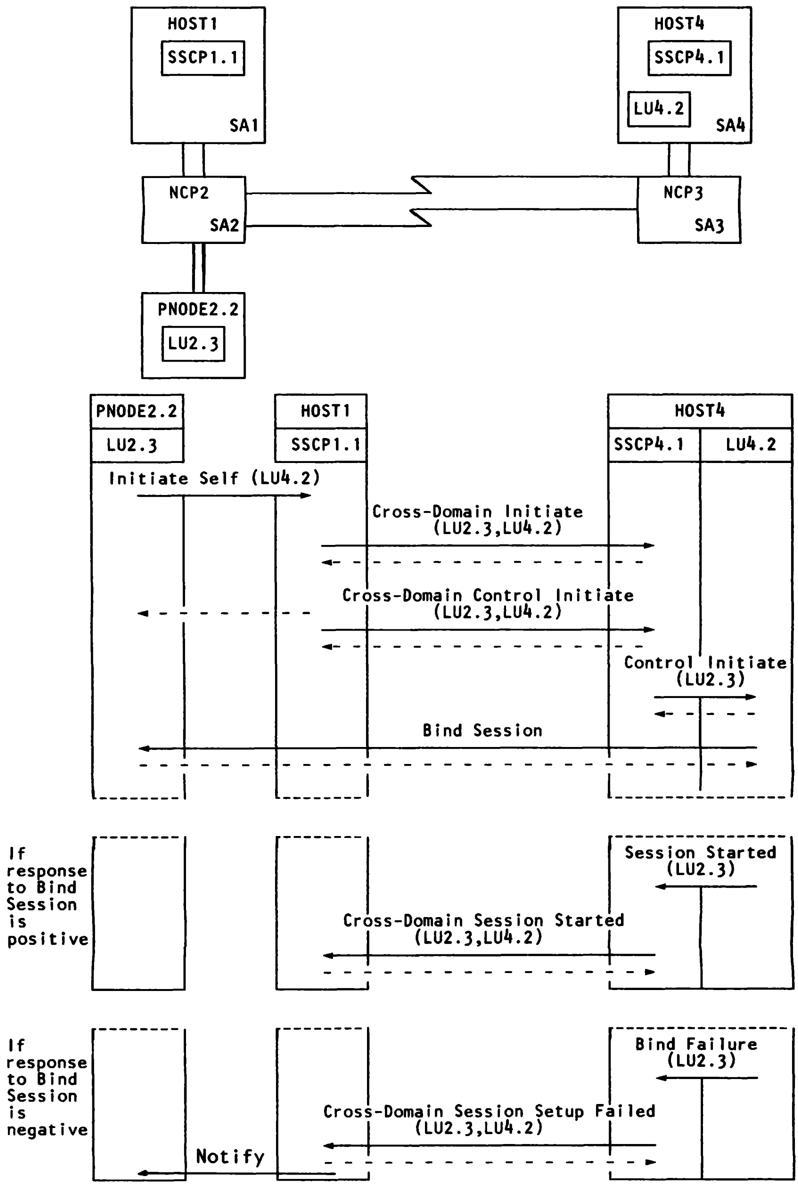
Activating a Same-Domain LU-LU Session

Figure 14-9.



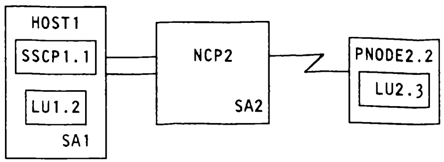
Activating an SSCP-SSCP Session

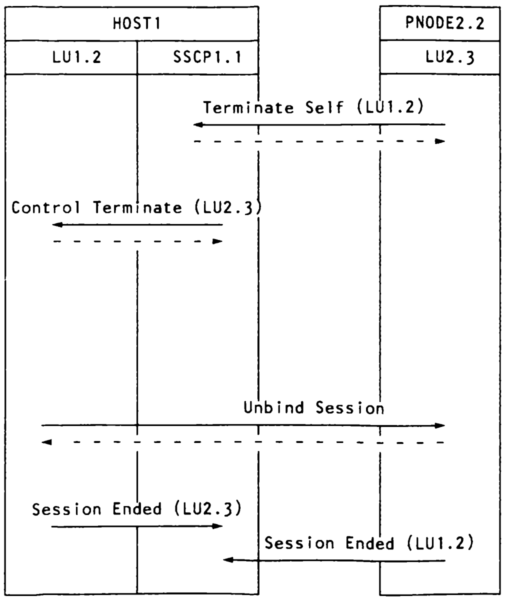
Figure 14-10.



Activating a Cross-Domain LU-LU Session

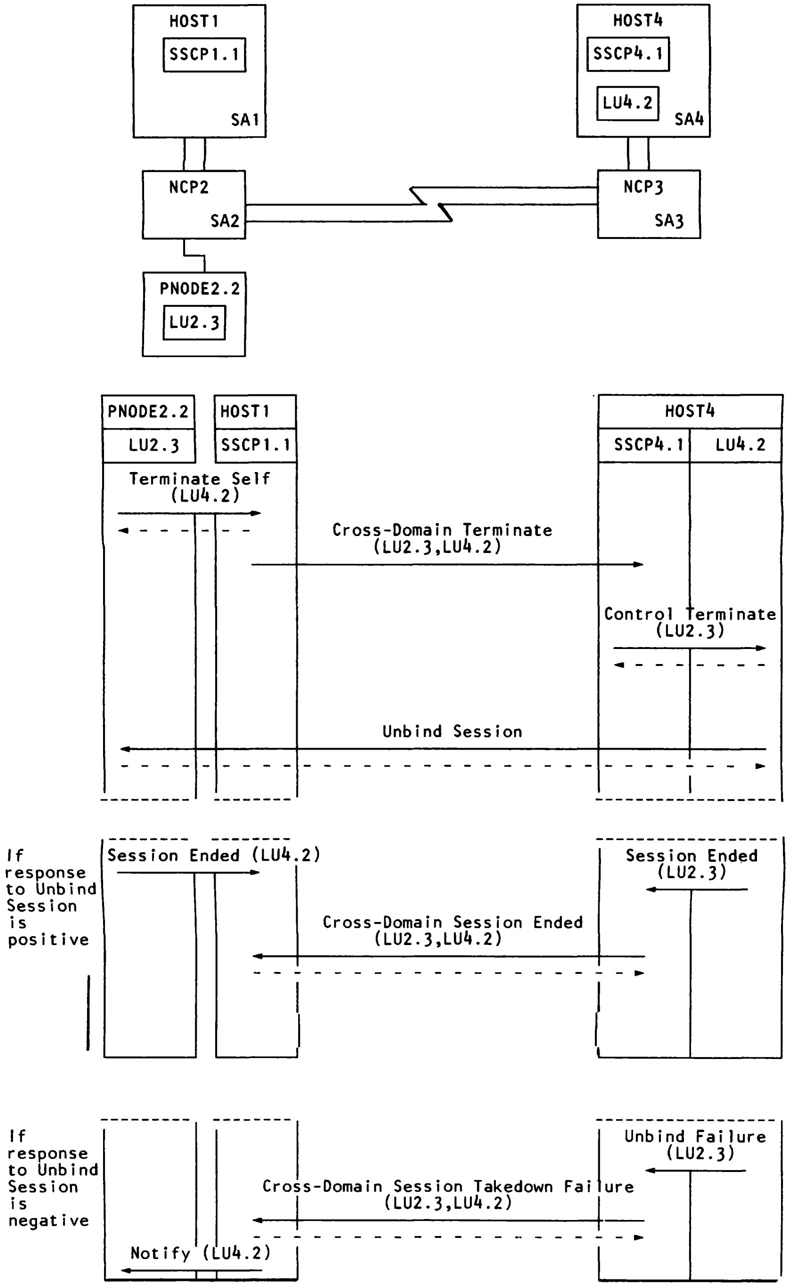
Figure 14-11.



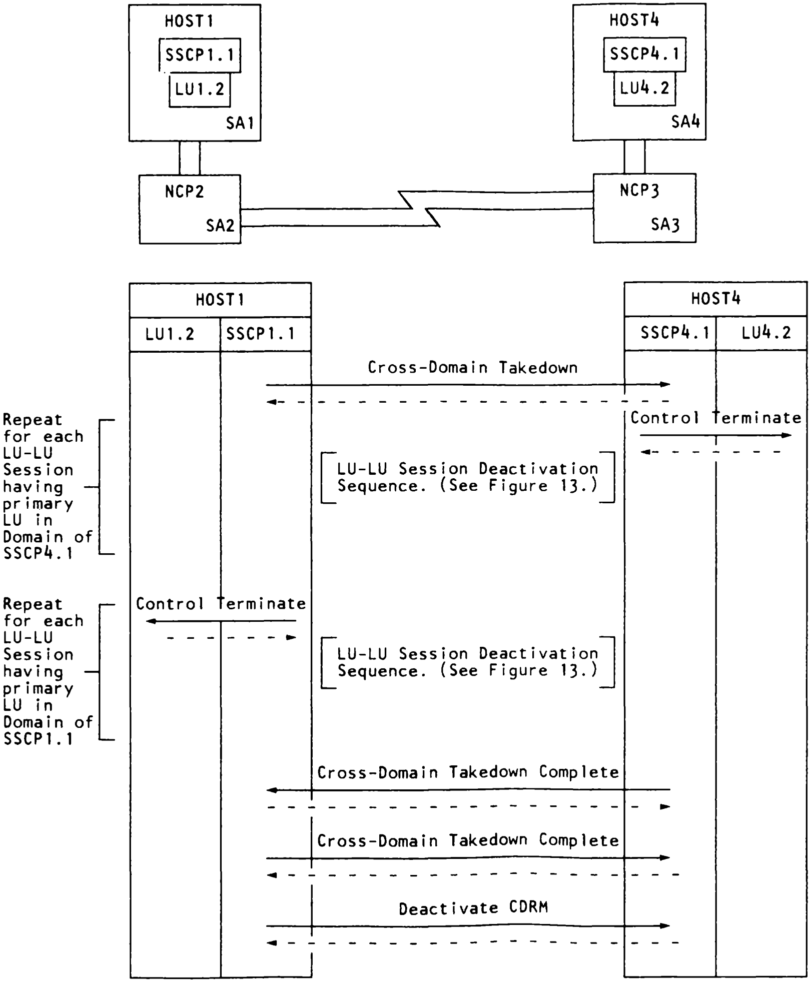


Deactivating a Same-Domain LU-LU Session

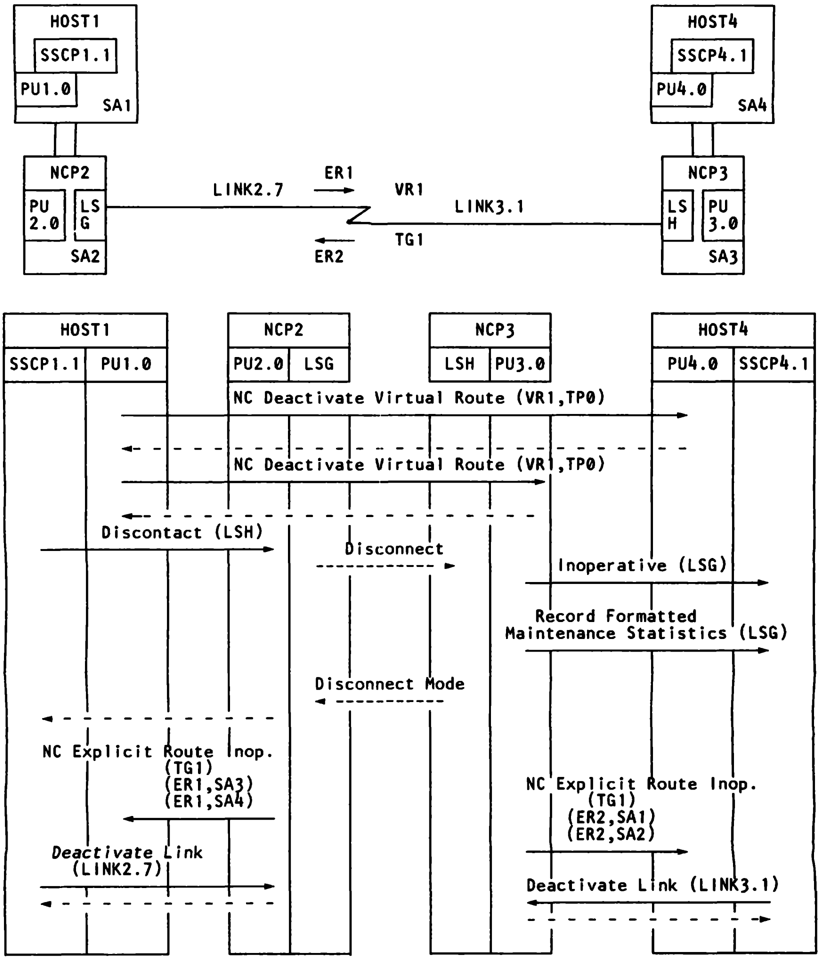
Figure 14-12.



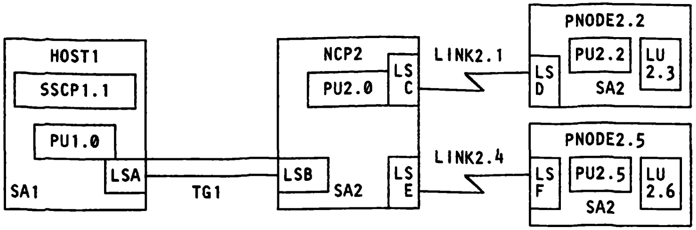
Deactivating a Cross-Domain LU-LU Session
Figure 14-13.

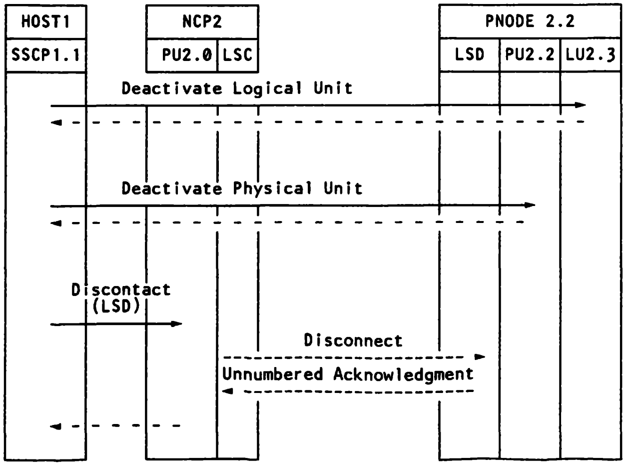


Cross-Domain Takedown Sequence
Figure 14-14.



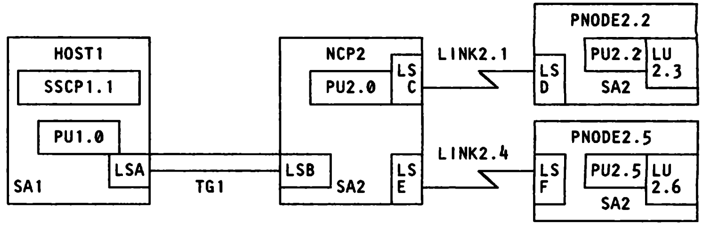
Deactivating Virtual Routes, Explicit Routes, and SDLC Links
Figure 14-15.

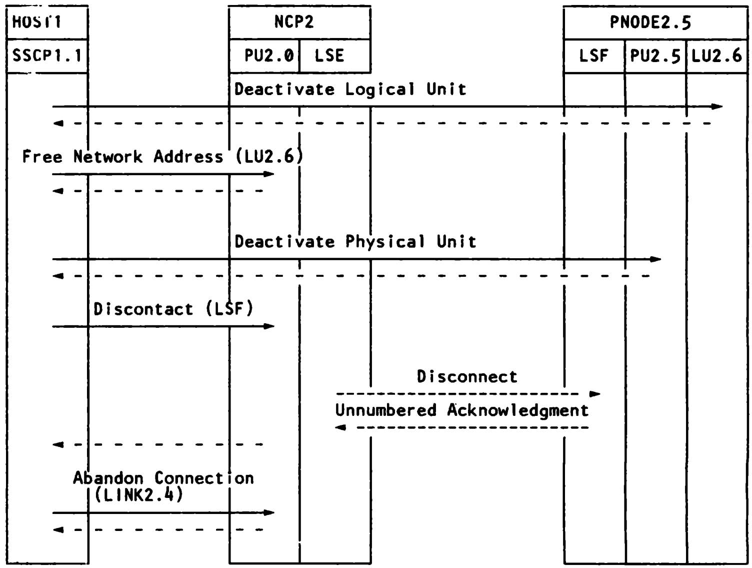




Deactivating a Peripheral Node Attached via a Nonswitched SDLC Link

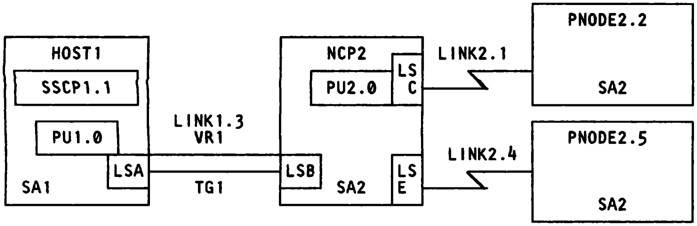
Figure 14-16.

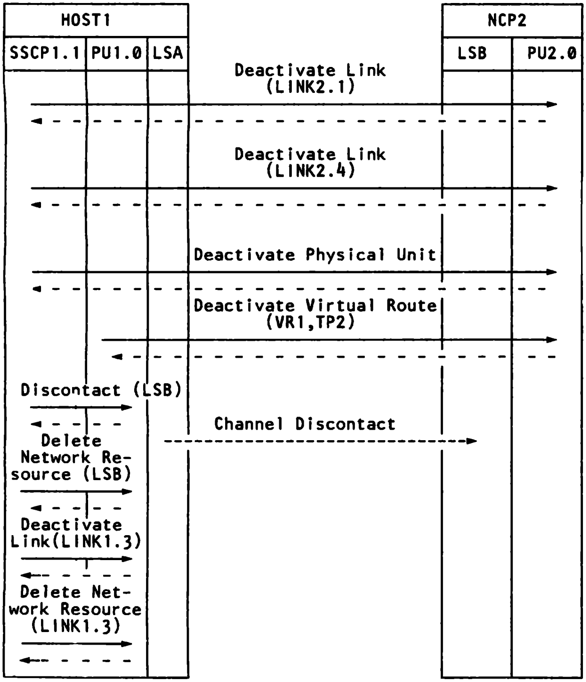




Deactivating a Peripheral Node Attached via a Switched SDLC Link

Figure 14-17.





Deactivating a Channel-Attached Subarea Node and Associated Resources

Figure 14-18.

Chapter 15. Other SNA Publications

This chapter lists other IBM SNA publications that you may find useful. These publications supplied information for various parts of the chapters in this book.

IBM Synchronous Data Link Control General Information (GA27-3093)

> This manual, written for technical people interested in data communication, presents in simple terms the concepts and operation of SDLC. *IBM Synchronous Data Link Control* assumes the reader has no prior knowledge of data communication.

Systems Network Architecture Concepts and Products (GC30-3072)

> This manual, written for DP managers and other decision-makers, briefly presents the basic concepts of SNA and briefly describes each of the SNA-based hardware and software products that IBM offers. *Systems Network Architecture Concepts and Products* assumes that the reader has no prior knowledge of SNA.

Systems Network Architecture Technical Overview (GC30-3073)

> This publication presents detailed information on the major functions of SNA for individuals responsible for designing, installing, programming, administering, and maintaining SNA networks. The book relates the architecture to major products that implement it, and is meant to be used with the product documentation for the SNA products that make up any particular network. The book contains annotated sequences of request/response units illustrating important SNA functions. The reader is

assumed to be familiar with the SNA concepts presented in *Systems Network Architecture Concepts and Products* (GC30-3072).

Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic (SC30-3112)

This manual, written for system programmers and maintenance people, provides a formal and detailed definition of all portions of SNA except for LU presentation services. In this manual, each functional layer of SNA consists of one or more protocol machines, which in turn consist of one or more procedures or finite-state machines, which are presented as routines or matrices written in a PL/I-like language called FAPL. *Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic* assumes that the reader has basic programming knowledge.

A

A	address (SDLC)
ACT	active, activate

B

B 'nnnn'	binary digits
BB	Begin Bracket
BBI	Begin Bracket Indicator
BC	Begin Chain
BCI	Begin Chain Indicator
BETB	Between Brackets
BF	boundary function
BIU	basic information unit
BLU	basic link unit
BSC	Binary Synchronous Communication
BTU	basic transmission unit

C

(c)	configuration services
C	control (SDLC)
CCA	communication controller adapter
CCITT	Comite Consultatif International Telegraphique et Telephonique (International Telegraph and Telephone Consultative Committee)
CD	cross-domain, Change Direction
CDI	Change Direction indicator
CDRM	cross-domain resource manager
CNM	communication network management
CNMA	communication network management application
CNMS	communication network management services
CONT	contention
COS	class of service
CPMGR	connection point manager
CSC	common session control
CSI	Code Selection indicator
CSP	Control Sequence Prefix

D

DAF	destination address field
DCE	Data Communication Equipment, Data Circuit-terminating Equipment
DCF	data count field
DD	day of month
ddd	day of year
DEF	Destination Element Address Field
DES	Date Encryption Standard
DFC	data flow control
DISC	Disconnect (SDLC)
DLC	data link control
DLU	destination logic unit
DM	Disconnected Mode (SDLC)
DPN	Destination Program Name
DQ	dequeue
DR1I	Definite Response 1 indicator
DR2I	Definite Response 2 indicator
DSAF	Destination Subarea Address Field
DTE	Data Terminal Equipment

E

EB	End Bracket
EBCDIC	extended binary coded decimal interchange code
EBI	End Bracket indicator
EC	End Chain
ECI	End Chain indicator
ED	enciphered data
EDI	Enciphered Data indicator
EFI	Expedited Flow indicator
ENP	Enable Presentation
ER	Explicit Route
ERI	Exception Response indicator
ERN	Explicit Route Number
ERP	error recovery procedures
Exp	expedited flow
EXR	Exception Request

F

F	flag (SDLC)
FCS	frame check sequence (SDLC)
FDX	full duplex data flow
FF	flip-flop direction control
FI	Format indicator
FID	format identification
FIFO	first-in, first-out

FM	function management
FMD	function management data
FMDS	munction management data services
FMH	function management header
FRMR	Frame Reject (SDLC)
FSM	finite-state machine

H

HDX	half-duplex data flow
HH	hours
HSID	half-session identification

I

I	information (SDLC)
I	initiate only
ID	identification
IERN	Initial Explicit Route Number
ILU	initiating logical unit
INB	in bracket
INIT	initiate
INOP	inoperative
INP	Inhibit Presentation
IPL	initial program load
I/Q	initiate or queue
ISO	International Organization for Standardization

L

LCID	local coded graphic character set identifier
LH	link header
LIFO	last-in, first-out
LT	link trailer
LSID	local session identification
LU	logical unit

M

(ma)	maintenance services
(me)	measurement services
MGR	manager
MM	month, minutes
(mn)	management services
MPC	maximum presentation column
MPF	mapping field (BIU segments)
MPL	maximum presentation line

N

NA	network address
NAU	network addressable unit
NC	network control
(no)	network operator services
Norm	normal flow
NS	network services
NTWK	network

O

OAF	Origin Address field
OEF	Origin Element field
OLU	originating logical unit
OSAF	Origin Subarea field

P

P	primary
PC	path control
PCID	procedure correlation identifier
PD	Padded Data
PDI	Padded Data indicator
PEND	pending
PI	Pacing indicator
PIU	path information unit
PLU	primary logical unit
POC	Program Operator Communication
PPU	primary physical unit
PRI	primary
PRID	procedure related identifier
PRN	Primary Resource Name
PRTY	Priority
PS	presentation services
PU	physical unit
PUCP	physical unit control point

Q

Q	queue
QR	Queued Response
QRI	Queued Response indicator

R

RCV	receive
RD	Request Disconnect (SDLC)
REC	receive

REJ	Reject (SDLC)
RES	resource
RH	request/response header
RIM	Request Initialization Mode (SDLC)
RLSD	released
RNR	Receive Not-Ready (SDLC)
RQ	request
RR	Receive Ready (SDLC)
RRI	Request/Response Indicator
RSP	response
RTI	Response Type indicator (+/-)
RU	request/response unit

S

S	secondary
(s)	session services
SC	session control
SCS	SNA Character String
SDI	Sense Data Included indicator
SDLC	Synchronous Data Link Control
SEC	secondary
SESS	session
SIM	Set Initialization Mode (SDLC)
SLU	secondary logical unit
SNA	Systems Network Architecture
SNC	sense code
SNF	sequence number field
SNRM	Set Normal Response Mode (SDLC)
SPU	secondary physical unit
SQN	sequence number
SS	seconds
SSCP	system services control point
SVC	services

T

TC	transmission control
TERM	terminate
TEST	Test (SDLC)
TG	transmission group
TGN	transmission group number
TH	transmission header
TLU	terminating logical unit
TPF	Transmission Priority Field
TS	transmission services
TWX	teletypewriter exchange service

U

UA	Unnumbered Acknowledgment (SDLC)
UI	Unnumbered Information (SDLC)
UNAVL	unavailable
UP	Unnumbered Poll (SDLC)
URC	user request correlation

V

VR	virtual route
VRID	Virtual Route identifier
VRN	virtual route number
VRPRQ	Virtual Route Pacing Request
VRPRS	Virtual Route Pacing Response
VT	Vertical Tab

X

XID	Exchange Identification (SDLC)
X'n...n'	hexadecimal digits
XMIT	transmit

Y

YY	year

|	or
*	any value
¬	not
**	exponential operator

Systems Network Architecture
Reference Summary

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