VSE/POWER and OS/400
NJE Configuration Examples

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First Edition (June 1994)

This edition applies to:

- Version 5 Release 2 of VSE/POWER, Program Number 5686-033 for use with the VSE/ESA* Version 1 Release 3 Modification 3
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Abstract

This document is the result of a residency project run at the ITSO Center Boeblingen to customize and test the NJE connection between VSE/POWER PNET and the AS/400 Communications Utilities. The function provides a more equal relationship for Job and SYSOUT processing between the two utilities compared to an RJE connection.

The NJE connection between VSE/POWER PNET and the VM/MVS Bridge of the AS/400 Communications Utilities is not officially supported. The customers have to implement this function based on their individual tests and at their own risk.

This document was written for systems engineers or system programmers responsible for the NJE implementation.

The reader is assumed to have a basic knowledge of NJE concepts, VSE/POWER Networking, and the AS/400 Communications Utilities.

(101 pages)

Contents

Figures

Special Notices

This publication is intended to help customer personnel and IBM technical experts to implement the NJE connection between VSE/POWER and the AS/400 Communications Utilities. This function is **NOT** officially supported. Therefore the customers have to implement this function based on their individual tests and at their own risk. There is no guarantee that the same or similar results will be obtained in future versions or releases.

The information in this publication is not intended as the specification of any programming interfaces that are provided by VSE/POWER and AS/400 Communications Utilities. See the PUBLICATIONS section of the IBM Programming Announcement for VSE/POWER and the AS/400 Communications Utilities for more information about what publications are considered to be product documentation.

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Preface

This document is intended to help customers and IBM personnel to implement an NJE connection between VSE/POWER PNET and the VM/MVS Bridge of the AS/400 Communications Utilities. It contains a description and configuration examples of the connection based on the actual installation performed at the ITSO Center Boeblingen for the specific operating environment as described in Chapter 2, “Test Environment” on page 7 of this document.

How This Document is Organized

The reader should read chapter 1 through chapter 4 to be able to set up a working environment, especially if you are setting up the NJE connection using the IBM Token-Ring LAN via the IBM 3172. For further attachments please also refer to the examples described in chapter 5.

The document is organized as follows:

- Chapter 1, “Introduction”

  This chapter introduces the NJE function as it operates between VSE/POWER and the AS/400.

- Chapter 2, “Test Environment”

  This chapter explains the test environment for the NJE connection as used in our system.

- Chapter 3, “VSE/ESA Host Definitions for the VM/MVS Bridge”

  This chapter describes the common host definitions and configurations relating to VSE/ESA, VSE/POWER, VSE/VTAM.

- Chapter 4, “Definitions for the Test Environment using the 3172”

  This chapter describes the host and the AS/400 communications configurations required for the connection between VSE/POWER and the AS/400 VM/MVS Bridge using the IBM 3172.

- Chapter 5, “Additional AS/400 to VSE/POWER Connection Examples”

  This chapter describes further examples of tested environments for the IBM 3174, IBM 3745 and IBM 9221 attachments. It also includes the ACF/NCP definitions required for the IBM 3745.

- Chapter 6, “Operation”

  This provides a brief summary of the operating procedures.

- Chapter 7, “Considerations Summary”

  This chapter describes the restrictions, the functional limitations, and the considerations summary.

- Appendix A, “File Transfer Between VSE/POWER and AS/400”
- Appendix B, “Trace Examples for Session Establishment”

Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this document.

- *NJE Formats and Protocols*, SC23-0070
- *NJE with JES2 and Other Systems*, GG22-9339
- *Network Job Entry Concepts and Protocols Overview*, GG66-0224
- *VSE/POWER Administration and Operation*, SC33-6571
- *VSE/POWER Remote Job Entry*, SC33-6572
- *VSE/POWER Networking*, SC33-6573
- *VSE/POWER Application Programming*, SC33-6574
- *VSE/ESA Networking Support*, SC33-6508
- *VSE/ESA 1.2.0 VSE/POWER 5.1 Networking Functions*, GG24-3751
- *VTAM Network Implementation Guide*, SC31-6434
- *VTAM Resource Definition Reference*, SC31-6438
- *ACF/NCP/SSP V3 Resource Definition Reference*, SC30-3254
- *IBM 3172 Interconnect Controller Program User's Guide*, SC30-3572
- *IBM 3174 Establishment Controller Installation Guide*, GG24-3061
- *AFP* Resources in a Multi-System Environment*, GG24-4029
- *AS/400 Advanced Peer-to-Peer Networking* Guide*, SC41-8188
- *AS/400 Communications Configuration Reference*, SC41-0001-01
- *AS/400 Control Language Programmer's Guide*, SC41-8077-01
- *AS/400 Control Language Reference*, SC41-0030-01
- *AS/400 Distribution Services Network Guide*, SC41-9588-01
- *AS/400 Remote Job Entry (RJE) Guide*, SC09-1373
- *AS/400 Languages: Systems Application Architecture* AD/Cycle* RPG/400* Reference*, SC09-1349
- *AS/400 Languages: Systems Application Architecture AD/Cycle RPG/400 User's Guide*, SC09-1348

International Technical Support Organization Publications

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Chapter 1. Introduction

This chapter describes some basic NJE concepts and the protocols involved.

The NJE function on AS/400 was originally provided for RSCS under the name of ″PROFS Bridge″. Then this function was expanded for JES under the name of ″VM/MVS bridge″. However, for VSE/POWER the function has not been tested by VSE and AS/400 development. In addition, some facilities on the NJE connection between VSE/POWER and AS/400 are not consistent with RSCS and JES as described in 1.3, “NJE between VSE/POWER and AS/400” on page 2. These are the main reasons why NJE between VSE/POWER and AS/400 is not officially supported.

The information contained in this document is the result of tests conducted in the lab environment described in Chapter 2, “Test Environment” on page 7.

1.1 Concepts and Terminology

Network Job Entry or **NJE** is a facility that provides access to computing facilities from other host systems. It enables users to transfer work and data throughout a distributed network of computing facilities. This document describes the configurations for NJE between VSE/POWER and AS/400 tested in a lab environment and also the remote computing facilities that can be accessed from one system by the other. NJE on the AS/400 is supported through the VM/MVS bridge of the AS/400 Communications Utilities.

NJE can be defined as a facility designed for transmitting SYSIN and SYSOUT jobs.

An **NJE network** is a group of two or more systems that communicate with each other. NJE connection between VSE/POWER and AS/400 is only possible for SNA communication. An NJE network is comprised of nodes that can transmit or receive a unit of work.

The nodes in an NJE network use protocols to communicate with each other.

Protocols are rules that a node uses to become part of an NJE network, receive a unit of work, send a unit of work and indicate that it was removed from the network.

In NJE terminology, **SYSIN** is that data being transmitted to a system for execution at the system.

In NJE terminology, **SYSOUT** is generally output from a program intended to be printed, punched, or to be viewed at a terminal.

In AS/400 terminology, a **spooled file** is output data, in an output queue, destined for printing.

1.2 NJE Functions

NJE nodes can support one or more of the three functions: **transmit**, **receive** and **store-and-forward**.

The **transmit** function consists of packaging SYSIN or SYSOUT jobs in NJE Control Records and inserting them into the network.

The **receive** function recognizes jobs packaged in NJE Control Records and processes them. For example, SYSIN jobs may be executed at that node or SYSOUT jobs may be printed.

A node having **store-and-forward** function, receives NJE jobs, stores them on spool and forwards them to the next node.

In addition, NJE protocols provide for messages and commands to be transmitted between interactive users and operators at any node in an NJE network.

1.3 NJE between VSE/POWER and AS/400

When the data reaches its destination, it may or may not be processed as the user intended, depending on the facilities available at that node. NJE protocols allow the destination node to reject files that it cannot process or perform other system-dependent actions.

For example, when you send a sequential physical file from the AS/400 using the SNDNETF command through an NJE network, the AS/400 VM/MVS bridge builds the file as NETDATA (TSO/E NetMail) format. TSO/E users can receive the file using TSO/E Interactive Data Transmission Facility. CMS users can also receive the file using the CMS RECEIVE command. VSE/POWER PNET receiver receives the transmitted data as it is without any translation and stores the data into the punch queue. There is no program supplied by IBM available to get the spooled NETDATA format data and to save the data as a file in the original format. However, the spooled NETDATA format data can be forwarded to another JES, RSCS, or AS/400 node for further processing. For transmitting a physical file using NJE between VSE/ESA and AS/400, please see Appendix A, “File Transfer Between VSE/POWER and AS/400” on page 75 for an alternative solution.

Another example is that messages can be exchanged between VSE/ESA and AS/400 via NJE. However there is no facility on the AS/400 to send and receive a command from VSE. For exchanging messages between VSE and AS/400, please see 6.6, “Exchanging Messages Between VSE and the AS/400” on page 67.

1.4 VSE/POWER Networking

The networking function (PNET) is a part of VSE/POWER. PNET is designed for use with multiple processing units (CPUs) that are located at different places. However, PNET may also be used in CPUs at the same location as an alternative to the VSE/POWER Shared Spooling function.

PNET provides for the transmission of selected jobs, operator commands, messages and output data between communicating job entry nodes that are

connected in a network. The nodes are connected by BSC lines, CTCAs, or SDLC lines.

1.5 AS/400 Communications Utilities

The IBM AS/400 Communications Utilities program is comprised of **VM/MVS bridge** and **Remote Job Entry** functions. These capabilities provide interchange of mail and files, and job submission between nodes connected to the AS/400 system.

1.5.1 VM/MVS Bridge

The VM/MVS bridge, a function of AS/400 Communications Utilities, supports the movement of mail and files to and from a System/370* host, using the Binary Synchronous Communication (BSC) protocol or Systems Network Architecture (SNA) over Synchronous Data Link Control (SDLC) lines, an X.25, or an IBM Token-Ring Network. The SDLC and X.25 lines can connect through an X.21 interface.

The VM/MVS bridge supports communications with host products such as:

- MVS JES2 subsystem (SNA)
- MVS JES3 subsystem (SNA)
- VM RSCS subsystem (SNA and BSC)

1.5.2 File Transfer Between VM/MVS Bridge and ES Host

The VM/MVS bridge capability of Communications Utilities enables the AS/400 system to exchange with VM RSCS or MVS JES (JES2 or JES3) any files, job streams, and messages generated by the Object Distribution Facility (ODF) on AS/400.

The VM/MVS bridge supports the exchange with VM RSCS or MVS JES of Advanced Function Printer (AFP) data stream, 1403 line data, and mixed AFP data stream with 1403 line data files without loss of attributes.

1.5.3 Remote Job Entry (RJE)

The Remote Job Entry portion of the Communications Utilities allows the AS/400 system to function as a Remote Job Entry (RJE) workstation to a host. The primary purpose of RJE is to submit jobs to, and receive output from, a host subsystem.

RJE supports Binary Synchronous Communications (BSC) or Systems Network Architecture (SNA) over Synchronous Data Link Control (SDLC) lines, an X.25 or an IBM Token-Ring Network. The SDLC and X.25 lines can connect through X.21 interface.

Remote Job Entry (RJE) supports communications with host products such as:

- MVS JES2 subsystem (SNA and BSC)
- MVS JES3 subsystem (SNA and BSC)
- VM RSCS subsystem (BSC)
- VSE/POWER subsystem (SNA)

1.6 NJE Advantages over RJE

The Remote Job Entry (RJE) function permits only inbound SYSIN and commands from the workstation to the host, and only outbound SYSOUT and messages from the host to the workstation.

The primary purpose of RJE is for the AS/400 to submit jobs to and receive output from a host subsystem.

The NJE protocol, in contrast, is a spool transfer protocol where a spool is considered to contain a SYSIN queue and a SYSOUT queue.

The VM/MVS Bridge makes the AS/400 system appear as a Network Job Entry (NJE) node to the host subsystem, and the host as an SNA Distribution Services (SNADS) node to the AS/400 system.

NJE allows a host to submit a job to be executed at the AS/400 and the output to be received back at the host. The AS/400 can also submit jobs to and receive output from the host.

VSE/POWER RJE supports buffer sizes of up to 256 bytes. However, using NJE, buffer sizes of more than 256 bytes can be specified. See 7.1, “Buffer Size Specification” on page 71 for further details.

1.7 NJE Products

NJE is supported by the following products:

- JES2
- JES3
- VM RSCS
- VSE/POWER
- The VM/MVS Bridge of the AS/400 Communications Utilities

  AS/400 does not support VSE/POWER communications in an NJE network

Figure 1 on page 5 shows an example of an NJE network using some of the products that support NJE.

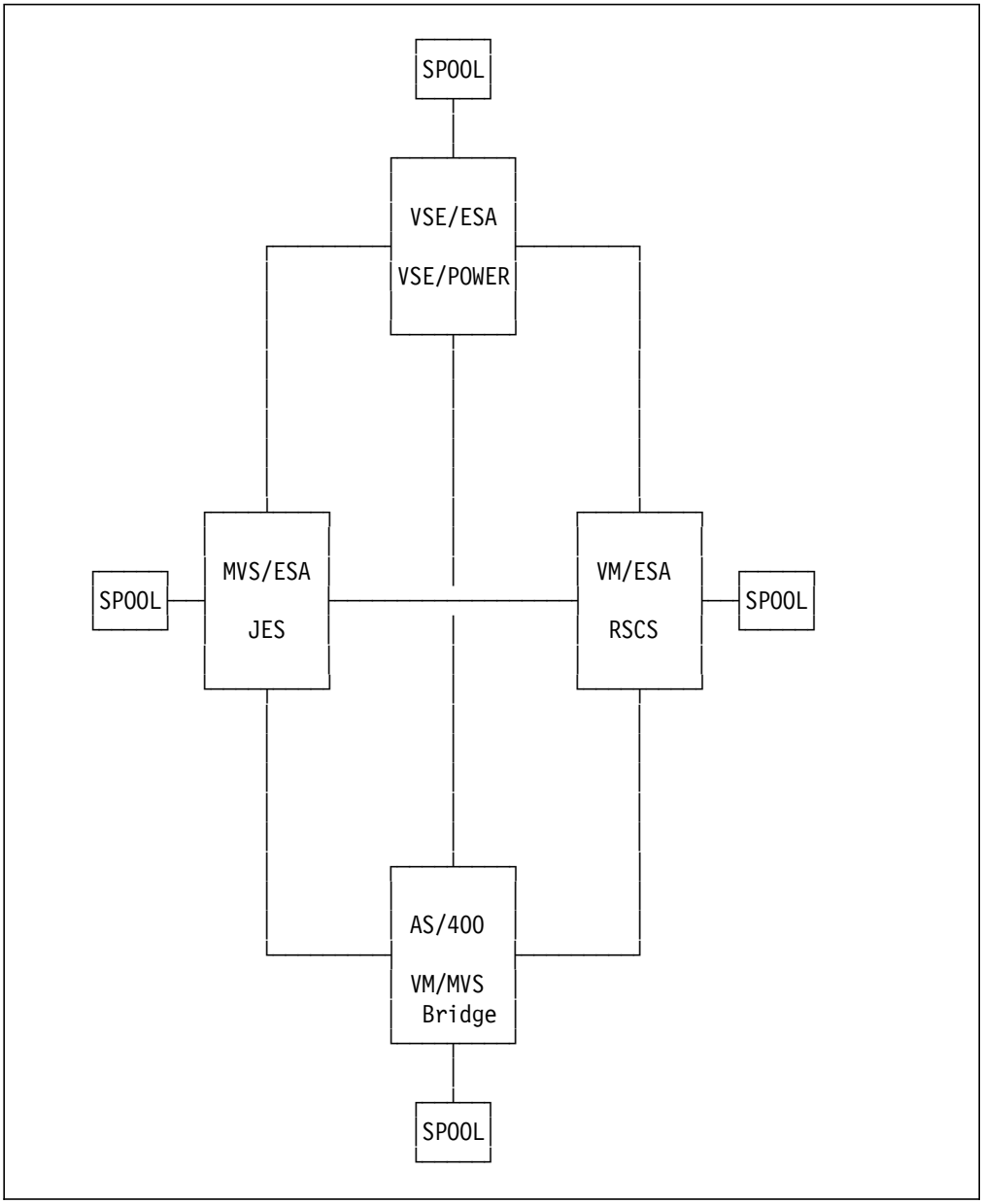

Figure 1. Example of an NJE Network

For more information on NJE please see the following publications:

- *NJE Formats and Protocols*
- *NJE with JES2 and Other Systems*
- *Network Job Entry Concepts and Protocols Overview*

Chapter 2. Test Environment

2.1 Hardware

This chapter describes the hardware and software that we used.

Our test environment consists of an IBM Token-Ring, two SDLC nonswitched links, and the components that we added to allow the VSE/ESA and the AS/400 to communicate. The resulting network configuration is illustrated in Figure 2 on page 8.

- An IBM 9221 Model 150 as the host with:
  - 64MB main memory
  - Integrated Communications Adapter (ICA) (#6031)
  - Parallel channels connecting to the IBM 3172, IBM 3174 and IBM 3745
- An IBM 3172 Model 003 with the Interconnect Controller Program (ICP) 3.2
- An IBM 3174 Model 11L with:
  - 6MB of real memory
  - Configuration Support C release 3.0
  - Token-Ring adapter
- An IBM 3745 Model 170 with 8MB storage
- An IBM AS/400 Model B50 with:
  - 24MB main memory
  - 4Mb Token-Ring adapter connecting to the IBM Token-Ring LAN
  - Communications line adapter

2.2 Software

- VM/ESA 2.1 with ACF/VTAM* 3.4.1 in the IBM 9221
- VSE/ESA 1.3.3 guest under VM in the IBM 9221 with ACF/VTAM 3.4.0
- VSE/POWER 5.2
- ACF/NCP 5.4.0 in the IBM 3745
- OS/400 V2R3 with the AS/400 Communications Utilities in the IBM AS/400

2.3 Network Configuration

Figure 2 on page 8 illustrates the network used in our implementation. It consists of:

- One IBM Token-Ring LAN
- Two SDLC nonswitched lines with the modems
- VM/ESA, VSE/ESA and VSE/POWER in the IBM 9221 with:
  - Parallel channels connecting to the IBM 3172, IBM 3174 and IBM 3745

  - IBM 3745 connecting to the SDLC line
  - IBM 3174 connecting to the IBM Token-Ring LAN
  - IBM 3172 connecting to the IBM Token-Ring LAN
  - Integrated Communications Adapter (ICA) (#6031)
- OS/400 and AS/400 Communications Utilities in the AS/400 with:
  - 4Mb Token-Ring adapter connecting to the IBM Token-Ring LAN
  - Communications line

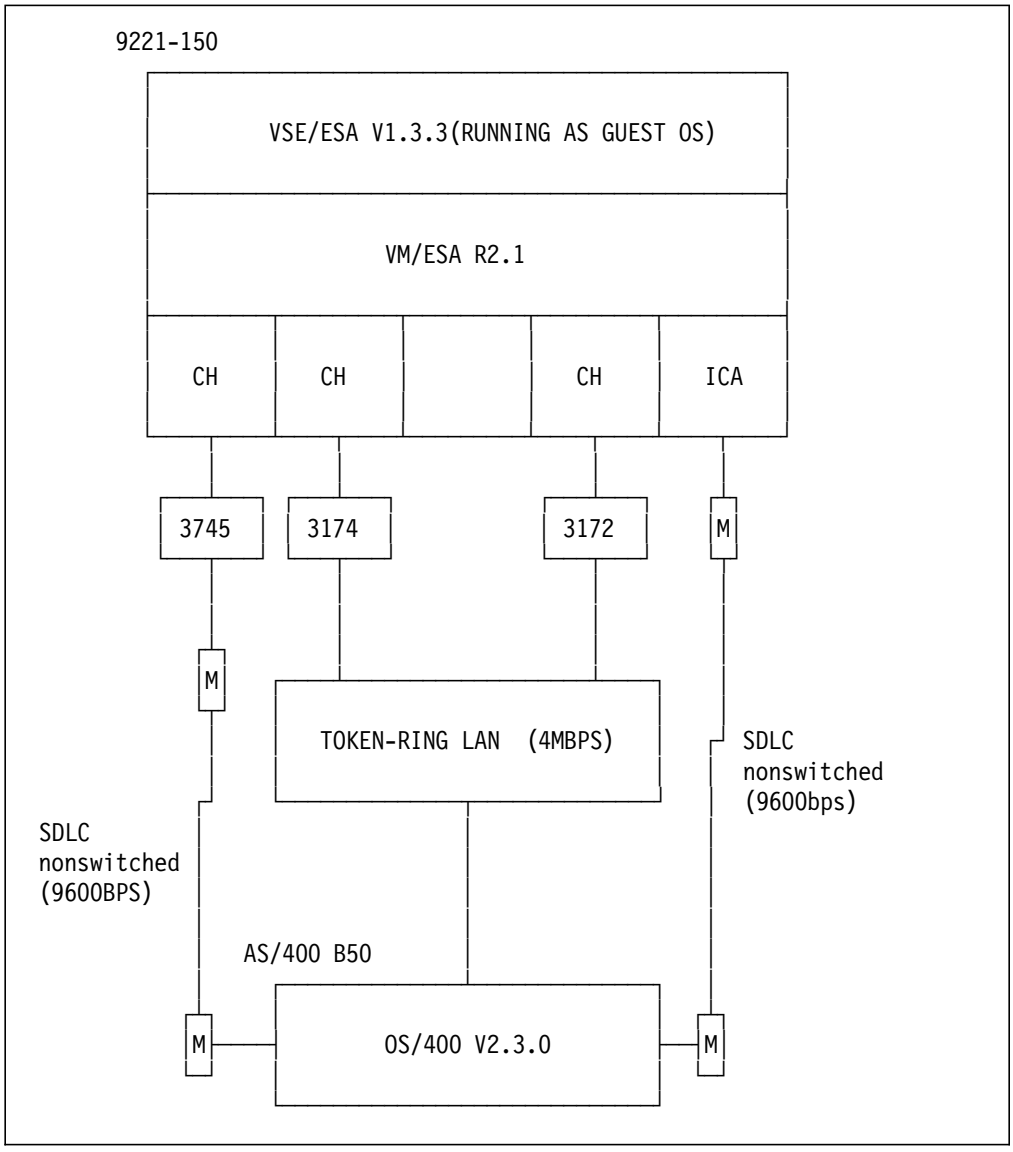

Figure 2. NJE Network Diagram

Chapter 3. VSE/ESA Host Definitions for the VM/MVS Bridge

This chapter describes mandatory definitions for the VSE/ESA host for the implementation of NJE.

Please read through this chapter as it contains required VSE/ESA host definitions common to all the different connectivity environments. These common host definitions are not repeated for specific environments in the subsequent chapters.

3.1 Common Host Definitions

These definitions are common to the different environment attachments including those described in Chapter 4, “Definitions for the Test Environment using the 3172” on page 19 and Chapter 5, “Additional AS/400 to VSE/POWER Connection Examples” on page 39.

3.1.1 VSE/ESA IPL Procedure

ADD statement in the IPL procedure is used to define I/O devices to the VSE/ESA operating system. The IPL procedure must be cataloged in *IJSYSRS.SYSLIB*.

```
009,$$A$SUPX,VSIZE=120M,VIO=512K,VPOOL=128K,LOG
ADD 009,3277
ADD 00C,2540R
ADD 00D,2540P
ADD 00E,1403
ADD 080:089,3277
ADD 10D,1442N1
ADD 10E,3800            DUMMY
ADD 181:182,3480
ADD 183:184,3420T9
ADD 200,3791L           ADDRESS OF 3174 TRL G/W
ADD 201,3791L           ADDRESS OF AS/400 VIA 3174 TRL G/W
ADD 300,CETI
ADD 560,3745,01         ADDRESS OF 3745-170 COMM. CONTROLLER
ADD 800,CTCA,EML        VIRTUAL CTCA TO VM/VTAM
ADD 960,CTCA,EML        ADDRESS OF 3172 GATEWAY
ADD 991:996,3380
ADD B40,3705,10         ADDRESS OF 9221 ICA
ADD FEC,3505            POWER DUMMY READER, DO NOT DELETE
ADD FED,2520B2          POWER DUMMY PUNCH, DO NOT DELETE
ADD FEE,PRT1            POWER DUMMY PRINTER, DO NOT DELETE
ADD FEF,PRT1            POWER DUMMY PRINTER, DO NOT DELETE
ADD FFA,3505            ICCF INTERNAL READER, DO NOT DELETE
ADD FFC,3505            ICCF DUMMY READER, DO NOT DELETE
ADD FFD,2520B2          ICCF DUMMY PUNCH,  DO NOT DELETE
ADD FFE,PRT1            ICCF DUMMY PRINTER, DO NOT DELETE
ADD FFF,CONS            DUMMY CONSOLE, DO NOT DELETE
SET ZONE=EAST/01/00
DEF SYSCAT=DOSRES
DEF SYSREC=SYSWK1
SYS JA=YES
SYS BUFSIZE=1500
SYS NPARTS=44
SYS SEC=NO
SYS PASIZE=30M
SYS SPSIZE=1024K
SYS BUFLD=YES
DPD VOLID=DOSRES,CYL=211,NCYL=15,TYPE=N,DSF=N
DPD VOLID=SYSWK1,CYL=446,NCYL=15,TYPE=N,DSF=N
DPD VOLID=DOSRES,CYL=414,NCYL=14,TYPE=N,DSF=N
DPD VOLID=DOSRES,CYL=428,TYPE=N,DSF=N
DLA NAME=AREA1,VOLID=DOSRES,CYL=64,NCYL=3,DSF=N
SVA SDL=300,GETVIS=768K,PSIZE=640K
```

Figure 3. VSE/ESA IPL Procedure "$IPLBOE.PROC" (in IJSYSRS.SYSLIB)

3.1.2 VSE/POWER Startup Procedure

We have been using the predefined environment 6 since installing VSE/ESA. Therefore, the name of the VSE/POWER startup JCL must be "POWSTRT6.PROC", and it must be cataloged in the library *IJSYSRS.SYSLIB*.

```
// IF XPWMODE ¬= COLD THEN
// GOTO WARM
// ASSGN SYSLST,UA
// EXEC BOEPOWER                1
SET SJECL=YES
DEFINE L,CICSDATA,3F00,1,255,*
DEFINE L,CKPTPAGE,0004,1,2,B,1,32767
DEFINE L,FORMDEF,001D,1,6,C
DEFINE L,PAGEDEF,001F,1,6,C
DEFINE L,PIMSG,0021,2,3,C
DEFINE L,DATACK,2022,1,8,C
DEFINE L,FORMS,0010,1,4,C
DEFINE L,PRMODE,0018,1,8,C
DEFINE L,TRC,001A,1,3,C
FORMAT=D,A
PSTART BG,A0I
READER=FEC
PRINTERS=FEE,10E,00E,FEF
PUNCHES=FED,00D,10D
PSTART F2,L2
READER=FEC
PRINTERS=FEE,10E,00E,FEF
PUNCHES=FED,00D,10D
 :
 :
PSTART F8,P8
READER=FEC
PRINTERS=FEE,10E,00E,FEF
PUNCHES=FED,00D,10D
PSTART F9,R9
READER=FEC
PRINTERS=FEE,10E,00E,FEF
PUNCHES=FED,00D,10D
PSTART FA,S
READER=FEC
PRINTERS=FEE,10E,00E,FEF
PUNCHES=FED,00D,10D
PSTART FB,T
READER=FEC
PRINTERS=FEE,10E,00E,FEF
PUNCHES=FED,00D,10D
PSTART TASKTR,ENAB,10
PLOAD DYNC
/*
// GOTO EXIT
```

Figure 4 (Part 1 of 2). VSE/POWER Startup Procedure "POWSTRT6.PROC" (in IJSYSRS.SYSLIB)

```
/. WARM              POWER WARM START
// EXEC BOEPOWER              1
SET SJECL=YES
DEFINE L,CICSDATA,3F00,1,255,*
DEFINE L,CKPTPAGE,0004,1,2,B,1,32767
DEFINE L,FORMDEF,001D,1,6,C
DEFINE L,PAGEDEF,001F,1,6,C
DEFINE L,PIMSG,0021,2,3,C
DEFINE L,DATACK,2022,1,8,C
DEFINE L,FORMS,0010,1,4,C
DEFINE L,PRMODE,0018,1,8,C
DEFINE L,TRC,001A,1,3,C
FORMAT=NO
PSTART BG,A0I
READER=FEC
PRINTERS=FEE,10E,00E,FEF
PUNCHES=FED,00D,10D
PSTART F2,L2
READER=FEC
PRINTERS=FEE,10E,00E,FEF
PUNCHES=FED,00D,10D
 :
 :
PSTART F8,P8
READER=FEC
PRINTERS=FEE,10E,00E,FEF
PUNCHES=FED,00D,10D
PSTART F9,R9
READER=FEC
PRINTERS=FEE,10E,00E,FEF
PUNCHES=FED,00D,10D
PSTART FA,S
READER=FEC
PRINTERS=FEE,10E,00E,FEF
PUNCHES=FED,00D,10D
PSTART FB,T
READER=FEC
PRINTERS=FEE,10E,00E,FEF
PUNCHES=FED,00D,10D
PSTART TASKTR,ENAB,10
PLOAD DYNC
/*
/. EXIT
```

Figure 4 (Part 2 of 2). VSE/POWER Startup Procedure "POWSTRT6.PROC" (in IJSYSRS.SYSLIB)

1 BOEPOWER: The name of the VSE/POWER phase (load module) generated by the POWER macro. In our case, we used *BOEPOWER* as the name. *IPWPOWER* is usually provided as the original system setting.

3.1.3 VSE/POWER Generation

The following job is for generating ″BOEPOWER.PHASE″.

```
* $$ JOB JNM=BOEPWGEN,CLASS=O,DISP=D
* $$ LST CLASS=Q
// JOB BOEPWGEN VSE/POWER GENERATION
LIBDEF PHASE,CATALOG=PRD2.CONFIG
// OPTION CATAL
// EXEC ASSEMBLY
PWR      TITLE 'VSE/POWER - BOEPOWER.PHASE GENERATION '
         EJECT
         PRINT NOGEN
         SPACE 3
BOEPOWER POWER                                                  *
               ACCOUNT=YES,                                     *
               CLRPRT=YES,                                      *
               COPYSEP=YES,                                     *
               DBLKGP=10,                                       *
               DBLK=0,                                          *
               FEED=NO,                                         *
               JLOG=YES,                                        *
               JSEP=(0,0),                                      *
               LTAB=(10,00,05,10,15,20,25,30,35,40,45,50,56),   *
               MEMTYPE=P,                                       *
               MRKFRM=YES,                                      *
               MULT12=NO,                                       *
               NTFYMSG=100,                                     *
               PAUSE=NO,                                        *
               PNET=BOEPWNDT,          1                        *
               PRI=3,                                           *
               RBS=(0,0),                                       *
               SECNODE=AAAA,                                    *
               SHARED=NO,                                       *
               STDCARD=(0,0),                                   *
               STDLINE=(0,0),                                   *
               SPLIM=90,                                        *
               SPOOL=YES
         EJECT
         END
/*
// EXEC LNKEDT,PARM='MSHP'
/&
* $$ EOJ
```

Figure 5. VSE/POWER Generation Job

1 PNET=phasename: Specify the name of the VSE/POWER Network Definition Table (NDT) as phasename, and the NDT is automatically loaded during VSE/POWER initialization. See 4.1.4, “VSE/POWER Network Definition Table (NDT)” on page 22.

3.1.4 VTAM Startup Job

This job is for VTAM startup. In our case, we used *BOEVTAM* as the name of the job. *VTAMSTRT* is usually provided as the system original setting.

```
* $$ JOB JNM=BOEVTAM,DISP=L,CLASS=3
// JOB BOEVTAM  START VTAM
// OPTION DUMP,SADUMP=5
// SETPARM XNCPU=''
// EXEC PROC=$COMVAR,XNCPU
// EXEC DTRSETP,PARM='CPUVAR&XNCPU;;SET XSTATF3=ACTIVE'
/*
// SETPFIX LIMIT=1024K
// ASSGN SYS000,UA
// ASSGN SYS001,DISK,VOL=SYSWK1,SHR     TRACE FILE ASSIGNMENT
// ASSGN SYS004,DISK,VOL=SYSWK1,SHR     TRACE FILE ASSIGNMENT
// ASSGN SYS005,DISK,VOL=SYSWK1,SHR     NCP LOAD/DIAG FILE ASSIGN
// LIBDEF  *,SEARCH=(PRD2.CONFIG,PRD2.SAMPLE,PRD2.SSP360G,             X
               PRD2.NCP540G,PRD2.COMM,PRD2.COMM2,PRD1.BASE),PERM
// LIBDEF   DUMP,CATALOG=SYSDUMP.F3,PERM
// EXEC ISTINCVT,SIZE=AUTO,PARM='LIST=04'                  1
// EXEC DTRSETP,PARM='CPUVAR&XNCPU;;SET XSTATF3=INACTIVE'
/*
/&
* $$ EOJ
```

Figure 6. VTAM Startup Job "BOEVTAM"

1 PARM='LIST=04': Applying the PTF **UD49029**, related APAR **DY43020**, you can specify the suffix of the VTAM startup option list on the EXEC card, without prompting during VTAM startup.

3.1.5 VTAM Startup Option List

You must specify some necessary options for VTAM startup in this list.

```
SSCPID=22,              1                                          *
HOSTSA=22,              2                                          *
SSCPNAME=IPFV2B,                                                   *
HOSTPU=IPFVM22,                                                    *
NETID=DEIBMIPF,                                                    *
MAXSUBA=255,                                                       *
CONFIG=04,              3                                          *
IOINT=0,                                                           *
SGALIMIT=0,             4                                          *
BSBUF=(28,,,1),         5                                          *
CRPLBUF=(60,,,1),       5                                          *
LFBUF=(200,288,,20),    5       FROM 70 TO 200                     *
LPBUF=(12,,,6),         5                                          *
SFBUF=(20,,,20),        5                                          *
SPBUF=(210,,,32),       5                                          *
VFBUF=204800,           5       FROM 102400 TO 204800              *
VPBUF=528384,           5       FROM 446464 TO 528384              *
XDBUF=(6,,,1)           5
```

Figure 7. VTAM Startup Option List "ATCSTR04.B" (in PRD2.CONFIG)

1 SSCPID: Specifies the system services control point identifier. The decimal value specified must match the *SSCP identifier* specified in hexadecimal notation on the AS/400 host controller description. See 4.2.3, “Configuring the Host Controller Description” on page 26.

2 HOSTSA: Specify a decimal integer value that is used to identify VTAM′s subarea, which must be a unique address in the network.

3 CONFIG: Specify the suffix number of the list of major nodes to be activated when VTAM is started. In this case, major nodes under the list ATCCON04.B are activated.

4 SGALIMIT: Specify the maximum amount of system GETVIS area (SGA) in SVA (Shared Virtual Area) that can be used by VTAM. ″0″ is the default value. If you code 0 or take the default, no limit is enforced on the amount of SGA used by VTAM.

5 These describe buffer pools used by VTAM for holding data or building control blocks. For a description of the VTAM buffer pools, see *VTAM Network Implementation Guide* and *VTAM Resource Definition Reference*.

3.1.6 VTAM Configuration List

This member is pointed to by ATCSTR04.B. In order to activate a major node automatically, the name of the major node must be specified in this list. The minor node must have the initial status as *active*.

```
        BOEAPPL,                                    *
        BOENSNA,                                    *
        BOEPATH,      1                             *
        BOENCP1,      1                             *
        BOENCPSW,                                   *
        BOECDRM,                                    *
        BOELAN,                                     *
        BOELANSW,                                   *
        BOEXCA,                                     *
        BOEXCASW,                                   *
        BOEICA,                                     *
        BOESNA,                                     *
        BOECDRS,                                    *
        BOECTCA
```

Figure 8. VTAM Configuration List ″ATCCON04.B″ (in PRD2.CONFIG)

1 You must activate the VTAM path table (BOEPATH) prior to the NCP major node (BOENCP1). You must also allocate enough partition GETVIS below the 16MB line, or loading the NCP will fail with the sense code ″081C003C″.

3.1.7 VTAM Logon Mode Table

The Logon Mode Table is used by VTAM to interpret logon requests and to set proper session parameters when primary LU (PLU) and secondary LU (SLU) go into session. The table is pointed to by the *APPL* macro in the VTAM application major node. In this environment, the AS/400 (SLU) is a dependent LU within the attached VSE′s (PLU) domain and subarea. The AS/400 is defined as a PU Type-2, so the VTAM definitions are not similar to the other NJE APPL-to-APPL sessions.

```
* $$ JOB JNM=BOEMODTB
// JOB BOEMODTB
// OPTION CATAL
   PHASE NJEMODTB,*
// LIBDEF PHASE,CATALOG=PRD2.CONFIG
// EXEC PGM=ASSEMBLY
NJEMODTB MODETAB
NJEMOD   MODEENT  LOGMODE=NJEMOD,                                    +
               FMPROF=X'03',                                         +
               TSPROF=X'03',                                         +
               PRIPROT=X'B1',                                        +
               SECPROT=X'90',                                        +
               COMPROT=X'3080',                                      +
               RUSIZES=X'F7F7',     1                                +
               SSNDPAC=X'03',                                        +
               SRCVPAC=X'03',                                        +
               PSNDPAC=X'03',                                        +
               PSERVIC=X'000000000000000000000000'
         MODEEND
         END
/*
// EXEC PGM=LNKEDT
/&
* $$ EOJ
```

Figure 9. Logon Mode Table "NJEMODTB" Generation Job

1 RUSIZES: Maximum RU size. You may also specify X'0000' for this variable. For more information, see 7.1, "Buffer Size Specification" on page 71.

3.1.8 VTAM Application Major Node

PNET is one of the VTAM application programs and must be specified in the major node.

```
BOEAPPL  VBUILD TYPE=APPL
DBDCCICS APPL  AUTH=(PASS,ACQ)
CICSSA22 APPL  AUTH=(PASS,ACQ,VPACE),PARSESS=YES,ACBNAME=CICSSA22,     C
               EAS=4000,MODETAB=CICSIPMT,APPC=NO,                      C
               SONSCIP=YES,VPACING=5
POWER    APPL  AUTH=(ACQ)                          DEFAULT RJE NAME
BOEPWNJE APPL  AUTH=(PASS,ACQ),                    ACB NAME FOR PNET    C
               VPACING=3,           1                                  C
               MODETAB=NJEMODTB,    2                                  C
               DLOGMOD=NJEMOD       3
IESWAITT APPL  AUTH=(NOACQ)
```

Figure 10. VTAM Application Major Node "BOEAPPL.B" (in PRD2.CONFIG)

1 VPACING: In order to prevent PNET filling all the VTAM buffers when it is transmitting jobs or output, it is necessary to use the VTAM pacing facility. The specification of the parameter affects the performance of PNET. For more information on pacing, see *VTAM Network Implementation Guide*.

2 MODETAB: NJEMODTB must match the VTAM logon mode table name. See Figure 9.

3 DLOGMOD: NJEMOD must match the name specified by the ″LOGMODE=″ of MODEENT macro in VTAM logon mode table. See Figure 9.

Chapter 4. Definitions for the Test Environment using the 3172

This chapter describes mandatory definitions for the connectivity between VSE/ESA and AS/400 via an IBM 3172 Token-Ring Gateway.

4.1 AS/400 to VSE via 3172 Token-Ring Gateway

This part describes the host definitions related to the 3172 Token-Ring Gateway.

4.1.1 Configuration Overview

The 3172 is dedicated to the guest VSE machine as the address X'960'. The physical address of the 3172 is X'2960' by the 9221 IOCDS definition. See Figure 12.

The following command is included in the VSE/ESA user directory of the VM/ESA*.

DEDICATE 960 2960

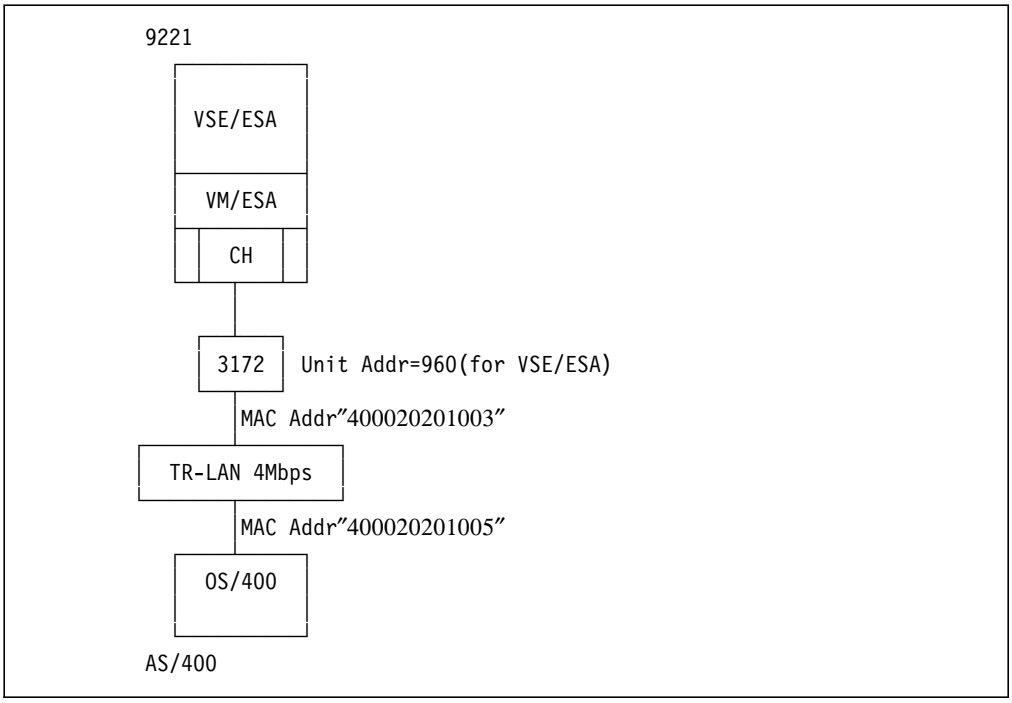

Figure 11. 3172 Token Ring Gateway Environment

4.1.2 3172 Definition for 9221 IOCDS

The 3172 must be defined in the 9221 IOCDS (I/O Configuration Data Set).

```
CHPID PATH=((29)),TYPE=BL
CNTLUNIT CUNUMBR=3172,PATH=(29),UNIT=3172,UNITADD=((60,32)),          X
               SHARED=N,PROTOCL=S4
IODEVICE ADDRESS=(2960,32),CUNUMBR=(3172),UNIT=3172
```

Figure 12. 3172 Definition Example for 9221 IOCDS

Note that the 3172 is dedicated to the guest VSE machine as the address X′960′. See 4.1.1, “Configuration Overview.”

4.1.3 3172 Definitions

Figure 13 on page 21 is a summary of the customization of the 3172.

```
3172-3 Configuration Summary

 3172 Name ................... : IS23172
 3172 Type ................... : 3172-3 LAN Gateway
 Int Enhancement Feature (IEF) : Yes
 User Data ................... : LAN Gateway for 9221-150(IS2)
 Location .................... : Building 02 Room 018

 ICP Base Code Version........ : 3.02.00
 ICP IEF Code Version......... : 3.02.00
 APARs/Patches applied........ : None

 Profile Name ................ : TRL3172

 Slot    Name        Adapter Type
 ----    ----------  ----------------------
  1      Unassigned
  2      Unassigned
  3      Unassigned
  4      CHAN29      Parallel Channel
  5      Reserved
  6      Unassigned
  7      TOK1        Token-Ring 16/4
  8      Fixed Disk

 LAN Function Name ........... : SNAGATE
 Channel Adapter Name ........ : CHAN29

                To        To       LAN     Block  Maximum
 Subchannels  Channel     LAN    Adapter   Delay  Response
 -----------  --------  -------- --------  -----  --------
    60        TOCHN060  TOLAN060 TOK1       10      100

 Slot ........................ : 4
 Adapter Name ................ : CHAN29
 Adapter Type ................ : Parallel Channel
 Transfer Mode and Speed ..... : 4.5 MB Data Streaming
 SNA Management Services ..... : No

 Slot ........................ : 7
 Adapter Name ................ : TOK1
 Adapter Type ................ : Token-Ring 16/4
 Relative Adapter Number ..... : 0
 Node Address ................ : 400020201003   1
 Data Rate (Mbps) ............ : 4              2
 To Operator Facility ........ : No
 Combined Function Address ... : 000000000000

 IEEE 802.2 (LLC)
   Response Timer (T1) ....... : 10  =  2000 ms
   Acknowledgment Timer (T2) . : 1   =    80 ms
   Inactivity Timer ....(Ti) . : 250 = 30000 ms
```

Figure 13. Configuration of the 3172

1 Node Address: The MAC address of the 3172 itself on the token-ring LAN.

2 Data Rate: The line speed of the token-ring LAN.

4.1.4 VSE/POWER Network Definition Table (NDT)

The NDT is generated by the PNODE macro. One PNODE macro statement is required for the local VSE/ESA node, and the other PNODE macro is for the AS/400 node.

```
* $$ JOB JNM=BOEPWNDT,CLASS=O,DISP=D
* $$ LST CLASS=Q
// JOB BOEPWNDT NETWORK DEFINITION TABLE
LIBDEF PHASE,CATALOG=PRD2.CONFIG
// OPTION CATAL
// EXEC ASSEMBLY
         PRINT NOGEN
BOEPWNDT PNODE NODE=BOEVSE22,      2                              X
 1             APPLID=BOEPWNJE,    3                              X
               LOCAL=YES           4
         PNODE NODE=BOEAS400,      5                              X
               APPLID=IPFT2XRA,    6                              X
               AUTH=NET,                                          X
               BUFSIZE=1920,       7                              X
               MAXBUF=(3,3)        8
         END
/*
// EXEC LNKEDT
/&
* $$ EOJ
```

Figure 14. NDT "BOEPWNDT" Creation Job

1 BOEPWNDT is the name of the NDT.

2 BOEVSE22 is the node name of the VSE/ESA.

3 BOEPWNJE is the application name of PNET specified in the VTAM application major node.

4 LOCAL=YES: The specification is for the local VSE/ESA node.

5 BOEAS400 is the node name of the AS/400.

6 The APPLID matches the LU name of the AS/400. The AS/400 is defined as PU Type-2. The NJE between VSE/ESA and AS/400 is not APPL to APPL session.

7 BUFSIZE: Specify the length of each of the VSE/POWER PNET buffers. This value is set into the FMH-4 record and used for the negotiation with the adjacent node in the session establishment process. See 7.1, "Buffer Size Specification" on page 71.

8 MAXBUF: Specify the number of buffers which may be used by every PNET-receiver and transmitter task. The number of buffers for transmitters and receivers is consistent. It is important for PNET performance. See "Performance Considerations" in *VSE/POWER Networking*.

For more information about the PNODE macro, see *VSE/POWER Administration and Operation*.

Since AS/400 VM/MVS Bridge does not support parallel file transmission, the subsequent transmission requests will be queued in serially.

4.1.5 VTAM Definitions for the 3172

The connection between VTAM and the token-ring LAN attached through the 3172 is defined in the VTAM external communication adapter (XCA) major node.

```
BOEXCA   VBUILD TYPE=XCA
*
* DEFINITION FOR 3172
*
BOE3172  PORT  CUADDR=960,    1       PORT ADDRESS                    X
               MEDIUM=RING,           IBM TOKEN RING LAN              X
               ADAPNO=0,              RELATIVE ADAPTER NUMBER         X
               TIMER=60         (SEC) VTAM WAIT AFTER CHANNEL ACTIVATE
G3172    GROUP DIAL=YES               SWITCHED ATTACHMENT
L317201  LINE  ISTATUS=ACTIVE,CALL=INOUT,ANSWER=ON
P317201  PU    ISTATUS=ACTIVE
          :
          :
```

Figure 15. VTAM XCA Major Node "BOEXCA.B" (in PRD2.CONFIG)

1 CUADDR: X'960' must match the address defined in the VSE/ESA IPL procedure.

4.1.6 VTAM Definitions for the AS/400

The AS/400 is defined as PU Type-2 in the VTAM switched major node on this test environment.

```
BOEXCASW       VBUILD TYPE=SWNET,MAXGRP=20,MAXNO=20
*
*  PU AND LU DEFINITION FOR AS/400
*
IPFP2XOR PU    ADDR=01,           STATION ADDRESS                    X
               IDBLK=056,     1   IDENTIFICATION BLOCK               X
               IDNUM=EA400,   1   IDENTIFICATION NUMBER              X
               DISCNT=NO,         VTAM DOES NOT HANG UP              X
               ISTATUS=ACTIVE,PACING=1,                              X
               VPACING=3,     2                                      X
               PUTYPE=2,      3   SNA CLUSTER CONTROLLER             X
               MAXDATA=1929,  4   MAX NUMBER OF BYTES HANDLED BY PU  X
               MAXOUT=1,          MAX PIUS IN A BATCH                X
               MAXPATH=1          MAX NUMBER OF DIAL PATHS
*
         PATH  DIALNO=0104400020201005    5
*
IPFT2XRA LU    LOCADDR=51,              7                            X
 6             DLOGMOD=NJEMOD,          8                            X
               ISTATUS=ACTIVE,                                       X
               MODETAB=NJEMODTB,        9                            X
               SSCPFM=USSSCS
```

Figure 16. VTAM Switched Major Node "BOEXCASW.B" (in PRD2.CONFIG)

1 IDBLK and IDNUM must match the *exchange identifier (EXCHID)* specified on the AS/400. See 4.2.2, “Configuring the Line Description” on page 25.

2 Note that this VPACING value and the MAXBUF operand of the PNODE macro must agree. See Figure 14 on page 22.

3 The AS/400 must be defined as PU Type-2.

4 MAXDATA defines the size of PIU (Path Information Unit). For a Type-2 PU, the PIU consists of TH(6 bytes), RH(3 bytes), and RU. For example, if the RU size is 1920 bytes then the PIU size is 1929 bytes.

5 DIALNO=0104400020201005: ′01′ has no meaning in the 3172 environment. ′04′ is the service-access-point address (SAPADDR), which should be specified as shown in the PATH statement. Regarding SAPADDR, we used the default value ′4′. ′400020201005′ is the MAC address for the AS/400 on the token-ring LAN. See Local adapter address (ADPTADR) in 4.2.2, “Configuring the Line Description” on page 25.

6 LU name must match the APPLID of the PNODE macro which defines the AS/400 node. See 4.1.4, “VSE/POWER Network Definition Table (NDT)” on page 22.

7 LOCADDR must match the *local location address (LOCADR)* (in hexadecimal notation) defined on the AS/400. See 4.2.4, “Configuring the SNUF Device Description” on page 27.

8 NJEMOD must match the name specified by the ″LOGMODE=″ of the MODEENT macro in the VTAM logon mode table. See Figure 9 on page 16.

9 NJEMODTB must match the VTAM logon mode table name. See Figure 9 on page 16.

4.2 AS/400 Configurations for the Token-Ring Connections

To customize the OS/400 VM/MVS Bridge to communicate with VSE/POWER you must create the necessary communications configuration objects, configure SNADS (SNA Distribution Services) and add the SNADS users to the system directory.

System Network Architecture distribution services (SNADS) is an asynchronous distribution service that can store data for delayed delivery.

Only SNA connections are supported between the AS/400 system and VSE/POWER.

In the lab environment we tested two types of physical connections: token-ring and SDLC. Other physical connections, such as X.25, might be possible.

This section will describe the communications setup between VSE/POWER via the 3172 Token-Ring Gateway and the AS/400 using the token-ring adapter.

The SDLC environment setup is discussed in Chapter 5, “Additional AS/400 to VSE/POWER Connection Examples” on page 39.

4.2.1 Configuring the AS/400 Communications Objects

Communications configuration objects are used by the AS/400 system to describe both physical and logical aspects of the communications environment. You must define the following objects for the NJE environment:

- Line description which describes the physical line and the line protocol used for communications
- Controller description which describes the logical representation of the remote system
- Device description which describes the characteristics of the logical remote device

4.2.2 Configuring the Line Description

To create the token-ring line description use the following command:

CRTLINTRN

Figure 17 shows the token-ring line configuration to communicate with the VSE/POWER host in our lab test environment.

```
                  Create Line Desc (Token-Ring) (CRTLINTRN)

 Type choices, press Enter.

 Line description . . . . . LIND         > VSE3172          1
 Resource name  . . . . . . RSRCNAME     > LIN051           2
 Online at IPL  . . . . . . ONLINE       > *NO
 Vary on wait . . . . . . . VRYWAIT        *NOWAIT
 Maximum controllers  . . . . MAXCTL       40
 Line speed . . . . . . . . . LINESPEED    4M               3
 Maximum frame size . . . . . MAXFRAME     1994             4
 Local adapter address  . . . ADPTADR    > 400020201005     5
 Exchange identifier  . . . . EXCHID     > 056EA400         6
 SSAP list:                   SSAP
   Source service access point  .           *SYSGEN         7
   SSAP maximum frame . . . . .
   SSAP type  . . . . . . . . .
                         + for more values
 Text 'description' . . . . . TEXT       > 'VSE NJE using 3172'

                                                                    Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
 F13=How to use this display        F24=More keys
```

Figure 17. Token-Ring Line Description

1 Line description name: This is the name that you will use when you want to vary on or vary off (activate or deactivate) the line (Vary Configuration (VRYCFG) command) or to check the status of the line (Work with Configuration Status (WRKCFGSTS) command). The naming of the line must follow AS/400 naming conventions.

2 Resource name: The unique name that is assigned by the system to the physical token-ring adapter. Use the WRKHDWPRD command to find out what the RSRCNAME should be.

3 Line speed: Valid values for the token-ring lines are 4M or 16M. If 16M is specified for a 4M line, the line will fail on vary on. In our lab test we used the 4M adapter on the AS/400.

4 Maximum frame size: For a 4M line the maximum frame size must be 1994 or less. Specify the correct value for your line speed.

5 Local adapter address: The address that the adapter from this line transmits from and answers to on the token-ring. You can use the preset address or you can specify your own. Valid values are 12-digit hexadecimal values in the range 400000000000 through 7FFFFFFFFFFF. See PATH DIALNO in 4.1.6, “VTAM Definitions for the AS/400” on page 23.

6 Exchange identifier: The exchange identifier that the local AS/400 system can send to the remote system. The identifier must be specified as 056xxxxx, where 056 is the AS/400 assigned block number and xxxxx is any combination of the characters 0 to 9 and A through F. See IDBLK/IDNUM in 4.1.6, “VTAM Definitions for the AS/400” on page 23.

7 SSAP list: Specifies the hexadecimal logical channel used to route incoming data off the network to the correct user. The SSAP values listed on this parameter must include all DSAP (destination service access point) values that are specified for the controller descriptions attached to this line.

4.2.3 Configuring the Host Controller Description

To create the controller description use the following command:

CRTCTLHOST

See Figure 18 for the controller description we used for our test environment.

```
                    Create Ctl Desc (SNA Host) (CRTCTLHOST)

Type choices, press Enter.

Controller description . . . . . CTLD         > VSE3172          1
Link type  . . . . . . . . . . . LINKTYPE     > *LAN             2
Online at IPL  . . . . . . . . . ONLINE       > *NO
APPN-capable . . . . . . . . . . APPN         > *NO              3
Switched line list . . . . . . . SWTLINLST    > VSE3172          4
                         + for more values
Maximum frame size . . . . . . . MAXFRAME       1994             5
Remote network identifier  . . . RMTNETID       *NETATR
Remote control point . . . . . . RMTCPNAME
SSCP identifier  . . . . . . . . SSCPID       > 050000000016     6
Local exchange identifier  . . . LCLEXCHID      *LIND
Initial connection . . . . . . . INLCNN         *DIAL
Dial initiation  . . . . . . . . DIALINIT       *LINKTYPE
LAN remote adapter address . . . ADPTADR      > 400020201003     7
Text 'description' . . . . . . . TEXT         > 'VSE to OS/400 NJE via 3172'

                                                                  Bottom
F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
F13=How to use this display        F24=More keys
```

Figure 18. Host Controller Description

1 Controller description name: This is the name that you will use when you want to vary on or vary off the controller (Vary Configuration (VRYCFG) command) or to check the status of the controller (Work with Configuration Status (WRKCFGSTS) command). The naming of the controller must follow AS/400 naming conventions.

2 Link type: The type of line to which this controller will be attached.

3 APPN: This parameter describes how the local AS/400 system treats the connection to the remote system; it does not describe the capabilities of the remote system.

See the *AS/400 Advanced Peer-to-Peer Networking Guide* for more information regarding APPN.

4 Switched line list: A LAN line is always regarded as a switched line on the AS/400 and therefore a LAN connected controller will specify a switched line list. The line description was created on 4.2.2, “Configuring the Line Description” on page 25.

5 Maximum frame size: The maximum path information unit (PIU) size that the controller can send or receive. This value is used to calculate request unit (RU) sizes for devices attached to the SNA host controllers. Specify the same MAXFRAME value that you specified for the line description.

6 SSCP identifier: The value used to identify the host controller when a connection is established and the host system sends an activate physical unit request (ACTPU) to the AS/400 system. The system service control point identifier is a 12-character hexadecimal value; the first two characters must be 05. See SSCPID in 3.1.5, “VTAM Startup Option List” on page 14.

7 LAN remote adapter address: The adapter address of the remote controller. This is the address the system will send data to when it communicates with the remote controller. See 3172 Node address in 4.1.3, “3172 Definitions” on page 20.

4.2.4 Configuring the SNUF Device Description

To create the required device description use the following command:

CRTDEVSNUF

See Figure 19 on page 28 for an example.

```
                    Create Device Desc (SNUF) (CRTDEVSNUF)

Type choices, press Enter.

Device description . . . . . DEVD         > VSE3172       1
Local location address . . . . . LOCADR       > 33            2
Remote location  . . . . . . . . RMTLOCNAME   > BOEVSE22      3
Online at IPL  . . . . . . . . . ONLINE       > *NO
Attached controller  . . . . . . CTL          > VSE3172       4
Program start request capable  . PGMSTRRQS      *NO
Application identifier . . . . . APPID        > BOEPWNJE      5
Host type  . . . . . . . . . . . HOST           *CICS
Record length  . . . . . . . . . RCDLEN         512
Block length . . . . . . . . . . BLKLEN         512
Default program  . . . . . . . . DFTPGM
  Library  . . . . . . . . . . .                  *LIBL
Text 'description' . . . . . . . TEXT         > 'VSE to OS/400 NJE via 3172'

                                                                      Bottom
F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
F13=How to use this display        F24=More keys
```

Figure 19. SNUF Device Description

1 Device description name: It is the name that will be used when you want to activate or deactivate the device (Vary Configuration (VRYCFG) command) or to check the status of the device (Work with Configuration Status (WRKCFGSTS) command). The naming of the device must follow AS/400 naming conventions.

2 Local location address: The location address must be unique for each device that is to be attached to the same controller. For SNUF devices this address must be a hexadecimal value in the range 01 to FF and must match the decimal local location address (LOCADDR) specified on the LU macro-instruction in the host system's definition. See LOCADDR in 4.1.6, "VTAM Definitions for the AS/400" on page 23.

3 Remote location name: The remote location name with which your system will be communicating. For the VM/MVS Bridge the remote location name must be the remote system's node name. See PNODE NODE in 4.1.4, "VSE/POWER Network Definition Table (NDT)" on page 22.

4 Attached controller: The name of the controller to which this device is attached. The controller description VSE3172 was created on 4.2.3, "Configuring the Host Controller Description" on page 26.

5 Application identifier: The VTAM application identifier of the host subsystem with which the AS/400 system communicates. See APPLID in 4.1.4, "VSE/POWER Network Definition Table (NDT)" on page 22.

4.3 System Node Names

System names are identifiers for the systems in a network. System names are normally set up as part of the system configuration. Because names must be unique in an SNADS network, identical system names must be changed when SNADS is configured.

Limit the characters used in the system name on your SNADS network to those characters that can be entered on the keyboard by all systems in your network. If you use the VM/MVS bridge, your host system name must be a valid host node name.

AS/400 SNADS has the following restrictions for system naming:

- Leading blanks are not permitted in a system name
- Embedded blanks are considered as part of the system name
- Trailing blanks are not considered as part of the system name

The name on the host node definition is RMTLOCNAME in the AS/400 SNUF device and the ADDRESS and SYSTEM in the AS/400 system directory. There is also a node definition for the AS/400. The name on that node definition must be the AS/400 system name in the network attributes. The APPL statement that goes with the AS/400 node definition must have the VTAM LU name of your SNUF device as the APPL name. Your SNUF device must match the VTAM LU that is defined to VSE/POWER for this (the AS/400) NJE node.

4.3.1 Network Attributes

The AS/400 system name is the one shown as the current system name when you display the network attributes (DSPNETA), see Figure 20.

If you change the system name, by using the Change Network Attributes (CHGNETA) command you must perform an IPL to ensure that the new system name is in effect.

```
                          Display Network Attributes
                                                                System:   BOEAS400
Current system name  . . . . . . . . . . . . . . . :   BOEAS400    1
  Pending system name  . . . . . . . . . . . . . . :
Local network ID . . . . . . . . . . . . . . . . . :   DEIBMIPF
Local control point name . . . . . . . . . . . . . :   IPFCPA40
Default local location . . . . . . . . . . . . . . :   IPFLLA40
```

Figure 20. AS/400 Network Attributes

1 AS/400 system name: This is the name referred to by NJE as the AS/400 node name. See PNODE NODE in 4.1.4, “VSE/POWER Network Definition Table (NDT)” on page 22.

4.4 Configuring Distribution Services

SNADS is used to exchange data between the AS/400 and VSE host, you must therefore create an SNADS configuration on the AS/400.

You need to add a distribution queue, see Figure 21 on page 30, and a routing table entry, see Figure 23 on page 31.

4.4.1 Distribution Queue

You can use either the Configure Distribution Services (CFGDSTSRV) command or the Add Distribution Queue (ADDDSTQ) command to add an entry to the distribution services queue table. The *AS/400 Control Language Reference* manual contains the syntax diagram and the command description for the ADDDSTQ command.

In this example we will use the CFGDSTSRV command. Type the CFGDSTSRV command on the command line. You will see the display shown in Figure 21.

```
                        Configure Distribution Services

Type choice, press Enter.

  Type of distribution services
    information to configure  . . .          1=Distribution queues
                                             2=Routing table
                                             3=Secondary system name table

F3=Exit      F12=Cancel
```

Figure 21. Configure Distribution Services Menu

Select option 1 (Distribution queues) and you will see the display shown in Figure 23 on page 31. Please note that the first time you select option 1, the message *No distribution queues* appears. After you make any entries, they appear on the display.

To add a distribution queue, press F6 from the Configure Distribution Queues display, see Figure 23 on page 31. The display shown in Figure 22 on page 31 will appear.

The important parameters are discussed following Figure 22 on page 31.

```
                        Add Distribution Queue

Type choices, press Enter.

  Queue . . . . . :   VSEQ              1
  Queue type  . . . . . :   *RPDS       2
  Remote location name  . . . :   BOEVSE22  3
  Mode  . . . . . :   *NETATR
  Remote net ID . . . . . :   *LOC
  Local location name . . . . :   *LOC
  Normal priority:
    Send time:
      From/To . . . . . :     :        :
      Force . . . . . :     :
    Send depth  . . . . . :     1
  High priority:
    Send time:
      From/To . . . . . :     :        :
      Force . . . . . :     :
    Send depth  . . . . . :     1
  Number of retries . . . . . :      3
  Number of minutes
    between retries . . . . . :      5
  To ignore time/depth values
    while receiving:
    Send queue  . . . . . :   Y                 Y=Yes, N=No

                                                                      Bottom
F3=Exit      F12=Cancel
```

Figure 22. Adding a Distribution Queue

1 Queue name: The name of the queue in which distributions are stored before they are sent.

2 Queue type: VM/MVS (*RPDS) queues are used to communicate between the AS/400 VM/MVS bridge and the host VSE/POWER NJE. The queue type is always specified as *RPDS for this environment.

3 Remote location name: The remote location name must be the host's VSE/POWER node name for *RPDS queues. It must also match the remote location name specified in Figure 19 on page 28.

```
                      Configure Distribution Queues

Type options, press Enter.
  2=Change  4=Remove  5=Display details

                                       Remote                  Remote
Opt  Queue Name        Queue Type    Location Name  Mode Name  Net ID
     VMQ                *RPDS          BOEVSE22     *NETATR    *LOC



F3=Exit      F5=Refresh         F6=Add distribution queue
F10=Work with distribution queues                        F12=Cancel
```

Figure 23. Configure Distribution Queues

4.4.2 Routing Table Entry

Routing table entries can be added using CFGDSTSRV or the Add Distribution Route (ADDDSTRTE) command. The *AS/400 Control Language Reference* contains the syntax diagram and the command description for the ADDDSTRTE command.

In this example we will use the CFGDSTSRV command. Type the CFGDSTSRV command on the command line. You will see the display shown in Figure 21 on page 30. Select option 2 (Routing table) and you will see the display shown in Figure 25 on page 33. Please note that the first time you select option 2, the message *No routing table entries* appears. After you make any entries, they appear on the display.

To add a routing table entry, press F6 from the Configure Routing Table display, see Figure 25 on page 33. The display shown in Figure 24 will appear.

The important parameters are discussed following Figure 24.

```
                    Add Routing Table Entry

Type choices, press Enter. (At least one queue name is required.)

  Destination system
    name/Group . . . . . :   BOEVSE22                          1
  Description  . . . . . :   Distribution for System BOEVSE22  2
  Service level:                                               3
    Fast:
      Queue name . . . . :   VSEQ                              4
      Maximum hops . . . :   *DFT
    Status:
      Queue name . . . . :   VSEQ                              4
      Maximum hops . . . :   *DFT
    Data high:
      Queue name . . . . :   VSEQ                              4
      Maximum hops . . . :   *DFT
    Data low:
      Queue name . . . . :   VSEQ                              4
      Maximum hops . . . :   *DFT

F3=Exit      F12=Cancel
```

Figure 24. Routing Table Entry

1 Destination system name/Group: The system or destination to which you are sending or forwarding distribution. This will be the PNET node name defined for VSE/POWER. See PNODE NODE in 4.1.4, “VSE/POWER Network Definition Table (NDT)” on page 22.

2 Description: The description of the destination system name. This is for your own information.

3 Service level: One or more service levels must be specified for each routing table entry. Your system will not route distributions for a service level you have not configured.

4 Queue name: You must specify a queue name for each service level required in the configuration, and distribution queues must be configured before

they are referred to. Our example uses the same queue for all service levels. This queue was defined in Figure 22 on page 31.

For more information about configuring distribution services, see *AS/400 Distribution Services Network Guide*.

```
                          Configure Routing Table

Type options, press Enter.
  2=Change  4=Remove  5=Display details

      ------System------
Opt   Name      Group     Description
      BOEVSE22            Distribution for System BOEVSE22


 F3=Exit      F5=Refresh         F6=Add routing table entry
 F12=Cancel
```

Figure 25. Adding a Routing Table Entry

4.5 Directory Entries for New Users

The system distribution directory contains the user ID, address, and description for users authorized to send and receive distributions in the network.

See the *AS/400 Distribution Services Network Guide* for a full discussion of the system distribution directory.

In our example we will discuss two types of users:

- a local user is a user who has a profile on the AS/400 system and whose system has the same name as the system name of the AS/400. If enrolled in the system directory, a local user can send and receive distributions from remote users.
- a remote user is a user who receives distribution on a remote system. The system name specified in the system directory entry for a remote user cannot be the system name of the local AS/400. The user profile of a remote user must not be specified in the directory entry.

You can use the Add Directory Entry (ADDDIRE) command or the Work with Directory (WRKDIR) command to add and enroll a user in the system directory. In our example we used the WRKDIR command.

Type WRKDIR from any command line and press Enter and you will see a display similar to the one shown on Figure 26 on page 34.

```
                              Work with Directory

Type options, press Enter.
  1=Add      2=Change   4=Remove   5=Display details   6=Print details
  7=Rename   8=Assign different ID to description   9=Add another description

Opt  User ID   Address   Description
 1
     *ANY      BOEVMISC  Any User on the VM System BOEVMISC
     QDFTOWN   QDFTOWN   Default Owner
     QDOC      QDOC      Internal Document Owner
     QLPAUTO   QLPAUTO   Licensed Program Automatic User
     QLPINSTL  QLPINSTL  Licensed Program Install
     QSECOFR   QSECOFR   Security Officer
     QSYS      QSYS      Internal System User Profile
     QUSER     QUSER     Default user for PC Support
                                                                        Bottom
F3=Exit      F5=Refresh   F9=Work with nicknames   F10=Search directory
F12=Cancel   F13=Work with departments   F17=Position to   F24=More keys
```

Figure 26. Work with Directory Display

Type option 1 on the first option line and press the Enter key to enroll new users in the system distribution directory. The Add Directory Entry display will appear. See Figure 27.

4.5.1 Adding a Local User

Figure 27 shows a display that has already been filled with information for the local user being added.

```
                         Add Directory Entry

Type choices, press Enter.

  User ID/Address . . . .   SWAZI     BOEAS400     1
  Description . . . . . .   Local AS/400 User      2
  System name/Group . . .   BOEAS400               3
  User profile  . . . . .   SWAZI                  4
  Network user ID . . . .

 Name:
   Last  . . . . . . . .
   First . . . . . . . .
   Middle  . . . . . . .
   Preferred . . . . . .
   Full  . . . . . . . .

 Department  . . . . . .                        F4 for list
 Job title . . . . . . .
 Company . . . . . . . .
                                                                    More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F18=Display location details
```

Figure 27. Directory Entry for a Local User on the AS/400 System

1 User ID/Address: The unique user ID and address you choose. The user profile is a convenient choice for the user ID. For the NJE environment the address must be the same name as the AS/400 system name for the AS/400 local user. See Figure 20 on page 29.

2 Description: Any description you want for this entry.

3 System name/Group: The display automatically contains the system name for your local system. The system name is a required entry for a local user. Do not use the system group for a local user.

4 User profile: The user profile is required for a local user and must be a valid user profile on the local AS/400 system.

4.5.2 Adding a Remote User

Figure 28 shows the display where a remote user is being added.

```
                        Add Directory Entry

 Type choices, press Enter.

   User ID/Address . . . .   *ANY      BOEVSE22                      1
   Description . . . . . .   Any User on the VSE System BOEVSE22     2
   System name/Group . . .   BOEVSE22                               3
   User profile  . . . . .                                          4
   Network user ID . . . .

  Name:
    Last  . . . . . . . .
    First . . . . . . . .
    Middle  . . . . . . .
    Preferred . . . . . .
    Full  . . . . . . . .

   Department  . . . . . .                        F4 for list
   Job title . . . . . . .
   Company . . . . . . . .
                                                                  More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F18=Display location details
```

Figure 28. Directory Entry for Remote Users on the VSE System

1 User ID/Address: For remote users you can use unique user IDs or you can use the *ANY entry. For more information regarding the *ANY entries please see *AS/400 Distribution Services Network Guide*. For our lab tests we used the *ANY user ID and a specific system name for the address to indicate that distributions can be sent or received from any user on that system. For the NJE environment the address must be the same name as the VSE/POWER PNET node name.

2 Description: Any description you want to add for this entry.

3 System name/Group: The system name for a remote user cannot be the system name for the local AS/400 system. The system name must be the same name as specified by the VSE/POWER PNET node name. This must match the destination system name in Figure 24 on page 32.

4 User profile: The user profile must be left blank for remote users.

4.6 AS/400 to 3172 Matching Parameters

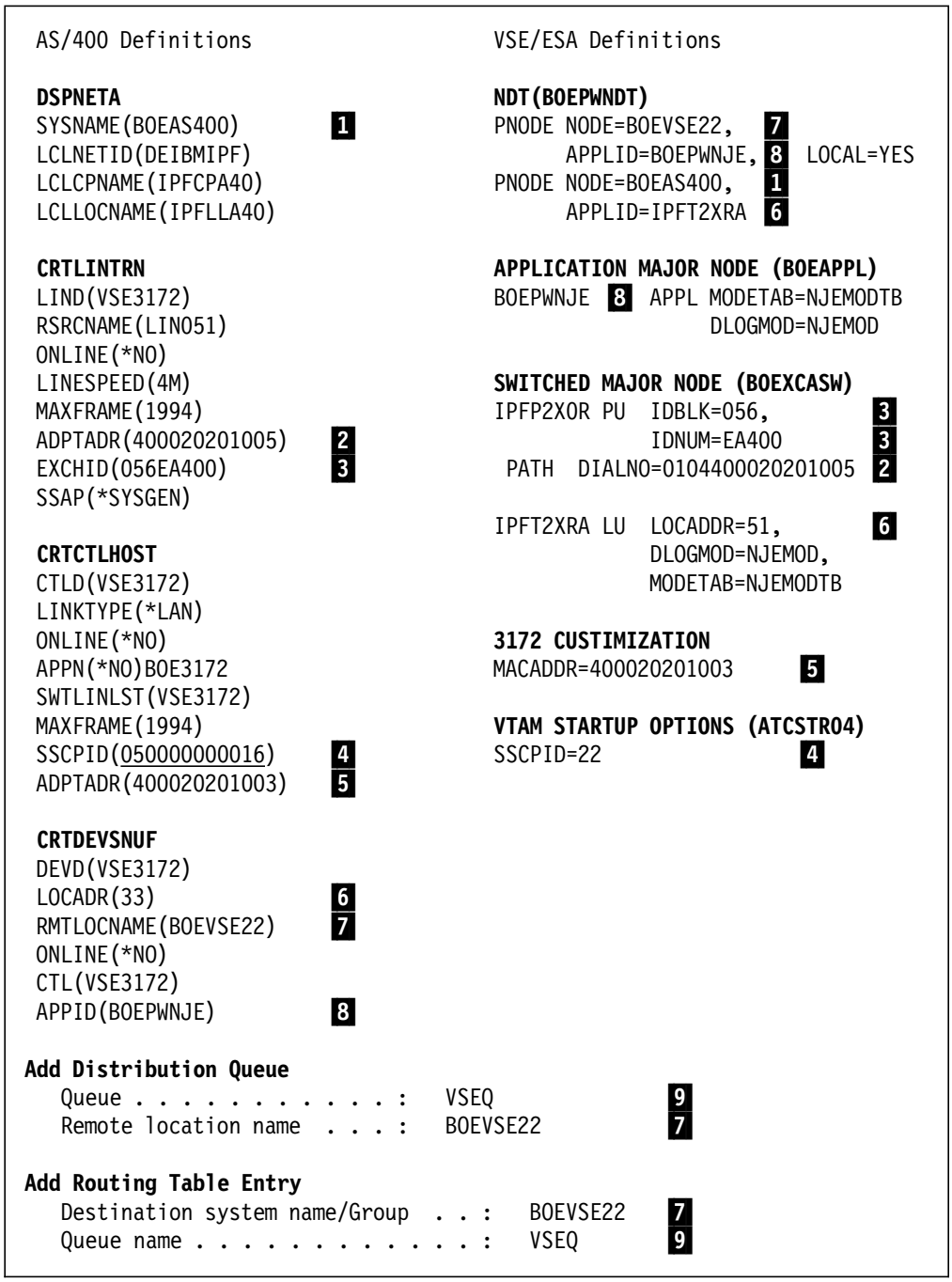

Figure 29. Matching Parameters for AS/400 and VSE

1 The AS/400 system name, as specified in the network attributes, must match the node name specified in the VSE/POWER network definition table for the AS/400.

2 The AS/400 token-ring adapter address must match the token-ring address specified for the AS/400 PU in the VSE/VTAM definition.

3 The IDBLK and IDNUM specified for the AS/400 PU must match the exchange identifier (EXCHID) specified in the token-ring line description on the AS/400.

4 The SSCPID specified on the host controller description, in hexadecimal format, on the AS/400 must match the SSCPID specified on the VTAM startup list which is specified in decimal format.

5 The host controller adapter address specified on the AS/400 must match the 3172 MAC address.

6 On the VSE/ESA definitions, the APPLID associated with the AS/400 PNODE node name must be same name as the LU defined for the AS/400 PU. The address of this LU, in decimal notation, must match the address of the AS/400 SNUF device description expressed in hexadecimal.

7 The remote location name (RMTLOCNAME) defined on the AS/400 SNUF device must match the PNODE (LOCAL=YES) node name defined for the VSE host in the network definition table.

8 The APPLID defined in the SNUF device must match the APPL (application program) defined in the VSE/ESA application major node definitions.

9 Queue name: The name of the queue in which distributions are stored before they are sent.

Chapter 5. Additional AS/400 to VSE/POWER Connection Examples

This chapter discusses more examples of configurations that were carried out in the lab test environment:

- AS/400 to VSE via 3174 Token-Ring Gateway
- AS/400 to VSE via 3745 SDLC Link
- AS/400 to VSE via 9221 ICA Adapter

Discussion will center mainly on the host definitions for these environments.

The AS/400 SNADS configuration is the same regardless of the connection type.

For a complete discussion on token-ring environment configuration please see Chapter 4, “Definitions for the Test Environment using the 3172” on page 19.

Configurations for an SDLC environment on the AS/400 are discussed later in this chapter. See 5.4, “AS/400 Configurations for the SDLC Connections” on page 51.

5.1 AS/400 to VSE via 3174 Token-Ring Gateway

This part describes the host definitions related to 3174.

See 3.1, “Common Host Definitions” on page 9 for the common host definitions.

5.1.1 Configuration Overview

The 3174 is assigned the physical address X′2000′ by the 9221 IOCDS definition, and dedicated to the guest VSE/ESA machine as the address X′200′. Similarly, the AS/400 is dedicated to the guest VSE/ESA machine as the address X′201′ via 3174 G/W. X′2001′ is assigned to the AS/400 as the physical address by the 9221 IOCDS definition. See Figure 31 on page 40.

Therefore the following commands are included in the VSE/ESA user directory.

DEDICATE 200 2000

DEDICATE 201 2001

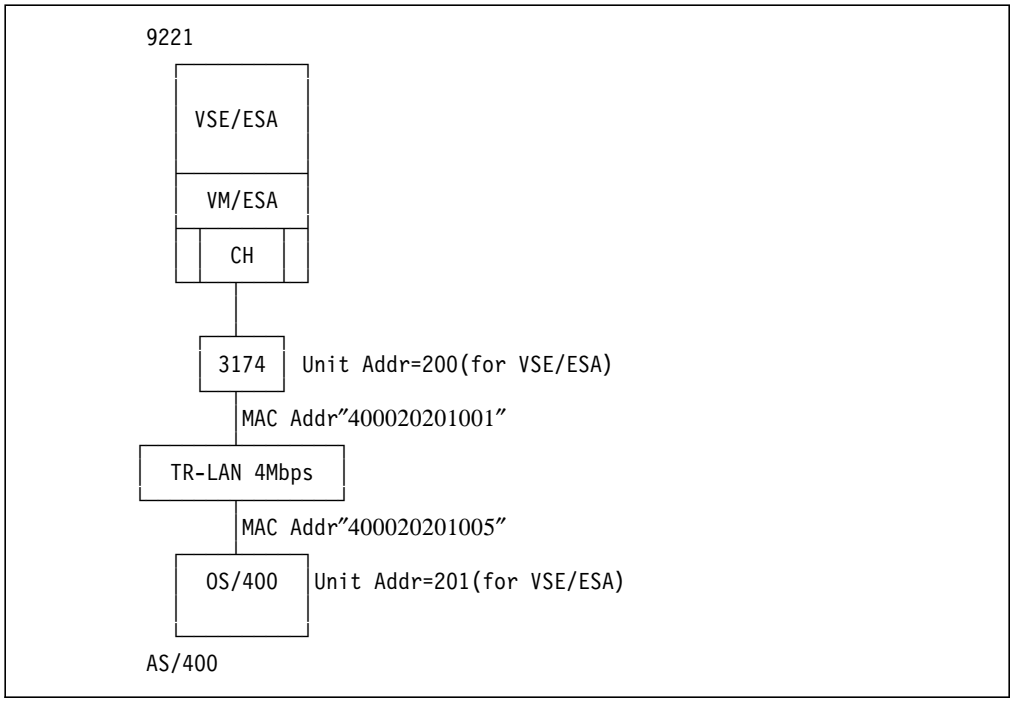

Figure 30. 3174 Token-Ring Gateway Environment

Regarding this connectivity in the VSE/ESA environment, please see *VSE/ESA Networking Support*.

5.1.2 3174 Definition for the 9221 IOCDS

The 3174 must be defined in the 9221 IOCDS. The 3174 is the local SNA controller, therefore the address range of PUs, which is controlled by the 3174, is from X'2000' to X'201F'.

```
CHPID PATH=((2A)),TYPE=BL
CNTLUNIT CUNUMBR=3174,PATH=(2A),UNIT=3705,UNITADD=((00,32)),PROTOCL=D,X
              SHARED=N
IODEVICE ADDRESS=(2000,32),CUNUMBR=(3174),UNIT=3705,MODEL=H8
```

Figure 31. 3174 Definition Example for the 9221 IOCDS

5.1.3 3174 Definition

Figure 32 on page 41 shows some important parameters for the 3174 customization.

```
Configuration Questions (Important parameters for this test environment)

900 : 4000 2020 1001 04        1    (MACADDR for 3174 Gateway)
911 : 0                        2    (Ring Speed of the Gateway : 4Mb)

940 : Ring address assignment for T2.0 node

S   Ring address  SAP TS
00  400020201001  04          3
01  400020201005  04  1       4
```

Figure 32. Configuration of the 3174

1 This is the 12 digits hexadecimal address of the 3174 Token-Ring Gateway.

2 The value on this option gives the Ring Speed of the Gateway.

3 Column 1 contains the unit address of the downstream physical unit. Column 2 is the 12 digit token-ring address of the downstream physical unit. Column 3 defines the service access point (SAP) identifier. Column 4 is the type of device for each downstream physical unit. The values on this row represent the unit address and the token-ring adapter address of the 3174.

4 The values on this row represent the unit address and the token-ring adapter address of the AS/400.

For more information on the IBM 3174 customization, please see the *IBM 3174 Establishment Controller Installation Guide*.

5.1.4 VSE/POWER Network Definition Table

Figure 33 shows the JCL of the job that creates the NDT.

```
* $$ JOB JNM=BOEPWNDT,CLASS=O,DISP=D
* $$ LST CLASS=Q
// JOB BOEPWNDT NETWORK DEFINITION TABLE
LIBDEF PHASE,CATALOG=PRD2.CONFIG
// OPTION CATAL
// EXEC ASSEMBLY
         PRINT NOGEN
BOEPWNDT PNODE NODE=BOEVSE22,APPLID=BOEPWNJE,LOCAL=YES
         PNODE NODE=BOEAS400,APPLID=IPFT2GRA,    1                    X
               AUTH=NET,BUFSIZE=1920,                                   X
               MAXBUF=(3,3)
         END
/*
// EXEC LNKEDT
/&
* $$ EOJ
```

Figure 33. NDT "BOEPWNDT" Creation Job

1 The APPLID defined for the AS/400 PNODE node name must match the LU name defined by VTAM for the AS/400. See Figure 34 on page 42.

For more information about NDT, see 4.1.4, “VSE/POWER Network Definition Table (NDT)” on page 22.

5.1.5 VTAM Definitions for the 3174 and AS/400

Both the AS/400 and the 3174 are defined in the VTAM local SNA major node on this test environment.

```
*
*  3174 LAN GATEWAY FOR AS/400
*
BOESNA   VBUILD TYPE=LOCAL
BOE3174G PU     CUADDR=200,              1                        X
                DELAY=0.2,                                        X
                ISTATUS=ACTIVE,                                   X
                MAXBFRU=29,                                       X
                PUTYPE=2,                                         X
                XID=YES,                                          X
                DYNLU=NO
IPFP2GOR PU     CUADDR=201,              1                        X
                DELAY=0.2,                                        X
                ISTATUS=ACTIVE,                                   X
                MAXBFRU=29,                                       X
                PUTYPE=2,                2                        X
                XID=NO,PACING=1,                                  X
                VPACING=3                2                        X
IPFT2GRA LU     LOCADDR=51,              2                        X
 3              DLOGMOD=NJEMOD,          2                        X
                MODETAB=NJEMODTB,        2                        X
                PACING=1,                                         X
                SSCPFM=USSSCS
```

Figure 34. VTAM Local SNA Major Node "BOESNA.B" (in PRD2.CONFIG)

1 CUADDR: X'200' and '201' must match the address defined in the VSE/ESA IPL procedure. The 3174 has the unit address 200 and the AS/400 has the unit address 201.

2 For an explanation of the other parameters, see 4.1.6, “VTAM Definitions for the AS/400” on page 23.

3 The LU name must match the APPLID of the PNODE macro which defines the AS/400 node. See Figure 33 on page 41.

5.2 AS/400 to VSE via 3745 SDLC Link

This part describes the host definitions related to the 3745 SDLC link.

See 3.1, “Common Host Definitions” on page 9 for the common host definitions.

5.2.1 Configuration Overview

The 3745 is dedicated to the guest VSE/ESA machine as the address X'560'. X'0560' is assigned to the 3745 as the physical address by the 9221 IOCDS definition. See Figure 36.

Therefore the following command is included in the VSE/ESA user directory of the VM/ESA:

DEDICATE 560 0560

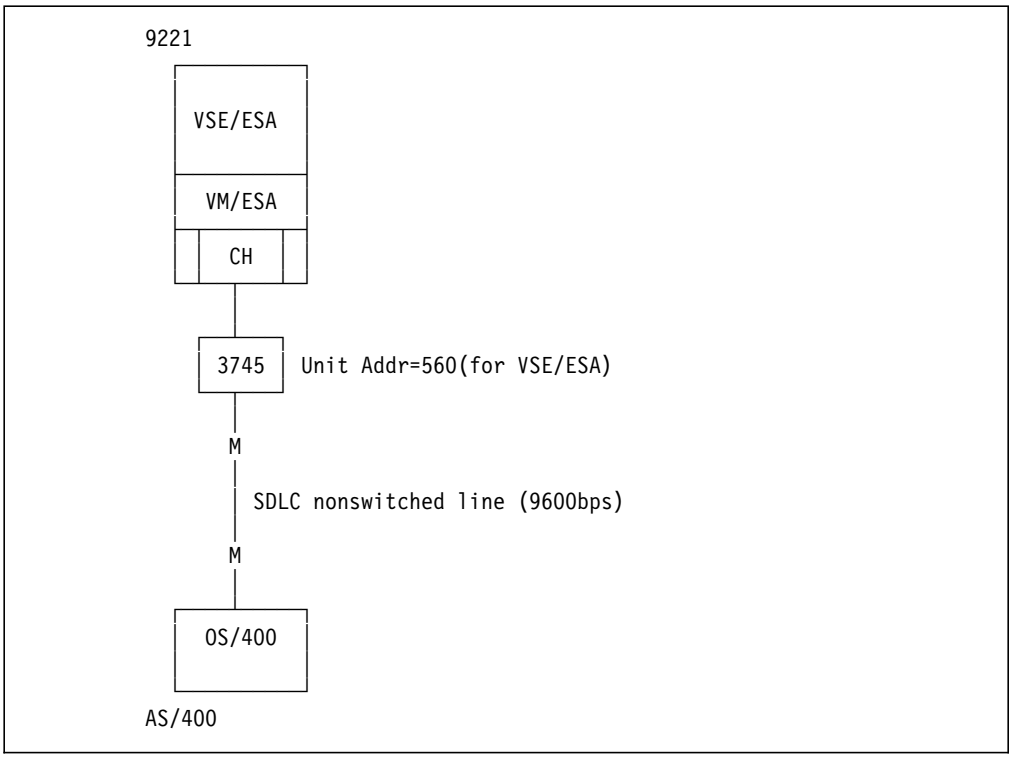

Figure 35. 3745 SDLC Link Environment

Regarding this connectivity in the VSE/ESA environment, please see *VSE/ESA Networking Support*.

5.2.2 3745 Definition for the 9221 IOCDS

The 3745 must be defined in the 9221 IOCDS.

```
CHPID PATH=((2A)),TYPE=BL
CNTLUNIT CUNUMBR=3745,PATH=(2A),UNIT=3745,UNITADD=((60)),PROTOCL=D,   X
              SHARED=N
IODEVICE ADDRESS=(0560),CUNUMBR=(3745),UNIT=3745
```

Figure 36. 3745 Definition Example for the 9221 IOCDS

Note that the 3745 is dedicated to the guest VSE machine as the address X'560'. See 5.2.1, "Configuration Overview."

5.2.3 VSE/POWER Network Definition Table for the 3745 SDLC Link

Figure 37 shows the job for generating the NDT.

```
* $$ JOB JNM=BOEPWNDT,CLASS=O,DISP=D
* $$ LST CLASS=Q
// JOB BOEPWNDT NETWORK DEFINITION TABLE
LIBDEF PHASE,CATALOG=PRD2.CONFIG
// OPTION CATAL
// EXEC ASSEMBLY
         PRINT NOGEN
BOEPWNDT PNODE NODE=BOEVSE22,APPLID=BOEPWNJE,LOCAL=YES
         PNODE NODE=BOEAS400,APPLID=IPFT2NRA, 1                    X
               AUTH=NET,BUFSIZE=1920,                              X
               MAXBUF=(3,3)
         END
/*
// EXEC LNKEDT
/&
* $$ EOJ
```

Figure 37. NDT "BOEPWNDT" Creation Job

1 IPFT2NRA is the LU name of the AS/400. See Figure 38 on page 45.

For more information about NDT, see 4.1.4, "VSE/POWER Network Definition Table (NDT)" on page 22.

5.2.4 VTAM/NCP Definitions for the 3745

Figure 38 on page 45 are the definitions related to the VTAM NCP major node and NCP generation.

For more information on each parameter, see *VTAM Resource Definition Reference* and *NCP,SSP,and EP Resource Definition Reference*.

```
*********************************************************************
*        OPTIONS MACRO SPECIFICATION                                *
*********************************************************************
         OPTIONS NEWDEFN=(YES,ECHO)
         EJECT
*********************************************************************
*        PCCU MACRO SPECIFICATION                                   *
*********************************************************************
         PCCU  CUADDR=560,     1 3745-170 CONTROL UNIT ADDRESS       X
               MAXDATA=4680,     MAXIMUM DATA TRANSFER TO NCP        X
               AUTOIPL=NO,       DO NOT AUTOIPL AND RESTART          X
               SUBAREA=22,     2 SAME AS ACF/VTAM HOSTSA OPERAND     X
               NCPLUB=SYS005     UNIT CONTAINING NCP LOAD MODULE
         EJECT
*********************************************************************
*        BUILD MACRO SPECIFICATION                                  *
*********************************************************************
         BUILD BFRS=240,           NCP BUFFER SIZE                   X
               BRANCH=500,         BRANCH TRACE ENTRIES              X
               CWALL=26,           MIN. BUFFERS BEFORE SLOWDOWN      X
               DR3270=YES,         DYNAMIC RECONFIG FOR SDLC 3270    X
               DSABLTO=11.5,       DISABLE TIMEOUT FOR DATA SET READY X
               ENABLTO=11.5,       ENABLE TIMEOUT FOR DATA SET READY X
               LTRACE=2,           ALLOW LINE TRACE                  X
               MAXSSCP=8,          MAXIMUM CONCURRENT SSCP-NCP SESSIONS X
               MAXSUBA=255,        THE MAXIMUM FOR SA NUMBERS (PRE-ENA) X
               SALIMIT=255,        THE MAXIMUM FOR SA NUMBERS (ESA)  X
               MEMSIZE=8192,       3745-170 STORAGE SIZE IN K-BYTES  X
               USGTIER=4,          SCANNER RELATED FEATURE CODE      X
               MODEL=3745-170,     MODEL FOR 3745-170                X
               NEWNAME=BOENCP1,                                      X
               OLT=YES,            ONLINE TEST AVAILABLE             X
               PRTGEN=NOGEN,       SUPPRESS PRINTING OF MACRO GEN STMTS X
               SLODOWN=12,         SLOWDOWN WHEN 12% OF BUFFERS AVAIL X
               SUBAREA=03,     3 NCP ITSELF SUBAREA ADDRESS          X
               TRACE=(YES,64),     64 ADDRESS TRACE ENTRIES          X
               TRANSFR=29,         MAX NCP BUFFER TRANSFER TO HOST   X
               TYPGEN=NCP,         CONTROLLER OPERATES CHANNEL ATTACHED X
               TYPSYS=DOS,         VSE/ESA IS A DOS BASED SYSTEM     X
               NETID=DEIBMIPF,     NAME OF THE NETWORK               X
               VERSION=V5R4        ACF/NCP VERSION V5R4 IS USED
         EJECT
```

Figure 38 (Part 1 of 3). VTAM/NCP Definitions for the 3745

```
*********************************************************************
*        SYSCNTRL MACRO SPECIFICATION                               *
*********************************************************************
         SYSCNTRL OPTIONS=(BHSASSC,ENDCALL,MODE,RCNTRL,RCOND,RECMD,    X
               RIMM,NAKLIM,SESSION,SSPAUSE,XMTLMT,STORDSP,DLRID,RDEVQ)
        EJECT
*********************************************************************
*        HOST MACRO SPECIFICATION                                   *
*********************************************************************
         HOST  BFRPAD=15,          15 REQUIRED BY VSE VTAM             X
               INBFRS=29,          MINIMUM NCP BUFFER ALLOCATION       X
               MAXBFRU=29,         VTAM BUFFER UNIT ALLOCATION         X
               SUBAREA=(22),   2   ACF/VTAM SUBAREA ADDRESS            X
               UNITSZ=288          ACF/VTAM IO BUFFER SIZE (LFBUF)
         EJECT
*********************************************************************
*        DYNAMIC RECONFIGURATION POOL SPACE                         *
*        LUDRPOOL AND PUDRPOOL MACRO SPECIFICATIONS                 *
*********************************************************************
         LUDRPOOL NUMTYP1=1,       ALLOW 1 LU ON PU.T1 PU              X
               NUMTYP2=300         ALLOW 300 LUS ON PU.T2 PU
         PUDRPOOL NUMBER=20        CAN ADD 20 PUS
         EJECT
*********************************************************************
*        PATH MACRO SPECIFICATION                                   *
*********************************************************************
         PATH  DESTSA=(22),        PATH TO VSE/VTAM                    X
               ER0=(22,1),VR0=0
         EJECT
```

Figure 38 (Part 2 of 3). VTAM/NCP Definitions for the 3745

```
*********************************************************************
*        LINE 000 LINK TO AS/400 (SDLC 9600bps)                     *
*********************************************************************
IPFG3000 GROUP LNCTL=SDLC,          SDLC LINK PROTOCOL                X
               DIAL=NO,             NONSWITCHED LINE                  X
               LSPRI=PU,                                              X
               REPLYTO=3,           REPLY TIME OUT AFTER 3 SECOND     X
               RNRLIMT=,            DEFAULT 3 MIN                     X
               TEXTTO=1,                                              X
               TYPE=NCP,                                              X
               ISTATUS=INACTIVE,    (V) VTAM                          X
               X21NTWK=NO
IPFL3000 LINE  ADDRESS=(000,HALF), TRANSMIT AND RECEIVE ADDRESSES     X
               CLOCKNG=EXT,         MODEM PROVIDES CLOCKING           X
               CONFIG=NONSW,        NONSWITCHED SUBAREA LINK          X
               DUPLEX=FULL,         MODEM STRAPPING IS FULL           X
               MAXPU=1,             MAX NO. OF PU ASSOCIATED WITH LINK X
               NEWSYNC=YES,         CONTROLLER DOES     SUPPLY NEWSYNC X
               NRZI=YES,            NON-RETURN-TO-ZERO CHANGE ON ONE  X
               RETRIES=(7,10,5),    7 RETRIES PAUSE 10 SECONDS 5 TIMES X
               SPEED=9600,          LINE SPEED IS 9600  BPS           X
               TYPE=NCP,            NETWORK CONTROL MODE              X
               ISTATUS=INACTIVE     (V) VTAM
IPFP2NOR PU    ADDR=C1,        (4)  PU ADDRESS                        X
               MAXOUT=3,            MAX PIU SENT BEFORE RESP REQ      X
               MAXDATA=2057,        MAX DATA TRANSFER PU CAN ACCEPT   X
               PASSLIM=3,           THE MOST CONSECUTIVE PIUS SENT ONCE X
               PUTYPE=2,            PHYSICAL UNIT TYPE                X
               ISTATUS=INACTIVE     (V) VTAM
IPFT2NRA LU    LOCADDR=51,     (5)                                    X
(6)            DLOGMOD=NJEMOD,                                        X
               MODETAB=NJEMODTB,                                      X
               VPACING=3,                                             X
               PACING=1,                                              X
               SSCPFM=USSSCS
         EJECT
*********************************************************************
*        GROUP MACRO SPECIFICATION FOR CAS (NEW STYLE GENS)         *
*********************************************************************
CAGROUP  GROUP LNCTL=CA,           THE FOLLOWING VALUES ARE FOR ALL CAS X
               DELAY=0.2,          CA ATT. DELAY                     X
               TIMEOUT=(120),      TIME, NCP WAITS FOR A RESPONSE    X
               NCPCA=ACTIVE,       STATUS OF THE CHANNEL ADAPTER     X
               CASDL=0,            INFINITE CA SLOW DOWN TIME        X
               ISTATUS=ACTIVE
CA0560   LINE  ADDRESS=001,                                           X
               CA=TYPE6
CP0560   PU    PUTYPE=5
*********************************************************************
*        GENEND DELIMITER                                           *
*********************************************************************
         GENEND
         END
```

Figure 38 (Part 3 of 3). VTAM/NCP Definitions for the 3745

1 CUADDR: The channel device address defines the three digit hexadecimal channel unit address of the channel attachment for the communication controller

in which the NCP runs. This address must match the address defined in VSE/ESA IPL procedure. See Figure 3 on page 10.

2 Subarea specifies the subarea number to which this PCCU definition statement applies. This number must match the number specified for HOSTSA defined in the VTAM startup option list. See 3.1.5, “VTAM Startup Option List” on page 14.

3 Subarea in the BUILD macro specifies the native network subarea address that represents the gateway NCP to the network being defined. This subarea address is unique only in the network being defined by this BUILD definition statement.

4 ADDR specifies the two digit hexadecimal SDLC station address for the physical unit. This address must match the *station address* (STNADR) defined in the host controller description on the AS/400. See Figure 46 on page 53.

5 LOCADDR specifies the local address of the logical unit. The decimal value specified for the address must match the hexadecimal value specified for the local location address (LOCADR) of the AS/400 SNUF device description. See Figure 19 on page 28.

6 This LU name must match the APPLID of the PNODE macro which defines the AS/400 node. See 5.2.3, “VSE/POWER Network Definition Table for the 3745 SDLC Link” on page 44.

5.2.5 VTAM Path Table

Here is the VTAM path table used in the test environment. This table defines the path to NCP whose subarea address is ′3′.

```
*  PATH TO CONNECT TO ACF/NCP (BOENCP1)
IPFHWT3  PATH  DESTSA=3,                                          X
               ER0=(3,1),VR0=0
```

Figure 39. VTAM Path Table ″BOEPATH.B″ (in PRD2.CONFIG)

5.3 AS/400 to VSE via 9221 ICA SDLC Link

This part describes the host definitions related to the 9221 ICA.

See 3.1, “Common Host Definitions” on page 9 for the common host definitions.

5.3.1 Configuration Overview

One SDLC nonswitched line (9600bps) is connected from the port of the ICA to the AS/400 Communications line. The physical address of the port is X′0B40′, by the 9221 IOCDS definition, and dedicated to the guest VSE/ESA machine as the address X′B40′.

Therefore the following command is included in the VSE/ESA user directory of VM/ESA:

DEDICATE B40 0B40

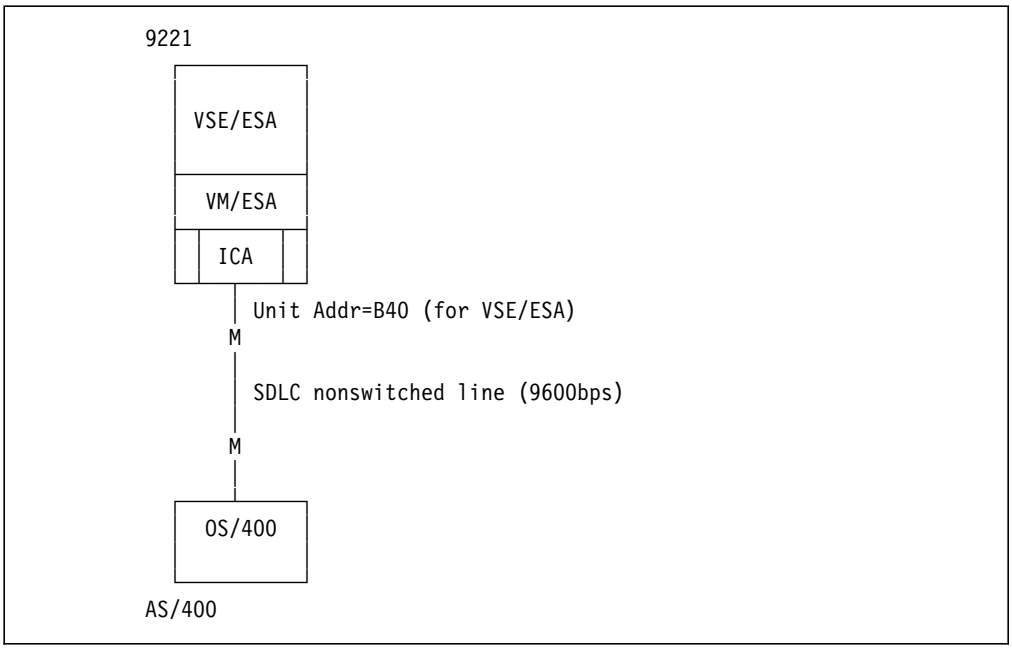

Figure 40. 9221 Integrated Communications Adapter Environment

For more information about this connectivity in the VSE/ESA environment, please see *VSE/ESA Networking Support*.

5.3.2 9221 ICA Definition for the 9221 IOCDS

The 9221 ICA must be defined in the 9221 IOCDS.

```
CHPID PATH=((0B,0B,0)),TYPE=IOC
CNTLUNIT CUNUMBR=0C04,PATH=(0B),UNIT=6252,UNITADD=((00,256)),SHARED=N
IODEVICE ADDRESS=(0B40,4),CUNUMBR=(0C04),UNIT=ICA,MODEL=SD
```

Figure 41. 9221 ICA Definition Example for the 9221 IOCDS

Note that the port, which has the SDLC line, is dedicated to the guest VSE/ESA machine as the address X′B40′. See 5.3.1, “Configuration Overview” on page 48.

5.3.3 9221 ICA Definition

Figure 42 on page 50 is a summary of the SDLC port customization.

```
Unit address                          : 40
Protocol                              : SDLC
Physical interface                    : RS232
Line speed                            : 9600 bps
NRZI                                  : YES            1
Switched/Leased                       : Leased line
V.25bis                               : Disabled
Permanent request to send             : YES            2
Clocking                              : DCE
Select standby                        : Disabled
Data rate select                      : Full speed
Data set ready enable time-out        : 3
Clear to send monitor                 : Enabled
Line utilization threshold percentage : 60
```

Figure 42. Configuration of the 9221 ICA

1 NRZI: Non-return to zero inverted is used to maintain data synchronization by preventing long periods without transitions when strings of binary zeros are transmitted. The specification must match on both the host and the AS/400. See 5.4.1, “SDLC Line Description” on page 52.

2 If you specify ″YES″, you must specify ″*FULL″ in *DUPLEX* defined on the SDLC Line description of the AS/400. See 5.4.1, “SDLC Line Description” on page 52.

5.3.4 VSE/POWER Network Definition Table

Figure 43 shows the job that creates the NDT.

```
* $$ JOB JNM=BOEPWNDT,CLASS=O,DISP=D
* $$ LST CLASS=Q
// JOB BOEPWNDT NETWORK DEFINITION TABLE
LIBDEF PHASE,CATALOG=PRD2.CONFIG
// OPTION CATAL
// EXEC ASSEMBLY
         PRINT NOGEN
BOEPWNDT PNODE NODE=BOEVSE22,APPLID=BOEPWNJE,LOCAL=YES
         PNODE NODE=BOEAS400,APPLID=IPFT2IRA,     1                  X
         AUTH=NET,BUFSIZE=1920,                                      X
               MAXBUF=(3,3)
         END
/*
// EXEC LNKEDT
/&
* $$ EOJ
```

Figure 43. NDT ″BOEPWNDT″ Creation Job

1 The APPLID defined for the AS/400 PNODE node name must match the LU name of AS/400. See 5.3.5, “VTAM CA Major Node Definition” on page 51.

For more information about NDT, see 4.1.4, “VSE/POWER Network Definition Table (NDT)” on page 22.

5.3.5 VTAM CA Major Node Definition

Both the AS/400 and the 9221 ICA are defined in the VTAM channel-attachment (CA) major node on this test environment.

```
*********************************************************************
*        CA MAJOR NODE                                              *
*********************************************************************
BOEICA   VBUILD TYPE=CA
G9221ICA GROUP LNCTL=SDLC,                                          X
               DIAL=NO,                                             X
               ISTATUS=INACTIVE
L9221ICA LINE  ADDRESS=B40,          1                              X
               CORNUM=(1,2),                                        X
               MAXBFRU=(2,8),                                       X
               PORT=A
IPFP2IOR PU    ADDR=C1,              2                              X
               MAXDATA=2057,         3                              X
               PUTYPE=2              4
IPFT2IRA LU    LOCADDR=51,           4                              X
 5             DLOGMOD=NJEMOD,       4                              X
               MODETAB=NJEMODTB,     4                              X
               VPACING=3,            4                              X
               PACING=1,SSCPFM=USSSCS
```

Figure 44. VTAM CA Major Node "BOEICA.B" (in PRD2.CONFIG)

1 ADDRESS: X'B40' must match the address defined in the VSE/ESA IPL procedure.

2 'C1' must match the *Station address* defined on the AS/400. See Figure 46 on page 53.

3 MAXDATA represents the size of PIU. See 4.1.6, "VTAM Definitions for the AS/400" on page 23.

4 See 4.1.6, "VTAM Definitions for the AS/400" on page 23.

5 IPFT2IRA must match the APPLID of the PNODE macro which defines the AS/400 node. See 5.3.4, "VSE/POWER Network Definition Table" on page 50.

5.4 AS/400 Configurations for the SDLC Connections

The same communications configuration objects were used on the AS/400 for communicating to the 3745 SDLC Link as for the 9221 ICA.

Only those parameters that are important for our environment and unique to the SDLC communications objects, compared to token-ring, will be discussed in this section.

5.4.1 SDLC Line Description

Use the CRTLINSDLC command to create the SDLC line description as shown in Figure 45 below.

```
                    Create Line Desc (SDLC) (CRTLINSDLC)

Type choices, press Enter.

Line description . . . . . . . . LIND         > VSE9221ICA
Resource names . . . . . . . . . RSRCNAME     > LIN021
                        + for more values
Online at IPL  . . . . . . . . . ONLINE       > *NO
Data link role . . . . . . . . . ROLE         > *SEC
Physical interface . . . . . . . INTERFACE      *RS232V24     1
Connection type  . . . . . . . . CNN            *NONSWTPP     2
Switched network backup  . . . . SNBU           *NO
Exchange identifier  . . . . . . EXCHID       > 056EE400
NRZI data encoding . . . . . . . NRZI           *YES          3
Line speed . . . . . . . . . . . LINESPEED      9600
Modem type supported . . . . . . MODEM          *NORMAL
Maximum frame size . . . . . . . MAXFRAME     > 2057          4
Duplex . . . . . . . . . . . . . DUPLEX       > *FULL         5
Inactivity timer . . . . . . . . INACTTMR       300
Poll response delay  . . . . . . POLLRSPDLY     0
Text 'description' . . . . . . . TEXT         > 'VSE to OS/400 NJE via 9221 ICA'

                                                                        Bottom
F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
F13=How to use this display        F24=More keys
```

Figure 45. SDLC Line Description

1 Physical interface: The type of physical communications line interface to which this communications adapter port and cable will be attached. The port and cable must be compatible with the type of physical interface to which they are being connected.

2 Connection type: The connection type specifies whether this line is nonswitched, switched or multipoint.

3 NRZI data encoding: The NRZI specification must match on both the host and the AS/400.

4 Maximum frame size: Specifies the maximum frame size that can be transmitted and received on this line.

5 Duplex: If *FULL duplex is selected, the AS/400 will leave the request-to-send (RTS) modem signal on continuously. If *HALF duplex is selected, RTS will be raised when the AS/400 must transmit and dropped when it is finished transmitting. The value specified for duplex must match the value specified at the host.

5.4.2 Host Controller Description

Use the CRTCTLHOST command to create the host controller description. Specify LINKTYPE(*SDLC) to indicate that the controller is attached to an SDLC line as shown in Figure 46 below.

```
                    Create Ctl Desc (SNA Host) (CRTCTLHOST)

 Type choices, press Enter.

 Controller description . . . . . CTLD         > VSE9221ICA
 Link type  . . . . . . . . . . . LINKTYPE     > *SDLC           1
 Online at IPL  . . . . . . . . . ONLINE       > *NO
 Switched connection  . . . . . . SWITCHED       *NO             2
 Switched network backup  . . . . SNBU           *NO
 APPN-capable . . . . . . . . . . APPN         > *NO
 Attached nonswitched line  . . . LINE         > VSE9221ICA
 Maximum frame size . . . . . . . MAXFRAME     > 2057            3
 Remote network identifier  . . . RMTNETID       *NETATR
 Remote control point . . . . . . RMTCPNAME
 SSCP identifier  . . . . . . . . SSCPID       > 050000000016    4
 Local exchange identifier  . . . LCLEXCHID      *LIND
 Station address  . . . . . . . . STNADR       > C1              5
 Recontact on vary off  . . . . . RECONTACT      *YES
 Text 'description' . . . . . . . TEXT         > 'VSE to OS/400 NJE via 9221 ICA'

                                                                      Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
 F13=How to use this display        F24=More keys
```

Figure 46. Host Controller Description

1 Link type: Specifies that this host controller is attached to an SDLC line.

2 Switched connection: Specifies whether this controller is attached to a switched line or not. SWITCHED(*NO) means that the controller is attached to a nonswitched line.

3 Maximum frame size: The maximum frame size that the controller can send and receive. In our test environment we found that this value must match the value on the line description.

4 SSCP identifier: For a host controller, the first two characters must be hex 05 and the remaining 10 must be the hex representation of the SSCPID as specified in the host.

5 Station address: For a host controller, this is the address of the AS/400 system. This information is specified on the ADDR parameter of the PU macro instruction at the host configuration.

5.4.3 SNUF Device Description

The SNUF device is created the same way regardless of the link type used. All the parameters that were specified for the token-ring connection apply equally for the SDLC link, see 4.2.4, “Configuring the SNUF Device Description” on page 27.

```
                    Create Device Desc (SNUF) (CRTDEVSNUF)

Type choices, press Enter.

Device description . . . . . DEVD         > VSE9221ICA
Local location address . . . . . LOCADR       > 33
Remote location  . . . . . RMTLOCNAME   > BOEVSE22
Online at IPL  . . . . . ONLINE       > *NO
Attached controller  . . . . . CTL          > VSE9221ICA
Program start request capable  . PGMSTRRQS      *NO
Application identifier . . . . . APPID        > BOEPWNJE
Host type  . . . . . HOST           *CICS
Record length  . . . . . RCDLEN         512
Block length . . . . . BLKLEN         512
Default program  . . . . . DFTPGM
  Library  . . . . . *LIBL
Text 'description' . . . . . TEXT         > 'VSE to OS/400 NJE via 9221 ICA'

                                                                      Bottom
F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
F13=How to use this display        F24=More keys
```

Figure 47. SNUF Device Description

For more information regarding the AS/400 communications objects configurations, their related commands and parameters, please see the *AS/400 Communications Configuration Guide*.

Chapter 6. Operation

This chapter discusses the actions required to start communications between the VSE host and the AS/400. It also discusses how to send and receive network jobs, spooled list files and messages between the two systems.

This chapter does not discuss the sending and receiving of VSE/ESA VSAM files (spooled punch files) and AS/400 physical files between VSE/POWER and AS/400. Please see Chapter 7, “Considerations Summary” on page 71.

6.1 Initiation and Termination

6.1.1 Initiating the VM/MVS Bridge Connection at the AS/400

To start communications between the host and the AS/400 use the Vary Configuration (VRYCFG) or the Work with Configuration Status (WRKCFGSTS) command. For more information on these commands please use the Help key on the AS/400 display or see the *AS/400 Control Language Reference* manual.

We used the WRKCFGSTS command to vary the line, controller and device on.

Check with the host operator that the PU and LU defining the AS/400 have been successfully activated.

The configuration status will only be as shown in Figure 48 if the configuration descriptions were successfully varied on and PU and LU on the host were successfully activated.

WRKCFGSTS *LIN VSE3172

```
                        Work with Configuration Status               BOEAS400
                                                          03/07/94  12:38:16
Position to  . . . . .               Starting characters

Type options, press Enter.
  1=Vary on   2=Vary off   5=Work with job   8=Work with description
  9=Display mode status ...

Opt  Description       Status                -------------Job--------------
     VSE3172          ACTIVE
       VSE3172        ACTIVE
         VSE3172      VARIED ON



                                                                        Bottom
Parameters or command
===>
F3=Exit   F4=Prompt   F12=Cancel   F23=More options   F24=More keys
```

Figure 48. Device Status Before Subsystem QSNADS is Started

Start subsystem QSNADS using the command:

STRSBS QSNADS

to complete the connection. QSNADS might take a few seconds to come up as there are a number of jobs that need to be started by the subsystem.

A successful connection to the host will result in the line, controller and device descriptions all showing a status of ACTIVE. The SNUF device description will have a job by user QGATE showing under “Job” as in Figure 49

WRKCFGSTS *LIN VSE3172

```
                        Work with Configuration Status                BOEAS400
                                                              03/07/94  12:41:13
Position to  . . . . .               Starting characters

Type options, press Enter.
  1=Vary on   2=Vary off   5=Work with job   8=Work with description
  9=Display mode status ...

Opt  Description       Status                -------------Job--------------
     VSE3172          ACTIVE
       VSE3172        ACTIVE
         VSE3172      ACTIVE                LDBOEVSE22  QGATE       001122


                                                                        Bottom
Parameters or command
===>
F3=Exit   F4=Prompt   F12=Cancel   F23=More options   F24=More keys
```

Figure 49. Device Status After Subsystem QSNADS is Started

If the QSNADS subsystem is already active and WRKCFGSTS shows that the SNUF device description is VARIED ON then you must end subsystem QSNADS. Use the End Subsystem command as follows:

ENDSBS QSNADS *IMMED

Make sure that QSNADS is completely ended by using the Work with Subsystems (WRKSBS) command and making sure that QSNADS is not listed in the list of active subsystems. Start subsystem QSNADS (STRSBS QSNADS) and keep on Refreshing (F5) the Work with Configuration Status display until the SNUF device description is ACTIVE and has a job by user QGATE as shown in Figure 49.

6.1.2 Initiating and Controlling VSE/POWER PNET Session

Before starting the PNET session from VSE/POWER, the SNUF device description on the AS/400 must be ACTIVE and must have a job by user QGATE as shown in Figure 49.

To start the PNET session with the VM/MVS Bridge, issue the PSTART command from the VSE operator console.

```
{PSTART|S} PNET,nodeid,[node-password],,,[TRACE][,NR]
```

Figure 50. Format of PSTART Command

```
PSTART PNET,BOEAS400
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1RB3I  NODE BOEAS400 SIGNED-ON ON LINE SNA, BSIZE=01920, TIME=
       8:25:26
```

Figure 51. Sample Console Log of PSTART Command

You can display the current status of the PNET session with the VSE/POWER commands.

1. To display information about the currently used NDT, you can issue the PDISPLAY PNET command from the VSE operator console.

```
{PDISPLAY|D} PNET[,ALL[,listaddr]|,nodeid|,LINKS]
```

Figure 52. Format of PDISPLAY PNET Command

2. To display active network tasks (transmitter and receiver), issue the PDISPLAY A command.

```
{PDISPLAY|D} A,PNET[,nodeid]
```

Figure 53. Format of PDISPLAY A Command

3. To display status information for all currently connected nodes, use the PINQUIRE command.

```
{PINQUIRE|I} ALL|NODE=nodeid
```

Figure 54. Format of PINQUIRE Command

```
D PNET,ALL
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1RB7I  *****  NDT NAME = BOEPWNDT  *****
F1 001 1RB7I  NODE     ROUTE1   ROUTE2   AUTH  BSIZE APPLID   PASSWORD
F1 001 1RB7I  BOEVSE22 ----- LOCAL -----             BOEPWNJE
F1 001 1RB7I  BOEAS400 *SNA *            NET    1920 IPFT2XRA
F1 001 1RB7I  BOEVMIS2 *SNA *            NET    2048 xxxxxxxx
F1 001 1RB7I  BOEVMISC BOEVMIS2          NET
D A,PNET
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1R48I  C-RV ,SNA,    AWAITING     NODE=BOEVMIS2
F1 001 1R48I  C-RV ,SNA,    AWAITING     NODE=BOEAS400
F1 001 1R48I  O-TR1,SNA,*,  ICCFPRT ,01383,A  LEFT=00005788 OF 00006268
       NODE=BOEAS400
I ALL
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1R56I  SNA PROCESSING NODE BOEAS400
F1 001 1R56I  SNA PROCESSING NODE BOEVMIS2
I NODE=BOEAS400
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1R56I  SNA PROCESSING NODE BOEAS400
F1 001 1R56I  JOB-TRANSMITTER 1=I 2=D 3=D 4=D 5=D 6=D 7=D
F1 001 1R56I  OUT-TRANSMITTER 1=A 2=D 3=D 4=D 5=D 6=D 7=D
F1 001 1R56I  JOB-RECEIVER... 1=I 2=I 3=I 4=I 5=I 6=I 7=I
F1 001 1R56I  OUT-RECEIVER... 1=I 2=I 3=I 4=I 5=I 6=I 7=I
```

Figure 55. Sample Console Log of PDISPLAY / PINQUIRE Command

In order to load a new NDT while VSE/POWER is using an already loaded (old) NDT, use the PLOAD command.

```
PLOAD PNET,phasename
```

Figure 56. Format of PLOAD PNET Command

```
PLOAD PNET,BOEPWNDT
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1RB4I  PLOAD NETWORK DEFINITION TABLE BOEPWNDT LOADED
```

Figure 57. Sample Console Log of PLOAD PNET Command

You are able to control transmitter or receiver tasks with the VSE/POWER commands.

1. Activating a transmitter/receiver, use the PACT command.

```
PACT PNET,nodeid,{RVn|TRn},{JOB|OUT}
```

Figure 58. Format of PACT Command

2. Deactivating (draining) a transmitter or receiver task, use the PDRAIN command.

```
{PDRAIN|N} PNET,nodeid,{RVn|TRn},{JOB|OUT}[,EOJ]
```

Figure 59. Format of PDRAIN Command

3. Flushing network receiving or transmitting, use the PFLUSH command.

```
{PFLUSH|F} PNET,nodeid,{RVn|TRn},{JOB|OUT}[,HOLD]
```

Figure 60. Format of PFLUSH Command

```
I NODE=BOEAS400
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1R56I  SNA PROCESSING NODE BOEAS400
F1 001 1R56I  JOB-TRANSMITTER 1=I 2=D 3=D 4=D 5=D 6=D 7=D
F1 001 1R56I  OUT-TRANSMITTER 1=I 2=D 3=D 4=D 5=D 6=D 7=D
F1 001 1R56I  JOB-RECEIVER... 1=I 2=I 3=I 4=I 5=I 6=I 7=I
F1 001 1R56I  OUT-RECEIVER... 1=I 2=I 3=I 4=I 5=I 6=I 7=I
PACT PNET,BOEAS400,TR2,JOB
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1R88I  OK
I NODE=BOEAS400
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1R56I  SNA PROCESSING NODE BOEAS400
F1 001 1R56I  JOB-TRANSMITTER 1=I 2=I 3=D 4=D 5=D 6=D 7=D
F1 001 1R56I  OUT-TRANSMITTER 1=I 2=D 3=D 4=D 5=D 6=D 7=D
F1 001 1R56I  JOB-RECEIVER... 1=I 2=I 3=I 4=I 5=I 6=I 7=I
F1 001 1R56I  OUT-RECEIVER... 1=I 2=I 3=I 4=I 5=I 6=I 7=I
PDRAIN PNET,BOEAS400,RV7,OUT
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1R88I  OK
I NODE=BOEAS400
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1R56I  SNA PROCESSING NODE BOEAS400
F1 001 1R56I  JOB-TRANSMITTER 1=I 2=I 3=D 4=D 5=D 6=D 7=D
F1 001 1R56I  OUT-TRANSMITTER 1=I 2=D 3=D 4=D 5=D 6=D 7=D
F1 001 1R56I  JOB-RECEIVER... 1=I 2=I 3=I 4=I 5=I 6=I 7=I
F1 001 1R56I  OUT-RECEIVER... 1=I 2=I 3=I 4=I 5=I 6=I 7=D
```

Figure 61. Sample Console Log of PACT/PDRAIN Command

6.1.3 Terminating the Session Between VSE/POWER and AS/400

In order to terminate the PNET session, you can use the PSTOP command.

```
{PSTOP|P} PNET,nodeid[,EOJ]
```

Figure 62. Format of PSTOP Command

```
P PNET,BOEAS400
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1RB0I  NODE BOEAS400 SIGNED-OFF ON LINE SNA, RC=0000, TIME=18:54:53
F1 001 1R05I  SENT 00608 RECEIVED 00035
F1 063 1RE1I  VTAM INTERFACE CLOSED FOR NETWORKING
```

Figure 63. Sample Console Log of PSTOP PNET Command

On the AS/400 the job can be terminated by using the normal ENDJOB command and then varying off the configuration descriptions when there are no other jobs running.

6.2 Network Jobs in the VSE/ESA Environment

VSE/ESA can send and receive jobs from the AS/400 using NJE. In this part, we will discuss the sending and receiving of jobs from the VSE/ESA host user's point of view.

6.2.1 Sending a Network Job to the AS/400

Using the XDEST parameter in the "* $$ JOB" JECL statement, you can send a job to the AS/400. When a destination node is AS/400, you must specify both nodeid and userid.

Figure 64 is an example of an input stream consisting of control language (CL) statements which can be sent to the AS/400. The function of the input stream is to create a physical file, based on the DDS source which has been defined within the input stream (INLINESRC). Unlike VSE/POWER the AS/400 has no automatic function of forwarding the results of the execution back to the sending host or to another system.

```
* $$ JOB JNM=AS400JOB,XDEST=(BOEAS400,SWAZI),CLASS=A
//BCHJOB   JOB(AS4JOB) JOBQ(*RDR)
CRTPF      FILE(SWAZI/EMPLOYEE) SRCFILE(INLINESRC) MBR(*NONE) +
           MAXMBRS(*NOMAX) SIZE(*NOMAX)
//DATA     FILE(INLINESRC) FILETYPE(*SRC) ENDCHAR('//')
     A                                      UNIQUE
     A          R EMPREC
     A            EMPNUM         6  0
     A            FNAME         10          COLHDG('EMPLOYEE FIRST NAME')
     A            LNAME         20          COLHDG('EMPLOYEE LAST NAME')
     A            ADDR          25          COLHDG('EMPLOYEE ADDRESS')
     A            ZCODE          5  0       COLHDG('ZIP CODE')
     A            SALARY         8  2       COLHDG('CURRENT SALARY')
     A          K EMPNUM
//ENDINP
//ENDBCHJOB
* $$ EOJ
```

Figure 64. Sample CL Sent to be Executed at the AS/400

You are able to submit a job through the Interactive Interface (II).

```
IESLIBP                          PRIMARY LIBRARY                    PAGE  1 of  8

PRIMARY (READ/WRITE):    90                                      PREFIX:

OPTIONS:   1 = EDIT     2 = CHANGE    3 = PRINT     4 = COPY      5 = DELETE
           6 = RENAME   7 = SUBMIT    8 = COMPILE

 OPT  MEMBER NAME   NEW NAME    NEW LIB  LAST ACCESSED  OWNER   PASSW  PRIVATE

  _     xxxxxxxx    ________     ____      03/25/94     HIRO             _
  7     AS400JOB    ________     ____      03/25/94     HIRO             _
  _     yyyyyyyy    ________     ____      03/25/94     HIRO             _
  _     zzzzzzzz    ________     ____      03/25/94     HIRO             _
  _     qqqqqqqq    ________     ____      03/25/94     HIRO             _
  _     xxxxxxxx    ________     ____      03/25/94     HIRO             _
  _     oooooooo    ________     ____      03/25/94     HIRO             _
  _     aaaaaaaa    ________     ____      03/24/94     YUKI             _
  _     bbbbbbbb    ________     ____      03/22/94     HIRO             _
  _     bbbbbbbb    ________     ____      03/22/94     HIRO             _

PF1=HELP       2=REFRESH    3=END        4=RETURN                 6=ADD MEMBER
               8=FORWARD    9=SORT.DATE 10=SORT.NAME              12=LIST QUEUE

LOCATE MEMBER/LIST QUEUE PREFIX ==> ________   MEMBER PREFIX (PF2) ==> _______
```

Figure 65. Library List Example in the Interactive Interface

Figure 66 is an example of the VSE/ESA console message in the case when the job is successfully transmitted.

```
F1 001 ------------------------------------------------------------------
       ---------
F1 001 1RA0I  JOB AS400JOB 01385 TRANSMITTED TO BOEAS400 FOR BOEAS400 J-TR1
-----
AR 015 ---------------------------------
F1 001 ---------------------------------------------
F1 001 -----------------------------------------------------
```

Figure 66. VSE/ESA Console Message for Job Submission

For the operation on the AS/400, see 6.4.2, “Receiving a Network Job from VSE” on page 64.

6.2.2 Receiving a Network Job from the AS/400

Jobs sent from the AS/400 are spooled to the RDR Queue and then executed in accordance with the parameters specified in the VSE/POWER JECL.

Receiving a job from the AS/400, you can see the messages shown by Figure 67.

```
F1 001 1RB5I  JOB FILECRAT 01479(00001) RECEIVED FROM BOEAS400 FOR BOEVSE22
       J-RV1
F1 001 1Q47I   BG FILECRAT 01479 FROM BOEAS400(SWAZI) , TIME= 8:30:54
BG 000 // JOB FILECRAT
   DATE 03/31/94,CLOCK 08/30/54
F1 001 1Q34I   BG WAITING FOR WORK
```

Figure 67. VSE Console Message for Job Receipt

Please see 6.4.1, “Sending a Network Job to VSE” on page 63. Sample VSE job and related information are described there.

6.3 Spooled List File in the VSE Environment

You can send list output files to and receive them from the AS/400.

6.3.1 Sending a Spooled List File to the AS/400

There are two ways to send a spooled list file:

- Specifying the destination in VSE/POWER JECL before job submission.
- Changing the destination of the SYSLST by PALTER LST command

1. Specifying in VSE/POWER JECL:
You can select from the following:

1. **LDEST=(nodeid,userid)** in *** $$ JOB** statement
2. **DEST=(nodeid,userid)** in *** $$ LST** statement

2. Changing by PALTER LST command:
Figure 68 simply shows the PALTER LST command. For more detail of the format, see *VSE/POWER Administration and Operation*.

```
{PALTER|A} LST[,abc*|,*abc|,ALL|,class|,jobname[,jobnumber[,jobsuffix]]]
           ,NODE=nodeid,USER=userid
```

Figure 68. Format of PALTER LST Command

Figure 69 is an output example of the PALTER LST command.

```
D LST,FILECRAT
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1R46I    LIST QUEUE   P D C S  PAGES  CC FORM
F1 001 1R46I  FILECRAT 01388 3 D A        3   1      TO=(HIRO)
       FROM=BOEAS400(SWAZI)
F1 001 1R46I  FILECRAT 01389 3 D A        4   1      TO=(HIRO)
       FROM=BOEAS400(SWAZI)
F1 001 1R46I  FILECRAT 01479 3 D A        3   1      TO=(HIRO)
       FROM=BOEAS400(SWAZI)
A LST,FILECRAT,01479,NODE=BOEAS400,USER=SWAZI
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1R88I  OK
F1 001 1RA0I  OUTPUT FILECRAT 01479(00001) TRANSMITTED TO BOEAS400 FOR
       BOEAS400 0-TR1
```

Figure 69. Sample Console Log of PALTER LST Command

6.3.2 Receiving a Spooled List File from the AS/400

List output files sent from the AS/400 are spooled to the LST Queue. Receiving them from the AS/400, you can see the message shown in Figure 70 on page 63.

```
--------------
---------------------------------------
------------------------------------------------------------------
F1 001 1RB5I  OUTPUT AS400001 01478(00001) RECEIVED FROM BOEAS400 FOR
       BOEVSE22 O-RV1
------------------------------------------------------------------
------------------------------------------------------------------
```

Figure 70. VSE Console Message for Output List Receipt

6.4 Network Jobs in the AS/400 Environment

The AS/400 can send and receive input streams from the VSE host. The following two sections will discuss the sending and receiving of jobs from the AS/400 user's point of view.

6.4.1 Sending a Network Job to VSE

The Submit Network Job (SBMNETJOB) command is used to send a physical file member as an input stream to the remote VSE host. The physical file member must contain the job control language (JCL) to be executed at the host. The host system restricts JCL to a record length of 80 bytes.

When you send an input stream to the remote host, the host will control how the input stream is processed.

Figure 71 is an example of a job being sent for submission at the VSE host. The first member in file VSEJCL library SWAZI contains the JCL statements that will be executed by the host.

```
                        Submit Network Job (SBMNETJOB)

Type choices, press Enter.

File . . . . . . . . . . . . . . FILE         > VSEJCL
  Library  . . . . . . . . . . .              >   SWAZI
User ID:                          TOUSRID
  User ID  . . . . . . . . . . .              > HIRO
  Address  . . . . . . . . . . .              > BOEVSE22
                       + for more values
Member . . . . . . . . . . . . . MBR            *FIRST




                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
F13=How to use this display        F24=More keys
```

Figure 71. Submit Network Job Display

Figure 72 on page 64 shows the JCL statements which when executed will create a file named CREAT.TEST.FILE in a disk volume address 996 and copy the data supplied within $$DITTO CSQ and $$DITTO EOJ into this new file.

The results of the execution are sent to the destination specified in VSE/POWER JECL. 6.3.1, "Sending a Spooled List File to the AS/400" on page 62 shows you

how to specify the destination to which the results of the execution must be sent. In this sample case, the results are forwarded to HIRO at BOEVSE22. If you do not specify any destination, the results of the execution are sent back to your node.

```
* $$ JOB JNM=FILECRAT,DISP=D,CLASS=O
* $$ LST DEST=(BOEVSE22,HIRO)
// JOB FILECRAT
// UPSI 1
// ASSGN SYSOO5,996,SHR
// DLBL HIROTST,'CREAT.TEST.FILE'
// EXTENT SYSOO5,SYSWK5,1,0,1665,60
// EXEC DITTO
$$DITTO CSQ FILEOUT=HIROTST
OOOOO1AAAAAAAA COMPANY    10 BOZO STREET      JOHANNESBURG        2000
OOOOO2GOBLEUP DOG FOOD    17 KNYSNA STREET    PRETORIA            0002
OOOOO5HAPPY HUE IMPLEMENTS20 GRASSY ROAD      KEMPTON PARK        1743
OOOO11GRASSGREEN CARPETS  124 SNYMAN STREET   BOSBOKRAND          2970
OOOO23JUICY STEAK         111 DOORN ROAD      RANDBURG            2657
$$DITTO EOJ
/*
/&
* $$ EOJ
```

Figure 72. Example of JCL Sent to the VSE Host

If the job is received and executed successfully by the host, the AS/400 user gets a job completion message as shown on Figure 73.

```
                              Display Messages
                                                        System:   BOEAS400
Queue . . . . . :   SWAZI                   Program . . . . :   *DSPMSG
  Library . . . :     QUSRSYS                 Library . . . :
Severity  . . . :   00                      Delivery  . . . :   *NOTIFY

Type reply (if required), press Enter.
  From  . . . :   SYSTEM   BOEVSE22     03/28/94   13:50:45
    1Q5DI  EXECUTION COMPLETED FOR FILECRAT 01388 ON BOEVSE22, RC=****,
    TIME=12:48:56



                                                                      Bottom
F3=Exit             F11=Remove a message                 F12=Cancel
F13=Remove all      F16=Remove all except unanswered    F24=More keys
```

Figure 73. Job Completion Message

If the job submission or execution is unsuccessful the user will receive messages to that effect.

6.4.2 Receiving a Network Job from VSE

The receipt of the input stream on the AS/400 is controlled by the Change Network Attributes (CHGNETA) command and by the job table through the Add Network Job Entry (ADDNETJOBE) command.

If a job stream is sent from the VSE host to the AS/400 system it can be handled in several ways depending on the option specified for the network job action

(JOBACN) parameter on the network attributes (DSPNETA) and the network job entries defined using the ADDNETJOBE command.

```
                              Display Messages
                                                          System:   BOEAS400
Queue . . . . . :   SWAZI                   Program . . . . :   *DSPMSG
  Library . . . :     QUSRSYS                 Library . . . :
Severity  . . . :   00                      Delivery  . . . :   *NOTIFY

Type reply (if required), press Enter.
 1 Input stream file AS400JOB member HIRO from user HIRO BOEVSE22 filed.
 2 Input stream file AS400JOB member HIRO received from user HIRO BOEVSE22. 1
     jobs submitted. 0 jobs not submitted




                                                                        Bottom
F3=Exit             F11=Remove a message                  F12=Cancel
F13=Remove all      F16=Remove all except unanswered      F24=More keys
```

Figure 74. Messages for Incoming Jobs

Figure 74 is an example of two ways that we handled an incoming job from VSE.

1 For the first job we specified JOBACN(*FILE) in the network attributes (CHGNETA). This caused the incoming network job stream to be filed in the Work with Network File (WRKNETF) queue.

2 For the second job we specified JOBACN(*SEARCH) in the network attributes and using the ADDNETJOBE command we specified that all jobs sent by user HIRO from system BOEVSE22 must be received and submitted to the QBATCH job queue.

6.5 Network Spooled Files in the AS/400 Environment

The AS/400 can send spooled files to and receive them from the VSE host. In the AS/400 environment, a spooled file, refers to that object in an output queue, destined for printing. The record length of the spooled file can be as long as 378 characters.

6.5.1 Sending a Spooled File to VSE

You can use the Send Network Spooled File (SNDNETSPLF) command or select option 1 from the Work with Output Queue (WRKOUTQ) display to send a spooled file to a VSE user.

```
                    Send Network Spooled File (SNDNETSPLF)

Type choices, press Enter.

Spooled file . . . . . . . . . . FILE         > QSYSPRT
User ID:                        TOUSRID
  User ID  . . . . . . . . . . .              > HIRO
  Address  . . . . . . . . . . .              > BOEVSE22
                          + for more values
Job name . . . . . . . . . . . . JOB          > QPRTJOB
  User . . . . . . . . . . . . .              >   SWAZI
  Number . . . . . . . . . . . .              >   002681
Spooled file number  . . . . . . SPLNBR       > 23
Data format  . . . . . . . . . . DTAFMT         *RCDDATA

                           Additional Parameters

VM/MVS class . . . . . . . . . . CLASS          A
Send priority  . . . . . . . . . PTY            *NORMAL

                                                                        Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 75. Send Network Spooled File Display

Figure 75 is an example of a spooled file we sent to user HIRO at address BOEVSE22 by using option 1 from a WRKOUTQ display. The system provided the job name, (sending) user, (job) number and the spooled file number. If you use the SNDNETSPLF command then you must provide these values in the command.

If the user ID and address to which the spooled file is being sent exist then the following message will be displayed:

File QSYSPRT sent to 1 users. Not sent to 0 users.

When the spooled file arrives successfully at the host, the host will send a message back to the AS/400 to acknowledge that the spooled file was received. See Figure 76.

```
                              Display Messages
                                                      System:   BOEAS400
Queue . . . . . :   SWAZI                  Program . . . . :   *DSPMSG
  Library . . . :     QUSRSYS                Library . . . :
Severity  . . . :   00                     Delivery  . . . :   *NOTIFY

Type reply (if required), press Enter.
  From  . . . :   SYSTEM   BOEVSE22     03/28/94   14:42:03
    1RB5I  OUTPUT AS400001 01395(00001) RECEIVED FROM BOEAS400 FOR BOEVSE22
    0-RV1



                                                                        Bottom
F3=Exit             F11=Remove a message                 F12=Cancel
F13=Remove all      F16=Remove all except unanswered     F24=More keys
```

Figure 76. Message from Host Acknowledging Receipt of Spooled File

6.5.2 Receiving a Spooled File from VSE

No specific action is needed by the receiver to receive a spooled file. When a spooled file arrives at your AS/400, it is placed on the output queue specified in the recipient's user profile. Both the recipient and the sender are notified of the arrival of the spooled file. See Figure 77 for the message notifying the recipient.

```
                              Display Messages
                                                          System:   BOEAS400
Queue . . . . . :   SWAZI                  Program . . . . :   *DSPMSG
  Library . . . :     QUSRSYS                Library . . . :
Severity  . . . :   00                     Delivery  . . . :   *NOTIFY

Type reply (if required), press Enter.
  Spooled file ICCFPRT received and placed on output queue QPRINT in library
    QGPL.

                                                                          Bottom
F3=Exit             F11=Remove a message                 F12=Cancel
F13=Remove all      F16=Remove all except unanswered     F24=More keys
```

Figure 77. Message Notifying of Spooled File Received from the Host

6.6 Exchanging Messages Between VSE and the AS/400

Messages can be exchanged between VSE/ESA and AS/400 via NJE. However there is no facility on the AS/400 to send or receive a command from VSE.

A message sent to a user on a system is kept in a message queue from which the user can view the message. Message text cannot be longer than 132 characters including the apostrophes in VSE. Longer messages will be truncated by VSE/POWER. The AS/400 allows messages of up to 256 characters to be sent.

6.6.1 Sending a Message from the AS/400

Figure 78 on page 68 shows an example of a user on the AS/400 sending a message to a user on the VSE host. Use the **SNDNETMSG** command to send a message to another node from the AS/400.

```
                        Send Network Message (SNDNETMSG)

 Type choices, press Enter.

 Message text . . . . . .   Hi Hiroki! How about lunch today?
Please reply to my message.


 User ID:
   User ID  . . . . . .                Character value
   Address  . . . . . .                Character value
               + for more values




                                                                      Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 78. Sending a Message to a VSE User

6.6.2 Receiving the Message on VSE

You can use the /MSG command on the ICCF command mode to display the message from the AS/400 user. See Figure 79 and Figure 80 for an example of using the /MSG command.

```
/MSG
 ...+....1....+....2....+....3....+....4....+....5....+....6....+....7....+..CM
*PROGRAM FUNCTION SET
*READY
```

Figure 79. /MSG Command Example on the ICCF User Screen

```


 ...+....1....+....2....+....3....+....4....+....5....+....6....+....7....+..CM
 04/13-11:38 MSG FROM BOEAS400,SWAZI:
HI HIROKI! HOW ABOUT LUNCH TODAY? PLEASE REPLY TO MY MESSAGE.
*END MSG
*READY
```

Figure 80. Displaying the Message on the ICCF User Screen

6.6.3 Sending a Message from VSE

The VSE/POWER command **PBRDCST** can be used to send a message to a user on another node. Figure 81 on page 69 shows the format of the command. When the destination node is an AS/400 then you must specify a user ID in addition to the node.

```
{PBRDCST|B} nodeid,userid,'text'
```

Figure 81. Format of PBRDCST Command

If your user ID is defined as systems administrator, you can send the message by issuing the /CP command on the ICCF command mode screen. Figure 82 illustrates the use of the /CP command.

```
/CP B BOEAS400,SWAZI,'SHALL WE GO OUT? HOW ABOUT JAPANESE RESTAURANT?'
 ...+....1....+....2....+....3....+....4....+....5....+....6....+....7....+..CM
 04/13-11:38 MSG FROM BOEAS400,SWAZI:
HI HIROKI! HOW ABOUT LUNCH TODAY? PLEASE REPLY TO MY MESSAGE.
*END MSG
*READY
```

Figure 82. /CP and PBRDCST example on the ICCF User Screen

6.6.4 Receiving the Message on the AS/400

On the AS/400 the message will be sent to the user's queue and the DSPMSG command can be used to view the message. Figure 83 shows the message sent by the VSE user being viewed by the AS/400 user with the Display Messages (DSPMSG) command.

```
                              Display Messages
                                                      System:   BOEAS400
Queue . . . . . :   SWAZI                 Program . . . . :   *DSPMSG
  Library . . . :     QUSRSYS               Library . . . :
Severity  . . . :   00                    Delivery  . . . :   *NOTIFY

Type reply (if required), press Enter.
  From  . . . :   HIRO     BOEVSE22     04/15/94   14:56:33
    SHALL WE GO OUT? HOW ABOUT JAPANESE RESTAURANT?



                                                                      Bottom
F3=Exit             F11=Remove a message                 F12=Cancel
F13=Remove all      F16=Remove all except unanswered     F24=More keys
```

Figure 83. Message Queue for User Showing Message Received from VSE User

Chapter 7. Considerations Summary

7.1 Buffer Size Specification

The actual transmission RU size for SNA NJE may be limited by the SNA Architecture which only allows RU sizes that can be described by the formula ″M * 2**E″ where M(mantissa) and E(exponent) are integers between 1 and 15. For example, 1920 bytes is a valid RU size (15 * 2**7 = 15 * 128).

For NJE connections, the actual transmission data buffer size used is equal to the smaller buffer size of the two adjacent nodes. This is negotiated independently for each NJE session via FMH-4 records. Appendix B, “Trace Examples for Session Establishment” on page 89 shows this negotiation process.

Regardless of the RU size in the logmode table, VSE/POWER sets the BUFSIZE value of the PNODE macro into the FMH-4 record.

The maximum RU size supported by VM/MVS Bridge on the AS/400 is 2048 bytes. This means that even though you specify the length more than this value as BUFSIZE in the PNODE macro it will be negotiated down to 2048 bytes.

Some NJE systems require that a valid RU size be used in the negotiation. Even though the session is established successfully, it will fail in the actual data transmission. Figure 84 and Figure 85 on page 72 show how the session fails. For both cases, we specified 1920 bytes (X′F7′) in the logmode table, (refer to Figure 9 on page 16).

Buffer size in PNODE macro as 2000 bytes

```
S PNET,BOEAS400
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1RB3I  NODE BOEAS400 SIGNED-ON ON LINE SNA, BSIZE=02000,
       TIME=17:03:19
F1 001 1RD8I  VTAM RECEIVE FAILED, RC/FDB2=04,04 SENSE=1002
F1 001 1RC0I  BUFFER(S) LOST ON LINK WITH NODE BOEAS400, RC=0004
F1 001 1RA9I  TRANSMISSION OF OUTPUT ICCFPRT 01947 FOR NODE BOEAS400
       CANCELED, RC=0003 0-TR1
F1 001 1RB0I  NODE BOEAS400 SIGNED-OFF ON LINE SNA, RC=0004, TIME=17:03:22
F1 001 1R05I  SENT 00014 RECEIVED 00002
```

Figure 84. Invalid RU Size (2000 Bytes)

Buffer size in PNODE macro as 1800 bytes

```
S PNET,BOEAS400
AR 015 1C39I COMMAND PASSED TO VSE/POWER
F1 001 1RB3I  NODE BOEAS400 SIGNED-ON ON LINE SNA, BSIZE=01800,
       TIME=17:08:06
F1 001 1RD8I  VTAM RECEIVE FAILED, RC/FDB2=04,04 SENSE=1002
F1 001 1RC0I  BUFFER(S) LOST ON LINK WITH NODE BOEAS400, RC=0004
F1 001 1RA9I  TRANSMISSION OF OUTPUT ICCFPRT 01947 FOR NODE BOEAS400
       CANCELED, RC=0003 0-TR1
F1 001 1RB0I  NODE BOEAS400 SIGNED-OFF ON LINE SNA, RC=0004, TIME=17:08:09
F1 001 1R05I  SENT 00017 RECEIVED 00002
```

Figure 85. Invalid RU Size (1800 Bytes)

7.2 Sending and Receiving AFP Print Files

We did not test the printing of AFP print files sent over the NJE network between VSE/POWER and AS/400.

If you are considering implementing this function, we recommend that you investigate the behavior of the required printing attributes, for example, the specification for FORMDEF, PAGEDEF and FORMS as discussed in the *AFP Resources in a Multi-System Environment* document. Also test that the AFP function works in your environment.

From our investigations, VSE/POWER treats FORMDEF and PAGEDEF as six character long strings, however, the AS/400 treats them as eight character long strings. When the AS/400 receives the spooled file, the FORMDEF is prefixed with F1 and the PAGEDEF with P1. It may cause a problem when these parameters are sent from or routed via an AS/400 node. Consider a printer parameter member or a Network Receiver Exit as an alternative.

For further information regarding AFP printing between VSE/POWER and AS/400, see the *AFP Resources in a Multi-System Environment* document.

7.3 File Transfer between AS/400 and VSE

File transfer from VSE to the AS/400 using the VSE/POWER Interactive Interface panel 3.9.1 (Transfer Files to Another System) cannot be used to transfer files to the AS/400. Neither can panel 3.9.2 (Transfer Files from Another System) be used to receive files sent by the SNDNETF from the AS/400 to VSE. The AS/400 VM/MVS bridge works with NETDATA format for processing network files but VSE/ESA does not support NETDATA format.

To accomplish file transfer between VSE and the AS/400 using NJE it is necessary to develop some application programs on the AS/400. On the VSE host, the IESFSEND Send File Utility and the IESFRCVE Receive File Utility can be used in conjunction with the AS/400 programs.

Back up the IESFSEND and IESFRCVE utilities if you plan to use them on a release of VSE that might not provide them.

Appendix A, “File Transfer Between VSE/POWER and AS/400” on page 75 is an example of steps we took and code we used to accomplish file transfer between VSE and the AS/400 using NJE.

7.4 Node Name Considerations

VSE and the AS/400 adhere to the connection protocols for establishing a connection as far as their node names are concerned. The system with the higher node name sends the initial signon record and the system with the lower node name replies with the response signon record. For more information on the node name considerations, see Appendix B, “Trace Examples for Session Establishment” on page 89.

An AS/400 system name must be unique in the SNADS network. Considerations for the AS/400 system name are described in 4.3, “System Node Names” on page 28.

Appendix A. File Transfer Between VSE/POWER and AS/400

This chapter describes the steps we performed to transfer a file with a record length of 3200 characters from VSE to the AS/400. VSE transfers the file with a record length of 80 characters. At the AS/400 we recreated the file to a record length of 3200 characters and then transferred back to VSE.

File transfer between VSE/POWER and AS/400 using NJE is not supported. VSE/POWER does not support NETDATA format which the AS/400 VM/MVS bridge uses during data transfer between the systems. See 1.3, “NJE between VSE/POWER and AS/400” on page 2 for a further discussion of NETDATA format.

Consider the use of NetView* FTP as an alternative solution. Especially if operability and performance are critical factors in your file transmission. NetView File Transfer Program (FTP) is a member of the NetView family of Communications Network Management (CNM) programs. This application program enables high-volume, bulk data, file transfer between IBM AS/400 systems with NetView FTP/400 (5730-082) installed and NetView FTP for VSE (5686-013).

On the AS/400 the VM/MVS bridge program works with NETDATA format. The SNDNETF command converts files to NETDATA format for transmission via NJE, then reconstructs the files at the receiving end. VSE does not support NETDATA format.

To accomplish file transfer between VSE and the AS/400 we used two programs which are parts of VSE/ESA Unique Code. One is IESFSEND and the other is IESFRCVE.

These programs are invoked from following Interactive Interface panels:

- IESFSEND is invoked from the panel (3.9.1) **Transfer Files to Another System**
- IESFRCVE is invoked from the panel (3.9.2) **Transfer Files from Another System**

However in our implementation, we used these programs as the native batch environment because the Interactive Interface does not consider AS/400 as a destination node.

The process summary is as follows:

- VSE/POWER sends the VSAM file to the AS/400 using IESFSEND with CL to recreate the file into a physical file with the original record length of 3200 characters. The file is sent as 80 character records with the first character of every record containing a control character.
- The AS/400 sends an 80 character records file, with the required control information, to VSE/POWER using SBMNETJOB. The file sent to VSE contains JCL which is used to recreate the file into a VSAM file with the original record length of 3200 characters. VSE/POWER uses IESFRCVE to receive and recreate the file.

A.1 VSE/POWER Environment

This section describes the steps used in the VSE host to accomplish file transfer between VSE and the AS/400.

A.1.1 IESFSEND File Send Utility

Figure 86 is the processing flow chart of the IESFSEND.

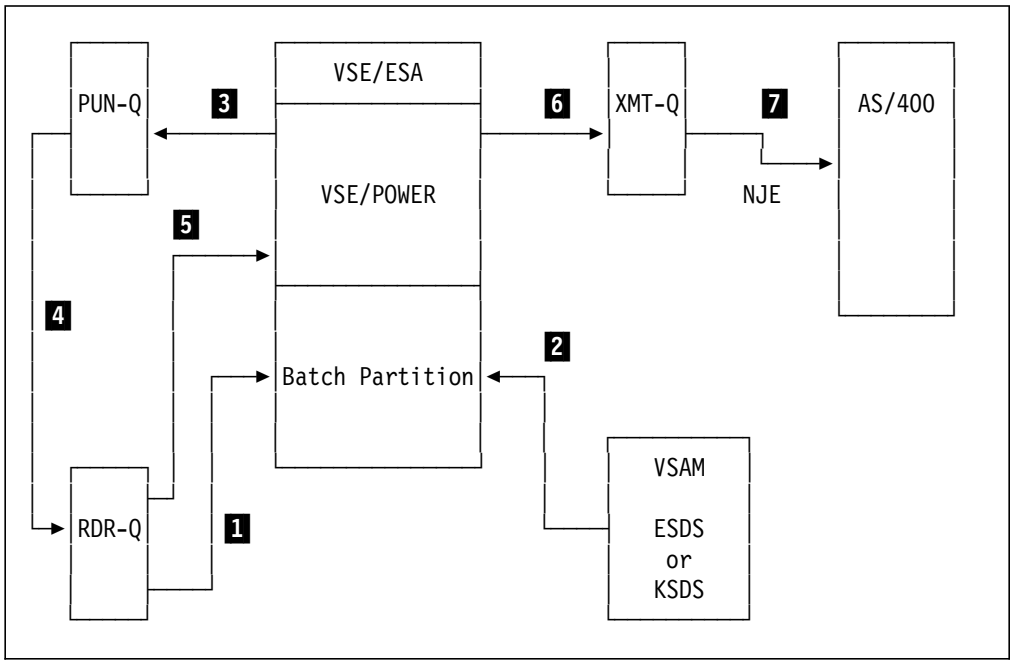

Figure 86. IESFSEND Processing Overview

1 Submit the job (see Figure 87 on page 78)

2 Open and read the VSAM file

3 Punch the AS/400 CL and the VSAM file as 80 byte records

4 Submit the AS/400 job from PUN-Q to RDR-Q by specifying DISP=I

5, **6**, **7** Send the job to AS/400 through NJE session

Figure 87 on page 78 is a sample JCL used to invoke IESFSEND.

The JCL used to invoke IESFSEND has the following format:

```
 * $$ PUN DISP=I,DEST=nodeid
 // DLBL IESFINP,'from.file',,VSAM,
 // EXEC IESFSEND,SIZE=AUTO
 ops       from.file
 .
 ...
 .
 .
 /&

with nodeid = PNET node id of the node receiving the file
        ops = operating system type of that node: SSX, VSE, MVS, MVR,
```

After control is given to IESFSEND by Job Control, the actions are as follows:

1. Open SYSIPT and SYSPCH file
2. Get first input record: 'send control statement' and save the information contained:

```
Format: OPSYS     DS   CL3        (SSX, VSE, MVS or MVR)
                                  (VMS, VMD, VMO, CMS)
                  DS   CL7         reserved
        FROMFILE  DS   CL44        file ID
```

3. Check file ID with SHOWCAT, if entry is not CLUSTER, AIX* or PATH, message

   IESA3214I FSEND INVALID FILE NAME

   is issued followed by

   IESA3214I ABNORMAL END IESFSEND

4. Get file characteristics from associated 'DATA' catalog entry. Save the parameters
   - maximum record length
   - relative key position
   - key length

5. Modify VSAM control blocks ACB and RPL from keyed to addressed access, when key length is zero (ESDS file)
6. Open VSAM input file, if this fails message

   IESA3213I FSEND OPEN ERROR, R15=rc, FDBK=fc

   is issued on the system console followed by

   IESA3213I ABNORMAL END IESFSEND

7. Read VSAM file sequentially up to end of file, copy each record to one or more SYSPCH records with the following format:

```
        first card : DC X'00'  column one not used
                     DS HL2    length of VSAM record
                     DS CL77   record data bytes 1 to 77

 cards 2 through n : DC X'00'  column one not used
                     DC CL79   record data from byte 78+(n-2)*79
```

8. On end of file issue message:

   IESA3215I END IESFSEND rrr RECORDS IN bbb BLOCKS OUT nnn BYTES

   with
   rrr = number of VSAM records copied
   bbb = number of SYSPCH records produced, excluding JCL
   nnn = number of VSAM data bytes copied

9. Close all files and return to the operating system

Example JCL for IESFSEND

```
* $$ JOB JNM=VSETOAS4
* $$ PUN DISP=I,DEST=(BOEAS400,SWAZI)  1
// JOB VSETOAS4
// DLBL TCPCAT,'TCPIP.USER.CATALOG',,VSAM
// DLBL IESFINP,'VSE.TO.AS400.KSDS',,VSAM,CAT=TCPCAT
// EXEC IESFSEND,SIZE=AUTO
MVS  2    VSE.TO.AS400.KSDS  3
//BCHJOB  JOB(AS4JOB) JOBQ(*RDR) CURLIB(SWAZI)              4
CPYF      FROMFILE(INLINE) TOFILE(SWAZI/VSEINP) MBROPT(*REPLACE) +
          FMTOPT(*NOCHK)
CALL      SWAZI/VSERPGI
//DATA    FILE(INLINE)
/&
* $$ EOJ
```

Figure 87. JCL for IESFSEND

1 The * $$ PUN statement must specify DISP=I. DEST=(nodeid,userid) must be the node name and the userid of the AS/400 user to which the VSAM file is being sent. If you do not specify the userid in the DEST operand the job will not reach the AS/400.

2 MVS must be specified starting from column 1.

3 The name of the VSAM file being sent must start in column 11.

4 The AS/400 CL, sent with the file, starts with the //BCHJOB statement and ends with the //DATA statement.

A.1.2 IESFRCVE File Receive Utility

Figure 88 on page 79 is the processing flow chart of the IESFRCVE.

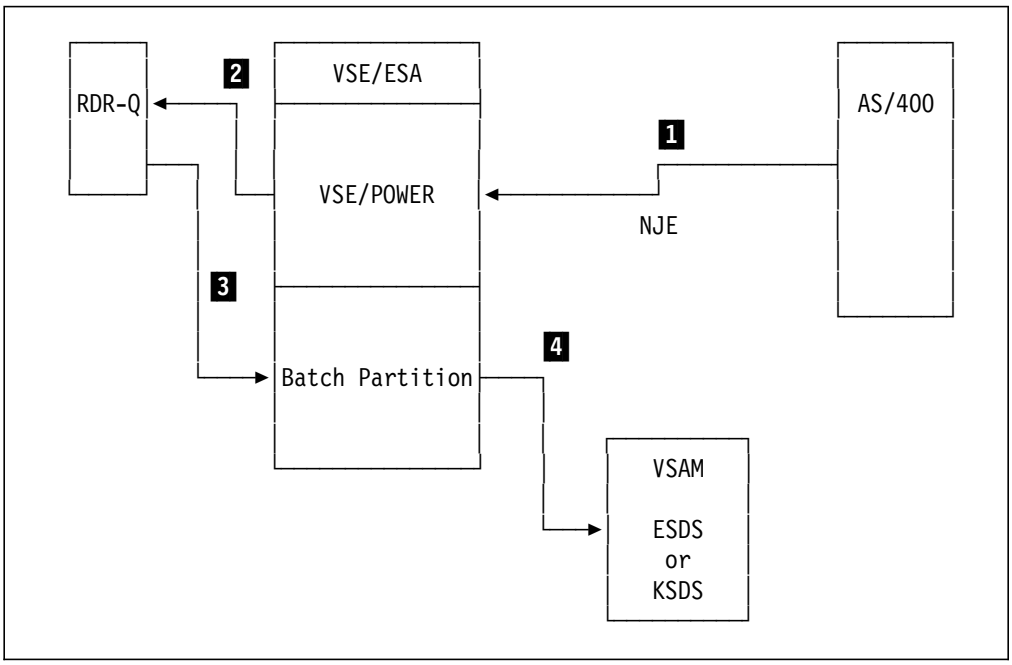

Figure 88. IESFRCVE Processing Overview

1 Send the VSE/ESA JCL and the data (see Figure 89 on page 81)

2, **3** Submit the job

4 Load the data into predefined cluster

Figure 89 on page 81 shows a sample JCL used to invoke IESFRCVE.

The JCL used to invoke IESFRCVE has the following format:

```
// DLBL IESFOUT,'to.file',,VSAM
// EXEC IESFRCVE,SIZE=AUTO
receive control statement
.
...
.
/*
/&

Format of the receive control statement:

  DS H    relative key position of the file (for KSDS, Zero if ESDS)
  DS H    key length (for KSDS, Zero if ESDS)
  DS F    maximum record length
  DS CL2  not used
  DS CL44 the target VSAM file ID.

Data format:

        first card : DC X'00'  column one not used
                     DS HL2    length of VSAM record
                     DS CL77   record data bytes 1 to 77

 cards 2 through n : DC X'00'  column one not used
                     DC CL79   record data from byte 78+(n-2)*79
```

After control is given to IESFRCVE by Job Control, the actions are as follows:

1. Open SYSIPT file
2. Get first input record: 'receive control statement' and save the information.
3. Acquire GETVIS workarea for the maximum record length to be expected and update VSAM RPL area pointer and area length field.
4. Check file ID with SHOWCAT, if entry is not CLUSTER, AIX or PATH, message

   IESA3211I FRCVE FILE NOT FOUND

   is issued followed by

   IESA3211I ABNORMAL END IESFRCVE

5. Get file characteristics from associated 'DATA' catalog entry. Save the parameters

   relative key position
   key length

6. Modify VSAM control blocks ACB and RPL from keyed to addressed access, when key length is zero (ESDS file)
7. Open VSAM output file, if this fails message

   IESA3210I FRCVE OPEN ERROR, R15=rc, FDBK=fc

   is issued on the system console followed by

   IESA3210I ABNORMAL END IESFRCVE

8. Read SYSIPT records until end of file. Copy the data part of these records, 77 bytes from the first card, 79 bytes from the following card to the VSAM workarea. When a VSAM record is complete, update the RPL RECLEN field with the current record length and issue a PUT RPL request to add the record to the VSAM output file.

   When a PUT request is rejected by VSAM, the message

   IESA3210I FRCVE PUT ERROR, R15=rc, FDBK=fc, RCD=nn (,KEY=kkk)

   is issued on the system console followed by

   IESA3210I ABNORMAL END IESFRCVE

   with the relative record number 'nn' of a KSDS file.

   The return code is usually '80'.

   Typical error codes (feed back codes 'fc') are:

   08 duplicate key, for example
   because the file was not empty as it should
   have been, or because a KSDS file was accessed instead of an ESDS

file.

0C record out of sequence, for example because an ESDS file was loaded by mistake into a KSDS file.

1C no more space available
6C record length larger than the allowed maximum

9. On end of file issue message:

IESA3212I END IESFRCVE bbb BLOCKS IN rrr RECORDS OUT nnn BYTES

with
bbb = number of records read from SYSIPT
rrr = number of VSAM records loaded
nnn = number of VSAM data bytes loaded

Example JCL for IESFRCVE

```
// JOB VSAMRCVE FROM AS/400
// DLBL TCPCAT,'TCPIP.USER.CATALOG',,VSAM
// DLBL IESFOUT,'AS400.TO.VSE.ESDS',,VSAM,CAT=TCPCAT
// EXEC IESFRCVE,SIZE=AUTO
Ø  AS400.TO.VSE.ESDS  1
.....................
.....................
         :                  2
.....................
.....................
.....................
/&
```

Figure 89. JCL for IESFRCVE

1 This record is the receive control statement.

2 The file data from AS/400.

A.2 AS/400 Environment

This section describes the steps performed on the AS/400 to accomplish file transfer between VSE/POWER and the AS/400.

A.2.1 Receiving the File from VSE

We performed the following steps:

1. We created a physical file with two fields. The first field was one character long to contain the control character. The second field was 79 characters long to contain the data. The DDS for the physical file is shown in Figure 90 on page 82. The physical file was created using the following command:

   CRTPF FILE(SWAZI/VSEINP) SRCFILE(SWAZI/QDDSSRC)

```
    A*
    A* DDS for VSEINP file created by CPYF from the input
    A* data sent from VSE/POWER by the IESFSEND Utility
    A*
    A          R RECINP
    A            CTLCHR         1
    A            DATA          79
```

Figure 90. DDS for the 80 Bytes Records File Sent by VSE

2. We also created a physical file with one field of 3200 characters long and a record length of 3200 characters. This file was to contain the data as it was on VSE before the file transmission took place. Figure 91 shows the DDS for the physical file.

   CRTPF FILE(SWAZI/REALPF) SRCFILE(SWAZI/QDDSSRC)

   was used to create the physical file.

```
    A*
    A* DDS for REALPF, record length of 3200 bytes
    A*
    A          R REC
    A            FIELD       3200
```

Figure 91. DDS for Creating a Physical File of 3200 Bytes Record Length

3. VSE submits a job to the AS/400. The job contains CL (control language) in addition to the data to be processed at the AS/400. The CL is used to copy the data into the file created in step 1 and then calls an RPG program to recreate the file to a record length of 3200 characters. The records are written into the physical file created in step 2. See Figure 92 for the CL and Figure 93 on page 83 for the RPG program.

```
/* */
/* CL and data sent from VSE as a network job  */
/* */
//BCHJOB  JOB(AS4JOB) JOBQ(*RDR) CURLIB(SWAZI)
CPYF      FROMFILE(INLINE) TOFILE(SWAZI/VSEINP) MBROPT(*REPLACE) +
          FMTOPT(*NOCHK)
CALL      SWAZI/VSERPGI
//DATA    FILE(INLINE)
.
.
/* The 80 character long records are included in this position */
.
.
//ENDINP
//ENDBCHJOB
```

Figure 92. CL and Data Sent from VSE to the AS/400 as a Network Job

```
F*
F* VSERPGI: Program for creating a file with a record length
F* of 3200 characters from the 80 character records File
F*
FVSEINP  IF  F      80           DISK
FREALPF  O   E                   DISK
E*
E* Each record contains 79 characters of data except the first
E* which contains 77 characters and the last which contains 42
E* characters. There are 41 records required in all,
E* that is, 77+(39x79)+42 = 3200.
E* The array contains record number 1 to 40, the last record
E* is processed separately.
E*
E                    ARR        40 79
IVSEINP  AA  01
I                                       2  80 DATA
IARRDS       DS
I                                       13160 ARR
C           *IN99     DOWEQ*OFF
C*
C                     DO   40        X       30
C                     READ VSEINP                  99
C*
C           *IN99     IFEQ *OFF
C                     MOVE DATA      ARR,X
C                     END
C*
C                     END
C*
C* Remove the first 2 characters (record length in binary) from
C* the length resulting from processing 40 input records.
C*
C           3158      SUBSTARRDS:3   FIELD     P
C                     READ VSEINP                  99
C*
C* Process the last input record to get the last 42 characters
C* of the output record, resulting in 3200 characters.
C*
C           *IN99     IFEQ *OFF
C                     MOVELDATA      SFLD   42
C                     MOVE SFLD      FIELD
C                     WRITEREC
C                     Z-ADD0         X
C                     MOVEA*BLANKS   ARR
C                     MOVE *BLANKS   SFLD
C                     MOVE *BLANKS   FIELD
C                     END
C*
C                     END
C*
C                     MOVE *ON       *INLR
```

Figure 93. RPG Program to Create 3200 Byte Records

A.2.2 Sending a File to VSE

We used file REALPF to send the file back to VSE.

We created two physical files, with a record length of 80 characters each:

- One file to contain the 80 character records recreated from the 3200 character record file. We used the following command:

  CRTPF FILE(SWAZI/VSEOUTP) RCDLEN(80)

- The second file is the job file which contains the necessary JCL and data for VSE. This was created using:

  CRTPF FILE(SWAZI/AS4TOVSE) RCDLEN(80)

JCL is necessary to recreate and receive the file at the VSE host. The JCL can be keyed in on a source file, source type TXT (text) to avoid syntax errors. The JCL can also be sent by the VSE operator to be included into the data when it is sent from the AS/400. The data is preceded by a control card which must be in the following format:

Offset	Description	Example
0	relative key position of the file	x'0000'
2	key length	x'000A'
4	maximum record length	x'00000C80'
8	not used	x'0000'
A	the target VSAM file ID	c'AS400.TO.VSE'

Figure 94 shows the header JCL sent with the data, and control card **1**.

```
// JOB AS4TOVSE
// DLBL TCPCAT,'TCPIP.USER.CATALOG',,VSAM
// DLBL IESFOUT,'AS400.TO.VSE.KSDS',,VSAM,CAT=TCPCAT
// EXEC IESFRCVE,SIZE=AUTO
@Ø  AS400.TO.VSE.KSDS   1
```

Figure 94. Header JCL for SBMNETJOB to VSE

```
/*
/&
```

Figure 95. Trailer JCL for SBMNETJOB to VSE

Figure 96 on page 85 shows the CL program that is used to create a physical file with a record length of 80 characters. This file must conform to the requirements specified by the IESFRCVE Utility in VSE.

The CL program performs the following steps:

1. Calls an RPG program, see Figure 97 on page 86, which creates the 80 character records file
2. Copies the header JCL to a job file
3. Copies the data created by the RPG program to the same job file
4. Copies the trailer JCL to the job file
5. Finally submits the network job to VSE

```
/* */
/* VSEJOB: CL program, calls RPG which creates 80  character */
/* records, copies header JCL, data and the trailer JCL      */
/* required to submit the job successfully to VSE            */
/* */
            PGM
            CALL       PGM(VSERPGO)
            CPYF       FROMFILE(SWAZI/QCLSRC) +
                         TOFILE(SWAZI/AS4TOVSE) FROMMBR(HDRJCL) +
                         MBROPT(*REPLACE) FMTOPT(*CVTSRC)
            CPYF       FROMFILE(SWAZI/VSEOUTP) +
                         TOFILE(SWAZI/AS4TOVSE) MBROPT(*ADD) +
                         FMTOPT(*NOCHK)
            CPYF       FROMFILE(SWAZI/QCLSRC) +
                         TOFILE(SWAZI/AS4TOVSE) FROMMBR(TRLJCL) +
                         MBROPT(*ADD) FMTOPT(*CVTSRC)
            SBMNETJOB  FILE(SWAZI/AS4TOVSE) TOUSRID((HIRO BOEVSE22))
            ENDPGM
```

Figure 96. Copy and Submit Network Job to VSE

```
F* VSERPGO: Program to create 80 character records
F* from 3200 character records for sending to VSE
F*
FREALPF  IF  E                    DISK
FVSEOUTP O   F      80            DISK
C*
C                     Z-ADD3200      RECL    40   1
C                     MOVE X'00'     CTL     1    2
C                     READ REALPF                   99
C*
C           *IN99     DOWEQ*OFF
C                     Z-ADD77        L       50   3
C                     Z-ADD0         N       50   4
C                     Z-ADD1         P       50   5
C                     Z-ADD0         R       50   6
C*
C* Get the first 77 characters of the input record
C*
C           L         SUBSTFIELD:P   FLD77  77
C                     MOVE *ON       *IN10
C                     EXCPT
C                     MOVE *OFF      *IN10
C                     MOVE *BLANKS   FLD77
C                     ADD  77        P
C                     Z-ADD79        L
C           RECL      SUB  79        R
C*
C           RECL      DOWGEP
C*
C* Get the subsequent records of 79 characters each
C*
C           P         IFLT R
C           L         SUBSTFIELD:P   FLD79  79
C*
C* Get the remaining characters of the input record to form
C*   the last record of the group of 80 characters each
C*
C                     ELSE
C           RECL      SUB  P         N
C                     ADD  1         N
C           N         SUBSTFIELD:P   FLD79     P
C                     END
C*
C                     MOVE *ON       *IN20
C                     EXCPT
C                     MOVE *OFF      *IN20
C                     MOVE *BLANKS   FLD79
C                     ADD  79        P
C                     END
C*
C                     READ REALPF                   99
C                     END
C*
C                     MOVE *ON       *INLR
OVSEOUTP E        10
O*
O* Write the first record for the group of 80 character records
O*
O                         CTL        1
O                         RECL       3B
O                         FLD77     80
O        E        20
O*
O* Write the subsequent records for the group
O*
O                         CTL        1
O                         FLD79     80
```

Figure 97. RPG Program to Create 80 Byte Records for Sending to VSE

1 RECL is the original record length of the file.

2 CTL is the control character in the first position of every

80 character output record.

3 L is the number of characters to break up the 3200 character input record to create an 80 character output record.

4 N is for processing the last output record for a set of 80 character records resulting from 1 x 3200 character record.

5 P is the start position for breaking up the input record.

6 R is to make sure that the start position is not beyond the input record length (3200).

Appendix B. Trace Examples for Session Establishment

This chapter discusses implications of the node name when the VSE host and the AS/400 are establishing a connection.

The nodes first attempt to establish a connection by exchanging a set of control records. The control records vary depending on the type of protocols the nodes will use to transmit the stream.

The NJE primary node always sends the initial signon record. If SNA protocols are used, the NJE primary node is the node with the higher node name. The subrecord control byte that precedes the initial signon record contains an identifier character ***I***.

The node receiving the initial signon record, called the NJE secondary node, responds with a signon record. The subrecord control byte that precedes the response signon record contains an identifier character ***J***.

For the format of the initial signon and response signon records, see the *NJE Formats and Protocols* document.

B.1 VSE Host Node Name Higher than AS/400 Node Name

Figure 98 on page 90 shows a trace that was run during session establishment between the VSE host and the AS/400. The VSE host has a higher node name, BOEVSE22, than the AS/400 node name of BOEAS400.

```
                                VTAM TRACE FILE UTILITY                          94.104  16:03:11    PAGE     1

  00003 PHYSICAL RECORDS MISSING FROM TRACE FILE
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:16.26                OUTBOUND
 VTAM     TH=400000000000000000000016000000161D000054000A008F0077    RH=6B8000
       31010303  72724022  0383F7F7  83030000  00000000  00000000  00000008  C2D6C5D7  ...... ..C77C........ 1
       E6D5D1C5  000008C9  D7C6E3F2  E7D9C160  18C453D9  C23CA0F1  B00FC4C5  C9C2D4C9  WNJE...IPFT2XRA-.D.RB..1..DEIBMI
       D7C64BC9  D7C6E5F2  C20E12F3  C4C5C9C2  D4C9D7C6  4BC2D6C5  D7E6D5D1  C52C0A01  PF.IPFV2B..3DEIBMIPF.BOEPWNJE...
       08404040  40404040  402D0908  D5D1C5D4  D6C44040                              .        ...NJEMOD
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:16.69                INBOUND
 VTAM     TH=400000000000000000000016000000161D00000A0054008F003C    RH=EB8000
       31010000  00000002  0080F7F7  80000000  00000000  00000000  00000000  00000060  .........77......... 2
       18C453D9  C23CA0F1  B00FC4C5  C9C2D4C9  D7C64BC9  D7C6E5F2  C2                .D.RB..1..DEIBMIPF.IPFV2B
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:16.69                OUTBOUND
 VTAM     TH=400000000000000000000016000000161D000054000A00900004    RH=6B8000
       A0                                                                          .                    3
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:16.81                INBOUND
 VTAM     TH=400000000000000000000016000000161D00000A005400900004    RH=EB8000
       A0                                                                          .                    4
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:17.24                OUTBOUND
 USER  08040780  0000E080                                                        ........             5
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:17.24                OUTBOUND
 VTAM     TH=400000000000000000000016000000161C000054000A0001000B    RH=0BA100
       08040780  0000E080                                                        ........             5
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:17.25                INBOUND
 VTAM     TH=400000000000000000000016000000161D00000A005400000006    RH=830100
       000003                                                                      ...
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:21.08                INBOUND
 VTAM     TH=400000000000000000000016000000161C00000A00540001000B    RH=0B8100
       08040800  0000C080                                                        ........             6
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:22.07                INBOUND
 VTAM     TH=400000000000000000000016000000161C00000A005400010003    RH=83A000
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:22.07                INBOUND
 USER  08040800  0000C080                                                        ........             6
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:22.07                OUTBOUND
 VTAM     TH=400000000000000000000016000000161D000054000A00010006    RH=830100
       000003                                                                      ...
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:22.07                OUTBOUND
 VTAM     TH=400000000000000000000016000000161C000054000A00010003    RH=8BA000
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:22.07                OUTBOUND
 USER  29F0C929  C2D6C5E5  E2C5F2F2  01000000  00000007  80404040  40404040  40404040  .OI.BOEVSE22......... 7
       40404040  40000000  0000                                                          .....
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:22.07                OUTBOUND
 VTAM     TH=400000000000000000000016000000161C000054000A0002002D    RH=03B500
       29F0C929  C2D6C5E5  E2C5F2F2  01000000  00000007  80404040  40404040  40404040  .OI.BOEVSE22......... 7
       40404040  40000000  0000                                                          .....
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:22.08                INBOUND
 VTAM     TH=400000000000000000000016000000161D00000A005400000006    RH=830100
       000003                                                                      ...
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:22.12                INBOUND
 VTAM     TH=400000000000000000000016000000161C00000A00540002002D    RH=038100
       29F0D129  C2D6C5C1  E2F4F0F0  01FFFFFF  FF000007  80404040  40404040  40404040  .0J.BOEAS400......... 8
       40404040  40000000  0000                                                          .....
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:22.12                INBOUND
 USER  29F0D129  C2D6C5C1  E2F4F0F0  01FFFFFF  FF000007  80404040  40404040  40404040  .0J.BOEAS400......... 8
       40404040  40000000  0000                                                          .....
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:22.12                OUTBOUND
 VTAM     TH=400000000000000000000016000000161D000054000A00020006    RH=830100
       000003                                                                      ...
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:22.14                OUTBOUND
 VTAM     TH=400000000000000000000016000000161C000054000A00010003    RH=83A000
```

Figure 98. Signon Trace Data

1 The VSE host (BOEVSE22) sends the BIND command and therefore it is the primary LU.

2 The AS/400 (BOEAS400) accepts the BIND command and therefore it is the secondary LU.

3 The VSE host (BOEVSE22) sends the SDT command.

4 The AS/400 (BOEAS400) accepts the SDT command.

5 The VSE host (BOEVSE22) sends FMH-4 record (RU size = 1920 bytes).

6 The AS/400 (BOEAS400) sends FMH-4 record (RU size = 2048 bytes).

7 The VSE host (BOEVSE22) sends the initial signon record (I) and therefore it is the primary NJE node.

8 The AS/400 (BOEAS400) is the secondary NJE node, sending the response signon record (J).

```
                                    VTAM TRACE FILE UTILITY                                    94.104  16:03:11    PAGE     2
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:32.22                OUTBOUND
 USER  03909900                                                                          ..R.
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:32.22                OUTBOUND
 VTAM     TH=40000000000000000000001600000161C000054000A00030007    RH=03B000
       03909900                                                                          ..R.
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:32.57                INBOUND
 VTAM     TH=40000000000000000000001600000161C00000A005400030007    RH=038000
       03A09900                                                                          ..R.
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:32.57                INBOUND
 USER  03A09900                                                                          ..R.
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:32.58                OUTBOUND
 VTAM     TH=40000000000000000000001600000161C000054000A00010003    RH=83A000
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:32.58                OUTBOUND
 USER  1399C0FF  01000080  00D40000  0738F4C1  80054001  C4008807  C9C3C3C6  D7E4D591  .R.......M....4A.. .D.H.ICCFPUNJ
       C80014A9  20AB7262  E18C00C2  D6C5E5E2  C5F2F2C8  C9D9D684  0CC2D6C5  E5E2C5F2  H..Z.......BOEVSE22HIROD.BOEVSE2
       F2C8C9D9  D6840CC2  D6C5E5E2  C5F2F2C8  C9D9D684  0CC2D6C5  E5E2C5F2  F2C8C9D9  2HIROD.BOEVSE22HIROD.BOEVSE22HIR
       D68CD000  ACC30001  01C40088  08006C86  0000C400  0090D000  0799C047  00480001  O....C...D.H..%F..D......R......
       C40088C4  0098C400  98                                                          D.HD.QD.Q
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:32.58                OUTBOUND
 VTAM     TH=40000000000000000000001600000161C000054000A0004008C    RH=03B000
       1399C0FF  01000080  00D40000  0738F4C1  80054001  C4008807  C9C3C3C6  D7E4D591  .R.......M....4A.. .D.H.ICCFPUNJ
       C80014A9  20AB7262  E18C00C2  D6C5E5E2  C5F2F2C8  C9D9D684  0CC2D6C5  E5E2C5F2  H..Z.......BOEVSE22HIROD.BOEVSE2
       F2C8C9D9  D6840CC2  D6C5E5E2  C5F2F2C8  C9D9D684  0CC2D6C5  E5E2C5F2  F2C8C9D9  2HIROD.BOEVSE22HIROD.BOEVSE22HIR
       D68CD000  ACC30001  01C40088  08006C86  0000C400  0090D000  0799C047  00480001  O....C...D.H..%F..D......R......
       C40088C4  0098C400  98                                                          D.HD.QD.Q
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:32.58                OUTBOUND
 USER  0599E0EF  00F0C300  10700000  C2D6C5C1  E2F4F0F0  E2E6C1E9  C99BC300  01C1C300  .R...0C.....BOEAS400SWAZI.C..AC.
       060100C2  005101C3  0088E000  0140C300  8808007C  86000020  F3C490C4  0005C6F4  ...B...C.H... C.H..@F...3D.D..F4
       000002C3  008C0444  60120088  D0008CC8  000201FF  DA000599  901F1F41  DEC1      ...C....-..H...H.......R.....A
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:32.58                OUTBOUND
 VTAM     TH=40000000000000000000001600000161C000054000A00050061    RH=03B100
       0599E0EF  00F0C300  10700000  C2D6C5C1  E2F4F0F0  E2E6C1E9  C99BC300  01C1C300  .R...0C.....BOEAS400SWAZI.C..AC.
       060100C2  005101C3  0088E000  0140C300  8808007C  86000020  F3C490C4  0005C6F4  ...B...C.H... C.H..@F...3D.D..F4
       000002C3  008C0444  60120088  D0008CC8  000201FF  DA000599  901F1F41  DEC1      ...C....-..H...H.......R.....A
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:32.58                OUTBOUND
 USER  0599D02F  0030C300  012CC300  12F40000  A920AB72  767D4C00  A920AB77  1D1DD4D1  .R....C...C..4..Z....'<.Z.....MJ
       00C30501  00                                                                  .C...
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:32.58                OUTBOUND
 VTAM     TH=40000000000000000000001600000161C000054000A00060028    RH=03B000
       0599D02F  0030C300  012CC300  12F40000  A920AB72  767D4C00  A920AB77  1D1DD4D1  .R....C...C..4..Z....'<.Z.....MJ
       00C30501  00                                                                  .C...
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:32.59                OUTBOUND
 USER  03990000                                                                          .R..
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:32.59                OUTBOUND
 VTAM     TH=40000000000000000000001600000161C000054000A00070007    RH=03B000
       03990000                                                                          .R..
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:32.60                INBOUND
 VTAM     TH=40000000000000000000001600000161D00000A005400000006    RH=830100
       000003                                                                            ...
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:37.90                INBOUND
 VTAM     TH=40000000000000000000001600000161C00000A005400040007    RH=038000
       03C09900                                                                          ..R.
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:37.90                INBOUND
 USER  03C09900                                                                          ..R.
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:37.90                OUTBOUND
 VTAM     TH=40000000000000000000001600000161C000054000A00010003    RH=83A000
```

Figure 99 (Part 1 of 2). The Rest of the Signon Trace

```
                                VTAM TRACE FILE UTILITY                          94.104  16:03:11    PAGE     3
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:47.26                INBOUND
 VTAM     TH=4000000000000000000000016000000161C00000A005400050070    RH=038100
       039A8069  116077OC  4CC2D6C5  E5E2C5F2  F200C8C9  D9D6840E  C2D6C5C1  E2F4F0F0  .....-..<BOEVSE22.HIROD.BOEAS400
       00E2E6C1  E9C9833F  C6899385  40C9C3C3  C6D7E4D5  40948594  82859940  C8C9D9D6  .SWAZIC.FILE ICCFPUN MEMBER HIRO
       4095A494  82859940  F9F94099  85838589  A5858440  86969940  A4A28599  40E2E6C1   NUMBER 99 RECEIVED FOR USER SWA
       E9C940C2  D6C5C105  E2F4F0F0  4B                                              ZI BOEA.S400.
BUF    BOEPWNJE/IPFT2XRA   94.104/15:01:47.26                INBOUND
 USER  039A8069  116077OC  4CC2D6C5  E5E2C5F2  F200C8C9  D9D6840E  C2D6C5C1  E2F4F0F0  .....-..<BOEVSE22.HIROD.BOEAS400
       00E2E6C1  E9C9833F  C6899385  40C9C3C3  C6D7E4D5  40948594  82859940  C8C9D9D6  .SWAZIC.FILE ICCFPUN MEMBER HIRO
       4095A494  82859940  F9F94099  85838589  A5858440  86969940  A4A28599  40E2E6C1   NUMBER 99 RECEIVED FOR USER SWA
       E9C940C2  D6C5C105  E2F4F0F0  4B                                              ZI BOEA.S400.
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:47.26                OUTBOUND
 VTAM     TH=4000000000000000000000016000000161D000054000A00050006    RH=830100
       000003                                                                      ...
BUF    IPFT2XRA/BOEPWNJE   94.104/15:01:47.27                OUTBOUND
 VTAM     TH=4000000000000000000000016000000161C000054000A00010003    RH=83A000
BUF    IPFT2XRA/BOEPWNJE   94.104/15:02:25.34                OUTBOUND
 VTAM     TH=4000000000000000000000016000000161D000054000A00900023    RH=6B8000
       32010000  00006018  C453D9C2  3CA0F1B0  0FC4C5C9  C2D4C9D7  C64BC9D7  C6E5F2C2  ......-.D.RB..1..DEIBMIPF.IPFV2B
BUF    BOEPWNJE/IPFT2XRA   94.104/15:02:25.45                INBOUND
 VTAM     TH=4000000000000000000000016000000161D00000A005400900004    RH=EB8000
       32                                                                          .
BUF    IPFV2B  /IPFT2XRA   94.104/15:02:27.49                INBOUND
 VTAM     TH=4000000000000000000000016000000161C000001005422220006    RH=0B8000
       81062006  06010001  000000                                                  A.........
BUF    IPFT2XRA/IPFV2B     94.104/15:02:27.49                OUTBOUND
 VTAM     TH=4000000000000000000000016000000161C000054000122220006    RH=8B8000
       810620                                                                      A..
END OF TRACE PRINT UTILITY
```

Figure 99 (Part 2 of 2). The Rest of the Signon Trace

B.2 AS/400 Node Name Higher than VSE Node Name

Figure 100 on page 93 shows a trace that was run during session establishment between the VSE host and the AS/400. The AS/400 has a higher node name, BOEVT400, than the VSE node name of BOEVSE22.

```
                                VTAM TRACE FILE UTILITY                          94.104  15:08:54    PAGE     1

  00001 PHYSICAL RECORDS MISSING FROM TRACE FILE
BUF    IPFV2B  /IPFT2XRA   94.104/14:05:39.22                INBOUND
 VTAM     TH=400000000000000000000016000000161C000001004B2222000E    RH=0B8000
       8106200C  06030001  000000                                                  A.........
BUF    IPFT2XRA/IPFV2B     94.104/14:05:39.23                OUTBOUND
 VTAM     TH=400000000000000000000016000000161C00004B000122220006    RH=8B8000
       810620                                                                      A..
BUF    IPFT2XRA/BOEPWNJE   94.104/14:06:07.74                OUTBOUND
 VTAM     TH=400000000000000000000016000000161D00004B000A00750077    RH=6B8000
       31010303  72724022  0383F7F7  83030000  00000000  00000000  00000008  C2D6C5D7  ...... ..C77C.............BOEP
       E6D5D1C5  000008C9  D7C6E3F2  E7D9C160  18C453D9  C23CA0F1  9F0FC4C5  C9C2D4C9  WNJE...IPFT2XRA-.D.RB..1..DEIBMI
       D7C64BC9  D7C6E5F2  C2E012F3  C4C5C9C2  D4C9D7C6  4BC2D6C5  D7E6D5D1  C52C0A01  PF.IPFV2B..3DEIBMIPF.BOEPWNJE...
       08404040  40404040  402D0908  D5D1C5D4  D6C44040                            .        ...NJEMOD
BUF    BOEPWNJE/IPFT2XRA   94.104/14:06:08.18                INBOUND
 VTAM     TH=400000000000000000000016000000161D00000A004B0075003C    RH=EB8000
       31010000  00000002  0080F7F7  80000000  00000000  00000000  00000000  00000060  .........77...................-
       18C453D9  C23CA0F1  9F0FC4C5  C9C2D4C9  D7C64BC9  D7C6E5F2  C2                .D.RB..1..DEIBMIPF.IPFV2B
BUF    IPFT2XRA/BOEPWNJE   94.104/14:06:08.18                OUTBOUND
 VTAM     TH=400000000000000000000016000000161D00004B000A00760004    RH=6B8000
       A0                                                                          .
BUF    BOEPWNJE/IPFT2XRA   94.104/14:06:08.35                INBOUND
 VTAM     TH=400000000000000000000016000000161D00000A004B00760004    RH=EB8000
       A0                                                                          .
BUF    IPFT2XRA/BOEPWNJE   94.104/14:06:08.72                OUTBOUND
 USER  08040780  0000E080                                                        ........
BUF    IPFT2XRA/BOEPWNJE   94.104/14:06:08.72                OUTBOUND
 VTAM     TH=400000000000000000000016000000161C00004B000A0001000B    RH=0BA100
       08040780  0000E080                                                        ........
BUF    BOEPWNJE/IPFT2XRA   94.104/14:06:08.74                INBOUND
 VTAM     TH=400000000000000000000016000000161D00000A004B00000006    RH=830100
       000003                                                                      ...
BUF    BOEPWNJE/IPFT2XRA   94.104/14:06:11.24                INBOUND
 VTAM     TH=400000000000000000000016000000161C00000A004B0001000B    RH=0B8100
       08040800  0000C080                                                        ........
BUF    BOEPWNJE/IPFT2XRA   94.104/14:06:12.29                INBOUND
 VTAM     TH=400000000000000000000016000000161C00000A004B00010003    RH=83A000
BUF    BOEPWNJE/IPFT2XRA   94.104/14:06:12.30                INBOUND
 USER  08040800  0000C080                                                        ........
BUF    IPFT2XRA/BOEPWNJE   94.104/14:06:12.30                OUTBOUND
 VTAM     TH=400000000000000000000016000000161D00004B000A00010006    RH=830100
       000003                                                                      ...
BUF    IPFT2XRA/BOEPWNJE   94.104/14:06:12.30                OUTBOUND
 VTAM     TH=400000000000000000000016000000161C00004B000A00010003    RH=8BA000
BUF    BOEPWNJE/IPFT2XRA   94.104/14:06:12.49                INBOUND
 VTAM     TH=400000000000000000000016000000161C00000A004B0002002D    RH=038100
       29F0C929  C2D6C5E5  E3F4F0F0  01000000  00000008  00404040  40404040  40404040  .OI.BOEVT400.........1
       40404040  40000000  0000                                                        .....
BUF    BOEPWNJE/IPFT2XRA   94.104/14:06:12.50                INBOUND
 USER  29F0C929  C2D6C5E5  E3F4F0F0  01000000  00000008  00404040  40404040  40404040  .OI.BOEVT400.........1
       40404040  40000000  0000                                                        .....
BUF    IPFT2XRA/BOEPWNJE   94.104/14:06:12.50                OUTBOUND
 VTAM     TH=400000000000000000000016000000161D00004B000A00020006    RH=830100
       000003                                                                      ...
BUF    IPFT2XRA/BOEPWNJE   94.104/14:06:12.51                OUTBOUND
 VTAM     TH=400000000000000000000016000000161C00004B000A00010003    RH=83A000
BUF    IPFT2XRA/BOEPWNJE   94.104/14:06:12.52                OUTBOUND
 USER  29F0D129  C2D6C5E5  E2C5F2F2  01FFFFFF  FF000007  80404040  40404040  40404040  .OJ.BOEVSE22.........2
       40404040  40000000  0000                                                        .....
BUF    IPFT2XRA/BOEPWNJE   94.104/14:06:12.52                OUTBOUND
 VTAM     TH=400000000000000000000016000000161C00004B000A0002002D    RH=03B500
       29F0D129  C2D6C5E5  E2C5F2F2  01FFFFFF  FF000007  80404040  40404040  40404040  .OJ.BOEVSE22.........2
       40404040  40000000  0000                                                        .....
```

Figure 100. Signon Trace Data

In this case, the AS/400 is the primary NJE node and VSE the secondary.

1 The AS/400 (BOEVT400) sends the initial signon record (I) and therefore it is the primary NJE node.

2 The VSE host (BOEVSE22) is the secondary NJE node, sending the response signon record (J).

```
                                VTAM TRACE FILE UTILITY                          94.104  15:08:54    PAGE     2
BUF    BOEPWNJE/IPFT2XRA   94.104/14:06:12.53                INBOUND
 VTAM     TH=400000000000000000000001600000016100000A004B00000006    RH=830100
       000003                                                                    ...
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:00.35                OUTBOUND
 USER  03909900                                                                  ..R.
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:00.35                OUTBOUND
 VTAM     TH=400000000000000000000001600000016100004B000A00030007    RH=03B000
       03909900                                                                  ..R.
BUF    BOEPWNJE/IPFT2XRA   94.104/14:07:01.73                INBOUND
 VTAM     TH=400000000000000000000001600000016100000A004B00030007    RH=038000
       03A09900                                                                  ..R.
BUF    BOEPWNJE/IPFT2XRA   94.104/14:07:01.73                INBOUND
 USER  03A09900                                                                  ..R.
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:01.74                OUTBOUND
 VTAM     TH=400000000000000000000001600000016100004B000A00010003    RH=83A000
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:01.74                OUTBOUND
 USER  1399C0FF  01000080  00D40000  0733F4C1  80054001  C4008807  C2D6C5D7  C1E3C891  .R.......M....4A.. .D.H.BOEPATHJ
       C80014A9  209F4168  491200C2  D6C5E5E2  C5F2F2C8  C9D9D684  0CC2D6C5  E5E2C5F2  H..Z.......BOEVSE22HIROD.BOEVSE2
       F2C8C9D9  D6840CC2  D6C5E5E2  C5F2F2C8  C9D9D684  0CC2D6C5  E5E2C5F2  F2C8C9D9  2HIROD.BOEVSE22HIROD.BOEVSE22HIR
       D68CD000  ACC30001  01C40088  08006C86  0000C400  0090D000  0799C047  00480001  O....C...D.H..%F..D......R......
       C40088C4  0098C400  98                                                    D.HD.QD.Q
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:01.74                OUTBOUND
 VTAM     TH=400000000000000000000001600000016100004B000A0004008C    RH=03B000
       1399C0FF  01000080  00D40000  0733F4C1  80054001  C4008807  C2D6C5D7  C1E3C891  .R.......M....4A.. .D.H.BOEPATHJ
       C80014A9  209F4168  491200C2  D6C5E5E2  C5F2F2C8  C9D9D684  0CC2D6C5  E5E2C5F2  H..Z.......BOEVSE22HIROD.BOEVSE2
       F2C8C9D9  D6840CC2  D6C5E5E2  C5F2F2C8  C9D9D684  0CC2D6C5  E5E2C5F2  F2C8C9D9  2HIROD.BOEVSE22HIROD.BOEVSE22HIR
       D68CD000  ACC30001  01C40088  08006C86  0000C400  0090D000  0799C047  00480001  O....C...D.H..%F..D......R......
       C40088C4  0098C400  98                                                    D.HD.QD.Q
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:01.74                OUTBOUND
 USER  0599E0EF  00F0C300  10700000  C2D6C5E5  E3F4F0F0  E2E6C1E9  C99BC300  01C1C300  .R...OC.....BOEVT400SWAZI.C..AC.
       060100C2  005101C3  0088E000  0140C300  8808007C  86000020  F3C490C4  0005C6F4  ...B...C.H... C.H..@F...3D.D..F4
       000002C3  008C0444  60120088  D0008CC8  000201FF  DA000599  901F1F41  DEC1      ...C....-..H...H.......R.....A
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:01.74                OUTBOUND
 VTAM     TH=400000000000000000000001600000016100004B000A00050061    RH=03B100
       0599E0EF  00F0C300  10700000  C2D6C5E5  E3F4F0F0  E2E6C1E9  C99BC300  01C1C300  .R...OC.....BOEVT400SWAZI.C..AC.
       060100C2  005101C3  0088E000  0140C300  8808007C  86000020  F3C490C4  0005C6F4  ...B...C.H... C.H..@F...3D.D..F4
       000002C3  008C0444  60120088  D0008CC8  000201FF  DA000599  901F1F41  DEC1      ...C....-..H...H.......R.....A
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:01.75                OUTBOUND
 USER  0599D02F  0030C300  012CC300  12F40000  A9209F41  82FC8200  A9209F46  92E71AD1  .R....C...C..4..Z...B.B.Z...KX.J
       00C30501  00                                                            .C...
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:01.75                OUTBOUND
 VTAM     TH=400000000000000000000001600000016100004B000A00060028    RH=03B000
       0599D02F  0030C300  012CC300  12F40000  A9209F41  82FC8200  A9209F46  92E71AD1  .R....C...C..4..Z...B.B.Z...KX.J
       00C30501  00                                                            .C...
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:01.75                OUTBOUND
 USER  03990000                                                                  .R..
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:01.75                OUTBOUND
 VTAM     TH=400000000000000000000001600000016100004B000A00070007    RH=03B000
       03990000                                                                  .R..
BUF    BOEPWNJE/IPFT2XRA   94.104/14:07:01.76                INBOUND
 VTAM     TH=400000000000000000000001600000016100000A004B00000006    RH=830100
       000003                                                                    ...
BUF    BOEPWNJE/IPFT2XRA   94.104/14:07:05.15                INBOUND
 VTAM     TH=400000000000000000000001600000016100000A004B00040007    RH=038000
       03C09900                                                                  ..R.
BUF    BOEPWNJE/IPFT2XRA   94.104/14:07:05.15                INBOUND
 USER  03C09900                                                                  ..R.
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:05.16                OUTBOUND
 VTAM     TH=400000000000000000000001600000016100004B000A00010003    RH=83A000
```

Figure 101 (Part 1 of 2). The Rest of the Signon Trace Data

```
                                    VTAM TRACE FILE UTILITY                                  94.104  15:08:54    PAGE     3
BUF    BOEPWNJE/IPFT2XRA   94.104/14:07:12.23                INBOUND
 VTAM     TH=4000000000000000000000016000000161C00000A004B00050074    RH=038100
       039A806C  1160770C  4FC2D6C5  E5E2C5F2  F200C8C9  D9D6840F  C2D6C5E5  E3F4F0F0  ...%.-..|BOEVSE22.HIROD.BOEVT400
       00E2E8E2  E3C5D482  3FC489A2  A3998982  A4A38996  95409686  40868993  8540C2D6  .SYSTEMB.DISTRIBUTION OF FILE BO
       C5D7C1E3  C8409485  94828599  40C8C9D9  D640A396  40A4A285  9940E2E6  C1E9C940  EPATH MEMBER HIRO TO USER SWAZI
       C2D6C5E5  E3F4F0F0  08408681  89938584  4B                                      BOEVT400. FAILED.
BUF    BOEPWNJE/IPFT2XRA   94.104/14:07:12.23                INBOUND
 USER  039A806C  1160770C  4FC2D6C5  E5E2C5F2  F200C8C9  D9D6840F  C2D6C5E5  E3F4F0F0  ...%.-..|BOEVSE22.HIROD.BOEVT400
       00E2E8E2  E3C5D482  3FC489A2  A3998982  A4A38996  95409686  40868993  8540C2D6  .SYSTEMB.DISTRIBUTION OF FILE BO
       C5D7C1E3  C8409485  94828599  40C8C9D9  D640A396  40A4A285  9940E2E6  C1E9C940  EPATH MEMBER HIRO TO USER SWAZI
       C2D6C5E5  E3F4F0F0  08408681  89938584  4B                                      BOEVT400. FAILED.
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:12.23                OUTBOUND
 VTAM     TH=4000000000000000000000016000000161D00004B000A00050006    RH=830100
       000003                                                                          ...
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:12.23                OUTBOUND
 VTAM     TH=4000000000000000000000016000000161C00004B000A00010003    RH=83A000
BUF    IPFT2XRA/BOEPWNJE   94.104/14:07:48.52                OUTBOUND
 VTAM     TH=4000000000000000000000016000000161D00004B000A00760023    RH=6B8000
       32010000  00006018  C453D9C2  3CA0F19F  0FC4C5C9  C2D4C9D7  C64BC9D7  C6E5F2C2  ......-.D.RB..1..DEIBMIPF.IPFV2B
BUF    BOEPWNJE/IPFT2XRA   94.104/14:07:48.62                INBOUND
 VTAM     TH=4000000000000000000000016000000161D00000A004B00760004    RH=EB8000
       32                                                                              .
BUF    IPFV2B  /IPFT2XRA   94.104/14:07:50.82                INBOUND
 VTAM     TH=4000000000000000000000016000000161C000001004B2222000E    RH=0B8000
       8106200C  06010001  000000                                                      A.........
BUF    IPFT2XRA/IPFV2B     94.104/14:07:50.82                OUTBOUND
 VTAM     TH=4000000000000000000000016000000161C00004B000122220006    RH=8B8000
       810620                                                                          A..
  NO  IO  RECORDS FOUND IN TRACE FILE
  NO LINE RECORDS FOUND IN TRACE FILE
  NO TNST RECORDS FOUND IN TRACE FILE
  NO  VIT RECORDS FOUND IN TRACE FILE
END OF TRACE PRINT UTILITY
```

Figure 101 (Part 2 of 2). The Rest of the Signon Trace Data

List of Abbreviations

AFP	advanced function printing
APPN	advanced peer-to-peer networking
CETI	continuously executing transfer interface
CL	control language
DDS	data description specification
DSAP	destination service access point (LAN)
ELAN	Ethernet LAN
ES	enterprise systems
FDDI	fiber distributed data interface
FMH	function management header
GW	gateway
IBM	International Business Machines Corporation
ICA	integrated communication adapter
IOCDS	I/O configuration data set
ISDN	integrated services digital network
ITSO	International Technical Support Organization
JCL	job control language
JECL	job entry control language
LAN	local area network
LPDU	link protocol data unit
LU	logical unit
MAC	medium access control
NDT	network definition table
NJE	network job entry
NRZI	non-return-to-zero inverted
PIU	path information unit
PLU	primary logical unit
PNET	POWER networking interface
PU	physical unit
RH	request header
RJE	remote job entry
RTS	request to send
RU	request unit
SAP	service access point
SDLC	synchronous data link control
SLU	secondary logical unit
SNA	systems network architecture
SNADS	systems network architecture distribution services
SNUF	systems network architecture upline facility
SSAP	source service access point (LAN)
SSCP	system services control point
TH	transmission header
TIC	token-ring interface connector
TRA	token-ring adapter
TRLAN	token-ring local area network

Index

Numerics

A

B

C

D

E

T

V

X

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