Burroughs

Administrator's Guide

B 20

Systems

B-NET

(Relative to Release Level 1.0)

Burroughs

*Administrator's
Guide*

**B 20
Systems
B-NET**

(Relative to Release Level 1.0)
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INTRODUCTION

This guide describes the features and operations of the
B-NET Communications system. It begins with an overview of
the system's components, then explains how to set up the
hardware and install the software, configure a network, and
communicate with other systems on the network.
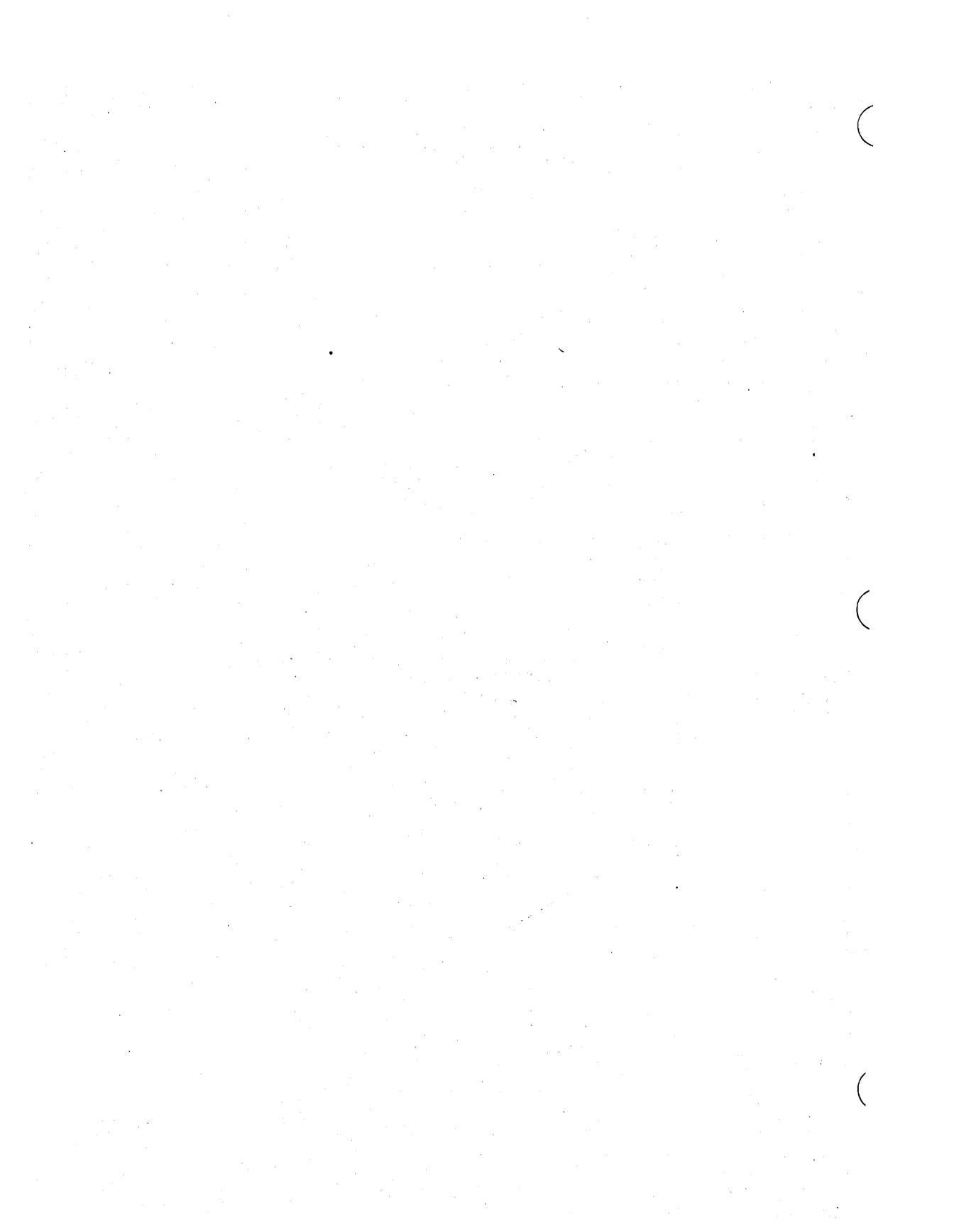
OVERVIEW OF THE CONTENTS

This guide contains nine sections, four appendices, and an
index.

Section 1, B-NET Overview, introduces the capabilities and
components of the B-NET system.

Section 2, Cable Connections and Modems, describes the
modems that B-NET supports, and explains how to build the
cables for connecting a modem to your workstation, and how
to set up the modem. It also describes the cable required
for direct connections between two B 25 workstations.

Section 3, Loading the B-NET Software from the Distribution
Diskette, explains how to load the B-NET software onto your
system. It includes procedures both for systems with hard
disk storage and dual floppy disk systems.

Section 4, B-NET System Installation, explains how to
activate the B-NET system after loading the software.

Section 5, Network Control Center (NCC), describes the B-NET
system's administrative interface.

Section 6, Node and Network Configuration, explains how to
configure your system for communicating with others in a
B-NET communications network. It discusses the function of
the Network Administrator in installing and maintaining a
network, and gives procedures for saving a network
configuration and deinstalling a network.

Section 7, Network Automatic Configuration (NAC) Facility
explains how to automatically reenter a previously
configured network.

Section 8, Monitoring Node and Network Status and Activity,
explains the utilities the B-NET system provides for keeping
track of network usage.

Section 9, Using the B-NET System, gives procedures for communicating over a B-NET network.

Appendix A, Status Ccdes and Status Messages, lists information the system provides to help you install and operate a network.

Appendix B, Creating B-NET Requests, provides technical information for system developers and programmers.

Appendix C lists the B-NET system's memory requirements, and Appendix D is a glossary of terms.

RELATED MATERIAL

This guide makes reference to the following literature:

- For additional information on the Executive, refer to the *B 20 Systems Standard Software Operations Guide.*

- For additional information about the B 20 Operating System (BTOS), refer to the *B 20 Operating System (BTOS), Reference Manual, Vols. 1 and 2.*

SECTION 1

B-NET OVERVIEW

GENERAL

B-NET is a communications software program that allows users
of B 20 systems to access the files and other resources of
systems in remote locations. B-NET provides administration,
data transfer, and link control procedures for communica-
tions between systems connected in a B-NET network.

B-NET operates as an extension of the BTOS message-based
operating system. B-NET supports a distributed BTOS
environment, in which operating system messages pass from
one workstation to another much like messages pass from one
process to another within a workstation.

As a result, using B-NET is similar to using BTOS; you use
the Executive to activate the system and to specify the
files you want to access at remote locations. Because B-NET
services users' requests automatically, its operation is
transparent to personnel at the remote location.

B-NET includes interactive utilities for installing and con-
figuring the network, and for monitoring network activities
and status. It also includes a facility for storing and auto-
matically reentering a previously configured network.

NETWORKS AND NODES

A network consists of two or more nodes that can communicate
with each other over one or more communications line media.

A node is a workstation (standalone, master, or cluster with
a local file system) in which the B-NET software has been
installed, and which has been configured to communicate with
one or more other nodes in the network.

Your node is the local node; remote nodes are nodes in other
locations.

A cluster workstation that is not a node itself (that is, does
not have the B-NET software installed) can access B-NET services
through the master workstation if the master is a node.

However, a master workstation that is not a node can not access B-NET services through a cluster workstation that is a node.

B-NET is a point-to-point system; that is, a line connection must exist between your node and a remote node you want to communicate with. For example, if your node does not have a line connection with node A, you can not access node A's files via node B, even though node B is connected with both your node and node A.

Because B-NET is media-independent, it supports several types of networks and a variety of communications line media, including the following:

- Intrabuilding connections:

    RS-232-C

- Interbuilding connections:

    circuit-switched networks (DDD and DDS)

- Intercity connections:

    public data networks (X.25 packet switching)

    circuit-switched networks (DDD and DDS)

- International connections:

    public data networks (X.25 packet switching)

    circuit-switched networks (DDD and DDS)

B-NET SUBSYSTEMS

The B-NET system includes three subsystems: the Net Transport Service, the Net Agent, and the Net Server. The Transport Service controls the routing, flow, and sequencing of communications between nodes. The Net Agent controls the sending of users' requests for service, while the Net Server controls the answering of requests.

Net Transport Service

The Net Transport Service is a BTOS system service that connects individual nodes into a B-NET communications network.

It includes utilities for installing and deinstalling a
network, and for monitoring network status and activity.
Each node's Transport Service communicates directly with the
Transport Service of remote nodes in the network.

The Transport Service is the communications vehicle for
distributed BTOS. The two other B-NET subsystems, the Net
Agent and the Net Server, interface with the Transport
Service to provide the distributed BTOS's request/response
type of interprocess communication.

The Transport Service performs four types of network services:

- managing communications between workstations on
  the network

- providing end-to-end data transfer among
  workstations on the network

- managing local buffer allocation and flow control

- providing communications administration services
  (establishing, terminating, and synchronizing
  communications)

The Transport Service includes the following features and
capabilities:

- supports leased-line operations between two
  adjacent systems at speeds between 2400 bps and
  4800 bps (full duplex)

- supports auto-dial, auto-answer dial line operations
  between two nodes with Bell 212-compatible Racal-Vadic
  VA212 and BizComp 1012-CT modems

- supports direct cable connections between B 25 work-
  stations located up to 50 feet apart at 9600 bps

- provides X.25 media support, with both permanent
  virtual circuits (PVCs) and switched virtual
  circuits (SVCs)

- supports two active lines (leased, dial, X.25)
  per node

- allows network configurations of up to 64 nodes

- based on International Standards Organization
  (ISO) Open Systems Interconnection (OSI) Draft
  Standard Transport Protocol (Class 4)

Net Transport Service Utilities

The Net Transport Service incorporates two utilities:

- the Network Control Center (NCC)

- the Network Automatic Configuration (NAC) facility

You use the NCC to configure the network and to monitor the network's status and activity. In addition, the NCC allows you to store network configuration entries in the Network Configuration file.

The NAC facility allows you to automatically reenter a previously configured network using the entries stored in a Network Configuration file.

Network Control Center (NCC)

The Network Control Center (NCC) is a full-screen, menu- and function key-driven utility you use to perform the following operations:

- configuring your node and the line media connecting your node to remote nodes

- monitoring your node's status and activity within the network (including the number of nodes in the network, the number of network users, the status of open sessions between nodes, etc.)

- storing the current network configuration in a Network Configuration file for automatic reentry after the network has been deinstalled

- in conjunction with the NAC facility, automatically reentering a network stored in a Network Configuration file.

Network Automatic Configuration (NAC) Facility

The Network Automatic Configuration (NAC) facility allows you to automatically reconfigure your node after the network has been deinstalled. You use the NAC facility to reenter the network from the Network Configuration file into the Transport Service's Media and Node Tables.

When you use the NAC facility in conjunction with Submit files, you can reconfigure a network in one step. Submit files are covered in the *B 20 Systems Standard Software Operations Guide.*

Net Agent and Net Server

The Net Agent is the B-NET subsystem that forwards users' requests for service to Net Servers installed on remote nodes. The Net Server subsystem responds to user's requests received from remote Net Agents. Requests and responses pass via the Transport Service between the Net Agents and Net Servers installed on a network's nodes.

The Net Agent and the Net Server are separate programs. You usually load both on the same workstation; however, in some cases, your workstation may require only one or the other.

- Workstations that originate but do not respond to requests for service need the Net Agent only.

- Workstations that respond to but do not originate requests for service need the Net Server only.

Net Agent

The Net Agent is an installed system service that allows you to use the Executive to enter requests for service.

When you enter an Executive command requesting service from a remote node, BTOS transmits the request to your node's Net Agent, which forwards it via the Transport Service to the Net Server on the remote node.

NOTE

The Net Agent can be loaded on any workstation with local file storage in a cluster; however, it is usually located in the master workstation.

Net Server

The Net Server is an installed system service that responds to requests for service from Net Agents installed on remote nodes in the network. When the Net Server receives a request from a remote node's Net Agent, it carries out the request and returns a response via the Transport Service.
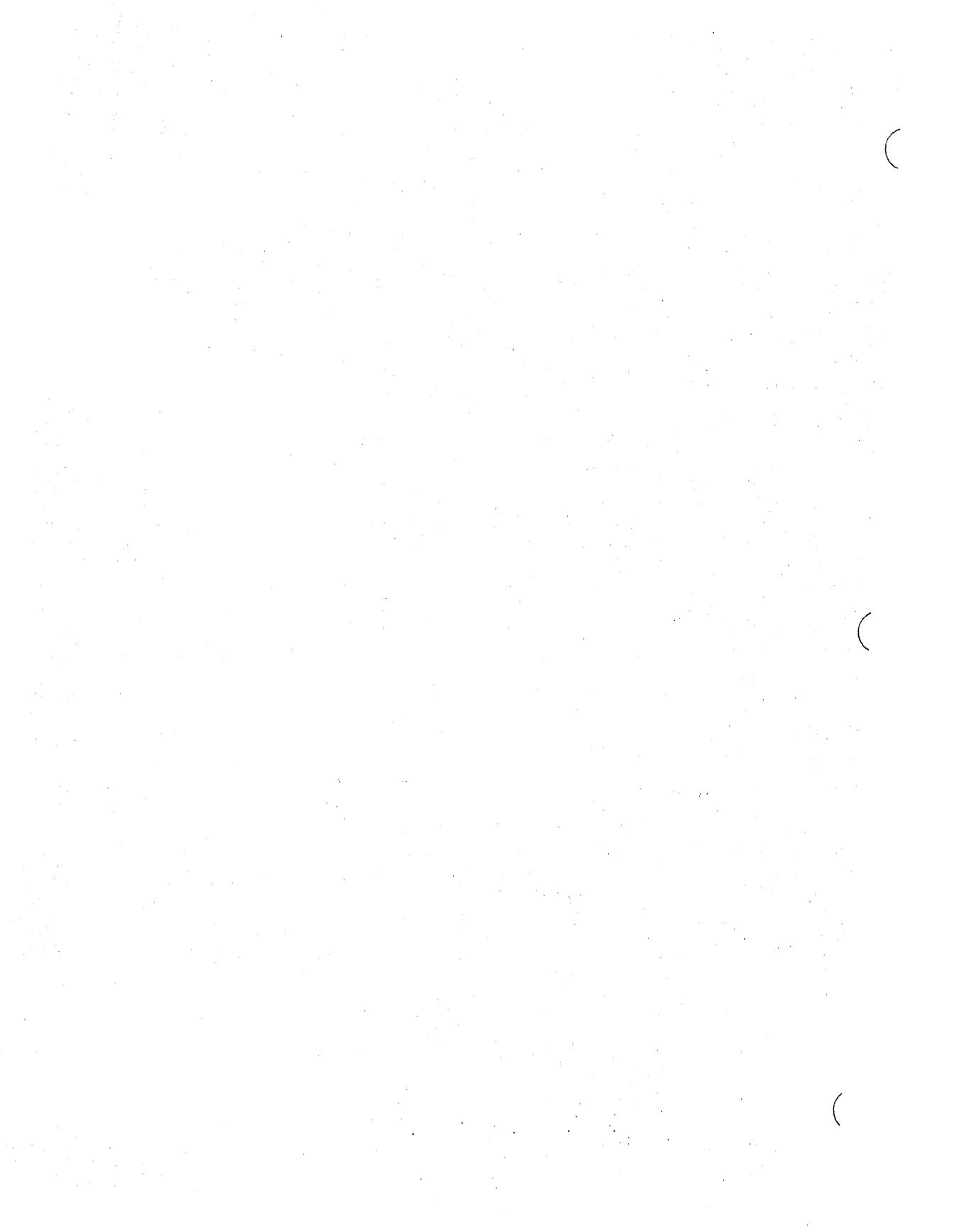
SECTION 2

CABLE CONNECTIONS AND MODEMS

GENERAL

B-NET supports three types of line media for connecting nodes:

- public telephone lines

- leased lines

- direct cable connections (between B 25 workstations located up to 50 feet apart)

Public telephone lines require a modem. Leased lines require a modem or a modem eliminator. (A modem eliminator is an electronic device that emulates a pair of modems transmitting and receiving; it originates clock signals that coordinate communications between workstations.) Direct cable connections require a special cable.

MODEMS

B-NET supports two types of modems: the Racal-Vadic VA212 and the BizComp 1012-CT. Both operate in synchronous mode once the system establishes a telephone connection.

Both the Racal-Vadic and the BizComp have three operating modes:

- **Auto dial/auto answer:** You can originate requests for service, and the node automatically answers requests from other nodes.

- **Originate only:** You can originate requests for service, but the node does not answer requests from other nodes.

- **Answer only:** The node will answer requests for service; however, if you try to originate a request, the system displays the status code 8944 with the message **This modem is answer only.**

You specify your modem's operating mode in the Network
Control Center's Media Table (refer to Media Table Entries,
in section 6).

Modifying the Standard Bizcomp 1012 Modem

The standard BizComp 1012 does not permit transmission of a
string of nulls longer than 1.6 seconds. Because B-NET
operates in synchronous mode, however, some files
transmitted may have strings of nulls longer than 1.6
seconds, causing the standard modem to disconnect.

The BizComp 1012-CT Modem is a special model equipped with a
hard-wired, factory-installed internal option needed to support
B-NET. If possible, you should use this special model.

If you already have a standard model, you can return it to
the manufacturer for modification, or have a qualified
technician modify it to support a transparent data mode for
B-NET synchronous operation.

Modem Cables

To ensure proper operation, you should use the modem cable
specified in the user's manual accompanying your modem. If
you have a generic RS-232-C modem cable, you must check it
pin-for-pin against the cable the modem manufacturer
specifies.

Often it is preferable to have a qualified technician make a
special cable instead of attempting to modify a generic
cable. If you can not avoid using a generic cable, be sure
you do the following:

- remove all pins that the modem does not use

- insure that the mating connector pins match
  according to the modem's signal requirements

Connecting the Racal-Vadic VA212 Modem

The Racal-Vadic VA212 Modem requires a straight-through
RS-232-C modem cable. See the user's manual accompanying
your modem for information concerning the pinouts of the
Data Communications Equipment (DCE) end of the cable.

On B 22 workstations, you must set the TxD and RxD clocks to
external clock on the channel that the line uses.

When you initially install the modem, you must set the user
options to the settings specified in table 2-1. Refer to
the appropriate section of the user's manual accompanying
your modem for detailed procedures.

NOTE

Options not included in table 2-1 retain
their default values. Before setting
the options, you should initialize all
settings to their default values by
setting option 1 to code 3.

Connecting the Bizcomp 1012-CT Modem

When you initially install the BizComp 1012-CT Modem, you
must set the switches to the following positions:

- switches 1 through 6 and 8: up

- switches 7 and 9: down

On B 22 workstations, you must set the TxD and RxD clocks to
external clock on the channel that the line uses.

The BizComp 1012-CT requires a modified or special cable
with pinouts as specified in table 2-2. All wiring is
straight-through.

If you modify a standard cable, you must remove all
connector pins the modem does not use. Refer to the user's
manual accompanying your modem for further information.

LEASED LINE CONNECTIONS

On a leased line, the system continuously maintains an open
connection between nodes, allowing traffic in both directions.
Leased lines function similarly to auto dial/auto answer modem
connections; however, you do not have to wait for the system
to establish a connection before beginning operations.

Leased lines require a modem or modem eliminator to provide
the workstation with Transmit Data (TxD) and Receive Data
(RxD) clocks. The modem eliminator should be set so that the
Request To Send (RTS) signal of the remote end toggles the
carrier detect.

Table 2-1. Racal-Vadic VA212 User Options

Option No.	Name	Setting	Code
01	Standard Options	Disabled	01*2
02	Data Format	Synchronous	02*2
07	Slave Clock	Enabled	07*1
13	Abort Timer Disconnect	Disabled	13*2
14	Respond to Remote Test	Disabled	14*2
16	CXR Control	Normal CXR	16*2
21	Local Copy	Disabled	21*2
24	Call Progress Detect	Disabled	24*2

Table 2-2. BizComp 1012-CT Modem Cable Pinouts

Workstation (DTE) Pin No.		Modem (DCE) Pin No.
1	←→	1
2	←→	2
3	←→	3
4	←→	4
5	←→	5
6	←→	6
7	←→	7
8	←→	8
14	←→	11
12	←→	12
15	←→	15
17	←→	17
20	←→	20
22	←→	22
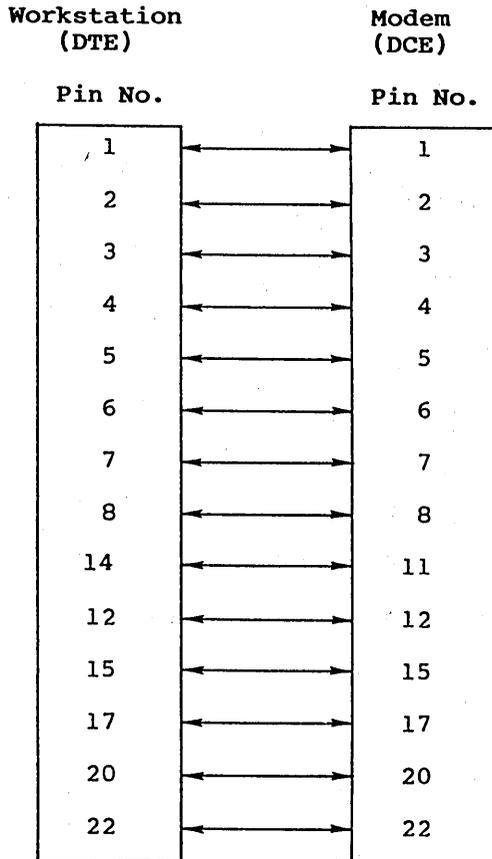
On B 22 workstations, you must set the TxD and RxD clocks to external clock on the channel the leased line uses.

B-NET currently supports a maximum line speed of 4800 bps on leased lines.

DIRECT CABLE CONNECTIONS

B-NET supports direct cable connections for synchronous operation at 9600 bps between two B 25 workstations. The workstations can be located up to 50 feet apart. This connection does not require a modem; however, it requires a special cable with pinouts as indicated in table 2-3.

When you configure your system, you treat this cable connection as a leased line (refer to Media Table Entries, in section 6).

Table 2-3. B 25 Direct Connection Cable Pinouts

```
          Workstation 1           Workstation 2

           Pin No.                  Pin No.
        ┌─────────┐              ┌─────────┐
        │    1    │◄───────────► │    1    │
        │    2    │◄───────────► │    3    │
        │    3    │◄───────────► │    2    │
        │    4    │◄───────────► │    5    │
        │    5    │◄───────────► │    4    │
        │    7    │◄───────────► │    7    │
        │   15    │◄───────────► │   17    │
        │   17    │◄───────────► │   15    │
        │   24    │◄─┐        ┌─►│   24    │
        │    8    │◄─┤     ┌──┤  │    8    │
        │   20    │◄─┘     └──┤  │   20    │
        └─────────┘           └─────────┘
```
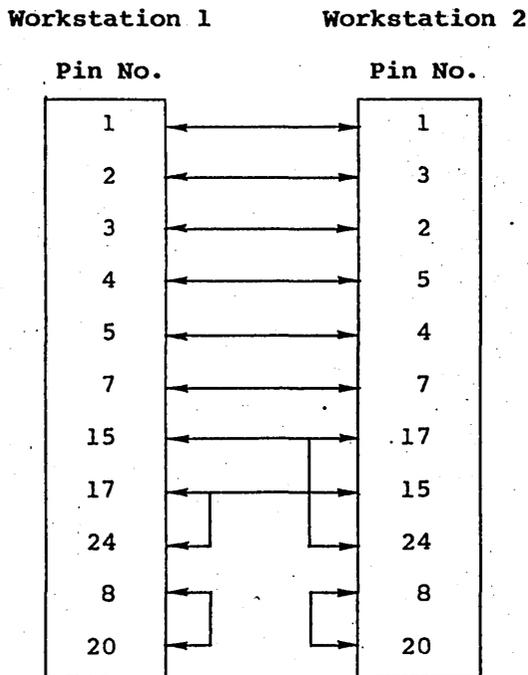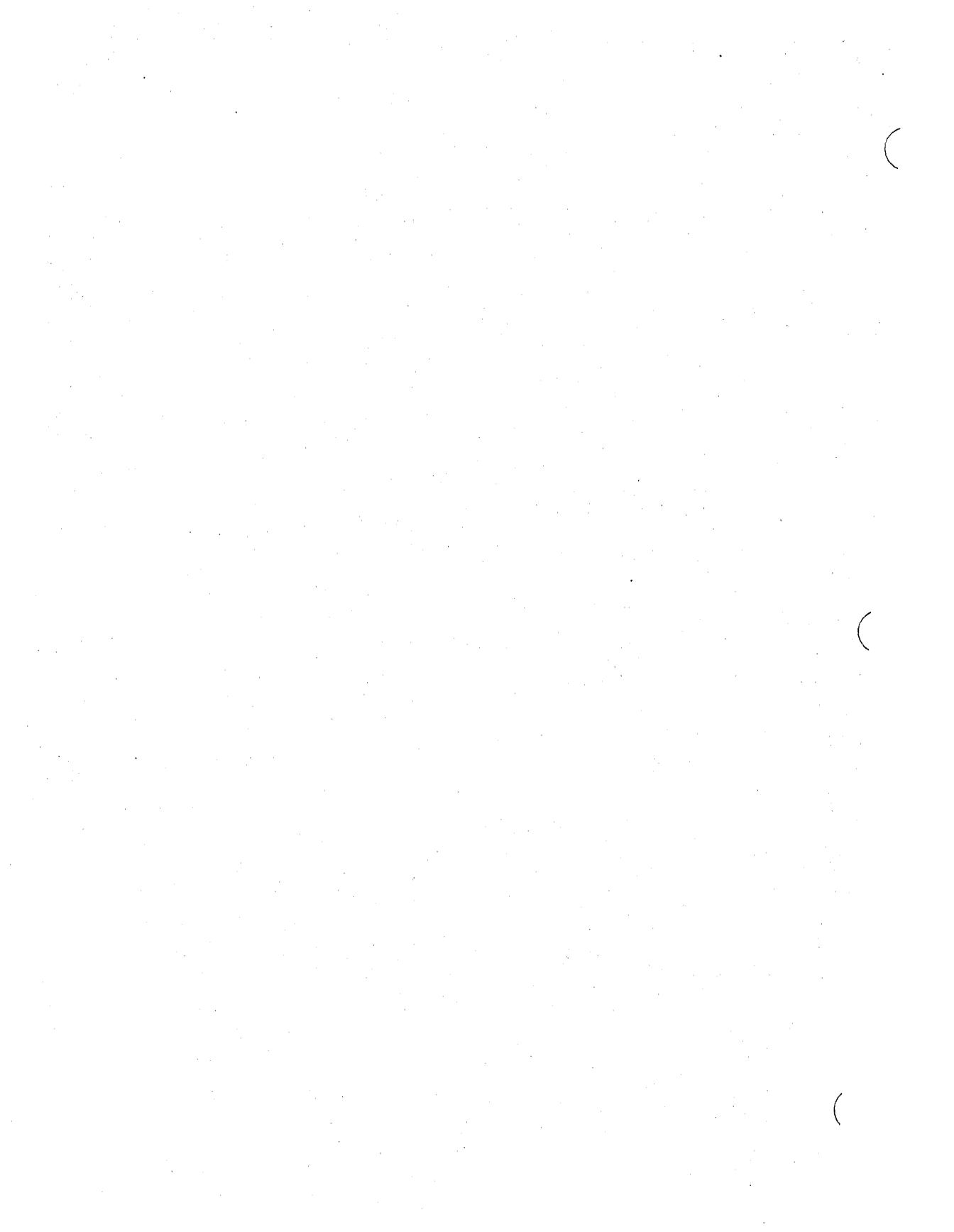
SECTION 3

LOADING THE B-NET SOFTWARE FROM
THE DISTRIBUTION DISKETTE

GENERAL

The distribution diskette accompanying this manual is your
master copy of the B-NET program. It has been shipped to
you write-protected; it should NOT be write-enabled. You
should not use your distribution diskette as a working copy.
Make a copy of it for that purpose, and store the original
in a safe place.

CONTENTS OF THE DISTRIBUTION DISKETTE

The B-NET distribution diskette contains the directory
<Burroughs> with the following files:

        NetCtrForm.Lib
        Net.run
        NetServer.run
        NetAgent.run
        StopNet.run
        Ncc.run
        Nac.run
        Request.4.sys

It also contains the directory <Sys> with the following files:

        Install.sub
        DFInstall.sub
        SpCleanup.sub

The system uses these files to load the program.

LOADING PROCEDURES

This section tells you how to load the B-NET software onto
your B 20 system. It includes procedures for workstations
with hard disks (both standalone systems and master work-
stations of cluster systems) and workstations with dual
floppy disk drives.

Workstations with Hard Disk Drives

Use the following procedure to load the B-NET software onto
standalone and master workstations equipped with a hard disk
drive.

NOTE

B 22 workstations must be set up for
synchronous communications.

Have a qualified service technician
power it down, remove the memory I/O
board, ensure that the communications
channel to be used for network communi-
cations is configured for external
clock, and replace the board in its
slot.

When this is done, power up the work-
station and complete the Signon form.

1. Insert your working copy of the distribution
    diskette in drive f0. DO NOT press the **RESET**
    button.

2. Enter the **Software Installation** command in the
    Executive command field; then press **GO**.

    The system displays the following message:

          B 20 B-NET Installation

    If this is a cluster system and the cluster is not
    disabled, then power down all cluster workstations.

              PRESS <GO> when ready

    If you are loading B-NET onto the master work-
    station of a cluster, power down the cluster
    workstations.

3. Press **GO**. The system copies the B-NET files from the distribution diskette and creates the B-NET commands; the following message then appears:

    If you have a Single Partition system,
            PRESS <GO>

    If you have a Multipartition system,
            PRESS <CANCEL> <GO>

    - If your system is configured as a single partition system, press **GO**. The system automatically removes the commands not applicable to single partition systems.

    - If your system is configured as a multi-partition system, hold down the **CANCEL** key while you press **GO**. The system retains the commands applicable to multipartition systems.

5. When the system completes the operation, it displays the following message:

    ***** INSTALLATION OF B 20 B-NET COMPLETE *****

    The Executive command prompt reappears on the display.

6. Remove your working copy of the distribution diskette from drive f0, and resume normal operations.

If you have a cluster system, you can now resume cluster operations.

Workstations with Dual Floppy Disk Drives

To load the B-NET software onto a workstation with dual floppy disk drives, use the following procedure:

1. Using a working copy of the Dual Floppy OS Boot diskette B26SF#-1 (# represents the release level), bootstrap your system and log onto the Executive.

2. Insert a working copy of the diskette labeled B26SF#-2 (# represents the release level) into drive f0. Make sure that it is not write-protected.

3. Insert a working copy of the B-NET distribution diskette into drive f1.

4. Enter the command **Submit** in the Executive command field, then press **RETURN**.

   The system displays the following command form:

   Submit
       File list
       [Parameters]
       [Force expansion?]
       [Show expansion?]

5. Enter **[f1]<Sys>DFInstall.sub** in the highlighted File list field; then press **GO**. The system displays the following message:

   B 20 B-NET Installation

   PRESS <GO> when ready

6. When the system prompts you, remove the B-NET distribution diskette from drive f1 and insert a working copy of Dual Floppy OS Boot diskette B26SF#-1 (**#** represents the release level) into drive f1; then press **GO**.

7. When the operation is complete, the system displays the following message:

   ***** INSTALLATION OF B 20 NET COMPLETE *****

   The Executive command prompt reappears on the display.

8. Remove the disk from drive f1 and resume normal operations.

                              NOTE

   To enter the B-NET commands and use the B-NET utilities described later in this manual, you must insert the copy of diskette B26SF#-1 (**#** represents the release level) modified in step 6 of this procedure into drive f0, and a working copy of the B-NET distribution diskette in drive f1.

   This is not required to communicate with remote nodes in the network.

SECTION 4

B-NET SYSTEM INSTALLATION

GENERAL

After loading the B-NET software, you can install the B-NET system services (the Transport Service, Net Server, and Net Agent). First, however, you must determine your node's name and address within the network, as well as the names and addresses of the nodes with which you want to communicate. Refer to Coordinating Network Configuration, in section 6.

INSTALLING THE B-NET SUBSYSTEMS

You install each of the B-NET subsystems by entering the appropriate Executive command and providing the information requested in the command form. When you press GO, the system brings the corresponding subsystem from disk into memory.

NOTE

You must install the Net Transport Service first; the Net Agent and Net Server can follow in either order.

If you use X.25 as a communications medium, you must install it before you install any of the B-NET subsystems.

Installing the Net Transport Service

To install the Net Transport Service, use the following procedure (use the NEXT, RETURN, or Down Arrow keys to move the highlight through the command form):

1.   Enter the command Install Net Transport Service in the Executive command field; then press RETURN.

The system displays the following command form:

```
Install Net Transport Service
        Node Name
        Node Address
        [Max # Media (default=2)]
        [Max # Nodes (default=2)]
        [Max # Users (default=2)]
        [Max # Connections (default=# of ws)]
```

The Node Name field is highlighted.

2.   Enter your node's name (up to 12 alphanumeric characters). The name could denote your node's location (for example, Chicago) or function (for example, Accounting).

3.   Move the highlight to the Node Address field.

4.   Enter your node's address. The address is a number you assign to a node when you add it to the network (refer to Node and Network Configuration, in section 6).

   Addresses begin with 1 and progress in numerical order up to the number you specify in the Max Nodes field (see step 5 below). The maximum is 64.

                          NOTE

   The node name and the node address identify a node and distinguish it from other nodes in the network. Therefore, each node on the network MUST have a different name and address.

The remaining parameters are optional. To accept the default values and complete installation of the Transport Service, press GO.

To change any of the parameters, use the following procedure:

1.   Move the highlight to the Max # Media field.

2.   Enter the maximum number of line media your node has going out or coming in.

   The default value is 2; to accept the default, leave this field blank.

3. Move the highlight to the Max # Nodes field.

4. Enter the maximum number of nodes to be included
    in the network. The current limit is 64.

    The default value is 2; to accept the default,
    leave this field blank.

5. Move the highlight to the Max # Users field.

6. Enter the maximum number of direct users of the
    Transport Service. This is normally 2 - the Net
    Agent and the Net Server. Some nodes may have
    only 1 - either the Net Agent or the Net Server
    alone (refer to Net Agent and Net Server, in
    section 1).

    The default value is 2; to accept the default,
    leave this field blank.

7. Move the highlight to the Max # Connections field.

8. Enter the maximum number of cluster users (or
    applications) that can communicate simultaneously
    with remote nodes in the network. The current
    maximum is 16.

    The default value is the number of workstations
    (master and clusters) on the node; to accept the
    default, leave this field blank.

9. Press GO to complete installation of the Transport
    Service.

Installing the Net Agent and the Net Server

After installing the Transport Service, you install the Net
Agent and/or the Net Server, in either order. Like the
Transport Service, you install the Net Agent and the Net
Server from the Executive.

Installing the Net Agent

To install the Net Agent, you enter the Install Net Agent
command in the Executive command field, then press RETURN.

The system displays the following command form:

```
Install Net Agent
     [Max # sessions open (default=4)]
     [Max # remote resources open (default=16)]
     [Max # client requests queued (default=8)]
     [Max # transport requests queued (default=4)]
     [Session timeout in sec. (default=60)]
```

The Max # sessions open field is highlighted.

All parameters are optional. To accept the default values
and complete installation of the Net Agent, press GO.

To change any of the parameters, use the following procedure
(use the **NEXT, RETURN,** or **Down Arrow** keys to move the
highlight through the command form):

1.   Specify the maximum number of sessions that can be
     open at the same time.

     A session is an open connection between two nodes;
     any number of users on a node can share a session.

     The default value is 4; to accept the default,
     leave this field blank.

2.   Move the highlight to the Max # remote resources
     open field.

3.   Specify the maximum number of remote resources
     that can be open at the same time. Any request
     that returns a file handle from a remote node (for
     example, OpenFile or EstablishMailConnection)
     requires a remote resource.

     The default value is 16; to accept the default,
     leave this field blank.

4.   Move the highlight to the Max # of client requests
     queued field.

5.   Specify the maximum number of client requests that
     can be in the Net Agent's queue at the same time.

     Client requests are requests to remote nodes. A
     client request remains in the queue until the
     remote node responds.

     The default value is 8; to accept the default
     value, leave this field blank.

6. Move the highlight to the Max # of transport requests queued field.

7. Specify the maximum number of requests the Net Agent can have in the Transport Service's queue at the same time. The Net Agent uses transport requests to send or receive blocks of data; the Transport Service accepts a maximum of 4.

   The default value is 4; to accept the default, leave this field blank.

8. Move the highlight to the Session timeout in sec. field.

9. Specify the length of time in seconds after which you want the Net Agent to close a session if there is no activity.

   The default value is 60; to accept the default, leave this field blank.

10. Press **GO** to complete installation of the Net Agent.

Installing the Net Server

To install the Net Server, you enter the **Install Net Server** command in the Executive command field, then press **RETURN**. The system displays the following command form:

```
Install Net Server
        [Max sessions open (default=4)]
        [Max # remote resources open (default=16)]
        [Max # data buffers (default=4)]
```

The Max sessions open field is highlighted.

All parameters are optional. To accept the default values and complete installation of the Net server, press **GO**.

To change any of the parameters, use the following procedure (use the **NEXT**, **RETURN**, or **Down Arrow** keys to move the highlight through the command form):

1. Specify the maximum number of sessions that can be open at the same time.

   A session is an open connection between two nodes; any number of users on a node can share a session.

The default value is 4; to accept the default,
leave this field blank.

2.   Move the highlight to the Max # remote resources
     open field.

3.   Specify the maximum number of remote resources
     that can be open at the same time. Any request
     that returns a file handle from a remote node (for
     example, OpenFile or EstablishMailConnection)
     requires a remote resource.

     The default value is 16; to accept the default,
     leave this field blank.

4.   Move the highlight to the Max # data buffers field.

5.   Specify the maximum number of data buffers you
     need. The Net Server requires one data buffer for
     each of the client requests it can service at the
     same time.

     The default value is 4; to accept the default,
     leave this field blank.

6.   Press GO to complete installation of the Net Server.

SECTION 5

NETWORK CONTROL CENTER (NCC)

GENERAL

To facilitate network configuration and administration, the
Transport Service includes the Network Control Center (NCC).
The NCC is a full-screen, menu- and function key driven
utility you use to perform the following tasks:

- configuring your node and the line media
  connecting your node to remote nodes

- monitoring your node's status and activity within
  the network (including the number of nodes in the
  network, the number of network users, the status
  of open sessions between nodes, etc.)

- storing the current network configuration in a
  Network Configuration file for automatic reentry
  after the network has been deinstalled

- automatically reentering a previously configured
  network

You can activate the NCC and access all of its functions
from any workstation on your node.

ACTIVATING THE NCC

You activate the NCC from the Executive when you want to
enter or modify a network, or monitor network activity.

Network Configuration Files

When you activate the NCC, the system opens a Network Con-
figuration file to store the currently entered network (refer
to Saving a Network, in section 6). You can accept the
default file, [Sys]<Sys>NetCfg.sys, or specify another file.

The Network Automatic Configuration facility uses Network
Configuration file entries to reconfigure a network that you
have deinstalled (refer to section 7, Network Automatic
Configuration Facility).

You can enter your node in only one network at a time. If you
want your node to participate in more than one network, you can
store each network configuration in a separate file; you specify
a different Network Configuration file name when you activate
the NCC to enter each configuration (refer to Specifying a
Network Configuration File, later in this section).

If you accept the default file or specify an existing file, the
system overwrites any existing entries with the current entries.

Accepting the Default Network Configuration File

To activate the NCC and accept the default Network
Configuration file, you enter the command **Network Control
Center** in the Executive command field, then you press **GO**.
The NCC Screen appears (refer to figure 5-1); initially, it
contains the Network Synopsis and the Home function key
display (refer to NCC Screen, later in this section).

Specifying a Network Configuration File

To activate the NCC and specify a Network Configuration
file, use the following procedure:

   1.   Enter the command **Network Control Center** in the
        Executive command field, then press **RETURN**. The
        system displays the following command form:

        Network Control Center
             [Network Configuration File].

   2.   Enter a file name in the highlighted Network
        Configuration File field.

   3.   Press **GO**. The NCC Screen appears (refer to
        figure 5-1); initially, it contains the Network
        Synopsis and the Home function key display (refer
        to NCC Screen, later in this section).
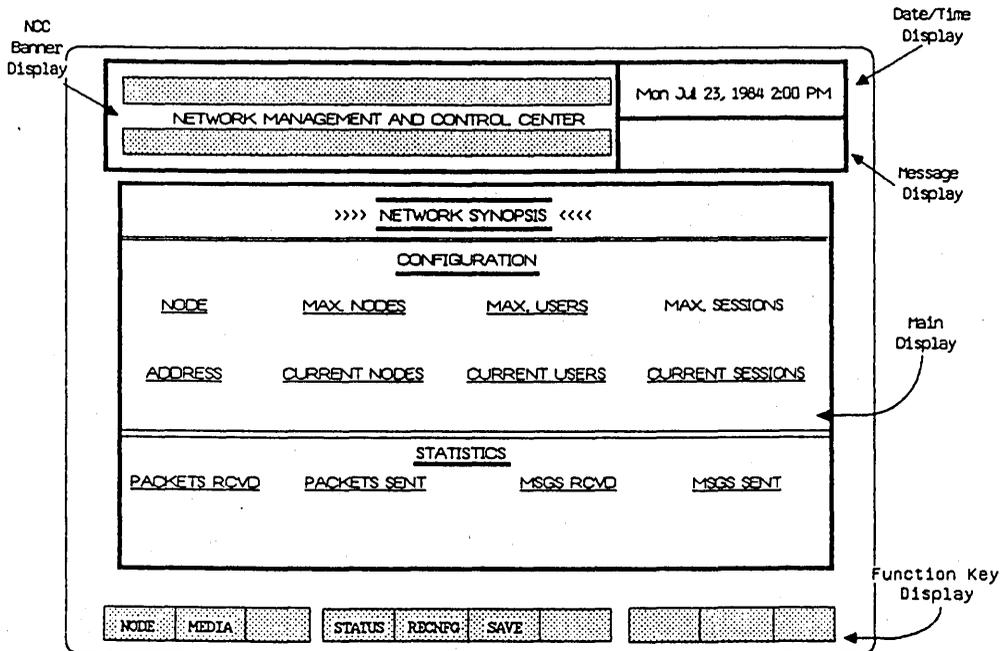
Figure 5-1. Network Control Center Screen with Network
Synopsis and Home Function Key Display

NCC SCREEN

The NCC Screen is the B-NET system's administrative
interface. It includes the following facilities:

- two tables, the Media and Node Tables, for node
  configuration

- three status displays, the Network Synopsis,
  Network Connection Summary, Network Connection
  Detailed Status Displays, for monitoring node and
  network activity

- four function key displays for entering commands

Display Areas

The NCC Screen is divided into 5 display areas (refer to figure 5-1):

- the NCC banner display

- the date/time display

- the message display

- the main display

- the function key display

NCC Banner Display

The NCC banner display (refer to figure 5-1) appears in the upper lefthand portion of the display. The banner, with the words **NETWORK MANAGEMENT AND CONTROL CENTER,** remains on the display as long as the NCC is activated.

Date/Time Display

The date/time display area is located in the upper righthand portion of the display. The system automatically enters and updates the date and time in this area.

Message Display

The message display area is located under the date/time display area. The system uses this area to display status messages during certain operations and to prompt you to enter information the system needs (refer to appendix A, Status Codes and Messages).

The main display area (refer to figure 5-1) occupies the
central portion of the display. The following NCC main
displays appear in the main display area:

- the Media Table (refer to figure 5-2)

- the Node Table (refer to figure 5-3)

- the Network Synopsis (refer to figure 5-4)

- the Network Connection Summary (refer to figure 5-5)

- the Network Connection Detailed Status (refer to
  figure 5-6)

You make entries in the Media and Node Tables when you
configure your node (refer to section 6, Node and Network
Configuration).

The Network Synopsis, Network Connection Summary, and
Network Connection Detailed Status provide information about
your node and the nodes it communicates with (refer to
section 8, Monitoring Node and Network Status and Activity).

Figure 5-2.   Media Table and Media Function Key Display

Figure 5-3. Node Table and Node Function Key Display

Figure 5-4. Network Synopsis and Home Function Key Display

Figure 5-5. Network Connection Summary and
Status Function Key Display

Figure 5-6. Network Connection Detailed Status
and Status Function Key Display

The function key display area (refer to figure 5-1) is
located below the main display area.

The function key display is a highlighted strip divided into
ten sections. Each section corresponds to one of the
function keys (f1 - f10) on the keyboard. The section
farthest to the left represents key f1, the next is f2, and
so on up to f10. The labels indicate the commands you enter
by pressing the corresponding key.

The NCC includes four different function key displays:

- Media function key display (refer to figure 5-2)

- Node function key display (refer to figure 5-3)

- Home function key display (refer to figure 5-4)

- Status function key display (refer to figure 5-5)

Each function key display is associated with one or more of
the NCC main displays. Table 5-1 shows the function key
display that appears with each of the main displays.

Table 5-1. NCC Function Key Displays and Main Displays

NCC Main Display	Function Key Display
Network Synopsis	Home
Media Table	Media
Node Table	Node
Network Synopsis	Status
Network Connection Summary	Status
Network Connection Detailed Status	Status

NCC FACILITIES

You use the function keys to access the NCC main displays
and the function key displays associated with them, and to
enter node configuration commands.

You configure your node and the line media connecting your
node to remote nodes by making entries in the Media and Node
Tables (refer to section 6, Node and Network Configuration).

The NCC stores network configuration entries in a Network
Configuration file (refer to Network Configuration Files,
earlier in this section). You can use the Network Automatic
Configuration facility to automatically reenter stored
networks (refer to section 7, Network Automatic
Configuration Facility).

You can monitor your node's status and activity within the
currently installed network by displaying the Network
Synopsis, the Network Connection Summary, and the Network
Connection Detailed Status (refer to section 8, Monitoring
Node and Network Status and Activity).
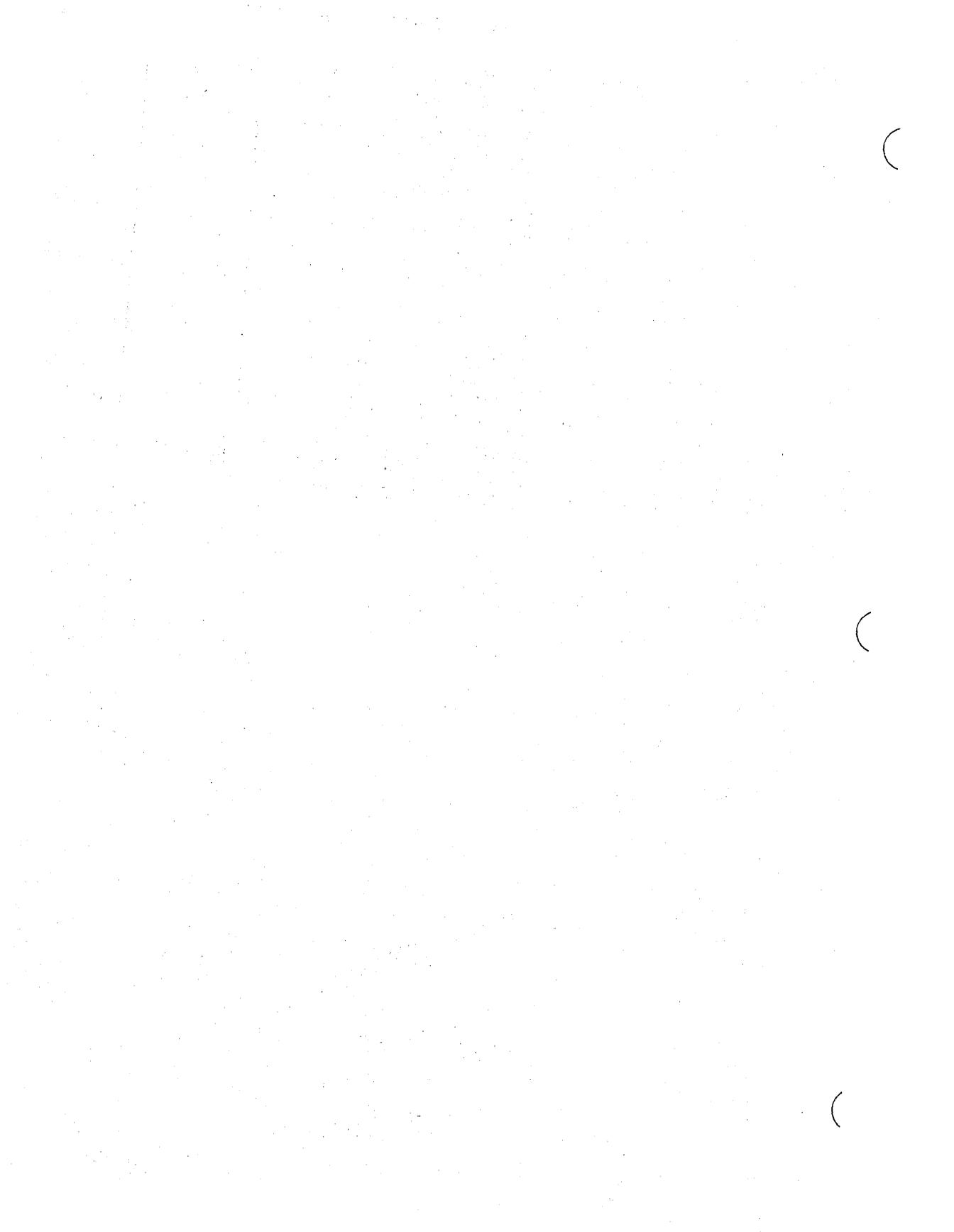
SECTION 6

NODE AND NETWORK CONFIGURATION

GENERAL

After each node has the B-NET software loaded and the three
subsystems installed, node and network configuration can begin.

Network configuration occurs on two levels:

- the network is configured by individually configur-
  ing the nodes that communicate with each other.

- the individual nodes are configured by making
  entries in the NCC's Media and Node Tables.

COORDINATING NETWORK CONFIGURATION

Media and Node Table entries include information not only
about your local node, but also about each node you want to
communicate with. To configure a network, each node must
have information about the other nodes.

This does not present a problem if one person configures the
entire network; however, in cases where a different person
configures each node, planning and coordination are necessary
before and during network configuration, and afterward when-
ever the network changes.

Formulating a Network Plan

There should be a Network Administrator at each node to plan
and coordinate network configuration with Network Admini-
strators at the other nodes on the network.

Initially, they should formulate a detailed plan of the
network, including the name and address of each node, the
line media between nodes, and other items specified in
configuring a node. The Network Administrators should use
this plan as a guide in configuring their local nodes.

Maintaining a Network Log

If a network is subject to growth or change, the Network
Administrators should establish procedures for maintaining a
log of node names and addresses, and for distributing this
information throughout the network.

The network plan, kept up-to-date by entries in the network
log, allows the Administrators to configure communications
lines between previously unconnected nodes and add new nodes
to the network with a minimum of confusion.

NCC MEDIA TABLE AND NODE TABLE

To configure your node for network communications, you
activate the NCC, then make appropriate entries in the NCC's
Media Table and Node Table.

Media Table entries specify the communication line media
your node uses to communicate with other nodes in the
network; Node Table entries specify the other nodes your
node can communicate with.

<div align="center">NOTE</div>

> When you initially configure your node,
> you make the Media Table entries first,
> followed by the Node Table entries. If
> you modify the entries later, you can
> display the tables in either order.

Displaying the Media Table

To display the Media Table, use the following procedure:

1.   Activate the Network Control Center (refer to
     Activating the NCC, in section 5). The NCC Screen
     appears with Network Synopsis and the Home
     function key display (refer to figure 6-1).

2.   Press the **MEDIA** key (f2). The Media Table and the
     Media function key display appear in the NCC main
     display area (refer to figure 6-2). The Media
     Table columns show any current entries.

     A highlight appears in the first line available
     for new entries.

```
┌──────────────────────────────────────────────────────────┐
│ ┌──────────────────────────────────────┐ ┌──────────────┐│
│ │                                       │ │Mon Jul 23, 1984 2:00 PM││
│ │   NETWORK MANAGEMENT AND CONTROL CENTER│ ├──────────────┤│
│ │                                       │ │              ││
│ └──────────────────────────────────────┘ └──────────────┘│
│   ┌──────────────────────────────────────────────────┐   │
│   │            >>>>  NETWORK SYNOPSIS  <<<<            │   │
│   │                                                    │   │
│   │                   CONFIGURATION                    │   │
│   │                                                    │   │
│   │   NODE      MAX. NODES      MAX. USERS   MAX. SESSIONS│ │
│   │                                                    │   │
│   │  ADDRESS   CURRENT NODES  CURRENT USERS CURRENT SESSIONS││
│   │                                                    │   │
│   │                    STATISTICS                      │   │
│   │ PACKETS RCVD  PACKETS SENT      MSGS RCVD    MSGS SENT│ │
│   │                                                    │   │
│   └──────────────────────────────────────────────────┘   │
│  ┌───────────────┐  ┌──────────────────┐ ┌──────────────┐ │
│  │ NODE   MEDIA   │  │ STATUS RECNFG SAVE│ │              │ │
│  └───────────────┘  └──────────────────┘ └──────────────┘ │
└──────────────────────────────────────────────────────────┘
```

Figure 6-1. NCC Screen with Network Synopsis and
Home Function Key Display (Sample)

Media Table Entries

The Media Table (refer to figure 6-2) includes three columns:

- Media column

- Type column

- Parameters column

You enter information into these columns for each of your
node's line media.

Media Column

In the Media column, you assign a number for each line medium
connecting your node with other nodes in the network. Number-
ing begins with 1 and progresses sequentially up to 255.

Figure 6-2. Media Table and Media Function Key Display

Type Column

In the Type column, you specify the type of line media
connecting your node to other nodes. Three types are
currently supported:

- dial lines

- leased lines

- X.25

    - Permanent Virtual Circuit (PVC)

    - Switched Virtual Circuit (SVC)

Parameters Column

In the Parameters column, you specify the details of each line.

6-4

Leased Line

To configure a leased line or a direct cable connection be-
tween two B 25 workstations, you specify the channel (A or B)
that line uses, followed by the baud rate.

- for a direct cable connection between B 25 work-
  stations, specify 9600

- for a leased line, specify 0

For example, to specify a leased line using channel A, you
would enter **A,0** in the parameters column; to specify a
direct cable connection using channel B, you enter **B,9600**.

Dial Line

To configure a dial line, you specify the following parameters:

- Channel (A or B)

- Modem type (R = Racal-Vadic; B = BizComp)

- Modem mode (B = Auto Answer/Dial; A = Answer only;
  O = Originate only)

- Local dialing support (T = Tone, P = Pulse)

X.25 PVC

To configure an X.25 PVC connection, you specify the
following parameters:

- Local Channel Number (LCN); your X.25 vendor
  assigns an LCN when you subscribe to the service.

- Number of Retries - the number of retries the
  Transport Service makes to establish the X.25 PVC
  connection to the distant Data Terminal Equipment
  (DTE) node (65535 = unlimited retries).

- Buffer Size - the size of the X.25 packet. You
  must specify the same value in the Default packet
  size parameter in the X.25 Network Gateway
  installation command form.

To configure an X.25 SVC connection, you specify the following parameters:

- Call Type (I = incoming calls only; O = outgoing calls only; B = both incoming and outgoing calls).

- Number of Retries - the number of retries the Transport Service makes to establish the X.25 SVC connection to the distant Data Terminal Equipment (DTE) node (65535 = unlimited retries).

- Low Port - the low end of the device address range (00-99) within which the Transport Service accepts incoming calls with a port address in the destination address.

- High Port - the high end of the device address range (00-99) within which the Transport Service accepts incoming calls with a port address in the destination address.

- Buffer Size - the size of the X.25 packet. You must specify the same value in the Default packet size parameter in the X.25 Network Gateway installation command form.

Adding Media

To add media to your node's Media Table, use the following procedure:

1. Display the Media Table and the Media function key display (refer to Displaying the Media Table, earlier in this section).

2. Press the **ADD** key (f1). The cursor appears in the Media column.

3. Assign a number to the line medium you are configuring; media numbering begins with 1 and progresses sequentially up to 255.

4. Press **RETURN** to move the cursor to the Type column.

5. Enter the type of line medium (refer to Type Column, earlier in this section).

6. Press **RETURN** to move the cursor to the Parameters column.

7. Enter the parameters appropriate to the line medium you are configuring (refer to Parameters Column, earlier in this section). Separate the parameters with a comma.

8. Press **GO**. If your entry is correct, the system enters a period (.) at the end of the line, and the message **Response Received** appears in the message display area. This indicates that the Transport Service received and processed the entry.

   If you make an incorrect entry, the message **Invalid media parameters** appears at the bottom of the main display area. Press **CANCEL** to delete the line entries, and repeat steps 2 through 5.

9. Repeat steps 2 through 5 for each line medium in your node's configuration.

To return to the Network Synopsis and Home function key display, you press the **HOME** key (f10).

Deleting Media

To delete media from your node's configuration, use the following procedure:

1. Display the Media Table and the Media function key display (refer to Displaying the Media Table, earlier in this section).

2. Use the **Up Arrow** and **Down Arrow** keys to move the highlight to the line medium you want to delete; then press the **DELETE** key (f2).

3. Press **GO**. The message **Response Received** appears in the message display area. This indicates that the Transport Service received and processed the entry.

4. Repeat steps 2 and 3 for each of the line media included in your node's configuration.

To return to the Network Synopsis and Home function key display, you press the **HOME** key (f10).

Displaying the Node Table

To display the Node Table, use the following procedure:

1. Activate the Network Control Center (refer to
    Activating the NCC, in section 5). The NCC Screen
    appears with Network Synopsis and the Home
    function key display (refer to figure 6-1).

2. Press the **NODE** key (f1). The Node Table and the
    Node function key display appear in the NCC main
    display area (refer to figure 6-3). The Node
    Table columns show any current entries.

    A highlight appears in the first line available
    for new entries.

Node Table Entries

The Node Table (refer to figure 6-3) includes four columns:

- Name column

- Address column

- Media column

- SubAddress column

You enter information into these columns for each of the
remote nodes you want your node to communicate with.

Name Column

In the Name column, you enter the name of each remote node
you want to communicate with. A name can be up to 12
alphanumeric characters long.

Each node on the network must have a different name; the
system does not accept duplicate node names. Therefore, the
Network Administrators must coordinate the names of the
network's nodes before configuring the network (refer to
Coordinating Network Configuration, earlier in this section).

Figure 6-3. Node Table and Node Function Key Display

Address Column

In the Address column, you enter the address of each remote
node you want to communicate with. An address can be any
number from 1 to 64.

Each node on the network must have a different address; the
system does not accept duplicate address numbers. There-
fore, the Network Administrators must coordinate the address
numbers of the network's nodes before setting up the network
(refer to Coordinating Network Configuration, earlier in
this section).

Media Column

In the Media column, you enter a number for each line medium
connecting your node with other nodes in the network.

The numbers you enter here must correspond with the entries
in the Media column of the Media Table (refer to Media Table
Entries, earlier in this section).

SubAddress Column

In the SubAddress column, you enter the telephone number or
the X.25 Data Terminal Equipment (DTE) address of the remote
nodes with which you have a dial line or X.25 connection.
SubAddresses can be up to 16 characters long.

A special code character is required to instruct the modem
to pause for a second dial tone (for example, if you go
through a PBX).

- If your node uses a Racal-Vadic modem, you insert the
  letter K at the place in the telephone number where
  the dial tone occurs (for example, 9K7135551212).

- If your node has a BizComp modem, you insert a colon
  (:) at the place in the telephone number where the
  dial tone occurs (for example, 9:7135551212).

Leased lines do not require SubAddress entries.

Adding Nodes

To add nodes to the Node Table, use the following procedure:

1. Display the·Node Table and the Node function key
   display (refer to Displaying the Node Table,
   earlier in this section).

2. Press the **ADD** key (**fl**). The cursor appears in the
   Name column.

   Enter the name of the remote node you want to
   communicate with. A name can be up to 12
   characters long.

   Each node on the network must have a different
   name.

3. Press **RETURN** to move the cursor to the Address
   column.

   Enter the address of the remote node you want to
   communicate with. An address can be any number
   from 1 to 64

   Each node on the network must have a different
   address.

4. Press **RETURN** to move the cursor to the Media column.

    Enter the numerical designation of the line medium connecting your node with the remote node; this number must be the same as the number specified in the Media column of the Media Table (refer to Media Table Entries, earlier in this section).

5. Press **RETURN** to move to the SubAddress column.

6. If you specified a dial line or an X.25 connection in the Media column, enter the remote node's telephone number or X.25 Data Terminal Equipment (DTE) address in the SubAddress column.

    If the line is a leased line, leave this column blank.

NOTE

A special code character is required to instruct the modem to pause for a second dial tone (for example, if you go through a PBX).

- If your node uses a Racal-Vadic modem, you insert the letter K at the point in the telephone number where the dial tone occurs (for example, 9K7135551212).

- If your node has a BizComp modem, you insert a colon (:) at the point in the telephone number where the dial tone occurs (for example, 9:7135551212).

7. Press **GO**. If your entry is correct, the message **Response Received** appears in the message display area. This indicates that the Transport Service received and processed the entry.

    If you make an incorrect entry, the message **Invalid media parameters** appears at the bottom of the main display area. Press **CANCEL** to delete the line entries, and repeat steps 2 through 7.

8. Repeat steps 2 through 7 for each line medium in your node's configuration.

To return to the Network Synopsis and Home function key
display, press the **HOME** key (**f10**).

Deleting Nodes

To delete nodes from the Node Table, use the following
procedure:

    1.   Display the Node Table and the Node function key
           display (refer to Displaying the Node Table,
           earlier in this section).

    2.   Use the **Up Arrow** and **Down Arrow** keys to move the
           highlight to the node you want to delete; then
           press the **DELETE** key (**f2**).

    3.   Press GO. The message **Response Received** appears in
           the message display area. This indicates that the
           Transport Service received and processed the entry.

    4.   Repeat steps 2 and 3 for each medium you want to
           delete.

To return to the Network Synopsis and Home function key
display, press the **HOME** key (**f10**).

Modifying Node Entries

You can modify entries in the Node Table's Media and
SubAddress columns. However, you can not modify entries in
the Name and Address columns; you must delete and reenter
them. Use the following procedure:

    1.   Display the Node Table and the Node function key
           display (refer to Displaying the Node Table,
           earlier in this section).

    2.   Use the **Up Arrow** and **Down Arrow** keys to move the
           highlight to the node you want to modify; then
           press the **MODIFY** key (**f3**).

    3.   Press the **RETURN** key to move the cursor to the
           column you want to modify, then enter your changes.

    4.   Press GO. The message **Response Received** appears in
           the message display area. This indicates that the
           Transport Service received and processed the entry.

5.   Repeat steps 1 through 4 for each node you want to
      modify.

To return to the Network Synopsis and Home function key
display to the screen, press the HOME key (f10).

Saving a Network Configuration

You save the currently entered network configuration by
storing it in a Network Configuration File (refer to Network
Configuration File, in section 5). Subsequently, you can
use the Network Automatic Configuration facility to reenter
it automatically in the Media and Node Tables.

You usually store the network configuration immediately after
completing or modifying the Media or Node Table entries,
before you exit the NCC. Use the following procedure:

1.   After making your last entry in the Media or Node
      Table, press the HOME key (f10). The Network
      Synopsis and Home function key display return to
      the screen (refer to figure 6-1).

2.   Press the SAVE key (f6). The system stores the
      network in the Network Configuration File you
      specified when you activated the NCC (or the
      default file).

      If the file currently contains network config-
      uration entries, the system overwrites them.

You can also save the currently entered network configuration
when you exit the NCC (refer to Exiting the NCC, later in
this section).

Exiting the NCC

To return to the Executive and save the network in the
Network Configuration File you specified when you activated
the NCC, you press FINISH, then you press GO.

If the file currently contains network configuration
entries, the system overwrites them.

To return to the Executive without updating the Network Config-
uration file, press the ACTION and FINISH keys simultaneously.

Deinstalling the B-NET System

You deinstall the B-NET System by individually deinstalling its three subsystems (the Net Transport Service, the Net Agent, and the Net Server).

Deinstalling the B-NET System removes your node from the network. It also removes the entries from the Media and Node Tables.

You deinstall the network by deinstalling each of the B-NET system's subsystems; use the following procedure:

1. Enter the Executive command **Stop Net Transport Service**, then press **GO**.

2. Enter the Executive command **Stop Net Agent**, then press **GO**.

3. Enter the Executive command **Stop Net Server**, then press **GO**.

    On multipartition BTOS systems, this procedure frees all memory and system resources from B-NET system use, and vacates the partition.

4. On single-partition systems, press the **RESET** button.

SECTION 7

NETWORK AUTOMATIC CONFIGURATION (NAC) FACILITY

GENERAL

The Network Automatic Configuration (NAC) facility allows
you to automatically reenter a previously configured and
stored network. The NAC facility reenters the network from
the Network Configuration file where it is stored (either
the default file or a file you specify) into the Transport
Service's Media and Node tables.

When you use the NAC facility in conjunction with Submit
files, you can install the B-NET subsystems and reenter the
network in one step. Submit files are discussed in the
B 20 Systems Standard Software Operations Guide.

In addition, the NAC facility allows you to edit Network
Configuration files using the Editor or Word Processor.

REENTERING A NETWORK

The NAC provides two methods for reentering a network:

- from the Executive

- from the NCC

You can reenter a network configuration only if the Media
and Node Tables currently have no entries in them.

Clearing the Media and Node Tables

If a network is currently entered, you clear the Media and
Node Tables by deinstalling the B-NET system (refer to
Deinstalling the B-NET System, in section 6); then you
reinstall the B-NET subprograms (refer to section 4, B-NET
System Installation).

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Reentering a Network Configuration from the Executive

When you reenter a network from the Executive, you can accept the default file, [Sys]<Sys>NetCfg.sys, or specify another Network Configuration file.

Accepting the Default Network Configuration File

To accept the default Network Configuration file, you enter the command **Network Automatic Configuration** in the Executive command field, then you press **GO**. The system automatically places the entries currently stored in the default file [Sys]<Sys>NetCfg.sys into the NCC's Media and Node Tables.

Specifying a Network Configuration File

To specify a Network Configuration file, use the following procedure:

1. Enter the command **Network Automatic Configuration** in the Executive command field; then press **RETURN**. The system displays the following command form:

   Network Automatic Configuration
        [Network Configuration File]

2. Enter a file name in the highlighted Network Configuration File field.

3. Press **GO**. The system places the entries from that file into the Transport Service's Media and Node Tables.

Reentering a Network Configuration from the NCC

To reenter a network configuration from the NCC, use the following procedure:

1. Activate the Network Control Center (refer to Activating the NCC, in section 5).

2. Specify the Network Configuration file containing the network you want to reenter (or accept the default file). The NCC main screen appears with the Network Synopsis and the Home function key display (refer to figure 7-1).

3. Press the **RECNFG** key (**f5**). The system automatic-
    ally completes the Media and Node Tables, using
    the entries stored in the Network Configuration
    File specified in step 1 (or in the default file).

EDITING NETWORK CONFIGURATION FILES

You can modify the network configuration stored in a Network
Configuration file using the Editor or the Word Processor
(refer to the   *B 20 Systems Editor Reference Manual*   or your
word processor's reference guide).

Network Configuration File Conventions

The following conventions permit the NAC facility to identify
the entries and automatically place them in the NCC's Media
and Node Tables when you reenter the network configuration:

*   the table headings are enclosed by square brackets

*   the parameters are enclosed by colons

*   the final entry for each table is **:Finish:**

Figure 7-1 shows a typical Network Configuration file.

```
[Media]
 :EntryNumber:1
 :Type:Dial
 :Param0:B         ;channel B
 :Param1:BC        ; BizComp modem
 :Param2:Both      ; originate and answer mode
 :Param3:Tone
 :Finish:

[Node]
 :Name:LosAngeles
 :Address:2
 :Media:1
 :SubAddress:'9:2135551212'
 :Finish:
```

Figure 7-1. Network Configuration File (Sample)

The items listed under [Media] are the Media Table para-
meters for the network configuration; the items listed under
[Node] are the Node Table parameters. Your file may not
include some of the entries shown in the example in figure
7-1; it will have only those applicable to your network.

If you wish, you can include a note or comment after an entry
by preceding it with a semicolon. The system ignores the
comment when it reenters the network configuration.

Media Table Parameters

Table 7-1 summarizes the Media Table parameters and entries.
You can make only one entry for each parameter. If your
node has both a leased line and a dial line, the file will
have two separate listings under the [Media] heading.

Node Table Parameters

Table 7-2 summarizes the Node Table parameters and entries.
You can make only one entry for each parameter. If your node
communicates with more than one other node, the file will
have separate listings for each under the [Node] heading.

Table 7-1. Media Table Parameters

Parameter	Description	Entry
EntryNumber	The number you assign to the line medium	1 - 255 (in numerical sequence)
Type	The type of line medium	Dial Leased PVC SVC
Param0	The channel the line medium uses	A B
Param1	Modem type	BC (BizComp) RV (Racal-Vadic)
Param2	Modem mode	Both (Auto answer/dial) AnsOnly(Answer only) OrgOnly(Originate only)
Param3	Local dialing support	Tone Pulse

Table 7-2. Node Table Parameters

Parameter	Description	Entry
Name	The name of the remote node	An alphanumeric string up to 12 characters long
Address	The address of the remote node	A number between 1 and 64
MediaNumber	The number assigned to the line medium connecting your node with the remote node	A number between 1 and 255
SubAddress	The telephone number or X.25 DTE address of the remote node	An alphanumeric string up to 25 characters long

NOTE

If a string includes a left bracket, right bracket, colon, or semicolon, you must enclose the entire string in single quotation marks (for example, the SubAddress parameter in figure 7-1).

SECTION 8

MONITORING NODE AND NETWORK
STATUS AND ACTIVITY

GENERAL

The NCC includes the following three status displays for
monitoring node and network activity:

- the Network Synopsis

- the Network Connection Summary

- the Network Connection Detailed Status

ACCESSING THE NCC STATUS DISPLAYS

You access the NCC status displays from the NCC Screen and
the Status function key display; use the following procedure:

1. Activate the Network Control Center (refer to
    Activating the NCC, in section 5). The NCC Screen
    appears with the Network Synopsis and the Home
    function key display (refer to figure 5-1).

2. Press the STATUS key (f4); the Status function key
    display appears at the bottom of the screen (refer
    to figure 8-1).

    The Network Synopsis remains in the main display area.

    To display the Network Connection Summary (refer
    to figure 8-2), press the CONSUM key (f2).

    To display the Network Connection Detailed Status
    (refer to figure 8-3), press the CONDET key (f3).

    To return to the Network Synopsis from one of the
    other displays, press the NODSUM key (f1).

    To restore the Home function key display, press
    the HOME key (f10).

```
┌─────────────────────────────────────────────┬──────────────────────────┐
│ ░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░ │ Mon Jul 23, 1984 2:00 PM │
│       NETWORK MANAGEMENT AND CONTROL CENTER  ├──────────────────────────┤
│ ░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░ │                          │
└─────────────────────────────────────────────┴──────────────────────────┘

    ┌──────────────────────────────────────────────────────────┐
    │                  >>>> NETWORK SYNOPSIS <<<<                │
    │                                                            │
    │                       CONFIGURATION                        │
    │                                                            │
    │   NODE        MAX. NODES      MAX. USERS      MAX. SESSIONS │
    │                                                            │
    │  ADDRESS    CURRENT NODES   CURRENT USERS   CURRENT SESSIONS│
    │                                                            │
    │                         STATISTICS                         │
    │ PACKETS RCVD    PACKETS SENT      MSGS RCVD       MSGS SENT │
    │                                                            │
    └──────────────────────────────────────────────────────────┘
```

```
┌─────────────────┬─────────────────────────┬──────────────────┐
│NODSUM CONSUM CONDET│ ░░░░░░░░░░░░░░░░░░░░░░░ │ ░░░░░░░░░░░ HOME │
└─────────────────┴─────────────────────────┴──────────────────┘
```
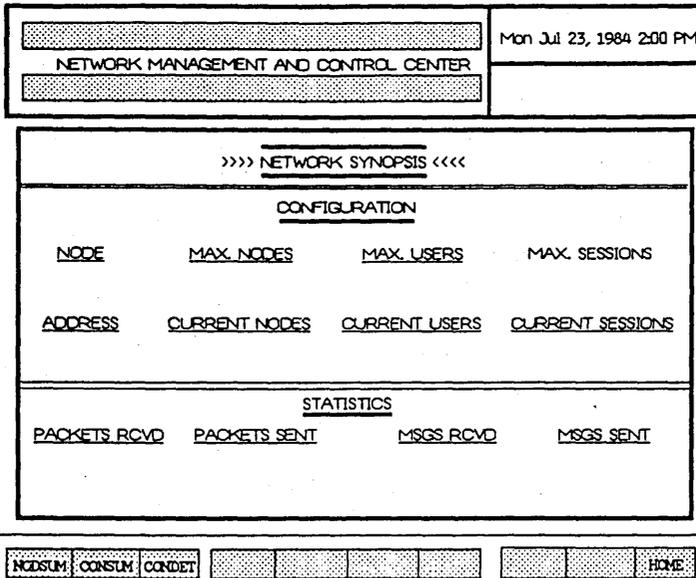
Figure 8-1.   Network Synopsis and
              Status Function Key Display

```
┌─────────────────────────────────────────────┬──────────────────────────┐
│ ░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░ │ Mon Jul 23, 1984 2:00 PM │
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└─────────────────────────────────────────────┴──────────────────────────┘

    ┌──────────────────────────────────────────────────────────┐
    │                NETWORK CONNECTION SUMMARY                  │
    ├────────────┬──────┬────────┬──────────┬──────────┬────────┤
    │ CONNECTION │ TSAP │ STATUS │ DATA RCVD│ DATA SENT│  TYPE  │
    ├────────────┴──────┴────────┴──────────┴──────────┴────────┤
    │ ░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░ │
    │                                                            │
    │                                                            │
    │                                                            │
    │                                                            │
    └──────────────────────────────────────────────────────────┘
```

```
┌─────────────────┬─────────────────────────┬──────────────────┐
│NODSUM CONSUM CONDET│ ░░░░░░░░░░░░░░░░░░░░░░░ │ ░░░░░░░░░░░ HOME │
└─────────────────┴─────────────────────────┴──────────────────┘
```
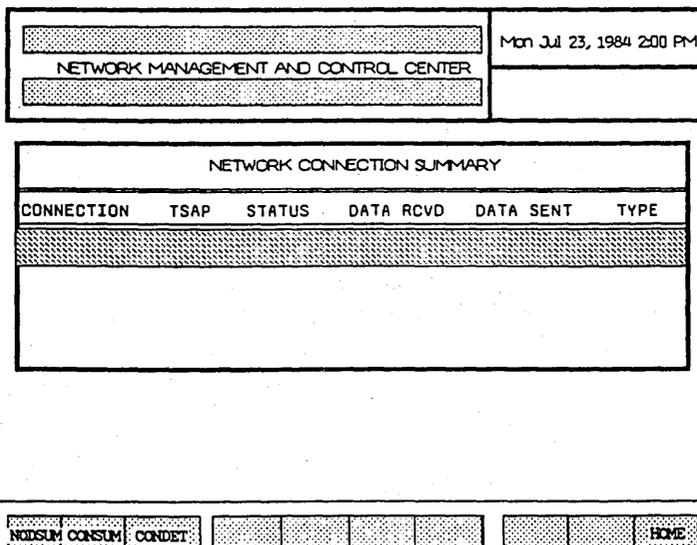
Figure 8-2.   Network Connection Summary and
              Status Function Key Display

```
┌─────────────────────────────────────────────┬────────────────────────┐
│ ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓ │ Mon Jul 23, 1984 2:00 PM│
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│ ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓ │                        │
└─────────────────────────────────────────────┴────────────────────────┘

   ┌──────────────────────────────────────────────────────────────┐
   │              NETWORK CONNECTION DETAILED STATUS                │
   │                                                                │
   │   PARTNER  STATUS      DATA RX   DATA TX     MSGS RX   MSGS TX  │
   │                                                                │
   │   RCV NXT   SND NXT   SND SNF   SND UNA      SND HWE    LWE     │
   │                                                                │
   │      LC CREDIT   RM CREDIT           UNCLAIMED   QUEUED         │
   │                                                                │
   │                                                                │
   │                                                                │
   │                                                                │
   └──────────────────────────────────────────────────────────────┘
  ─────────────────────────────────────────────────────────────────
   ┌─────────────────────────┐ ┌───────────────────┐ ┌────────────┐
   │ NODSUM CONSUM  CONDET    │ │                   │ │      HOME  │
   └─────────────────────────┘ └───────────────────┘ └────────────┘
```
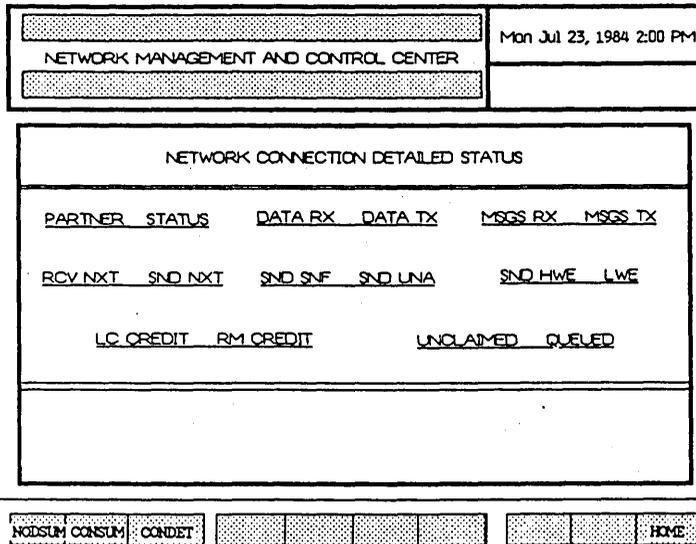
**Figure 8-3. Network Connection Detailed Status and
             Status Function Key Display**

Network Synopsis

The Network Synopsis (refer to figure 8-1) provides
information about your node's configuration, its current
status, and its activity in the network.

The Network Synopsis is divided into two sections:

   •   the Configuration section

   •   the Statistics section

Configuration Section

The Configuration section appears immediately below the
Network Synopsis title line (refer to figure 8-1).

Several items in the Configuration section reflect entries
you make when you install the system (refer to section 4,
B-NET System Installation) and provide information about
your node's configuration; these include:

NODE   Indicates your node's name.

                              Specified in the Node Table (refer
                              to Node Table Entries, in
                              section 6).

MAX. NODES   Indicates the maximum number of
                              nodes on the network.

                              Specified when installing the
                              Transport Service (refer to Installing
                              the Transport Service, in section 4).

MAX. USERS   Indicates the maximum number of users
                              of the Transport Service.

                              Specified when installing the
                              Transport Service (refer to Installing
                              the Transport Service, in section 4).

MAX. SESSIONS   Indicates the maximum number of
                              connections that can be open at the
                              same time.

                              Specified when installing the Net
                              Agent and the Net Server (refer to
                              Installing the Net Agent and the
                              Net Server, in section 4).

ADDRESS   Indicates your node's address on
                              the network as specified when
                              installing the Transport Service
                              (refer to Installing the Transport
                              Service, in section 4).

The remaining items provide information about your node's
current status:

CURRENT NODES   Indicates the number of nodes
                              currently connected with your node.

CURRENT USERS   Indicates the actual number of
                              users of the Transport Service.

CURRENT SESSIONS   Indicates the number of connections
                              currently open with other nodes.

8-4

Statistics Section

The Statistics section appears immediately below the Configura-
tion section of the Network Synopsis (refer to figure 8-1). It
provides information about your node's communications activi-
ties from the time you first enter the network.

It includes the following:

PACKETS RCVD	Indicates the number of data packets your node has received.
PACKETS SENT	Indicates the number of data packets your node has sent.
MSGS RCVD	Indicates the number of complete messages your node has received.
MSGS SENT	Indicates the number of complete messages your node has sent.

Network Connection Summary

The Network Connection Summary (refer to figure 8-2)
provides information about individual connections between
your node and remote nodes.

You access the Network Connection Summary by pressing the
CONSUM key (f2) (refer to Accessing the NCC Status Displays,
earlier in this section).

The Network Connection summary displays five lines at a time.
To display additional lines, you press the **SCROLL UP** key.

The Network Connection Summary provides the following
information:

CONNECTION	Indicates the number for each connection
TSAP	Transport Service Access Point
	Identifies the user of the connection.
STATUS	0 = inactive 3 = active
DATA RCVD	Indicates the number of data packets received via this connection.

DATA SENT   Indicates the number of data packets
                   sent via this connection.

TYPE   Indicates the ISO OSI Transport Protocol
                   this connection is based on (currently,
                   4 is the only option).

Network Connection Detailed Status

The Network Connection Detailed Status (refer to figure 8-3)
provides detailed information about the connections listed
in the Network Connection Summary.

To access the Network Connection Detailed Status from the
Network Connection Summary; use the following procedure:

1.   Display the Network Connection Summary by pressing
     the **CONSUM** key (f2) (refer to Accessing the NCC
     Status Displays, earlier in this section).

2.   Using the **RETURN** key, move the highlight to the
     line entry for the connection about which you want
     details.

3.   Press the **CONDET** key (f3).

The Network Connection Detailed Status provides the follow-
ing information about the connection you select in step 2:

PARTNER   Indicates the user at the remote end of
                   the connection.

STATUS   0 = inactive
                   3 = active

DATA RX   Data Received

                   Indicates the total number of data
                   packets received via this connection.

DATA TX   Data Transmitted

                   Indicates the total number of data
                   packets transmitted via this connection.

MSGS RX   Messages Received

                   Indicates the total number of messages
                   received via this connection.

MSGS TX   Messages Transmitted

                  Indicates the total number of messages
                  transmitted via this connection.

RCV NXT   Receive Next

                  Indicates the sequence number of the
                  data packet you expect to receive next.

SND NXT   Send Next

                  Indicates the sequence number of the
                  data packet you will transmit next.

SND SNF   Send Sequence Number Field

                  Indicates the next number available for
                  assigning to a data packet.

SND UNA   Send Unacknowledged

                  Indicates the sequence number of the
                  lowest-numbered unacknowledged data
                  packet. This number is assigned from
                  the acknowledgement number of an
                  incoming data acknowledge packet.

SND HWE   Send High Window Edge

                  Indicates the highest sequence number
                  within the window of a data packet
                  transmitted via this connection.

LWE   Receive Low Window Edge

                  Indicates the lowest sequence number of
                  a data packet that the Transport Service
                  accepts.

LC CREDIT   Local Credit

                  Indicates the latest local credit of the
                  local Transport Service. Credit is the
                  number of packets that can occupy the
                  available buffer space.

RM CREDIT   Remote Credit (refer. to LC Credit)

                  Indicates the latest remote credit of
                  the local Transport Service.

UNCLAIMED   Indicates the total number of unclaimed
                   received packets.

QUEUED   Indicates the total number of packets
                   queued for transmission.

SECTION 9

USING THE B-NET SYSTEM

GENERAL

Once you or your Network Administrator installs the B-NET
system and configures your node, you can communicate with
other nodes on the network. Because the B-NET system
functions like an extension of the B 20 Operating System
(BTOS), accessing the files of another node on the network
is similar to accessing the files of your own workstation or
cluster.

ACCESSING REMOTE NODES

To access the files of another node on the network, you
enter the Executive command for an operation in the usual
way. When the command form appears, you specify the file
name of the file you want to access; but you prefix the file
name with the name of the node where the file is located,
enclosing the node's name in braces ({ }).

For example, to copy a file from a remote node named
LosAngeles, you would use the following procedure:

1. Enter the **Copy** command in the Executive command
    field; then press **RETURN**. The system displays the
    following command form:

    Copy
        File from
        File to
        [Overwrite ok?]
        [Confirm each?]

    The File from field is highlighted.

2. Enter the file name of the file you want to access,
    prefixed with the remote node's name in braces.
    For example, {LosAngeles}[sys]<sys>OldFile.fls.

NOTE

If you enter a file specification that
does not begin with a node name, the
system uses local node as the default.

3. Press **RETURN**; the highlight moves to the File to
    field. Enter the name of the file into which you
    want to copy the file from Los Angeles.

    In this example, you would enter a file name such
    as **NewFile.fls**. The remaining parameters are
    optional.

4. Complete the command form; then press **GO**. The
    system copies the file named **OldFile.fls** from the
    node in Los Angeles, and puts it into a file named
    NewFile.fls at your node.

You can use the **Path** command to specify a remote node as the
currently logged on node. When you are logged onto a remote
node, you specify your local node by specifying {local} as
the node name; on cluster systems, you specify the master
workstation of the local node by using the node name
master}.

DIAL LINE COMMUNICATIONS

When you originate a request for service over a dial line,
most of the operation is transparent to you. You simply enter
the appropriate Executive commands without concern for details
such as taking the phone off-hook, dialing the number, etc.

Once you enter parameters such as auto-dial/auto-answer,
telephone number of remote node, etc., in the Media and Node
Tables, the B-NET System performs these tasks automatically.

After you enter an Executive command and complete the
corresponding command form, you press **GO**. The B-NET System
automatically dials the telephone number, establishes the
connection, and begins the transaction.

If it cannot make the connection, the system displays the
status code 8939 with the message **No dial connection**; this
usually indicates that the remote node is not configured, or
other communications problems. You should keep trying until
the system makes the connection.

The operation is transparent to the node answering your request. The system performs all tasks in background, and it is not necessary for anyone at the answering node to be aware that a transaction is taking place.

Once a connection is open, users at both nodes can perform transactions. When all transactions are complete, the system automatically ends the session at the end of the time-out period specified when you install the Net Agent (refer to Installing the Net Agent, in section 4).

LEASED LINE AND DIRECT CABLE COMMUNICATIONS

You use the same procedures with leased lines and direct cable connections between B 25 workstations as with dial lines. Since a leased line or a direct cable connection is always open, however, neither dialing nor opening and closing of connections is involved.
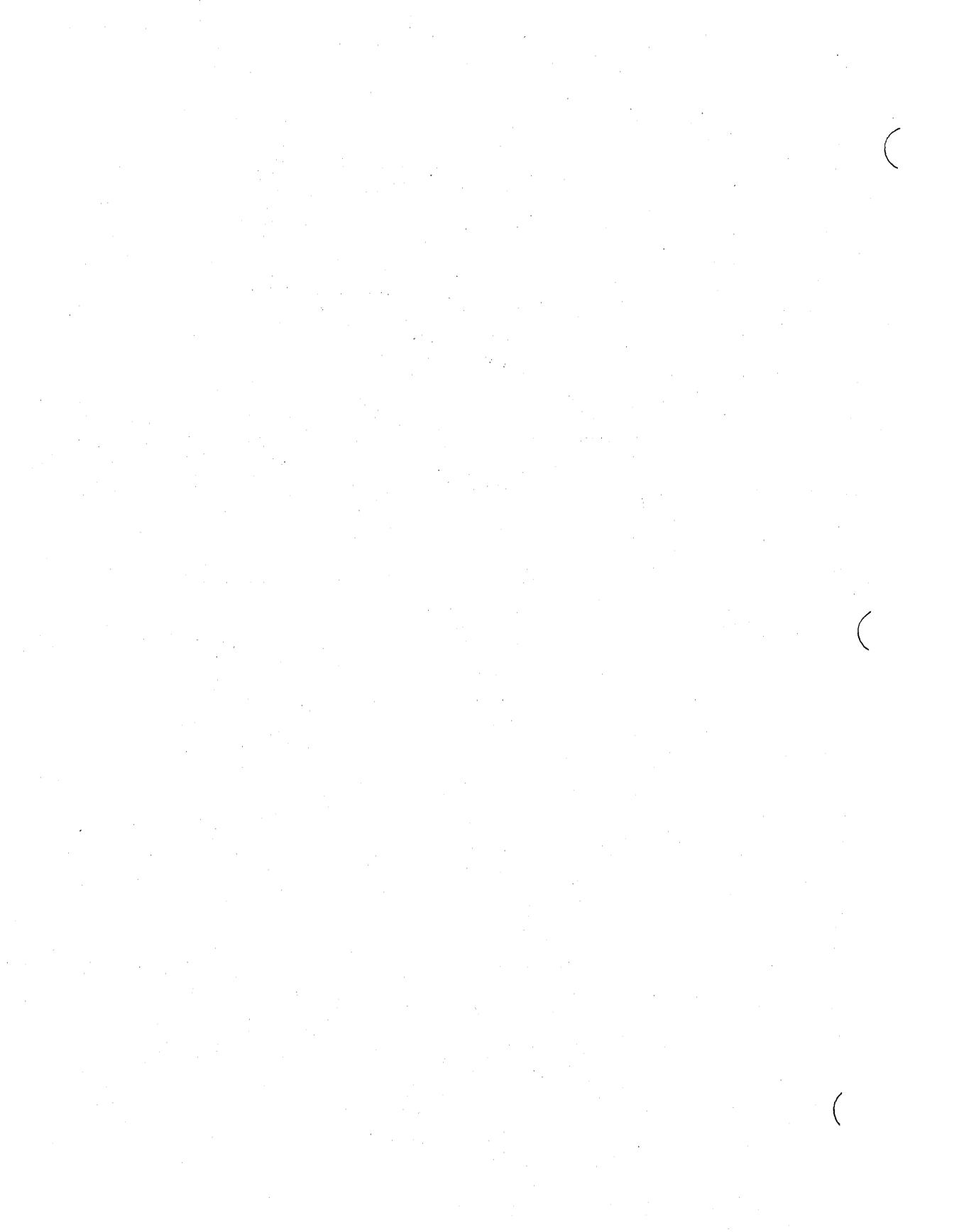
APPENDIX A

STATUS CODES AND STATUS MESSAGES

GENERAL

The B-NET software includes status codes and status messages
to help you install and operate a network.

The system displays status codes at the Executive level to
inform you of error conditions that occur during B-NET
operations.

Status messages appear in the NCC Screen's message display
area (refer to Message Display, in section 5) to alert you
of error conditions during installation of the B-NET
subsystems.

STATUS CODES

A status code is a four-digit number, followed by a short
message, indicating a problem within the system.

The status codes pertaining to each of the B-NET subsystems
fall within the following ranges:

- Net Server   5000 to 5099

- Net Agent   5100 to 7299

- Net Transport Service 8900 to 9000

The following tables list the status codes and accompanying
messages, along with a brief explanation for each:

  Table A-1. Net Server Status Codes

  Table A-2. Net Agent Status Codes

  Table A-3. Net Transport Service Status Codes

For further information, refer to the *B 20 Systems Operating
System (BTOS) Reference Manual, Vols. 1 and 2.*

Table A-1.   Net Server Status Codes

Status Code	Message/Explanation
5000,5001	Reserved
5002	**Request data too large.**
	The request data in a client request is larger than the size of the buffer specified by sXbData in the command line.
	Possible cause: Net Server receiving data incorrectly from the Net Transport Service.
5003	**No user number available.**
	The Net Server does not have a user number to allocate for this request. The client should try again later or allocate more remote user numbers to the Net Server in the in the nNet Users parameter of the Sysgen Prefix File.
5004	**Buffer not waiting for Read.**
	The Net Server received a Read event for a buffer that is not wating for a Read.
5005	**Invalid request.**
	The Net Server received an unexpected request at an exchange allocated to the Net Server. It is not a response to a request that the Net Server originated.
	Possible cause: the system has sent a request to the wrong exchange.

Status Code	Message/Explanation
5006	**Buffer not waiting for response.** The Net Server received a response to a request when its buffer was not waiting for a response. Possible causes: • program error • the system may have written data in memory at random.
5007	**Buffer not in Write state.** The Net Server received a response to a Write when its buffer is not in StateWaitingForWrite. Possible causes: • program error • the system may have written data in memory at random.
5008	**Invalid disconnect response.** The Net Server received an unexpected Disconnect request from the Net Transport Service.
5009	**Invalid user number.** The Net Server received a response to a client request when the user number in the request block is not assigned to remote users.

Table A-1. Net Server Status Codes (Cont)

Status Code	Message/Explanation
5010	**Invalid event.** The Net Server received an event of an unknown type from the Transport Service. Possible causes: • program error • the system may have written data in memory at random.
5011	**No abort requests.** The Net Server expects the Request.asm to specify Abort requests.
5012	**Invalid connection handle.** The Net Server received a connection handle from the Transport Service that is not in the Net Server table. Possible causes: • program error • the system may have written data in memory at random.
5013	**Invalid request size.** The size of the message received from the Net Server does not equal the total of the header, the request block, and the request data. Possible cause: data incorrectly received from the Transport Service.

Table A-1. Net Server Status Codes (Cont)

Status Code   Message/Explanation

5014   Invalid buffer on read.

                           The pointer returned by the event
                           request on a Read does not point to a
                           buffer.

                           Possible causes:

                               •   program error

                               •   the system may have written
                                    data in memory at random.

5015   Session closed.

                           The system has closed the session due to
                           a timeout.

5016   File handle to close not found.

                           The handle of a file closed by a remote
                           user is not in the Net Server's table of
                           remote file handles.

                           Possible causes:

                               •   program error

                               •   the system may have written
                                    data in memory at random.

5017   File handle for change longevity not
                           found.

                           The file handle specified by
                           ChangeFhLongevity is not in the Net
                           Server's table of remote file handles.

                           Possible causes:

                               •   program error

                               •   the system may have written
                                    data in memory at random.

Table A-1. Net Server Status Codes (Cont)

Status Code   Message/Explanation

5018   **No remote file handle available.**

                     The Net Server has processed an Open
                     request but does not nave room in its
                     table of remote file handles. Requires
                     a larger number of remote files in the
                     command line.

5019   **User resource count zero.**

                     The system is closing a file when the
                     user's resource count is already zero.

                     Possible causes: program error; the
                     system may have written data in memory
                     at random.

5020   **No net users.**

                     For the Net Server to run, BTOS must
                     allocate at least one user number for
                     net users. This is a Sysgen option
                     specified by the nNetUsers parameter in
                     the Prefix file.

5021   **No Transport Service.**

                     The Transport Service must be initial-
                     ized before the Net Server. The
                     Transport Service is not serving the
                     exchange for AttachBNet.

5022   **Unexpected request.**

                     A user has stopped the Net Server with a
                     request in its queue.

                     Possible causes:

                     ●   program error

                     ●   the system may have written
                          data in memory at random.

Table A-1. Net Server Status Codes (Cont)

Status Code	Message/Explanation
5023 to 5025	Reserved
5026	Net Server array too small.
	The static array in the InitAlloc module is not large enough to accomodate all dynamically allocated arrays the system initializes; requires reassembling InitAlloc. Enlarging the array enlarges the run file. The system returns unused memory at the completion of initialization.
5027 to 5099	Reserved

Table A-2.   Net Agent Status Codes

Status Code	Message/Explanation
5100	Reserved
5101	The list of Request Control Blocks is inconsistent. Internal error.
5102	Net Agent no room. The command line allocates a fixed number of Request Control Blocks (RCB). The net Agent does not have a free RCB to handle the request.
5103	NetXbuf too small.
5104	Invalid message header. The first word of a message should point to the Request Control Block (RCB) that belongs to the message, and the first word is not a valid pointer. Possible cause: invalid data received from the Net Transport Service.
5105	Message wrong session. The ConnectionHandle accompanying the message does not agree with the ConnectionHandle of the Request Control Block (RCB) associated with the message.
5106	Invalid net request. The Net Agent received an unexpected request. Possible cause: request sent to wrong exchange.
5107	Invalid event. The Net Agent does not recognize an event received from the Net Transport Service.

Table A-2.   Net Agent Status Codes (Cont)

Status Code	Message/Explanation
5108	Internal error.
5109	Read overflow.

The Net Server returned more bytes for a read request than can fit in the client's buffer.

Possible causes:

- program error

- the system may have written data in memory at random.

| 5110 | No session available. |

No session is currently available to handle the request.   Try again later; or allocate a greater value to nSessions in the Net Agent command line.

| 5111 | Internal error. |
| 5112 | Invalid system request. |

The Net Agent received a request with a zero routing code that is not a system request (a zero routing code indicates a system request).

Possible causes:

- program error

- the system may have written data in memory at random.

Table A-2.   Net Agent Status Codes (Cont)

Status Code	Message/Explanation
5113	**Invalid Net Agent connection.**
	The Net Transport Service returned a ConnectionHandle that is not in the Net Agent's table.
	Possible causes:
	• program error
	• the system may have written data in memory at random.
5114	**Invalid file handle.**
	The client passed a file handle to the Net Agent that exceeds the number of remote file handles; or the file handle does not correspond to an open session.
5115	**Transport failure.**
	The Transport Service returned an event request with the notice of event transport failure.
5116	**Remote file handle not found.**
	A remote file handle does not exist in the Net Agent's table of remote resources.
	Possible causes:
	• program error
	• the system may have written data in memory at random.
5117	**Invalid user number.**
	The user number in a request is greater than the last cluster user number. Request routed to the Net Agent incorrectly.

Status Code	Message/Explanation
5118	Invalid node name.
	The node name in a file specification is too long or not enclosed in braces.
5119	No remote file handles available.
	No more remote file handles are available. Possible correction: increasing nRemoteFhMax in the command line.
5120	File to close not found.
	The file handle for a Close request does not exist in the Net Agent's table of remote file handles.
	Possible causes:
	• program error
	• the system may have written data in memory at random.
5121	No Transport Service.
	The Transport Service must be initialized before the Net Agent. The Transport service is not serving the exchange for AttachBNet.
5122	Session closed.
	The system has closed the session (probably due to a timeout).

Table A-2. Net Agent Status Codes (Cont)

Status Code   Message/Explanation

5123   Session not waiting for open.

                     The Net Agent received a response to an
                     Open request when the session was not
                     waiting for an Open.

                     Possible causes:

                         •   program error

                         •   the system may have written
                              data in memory at random.

5124   Invalid timeout.

                     The Net Agent received a request with
                     zero request code (indicates a
                     TimerRequestBlock) when the request
                     pointer does not point to a SessionData
                     record.

                     Possible causes:

                         •   program error

                         •   the system may have written
                              data in memory at random.

5125   Bad sequence number.

                     The Net Server sent a request with a
                     sequence number that does not correspond
                     to the request the Net Agent received.

                     Possible cause: invalid data received
                     from the Transport Service.

Table A-2.   Net Agent Status Codes (Cont)

Status Code   Message/Explanation

5126   Net Agent array too small.

                       The static array in the InitAlloc module
                       is not large enough to accomodate all
                       dynamically allocated arrays the system
                       initializes.   Enlarging the array
                       enlarges the run file.   The system
                       returns unused memory at the completion
                       of initialization.

5127   Net Agent stopped.

                       The Net Agent received a request from a
                       client after deactivation.

                       Possible causes:

                           ●   program error

                           ●   the system may have written
                                 data in memory at random.

5128 to 7299   Reserved.

Table A-3. Net Transport Service Status Codes

Status Code	Message/Explanation
8900	Link disconnected. The link between two nodes received an unexpected unrecoverable error. All operations currently in progress are terminated.
8901	Resources unavailable. An internal B-NET resource is currently expended. User should retry the operation later.
8902	Maximum TSAP attachments are exceeded. A TSAP (that is, a Net Agent or Net Server user) tried to access the Net Transport Service, exceeding the maximum number of users specified in the Max Users parameter when installing the Net Transport Service.
8903	TSAP in use. A Net Transport Service user tried to use a TSAP (that is, an address) currently allocated to another user.
8904	Data truncated. The user tried to receive or transmit data exceeding the specified limitations of the buffer size. The system returned as much of the excess as possible.
8905	Invalid TSAP. A Net Agent or Net Server user specified a TSAP out of the valid range.
8906	Timeout has occurred.
8907	An invalid node address has been given.
8908	Node has been reset.

Status Code	Message/Explanation
8909	TSAP has been reset.
8910	Invalid connection index received.
8911	Invalid connection.
8912	TSAP has been deactivated.
8913	Invalid state.
8914	Request came from a user the Transport Service does not recognize.
8915	Write-type or read-type request received when a buffer does not exist for data transmission or receipt .
8916	No connections exist for this TSAP (user).
8917	Queue contains the maximum number of requests of this type.
8918	No more internal queuing structures exist in the Transport Service. User should retry later.
8919	TSAP Index mismatch.
8920	Purge request received - OS aborted.
8921	TSAP in session.
8922	Invalid TSAP range.
8923	Maximum connects at this node.
8924	Reserved
8925	Transport Service user detached.
	The Net Agent or the Net Server is detached from the Net Transport Service. All pending operations are terminated.

Table A-3. Net Transport Service Status Codes (Cont)

Status Code	Message/Explanation
8926	Invalid address range.
8927	Invalid node range.
8928	Invalid connect range.
8929	Disconnect received from partner.
8930	Reserved
8931	Invalid channel specified.
8932	Not yes or no.
8933	Invalid dial ID.
8934	Invalid buffer size.
8935	Invalid maximum number of media specified.
8936	Invalid node name.
8937	Duplicate node.
8938	No such media.
8939	No dial connection.
8940	No such task type.
8941	Node in use - cannot delete.
8942	Media in use - cannot delete.
8943	Phone not on-hook.
8944	This modem is answer only.
8945	No more RS-232-C lines.
8946	Cannot delete media.

Table A-3. Net Transport Service Status Codes (Cont)

Status Code	Message/Explanation
8947	Maximum number of nodes exceeded.

A user attempted to exceed the number of nodes specified when installing the Net Transport Service. |
| 8948 | Maximum number of media exceeded.

A user attempted to exceed the number of media specified when installing the Net Transport Service. |
| 8949 | Invalid media range.

The media number exceeds the maximum allowable number of media. |
8950	Duplicate media.
8951	Transport Service stopped.
8952	Reserved
8953	X.25 Network connection failed.
8954	X.25 too few buffers or request blocks.
8955	No matching virtual circuit block.
8956	X.25 lost request block.
8957	Too many X.25 network request blocks.
8958	Too few X.25 buffers.
8959 to 9000	Reserved

STATUS MESSAGES

Table A-4 lists the status messages that appear in the NCC's message display area (refer to section 5, Network Control Center). Messages are in alphabetical order.

Table A-4.   Status Messages

Bad number format.

Channel in use.

Configuration complete.

Configuration table is full.

Disconnect received.

duplicate media.

Duplicate node.

Duplicate node entry.

End of entry table reached.

Entry is not allowed.

Error during configuration.

Error oout of range.

Invalid address range.

Invalid buffer size.

Invalid channel.

Invalid connection rnage.

Invalid dial ID.

Invalid dial type string.

Invalid entry parameter string.

Invalid maximum media.

Table A-4.   Status Messages (Cont)

Invalid media channel string.

Invalid media parameters.

   (Valid parameters are Leased, Dial, PVC, and SVC)

Invalid media range.

Invalid media type string.

Invalid modem mode string.

Invalid modem type string.

Invalid node name.

Invalid node range.

Invalid YES/NO entry.

Last entry in table.

Maximum media exceeded.

Maximum nodes exceeded.

Maximum nodes added.

Media cannot delete media.

Media in use.

Media table is full.

Missing quote.

Modem answer only.

No connection number selected.

No dial connection.

No entries in table.

No entries to save in configuration file.

No more RS-232-C lines.

Table A-4. Status Messages (Cont)

No such media.

No such media type.

Node in use.

Not YES/NO entry.

Number entered exceeds maximum value allowed.

Phone not on-hook.

Reconfigure operation not completed, error encountered.

Too many entries.

Too many parameter fields for entry.

Top of entry table reached.

TSAP detached.

Undefined media type.

Unrecognized entry parameter.

Unrecognized entry string.

APPENDIX B

CREATING B-NET REQUESTS

GENERAL

This appendix contains information you need to create new
B-NET requests. It also explains how B-NET handles and
routes requests. Because requests incorporate routing
information, an understanding of routing is necessary to
enable you to create new B-NET requests.

REQUESTS

B-NET is an extension of the B-20 message-based operating
system. In this system, one process communicates with
another by passing messages called requests through the
distributed operating system, either within a workstation or
between workstations. A request instructs BTOS to command a
system service to perform an operation.

For detailed information about requests, refer to the *B 20
Systems Operating System (BTOS) Reference Manual, vols. 1 and 2.*

A B-NET request is addressed to a resource located at a
remote node. The Net Agent receives B-NET service requests
from BTOS, and forwards them to their destinations via the
Transport Service.

You normally use the Executive to send requests over B-NET.
In addition, you can build new requests, combine them in B-NET
sessions, and direct them to remote nodes via the Net Agent.

Requests are packaged in highly structured, self-contained
data elements called request blocks. You must construct
request blocks carefully to include critical routing infor-
mation that BTOS software elements use.

OVERVIEW OF B-NET OPERATIONS

In general, you can use B-NET to request any BTOS operation.
Because BTOS runs on top of the B-NET layer, B-NET is
transparent to BTOS.

At the local node, if the Net Agent is installed on the workstation originating a request, BTOS forwards B-NET the request directly to the Net Agent. If the Net Agent is installed on the master workstation in the cluster, BTOS sends the request to the local Cluster Workstation Agent, which forwards the request to the master workstation, which routes the request to the Net Agent.

At the remote node, the Net Server receives a request block from the originating node's Net Agent, executes the request, and returns the response to the originating node's Net Agent.

B-NET SESSION STRUCTURE

Whenever possible in a B-NET request/response session, the system routes requests directly to the Net Server, which functions as an exchange.

A session can last for only one request. In a network poll-type transaction, for example, no resource handle is returned, and receiving the response completes the session.

In a session opening an ISAM dataset, a typical session may allocate a resource (for example, opening a file), communicate one or more requests using the resource handle (the one for read/write records), and terminate the session by releasing the resource.

B-NET supports application systems using up to five-sector buffer lengths.

ROUTING B-NET REQUESTS

The B-NET system, operating together with BTOS, commonly uses the file specification to route a request to its destination. As an alternative, it may route requests by handle.

Routing by File Specification

A specification, such as a file specification, is a string of characters (that is, bytes) that a pb/cb pair in a request block points to.

The count byte (cb) and the pointer byte (pb) are a pair of
bytes in the request block. The cb is the count of bytes
in the string; the pb points to the logical memory address
of the byte string. Both are required to define and locate
a string of bytes.

Example of a Request Routed by Specification

The OpenFile request is an example of a request that is
routed by file specification. A fully expanded file
specification includes the node, volume, and directory names
prefixed to the file name, as in the following example:

> **{LosAngeles}[HdQtrs]<BNET>NetRouting.doc**

If the file specification begins with a node name enclosed
in braces, the system routes the request to that node.

The OpenFile request returns a handle that the system can
use to reference the file in subsequent operations (refer to
Routing by Handle, later in this appendix).

Rules for Routing by Specification

You must observe certain rules with respect to node names,
limiting the number of file specifications per request, and
applying passwords.

Node Naming Conventions

Node names can be any combination of up to 12 alphanumeric
characters. Each node on the network must have a different
name; the system does not accept duplicate node names (refer
to Node Table Entries, in section 6).

Two node names are reserved:

- {local} (tells the system not to route the request)

- {master} (tells the system to route the request to
  the master workstation)

Refer to How the System Routes Requests, later in this appendix.

Maximum Number of File Specifications

A request can include a maximum of two file specifications.
The first must occur in the first request pb/cb pair; if
there is a second specification, if must occur in the third
pb/cb pair.

Passwords

If a file specification has a password associated with it,
the pb/cb pair immediately following the pb/cb pair for the
file specification must include the password. If the file
specification occurs twice in a request, the password must
occur each time also.

How the System Expands Specifications

The system must expand specifications when you originate a
request from a cluster workstation, and when you direct a
request to a remote queue.

Requests Originating from a Cluster Workstation

When you originate a request from a cluster workstation, the
Cluster Workstation Agent must expand each specification
before it sends the request to the master workstation.
Because the master does not have the cluster workstation's
User Control Block, it can not expand the specifications
itself.

A pb/cb pair in a request may describe a specification that
is not fully expanded. Expanding a specification adds
default path information from the User Control Block to make
the specification complete.

The information added from the User Control Block depends on
the type of specification. The following examples illus-
trate the form of several types of specifications:

    FileSpec:

        {NodeName}[VolumeName]<DirectoryName>FileName

DirSpec:

   {NodeName}[VolumeName]<DirectoryName>

DevSpec:

   {NodeName}[VolumeName]

B-NET Routing Macros

B-NET routing macros tell the Cluster Workstation Agent how
to expand specifications when it receives a request.

A request macro in the Request.asm file specifies each
request BTOS recognizes. Request macro parameters specify
the name of the request, the value of the request code, the
number of the pb/cb pairs, etc. Each request macro can
include B-NET routing macros.

B-NET routing macros answer three questions:

   o   Is the request routed by specification or by
        handle?

   o   For requests routed by specification, where is the
        specification in the request block?

   o   For requests routed by specification, how is the
        specification expanded?

Table B-1 describes the routing macros used in expanding
specifications.

Requests Directed to a Remote Queue

When you direct a request to a remote queue, the Queue
Manager searches the Queue.index file for the corresponding
entry, then adds the local node name to the file specifi-
cation before resending the request over the network.

How the System Routes Requests

When the kernel receives a request routed by specification,
it determines whether the specification begins with a node
name (that is, a name enclosed in braces).

Table B-1.   Routing Macros

Macro	Description
%FileSpec	Expands everything to the left of the file name:
	Default file name prefix
	Default directory
	Default vol·ıme
	Default node
%DirSpec	Expands everything to the left of the directory name:
	Default volume
	Default node
%DevSpec	Expands everything to the left of the volume name:
	Default node
%FileSpec2	Same as %FileSpec, except that the request contains two specifications
%FileSpecP2S2	Same as %FileSpec, except that the specification occurs in the third request pb/cb pair instead of the first pair

If the specification does not begin with a node name
(enclosed in braces) or a device name (enclosed in
brackets), the kernel determines whether the user's default
path specifies a node name, then takes the appropriate
action:

- If the node name is the reserved name {local}, the
  kernel does not route the request.

- If the node name is the reserved name {master},
  the kernel routes the request to the master.

- If the specification begins with a node name, or if the user's default path specifies a node name, the kernel routes the request to the Net Agent.

- If the request originates from a workstation with the Net Agent installed, the kernel routes the request directly to the Net Agent.

- If the request originates from a cluster workstation without the net Agent installed, the kernel routes the request to the Cluster Workstation Agent.

  The Cluster Workstation Agent sends the request to the master, which routes the request to the Net Agent.

- If no Net Agent is available to serve a request directed to a remote node, the system returns the request to the originator with the error message **Service not available (33).**

Routing by Handle

A handle is a 16-bit value a system service assigns to a resource used to perform an operation; for example, a Read request is routed by handle. The system uses that handle to reference the resource.

The file system uses a file handle to reference files you open using the OpenFile request.

The Net Agent sets the high-order bit on a handle returned from a remote node to indicate a remote resource. When the system encounters a request that refers to a handle with the high-order bit set, it routes it to the Net Agent.

Rules for Routing by Handle

The following rules apply to requests routed by handle:

- The handle must be in the first word of the control information.

- A handle returned from a remote service must never be zero.

- If a request returns a handle to a resource (for example, an OpenFile request), the first response pb/cb pair must return the handle.

Table B-2 explains how the Net Agent translates a handle before
returning it to the originator of the request.

Routing by Request Codes and Routing Codes

A request code is a byte in the request block (byte 10) that
uniquely identifies a system service. For example, the
request code for the Write operation is 36.

A routing code is a byte in the request block that the
kernel and agents use to route a request from a program
anywhere in the network, even if BTOS at the local node does
not recognize the request code.

Table B-2. How the Net Agent Translates a Handle

Bit	Translation
15	The Net Agent sets the high-order bit to indicate that the system routes any request using this handle to the Net Agent.
14 to 12	The Net Agent does not change these bits. The file system uses these bits as a verification code.
11 to 8	The Net Agent does not change these bits.
7 to 0	The Net Agent translates the low-order byte of the handle into a unique number ranging from 1 through 255. This permits the Net Agent to associate the handle with a session and a remote handle.
	When the Net Agent receives a request routed by handle, it uses the low-order byte of the handle to find the session and the remote handle in its table.

Request Codes

The system uses request codes for two purposes:

- to route a request to the appropriate system service process

- to specify to that process which one of the several services it provides the system is currently requesting

If BTOS at the local node recognizes a request code, but the originating workstation does not serve the request, the system routes the request to a remote node if routing information points to a remote node.

Routing Codes

It is possible to route a request to a remote node if BTOS at the local node does not recognize the request code.

When the system assembles a request, it creates a one-byte routing code that it associates with that request. The kernel searches for the routing code in the rtCode field of the request block. Unless this field is zero, the system uses it to route the request to a remote node.

Tables B-3 and B-4 indicate the meaning of the routing code in the rtCode field of the request block. The tables give the equivalent macros of each bit in the routing code; macros begin with a percent sign (%).

How the Net Agent Handles Requests

The parameters you enter when you install the Net Agent determine how the Net Agent handles requests. These parameters are explained in Installing the Net Agent, in section 4.

Table B-3. Routing Codes

Bit	Macro	Description
0	%RW	This request is a Read or Write, and may have to be broken up into small requests.
1	%OpenFh	This request opens a resource. This request's first response pb/cb pair returns a handle for reference to this resource in subsequent operations.
2	Reserved	
3	%SpecPW	Each file specification pb/cb pair is followed by a password pb/cb pair.
		If %SpecPW is set and there is no file specification to expand (rSpec = 0, or rSpec > 5), the first pb/cb pair becomes a password to expand (for example, ChangeOpenMode).
4	%rFh	Route this request by handle. The system returned this handle in response to a request marked %OpenFh.
5, 6, 7	rSpec	This field indicates that a request is routed by a specification, or that this request closes a resource.
		Refer to Table B-4 for the value of rSpec.

Table B-4. The Values of rSpec

Value	Macro	Meaning
0		No specification routing
1	%DevSpec	Route by Device Specification
2	%DirSpec	Route by Directory Specification
3	%FileSpec	Route by File Specification
4	%FileSpec2	Route by File Specification (request includes two file specifications)
5	FileSpecP2S2	Route by File Specification in P2/S2
6	%CloseFh	Closes the resource that the request %OpenFh opened
7		Reserved

APPENDIX C

MEMORY REQUIREMENTS

GENERAL

This appendix defines the memory requirements of each of the
B-NET subsystems.

NET TRANSPORT SERVICE

The NET Transport Service (less utilities) requires 54KB of
memory.

Based on network configuration, additional memory may be
required, up to a maximum of 115KB:

- each node or user requires approximately 100 bytes
  of control storage

- buffer areas range from 15KB to 60KB

The Network Control Center requires 70KB.

The Network Automatic Configuration facility requires 40KB.

NET AGENT

The Net Agent software requires 9.6KB, plus 11KB if the user
accepts the default parameters. Additional memory may be
required, as follows:

- 35 bytes for each additional session

- 6 bytes for each additional remote resource

- 38 bytes for each additional client

- 74 bytes for each additional transport request

NET SERVER

The Net Server software requires 13.5KB, plus 11KB if the user accepts the default parameters, and 85 bytes for each remote user.

Additional memory may be required, as follows:

- 35 bytes for each additional session

- 6 bytes for each additional remote resource

- 578 bytes for each additional memory buffer

APPENDIX D

GLOSSARY

Address

An Address is a number from 1 through 64 that identifies a
node from the other nodes on the network. You enter your
node's address in the NCC's Node Table, as well as the
addresses of the nodes your node communicates with . Each
node must have a different address.

Auto-answer

Auto-answer is a feature of a modem whereby the modem
automatically answers incoming calls.

Auto-dial

Auto-dial is a feature of a modem whereby the modem
automatically dials a prespecified number and establishes a
commection.

Channel

A channel is an RS-232-C communications port on a
workstation (master or cluster).

Client Request

A client request is a B-NET request in the Net Agent's
queue.

Cluster Workstation Agent

The Cluster Workstation Agent Service Process concerts
interprocess requests to interstation messages for
transmission to the master workstation. At system build it
forms part of the system image for use on a cluster
workstation. It is the equivalent of the Master Workstation
Agent Service Process.

Credit (Local)

Local credit is the buffer space available at the local end
of a connection, measured in the number of packets that can
occupy the buffer space.

Credit (Remote)

Remote credit is the buffer space available at the remote end of a connection, measured in the number of packets that can occupy the buffer space.

CRX

CRX (Carrier Detect) is a modem signal.

Data Buffer

A data buffer is the buffer the Net Server uses to service each open request.

DCE

DCE is an abbrevation for Data Communications Equipment (for example, a modem).

DDD

DDD is an abbrevation for Direct Distance Dialing.

DDS

DDS is an abbrevation for Direct Distince Switching.

Deinstallation

Deinstalling a system service causes the system to vacate memory and, in a multipartition system, relinquish the partition and system resources.

Dial Line

A dial line is a telephone line that requires you to initiate each call separately by entering a telephone number.

DTE

DTE (Data Terminal Equipment) is any terminal or workstation that uses the network.

DTR

DTR (Data Terminal Ready) is a modem signal.

File Specification

A file specification is a syntactical string that identifies
a file. In its expanded form, it includes a node name,
volume name, directory name, possibly a file prefix, and a
file name.

GND

GND is an abbrevation for ground.

Handle

A handle is a name a system service assigns to reference a
resource the system uses to perform an operation.

IM

IM is an abbrevation for intelligent modem. An intelligent
modem is a modem that has auto-answer auto-dial capability
(see Auto-answer and Auto-dial, in this section).

IPC

IPC (Interprocess Communication) is the request/response
model of the B 20 message-based operating system (BTOS).

ISO

The ISO (International Standards Organization) establishes
standards for network architecture. The ISO standard
divides network architecture into seven layers: physical,
link, network, transport, session, presentation, and
application.

Kernel

The kernel is the innermost layer of BTOS. It executes at a
higher priority than any porcess. It schedules processes
and provides interprocess communication primitives.

Layer

A layer is a network function or a set of related network
functions that forms an autonomous functional block in the
superset of network architectureal functions. This parti-
tioning of the necessary network functions allows each layer
to interface transparently with adjoining layers, thereby
providing a method of making network components more
manageable.

LAN

An LAN (Local Area Network) is a network that does not require public communications facilities (for example, an intraoffice network).

LCN

The LCN (Logical Channel Number) is the number of the Logical Channel you subscribe to. A Logical Channel is one multiplexed data stream over a physical line supplied by the public carrier.

Leased Line

A leased line is a communications line a subscriber leased from a common carrier for exclusive use. The subscriber has private, full-time access to the line for the duration of the contract.

Media Table

The Media Table is a facility of the Network Control Center. It has columns in which you make entries to specify the communication line media your node uses to communicate with other nodes one the network.

Medium

A medium is a physical connection over which the system transmits and receives data (for example, a dial line or a leased line).

Message

A message is a complete block of data comprising one or more packets.

Modem Eliminator

A modem eliminator is an electronic device that emulates two modems transmitting and receiving data. It originates clock signals that coordinate communications between workstations.

Net Agent

The Net Agent is a B-NET subsystem that initiates a request on behalf of a user.

Net Server

The Net Server is a B-NET subsystem that executes requests
from the Net Agent and returns responses to Net Agents that
originate requests.

Net Transport Service

See Transport Service.

Network Automatic Configuration Facility (NAC)

The NAC is a B-NET facility that allows you to save a
network configuration and automatically reconfigure it after
you deinstall it.

Network Configuration File

A Network Configuration File is a file you specify to store
Node Table and Media Table entries. The system stores a
network configuration in a network configuration file for
automatic reentry later.

Network Connection Summary

The Network Connection Summary is a facility of the Network
Control Center. It displays information about individual
connections between your node and remote nodes.

Network Control Center (NCC)

The NCC is a full-screen, menu- and function key driven
utility that provides the administrative interface for
configuring a node and monitoring node and network activity.

Network Management and Control Center

See Network Control Center (NCC).

Network Synopsis

The Network Synopsis is a facility of the NCC. It displays
a summary of the current configuration's parameters and
statistics concerning the activity of the currently active
node.

Node Address

See Address.

Node Table

The Node Table is a facility of the Network Control Center.
It has columns in which you make entries to specify the
other nodes on the network your node can communicate with.

Off-Hook

Off-hook is the condition of a telephone line activated for
communications. When you lift the handset of a telephone
from the cradle, the telephone is off-hook. Intelligent
modems emulate lifting and replacing the handset.

On-Hook

On-hook is the condition of a telephone line not activated
for communications, as when the handset is on the cradle.

OSI

OSI (Open Systems Interconnection) is a standard of the ISO
that attempts to provide for consistent hardware and
software interfaces among network products.

Packet

A packet is the basic block of data sent in a packet-
switched network. A packet consists of control information
and a segment of data.

Packet-Switching

Packet-switching is a technique for transmitting data in
small segments called packets. The line is used only during
transmission of the packet, allowing more efficient use of
the line.

pb/cb

The pointer byte (pc) and count byte (cb) are a pair of
bytes in a request block that point to and define the extent
of a string of bytes in logical memory.

PBX

A PBX (Private Branch Exchange) is an in-house telephone
switching system.

PDN

A PDN (Public Data Network) is a Federally regulated
provider of communications services (for example, Tymnet or
Telenet).

Permanent Virtual Circuit

A Permanent Virtual Circuit (PVC) is a connection that the
system is not required to clear or establish with each use.

Pulse Dialing

Pulse dialing uses a telephone with a rotary dial. The dial
generates pulses that encode the numbers. Also see Tone
Dialing.

Remote Resource

A remote resource is a system resource located at a remote
node that the system needs to complete a B-NET request. Any
request that returns a handle from a remote node requires a
remote resource.

Request

A request is the medium of exchange between processes in the
B 20 message-based operating system (BTOS). A request is a
message consisting of a standard request block that requests
the system to perform a standard operation as specified by a
resource.

Request Code

A request code (rqCode) is a 16-bit value (byte 10 in the
request block) that uniquely identifies a system service.
For example, the request code for the Write operation is 36.

The system uses request codes to route a request to the
appropriate system service process, and to specify to that
process which one of the several services it provides the
system is currently requesting.

Resource

See Remote Resource.

Routing Code

A routing code is a 16-bit value (byte 1 in the rtCode field of the request block).

If BTOS at the local node does not recognize the request code, the kernel checks the routing code to determine how to route the request. the routing code is decoded by a table containing macros and some special routing instructions.

RxD

RxD (Receive Data) is the designation of a clock on a workstation's communications channel.

Session

A session is a connection the Net Agent initiates between two nodes; all users on both nodes can share a session.

Session Timeout

A session timeout is the time the Net Agent allows for a session to remain unused while no resources are open.

SNF

SNF (Sequence Number Field) is a field defining the sequential number the system assigns to the next packet to be sent.

Subaddress

A subaddress is a node's telephone number.

Switched Virtual Circuit

A Switched Virtual Circuit (SVC) relies on the network controller to establish a connection path and clear it when not in use.

Sysgen Prefix File

The System Prefix file is used during the Sysgen of an operating system.

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System Configuration Block

The System Configuration Block is a part of BTOS that allows the application system to determine details about the System Image (for example, workstation configuration and system build parameters).

Tone Dialing

Tone dialing uses a telephone with a touch-tone dial. This system uses tones with different pitches to represent a number. See also Pulse Dialing.

Topology

The topology of a network describes the network in terms of the number of nodes it includes, the media connecting the nodes, and which nodes are connected.

The topology of a network architecture describes how the network is organized. B-NET uses a distributed, independent multimedia topology; that is, all nodes are peers (equal), and any node can connect to any other. An individual node may consist of a subnet implementing, for example, a ring or star topology connected with a different network technology.

Transport Request

A transport request is an outstanding Net Agent request to the Transport Service.

Transport Service

The Transport Service is a B-NET subsystem that performs the transmission control and interface layer of B-NET.

TSAP

TSAP is an abbreviation for Transport Service Access Point.

TxD

TxD (Transmit Data) is the designation of a clock on a workstation's communications channel.

Virtual Circuit

A virtual circuit is a network communications link in a store-and-forward packet-switched network.

X.25

X.25 is a packet-switched network protocol based on a standard promulgated by the International Telegraph and Telephone Consultative Committee (CCITT).

Xmit

Xmit is an abbreviation for transmit.

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