Communications Server

Getting Started Guide
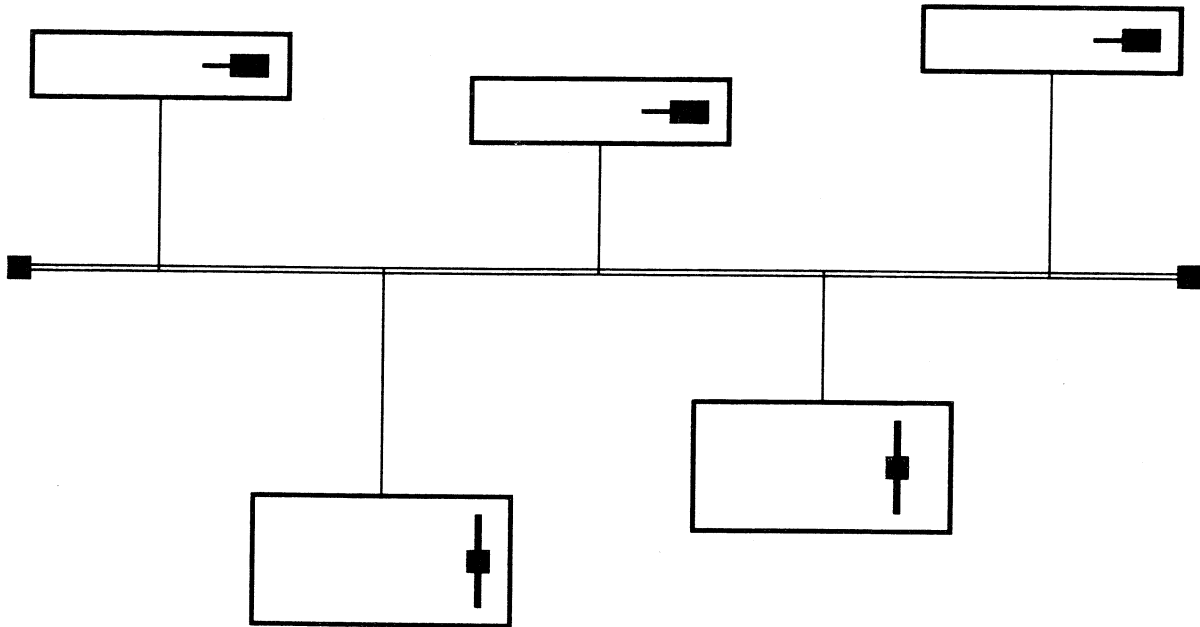
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**   **   WARNING   **   **

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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TABLES

FIGURES

REFERENCES

[1]   ESPL Communications Server User's Guide
      (Bridge Communications, Inc.)

[2]   ESPL Series/1 Planning and Installation Guide
      (Bridge Communications, Inc.)

[3]   ESPL Series/100 Planning and Installation Guide
      (Bridge Communications, Inc.)

[4]   The Ethernet, A Local Area Network: Data Link Layer and
      Physical Layer Specifications, Version 1.0
      (Digital Equipment Corporation, Intel Corporation, and Xerox
      Corporation, 1981)

[5]   NCS/100 Installation and Operation Guide
      (Bridge Communications, Inc.)

1.0 INTRODUCTION

This guide contains step-by-step instructions for installing and configuring a Bridge Communications, Inc., Series/1 or Series/100 Communications Server and for using the Communications Server to make a connection between devices on a network.

A Communications Server interconnects non-networked devices, such as terminals, hosts, and printers, through an XNS Ethernet local area network. The Communications Server provides all of the network interface functions necessary to allow virtual connections among the attached devices.

1.1 Audience

This guide has been prepared for the network manager who is installing a Communications Server for the first time and for the network user who wants only the minimum information necessary to use the Communications Server.

The network manager must use this guide in conjunction with the Communications Server User's Guide (reference [1]) and either the Series/1 Planning and Installation Guide (reference [2]) or the Series/100 Planning and Installation Guide (reference [3]).

The network user needs only the tutorial in Section 7.0 of this guide.

1.2 Scope

This guide describes only asynchronous Communications Servers (CS/1-A and CS/100-A). The general procedures for installing other models of Communications Server are the same as those described here, but the hardware connections to the supported devices may be different, and some additional configuration steps may be necessary.

This guide describes the procedures for configuring the Communications Server for use with hosts and CRT-type terminals with RS-232 connectors. Bridge Communications, Inc., recommends that you first attach a small number of host lines and terminals, and verify that these devices can communicate with each other through the Communications Server. Then install all modems, printers, and other equipment.

1.3 How to Use This Guide

The material in this guide is divided into sections that
represent four kinds of information:

⊠   Site Planning: Section 2.0 lists network hardware that is
     compatible with Bridge equipment and provides specifications
     for the cables connecting the Communications Server with the
     terminals and hosts it supports.

⊠   Installation, Configuration, and Checkout Procedures:
     Because the Communications Server provides an interface
     among several different devices, the installation, configu-
     ration, and checkout procedures are interdependent.

     Sections 3.0 and 4.0 describe the unpacking and installation
     steps. Section 4.0 also provides step-by-step configuration
     and checkout procedures designed both to test the installa-
     tion and to familiarize the network manager with the equip-
     ment. Section 5.0 describes the software configuration
     parameters.

⊠   Troubleshooting: Section 6.0 is a troubleshooting guide cov-
     ering the most common installation and configuration prob-
     lems.

⊠   Operation Tutorial: Section 7.0 is a tutorial covering the
     processes of establishing, suspending, resuming, and ter-
     minating a connection across the network.

The network manager should read Section 2.0 before starting the
actual installation and configuration procedures, in order to
have all equipment ready when needed for installation. The net-
work manager should then follow the recommendations in Sections
3.0 through 5.0 for setting up, testing, and configuring the Com-
munications Server.

Once the server is installed, the network manager should attempt
to make a connection across the network, using the tutorial in
Section 7.0. The tutorial can also be used for training of net-
work users who will use the Communications Server only for making
a connection from a terminal to a host.

2.0 PREINSTALLATION AND SITE PLANNING

This section recommends network hardware that is compatible with
Bridge equipment and provides specifications for the cables con-
necting a Communications Server to the devices it supports.

2.1 Network Installation

Installation of the Ethernet cable must be performed by a quali-
fied contractor familiar with both standard procedures and local
regulations. The subsections below offer specific guidelines for
the equipment to be used with Bridge local area network products
and provide pointers to the instructions for Ethernet cable, tap,
and transceiver installation.

2.1.1 Selection of Equipment

Bridge Communications, Inc., recommends the use of TCL* Ethernet
1.0 or Bridge tap blocks and transceivers. This equipment can be
ordered from TCL, Inc., or from Bridge. Check with Bridge before
ordering any other brand of blocks and transceivers.

Transceivers designed to meet Ethernet Version 2.0 or IEEE 802.3
specifications are not currently compatible with Bridge equip-
ment. DELNI** transceiver eliminators are not compatible with
Bridge Series/1 equipment.   DELNIs can be used with Series/100
equipment ordered after November, 1984. All transceiver elimina-
tors introduce transmission delays.

The cables used to connect the Communications Server with the
transceiver must meet the Ethernet Version 1.0 Specification (see
reference [4]). You can order cables of various lengths manufac-
tured to this specification from Bridge Communications, Inc.

Bridge also provides both PVC Ethernet cable and Teflon Ethernet
cable. The Teflon cable is recommended (and, in some areas,
required) for installations in which the cable is not enclosed in
conduit. Before choosing a cable type, investigate local regula-
tions and the requirements of the installation.

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*   TCL is a trademark of TCL, Inc.

**   DELNI is a trademark of Digital Equipment Corporation.

2.1.2 Installation of Equipment

When installing the Ethernet cable, follow the precautions listed in Section 3.0 of either the <u>Series/1 Planning and Installation Guide</u> or the <u>Series/100 Planning and Installation Guide.</u>

Ensure that continuity checks have been made on the cable during and after installation.

After installing the Ethernet cable, install one tap and transceiver for each Communications Server, Gateway Server, or Network Control Server in the system. When installing taps and transceivers, follow the procedures listed in Section 3.0 of either the <u>Series/1 Planning and Installation Guide</u> or the <u>Series/100 Planning and Installation Guide.</u>

Improper tap and transceiver installation is one of the most common network installation problems. Make sure that the taps are clean and that the transceivers are properly tightened and well secured.

On large networks, Bridge recommends a formal cable testing procedure, such as Time Domain Reflectometry (TDR) analysis. For more information on cable tests, call the Bridge service representative.

2.2 Device Cable Considerations

Figure 2-1 illustrates the standard asynchronous DTE device cable specification. This cable is used to connect both terminals and hosts to ports on the CS/100-A and to ports on an SIO-A module on the CS/1. This cable is also used to connect a terminal to the CS/1 console port. For cable specifications for use with other devices and other models of server, see Section 4.0 in the Series/1 Planning and Installation Guide or Section 3.0 in the Series/100 Planning and Installation Guide.

```
DB-25 MALE                                    DB-25 MALE*
CONNECTOR                                     CONNECTOR
(SERVER)                                      (DTE DEVICE)

 AA   1  ─────────────────────────────────  1   AA

 BA   2  ◄────────────────────────────────  2   BA

 BB   3  ────────────────────────────────►  3   BB

 CA   4  ◄────────────────────────────────  4   CA

 CB   5  ────────────────────────────────►  5   CB

                                            6   CC

 AB   7  ──────────────────────────┐        7   AB

 CF   8  ──────────────────────────┼──────► 8   CF

 CD  20  ◄────────────────────────────────  20  CD
```
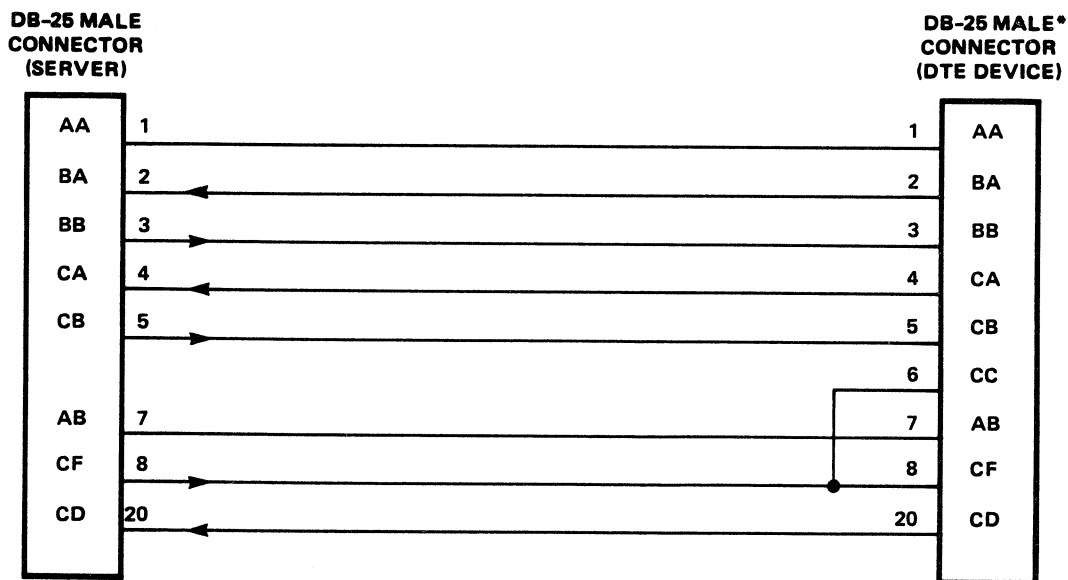
*DEVIATION FROM EIA STANDARD. CONNECTOR TYPE MAY VARY;
CHECK REQUIREMENTS OF DEVICE.

Figure 2-1 Asynchronous DTE Device Cable Specification
(for use with terminals and hosts)

To prevent spurious signals and interference among the cables
connecting the Communications Server with the devices it sup-
ports, always follow these cabling guidelines:

1.   Never use ribbon cable to attach a device to a Communica-
     tions Server.

2.   Never connect a device or server input to a line that is not
     driven by an active device on the other side. In particu-
     lar, do not connect the RTS, CTS, DTR, and DCD pins to a
     physical wire if those signals are not used.

3.   To guarantee proper operation and compliance with FCC regu-
     lations, ensure that each device cable is shielded and that
     the shield is connected either to pin 1 or to the connector
     boot.

4.   Limit RS-232-C cable lengths to 200 feet.

5.   For the CS/100, verify that the cable attached to port 0
     does not have a wire connected to pin 11. The presence of a
     wire on this pin can cause the CS/100 to halt normal opera-
     tions and branch into the PROM-resident monitor. The moni-
     tor is described in the Series/100 Planning and Installation
     Guide.

3.0 UNPACKING

This section provides guidelines for unpacking the Communications Server.

3.1 Release Memos

The two Planning and Installation Guides contain unpacking and installation procedures for each model of server. The printed guides, however, cannot always contain the most recent updates to procedures or parts lists.

Each system is shipped with a release memo, which describes the model in the shipment and provides any information that was not available when the manual was printed. Always read release memos and follow any recommended procedures. If the release memo and the manual contain conflicting information, rely on the release memo.

3.2 Unpacking Checklist

When unpacking a new Communications Server, follow these procedures:

1. Inspect the carton for damage sustained during shipment.

2. Open the top of the carton carefully, so that it can be reused if necessary.

3. Remove the upper layer of protective padding, and then remove the unit from the carton.

4. Remove the polyethylene bag from around the unit.

5. Inspect the unit for shipping damage. If any shipping damage is detected, contact the transport representative to file a report. If the unit must be returned to the factory, ship it in its original carton or a carton that provides equivalent protection.

6. Locate the packing slip, in an envelope taped to the outside of the carton. Verify that the carton contains all items listed on the packing slip.

    Report any discrepancy to Bridge Communications, Inc., or an authorized service representative.

7. Verify that the serial number on the unit matches the serial number listed on the packing slip.

8. Verify that the power specifications listed on the serial number label are appropriate for the available power source.

9.   Locate the two Ethernet address labels. Attach one of the
     labels to the outside of the server, unless security con-
     siderations override the convenience of having the address
     readily accessible.

10. If the unit is a CS/1, follow these additional unpacking
     procedures:

     a.   Remove the unit's top cover.   To remove the cover,
          disengage each ball stud separately by lifting each
          side of the back overhang with a brisk, upward motion.

     b.   Remove the strapping tape and the protective padding
          that covers the cardcage. Do not remove the foam pad
          glued to the inside of the top cover.

     c.   To ensure that all of the boards are securely seated,
          remove and reseat each board in the cardcage. To
          remove a board, pull up firmly on the extractor levers.
          Reseat each board with a firm, downward push.

     d.   Replace the top cover, locking each ball stud in place
          with a firm, downward push. Be careful to orient the
          cover so that the ventilation holes are on the same
          side of the server as the cooling fan.

After the unit is unpacked, it is ready to be installed in the
network.   Follow the installation procedures in Section 4.0 of
this guide.

4.0   INSTALLATION AND CHECKOUT

This section provides installation procedures for both the CS/1
and the CS/100 and checkout procedures for both an individual
server and the network as a whole.

A Communications Server is ready to be installed as soon as it is
unpacked.   In a few specialized applications, some adjustment of
the configuration jumpers may be necessary, but the default set-
tings are appropriate in almost all installations. For descrip-
tions of the configuration jumpers, refer to Section 5.0 of the
Series/1 Planning and Installation Guide or Section 4.0 of the
Series/100 Planning and Installation Guide.

The material in this section is presented in a tutorial format.
For best results, perform the procedures in the order in which
they appear.

The network user tutorial in Section 7.0 includes some additional
information on the Communications Server interface.

4.1 CS/1 Installation Procedure

This section describes tabletop installation of a Series/1 Com-
munications Server. For optional rack mount installation pro-
cedures, see Section 5.0 of the Series/1 Planning and Instal-
lation Guide.

For CS/100 installation procedures, see Section 4.2.

To install a Series/1 Communications Server, follow these steps:

1.   Set the server on a firm, level surface with at least 6
      inches (15 cm) clearance for cables at the back of the unit
      and 3 inches (8 cm) clearance for air flow at the front and
      sides. Make sure you can reach the back of the unit to
      install cables.

2.   Attach the power cable to the power receptacle in the lower
      right-hand corner of the server's back panel. Plug the
      cable into a grounded outlet.

3.   Use Table 4-1 to identify a port on the CS/1 with default
      parity and databits settings that meet the needs of the
      first terminal you plan to attach. Choose a port with the
      setting of "Terminal" listed in the DeVice column of Table
      4-1. The terminal must operate at 9600 baud.

      Figure 4-1 illustrates the locations of all ports on a
      CS/1-A with four SIO-A boards. The port numbers do not
      appear on the CS/1 back panel.

4.   Install a cable with 25-pin, D-Series connectors (RS-232-C)
      between the terminal and the port. The cable must meet the
      specifications in Figure 2-1 in Section 2.2.

When the power and terminal cables are installed, verify that the
server is working by following the checkout procedure in Section
4.3.

Table 4-1   Default CS/1-A Port Settings

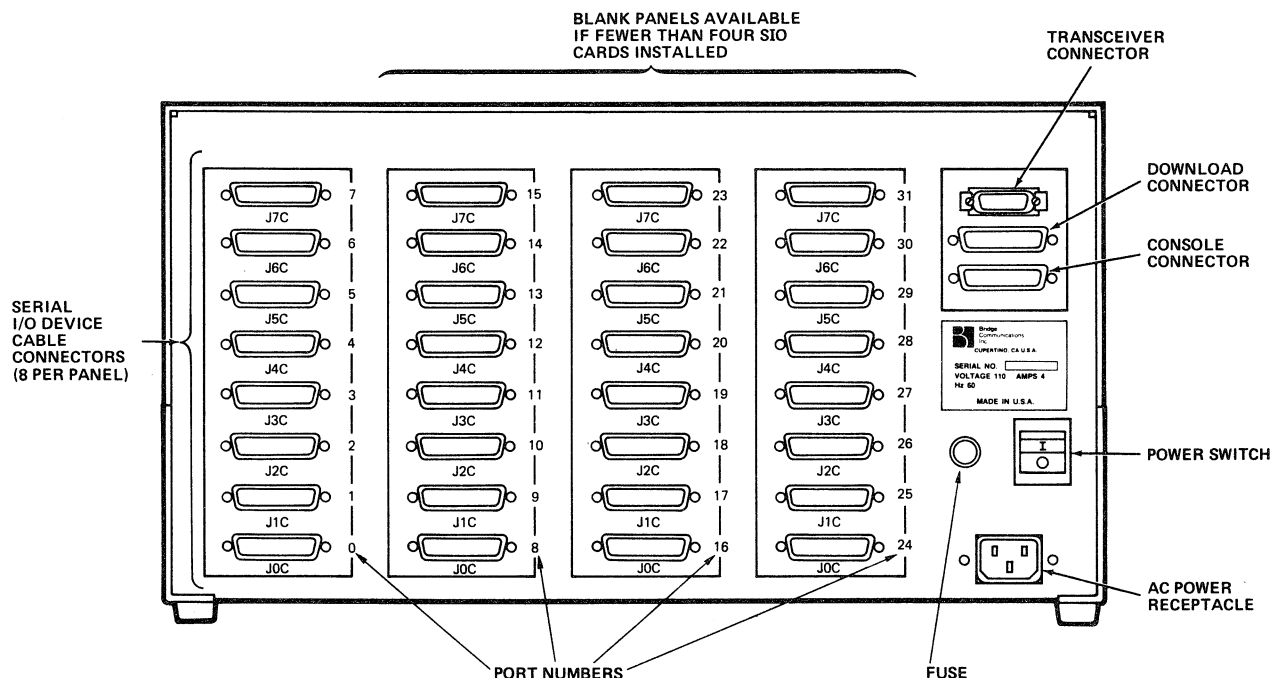| Ports	DeVice	DataBits	PARIty	BAud
7, 15, 23, 31	Terminal	7	1	9600
6, 14, 22, 30	Terminal	7	Even	9600
5, 13, 21, 29	Terminal	7	Odd	9600
4, 12, 20, 28	Terminal	8	None	9600
24 - 27 16 - 19 8 - 11 0 - 3	Host	8	None	9600

Figure 4-1   CS/1-A Device Port Locations

4.2 CS/100 Installation Procedure

This section describes tabletop installation of a Series/100 Communications Server. For optional wall brace and rack mount installation procedures, see Section 5.0 of the Series/100 Planning and Installation Guide.

For the CS/1 installation procedure, see Section 4.1.

To install a Series/100 Communications Server, follow these steps:

1. Set the server on a firm, level surface with at least 6 inches (15 cm) clearance for cables at the back of the unit and 3 inches (8 cm) clearance for air flow at the front and sides. Make sure you can reach the back of the unit to install cables.

2. Attach the power cable to the power receptacle in the lower left-hand corner of the server's back panel. Plug the cable into a grounded outlet.

3. Use Table 4-2 to identify a port on the CS/100 with default parity and databits settings that meet the needs of the first terminal you plan to attach. Choose a port with the setting of "Terminal" listed in the DeVice column of Table 4-2. The terminal must operate at 9600 baud.

    Figure 4-2 illustrates the locations of all ports on a 14-port CS/100-A. Each port is labeled with the port number surrounded by the letters "J" and "C". For example, port number 1 is labeled "J1C". If possible, do not use port 0 at this point in the installation procedure.

4. Install a cable with 25-pin, D-Series connectors (RS-232-C) between the terminal and the port. The cable must meet the specifications in Figure 2-1 in Section 2.2.

When the power and terminal cables are installed, verify that the server is working by following the checkout procedure in Section 4.3.

Table 4-2   Default CS/100-A Terminal Port Settings

Ports	DeVice	DataBits	PARIty	BAud
0	Terminal	8	None	9600
1	Terminal	7	Odd	9600
2	Terminal	7	Even	9600
3	Terminal	7	1	9600
4 - 7	Terminal	8	None	9600
8 - 13	Host	8	None	9600
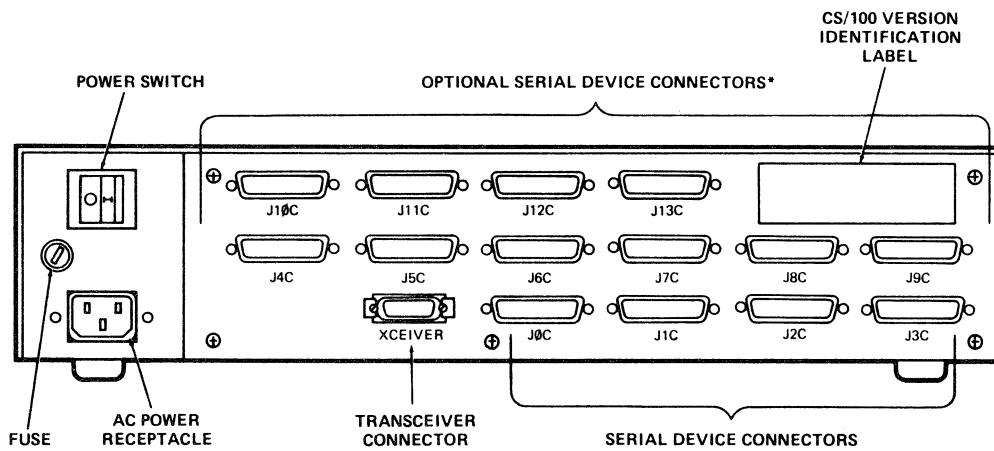
Figure 4-2   CS/100-A Device Port Locations

4.3 Server Startup and Checkout Procedures

Because so many individual devices and connections are involved, a newly installed Communications Server is tested in stages. The first step is to verify that the server is communicating with a single, attached terminal. The second step is to add another terminal and verify that you can make a connection from one terminal to the other through the server. The final test is to attach a host to the server and verify that you can make a connection between a terminal and a host through the server.

Once communication within an individual server is established, testing is expanded to include other devices on the network.

This section provides checkout procedures for an individual server, presented in a tutorial format. This format is intended to familiarize you with the equipment and its capabilities during the system checkout procedure. In the tutorial, material shown in **bold letters** indicates characters typed on a terminal keyboard. Material shown in normal type face indicates characters displayed on the screen by the Communications Server.

Section 4.4 provides checkout procedures for multiple servers on the same network.

4.3.1 Starting Up the Server

To start up a Communications Server with an internal disk drive, follow these steps:

1.   Power on the server by pressing the "I" side of the power switch located on the back panel. If the LEDs on the front panel fail to light, power off the server. Verify that the power cord is properly connected to a working outlet; then power on the server again.

2.   While the Self Test LED is still lit, place the Connection Service diskette in the floppy disk drive and close the drive door.

      On the CS/1, insert the diskette labeled "SW/1-A/BSC" with the label facing toward you and to the right. On the CS/100, insert the diskette labeled "SW/100-A/BSC" with the label facing toward you and up.

      If the Self Test LED turns off or begins blinking before the diskette is in place, insert the diskette and then press the reset switch on the server's front panel.

When power to the Communications Server is switched on, all LEDs on the server's front panel light briefly. Then most of them turn off. The Power LED remains lit as long as the server is powered on, and the Self Test LED remains lit for about 20 seconds while the system runs its self-test diagnostics.

When the Self Test LED turns off, the Boot State and disk activity LEDs light as the server enters bootstrap phase. When the Boot State LED turns off, the Communications Server is ready to communicate with the attached terminal. Proceed to the checkout procedure in Section 4.3.2.

If the server does not follow the sequence described here, refer to the troubleshooting guide in Section 6.0.

To start up a diskless Communications Server, you first boot the NCS/100 and then power on the individual server. See the Network Control Server/100 Installation and Operation Guide (reference [5]) for more details.

4.3.2 Testing the Terminal Connection

After starting up the server, test communication between the
server and the attached terminal by following these steps:

1.   Power on the attached terminal and press the carriage return
      key. A welcome message and prompt appear on the terminal
      screen. For example:

          Welcome to Bridge Communications' CS/1 !
          CS/1>

      If a message like this appears, the server is communicating
      successfully with the terminal. If this message does not
      appear, refer to the troubleshooting guide in Section 6.0.

2.   Test whether the server can successfully interpret commands
      issued from the terminal by entering this command:

          show address

      Follow this command and all other commands issued to the
      Communications Server with a carriage return.

      If some or all characters do not appear on the screen when
      typed, verify that the terminal is attached to a port with
      the appropriate databits and parity settings (refer to Table
      4-1 or 4-2).

      If communication is effective, the server responds to the
      command with a display something like this:

          ADDRess = %080000020004FB!4

      The twelve digits between the percent sign (%) and the exc-
      lamation point (!) are the Ethernet address of the Communi-
      cations Server. An Ethernet address can include any digits
      and any of the letters A through F. Each Bridge server has
      a unique Ethernet address. The digits following the excla-
      mation point indicate the number of the port to which the
      terminal is attached.

3.   Enter this command:

          show version

      Remember to follow the command with a carriage return.

      The system responds with the release numbers of your
      software and firmware and the time and source of the last
      bootstrap. If you ever have to call a Bridge service
      representative for assistance, use this command to determine
      the release number of your software before calling.

Figure 4-3 illustrates the dialog described in this section. Text shown in **bold letters** indicates characters typed on the terminal keyboard. Text shown in the normal type face indicates characters displayed on the screen by the Communications Server.

```
Welcome to Bridge Communications' CS/100 !
CS/100> show address
ADDRess = %0800020004FB!4
CS/100> show version
  SW/100-A/BSC-12701, booted on Wed Sep 12 16:00
                              from local floppy

  PROMS: MP  - Tl MMON rev. 01B
         SIO - T0 ASYN rev. 05E
```

Figure 4-3 Initial Screen Dialog

4.3.3 Attaching Additional Devices

Each port on the Communications Server has a set of parameters
that determine how the server interacts with the device attached
to that port. In many cases, the default parameter settings are
appropriate.

The first terminal attached, for example, was attached to a port
whose default parameters were compatible with the terminal. Once
a single terminal is communicating with the server, you can, if
necessary, use that terminal to adjust the parameters of other
ports on the server for communication with different devices.

This section steps you through the process of configuring a port
for communication with a second terminal. The second terminal
will then be used as the destination of a test connection in Sec-
tion 4.3.4.

To configure a port for a new terminal, follow these steps:

1.   Look at the screen of the terminal already attached to the
     server.

     If the last character displayed on the screen is an "at"
     sign (@), the port has lapsed into an inactive state known
     as "Listening mode". Any terminal port that remains inac-
     tive for 15 minutes lapses into Listening mode.

     If the last line of the screen display is the Communications
     Server prompt ("CS/1>" or "CS/100>"), the port is still in
     "Command mode". This means that the Communications Server
     is ready to accept commands typed on the terminal keyboard.

2.   Press the carriage return key on the terminal keyboard.   If
     the port was in Listening mode, pressing any key returns the
     port to Command mode. The terminal screen displays a new
     welcome message and prompt. If the port was already in Com-
     mand mode, pressing the carriage return key simply causes a
     new prompt to appear on the terminal screen.

     In the following text, the first terminal attached is
     referred to as the "source terminal" and the port to which
     it is attached as the "source port". Until other ports on
     the server have been configured, all interaction with the
     Communications Server takes place through commands issued at
     the source terminal.

3.   Attach a second terminal to another port on the same Commun-
     ications Server by installing a cable between the terminal
     and the port. Use a cable that meets the specifications in
     Figure 2-1 in Section 2.2.

On a CS/1, you can use any port for this test. On a CS/100, you can use any port except port 0 (labeled "J0C" on the back panel). You can minimize the amount of reconfiguration that is necessary by using one of the ports listed as a terminal port in Table 4-1 or 4-2.

In the following text, the second terminal is referred to as the "destination terminal" and the port to which it is attached as the "destination port".

4.   For security purposes, the Communications Server recognizes three different levels of system access, known as privilege levels. When a terminal is first powered on, it is always at the lowest privilege level, known as User level.

Before you can issue commands that change the parameters of the destination port, you must change the privilege level of the source port to Local Network Manager by resetting the PRIvilege parameter. Enter this command on the source terminal:

   set priv=lnm

The system prompts for a password. Since you are working on a new Communications Server, on which the passwords have not yet been altered, enter the default password:

   bridge

The password must be entered in lower case and followed by a carriage return.   For security, the password is not displayed on the screen.

If the command is successful, the system responds with the network manager prompt:

   cs/1#   (on the CS/1)

or

   cs/100#   (on the CS/100)

If you make a typing mistake in the password, or if the password has been changed from the default, the system responds with the message:

   Sorry

If the "sorry" message appears, repeat this entire step, being careful to type the password correctly.

5. Compare the port parameters of the destination port with the needs of the destination terminal. The critical parameters for a terminal port are DeVice, BAud, PARIty, and DataBits. Some of these parameters may already be set by default to the appropriate values.

    To display the DeVice setting of the destination port, enter this command on the source port:

    show (!<destination port number>) dp device

    The words in angle brackets (<>) indicate information that you must supply. Do not type the angle brackets themselves. For example, if the destination terminal is attached to port number 8, enter the command:

    show (!8) dp device

    The letters "dp" in this command stand for "defaultparameter".

    The system displays one of these responses:

        DeVice = (Terminal, Glass)

    or

        DeVice = (Host, Glass)

6. For interaction with a terminal, the DeVice parameter must be set to "Terminal, Glass". If necessary, change the device type by entering this command:

    setd (!<destination port number>) device=terminal

    For example, if the terminal is attached to port 8, enter the command:

    setd (!8) device=terminal

    The system responds with the message:

        Portid !<number> default parameters saved as
                            configuration <number>

7. Inspect the settings of the other critical parameters by entering this series of commands:

        show (!<destination port number>) dp baud
        show (!<destination port number>) dp parity
        show (!<destination port number>) dp databits

    The system responds to each command by displaying the default setting of the specified parameter.

Figure 4-4 illustrates the dialog that takes place on the source terminal during the first seven steps of this procedure.

```
@
Welcome to Bridge Communications' CS/100 !
CS/100> set priv=lnm
Password:

cs/100# show (!8) dp device
DeVice = ( Host, Glass )
cs/100# setd (!8) device=terminal
Portid !8 default parameters saved as configuration '8'
cs/100# show (!8) dp baud
BAud = 9600
cs/100# show (!8) dp parity
PARIty = None
cs/100# show (!8) dp databits
DataBits = 8
cs/100#
```

Figure 4-4   Sample Parameter Dialog

8.   The Communications Server interface accepts multiple show commands on a single line. To demonstrate this feature, repeat the three SHow commands entered in step 7, but use this format:

show (!<destination port number>) dp baud parity databits

For example, if your destination terminal is attached to port 8, enter the command:

show (!8) dp baud parity databits

The server responds by listing the values of all three parameters.

9.   If necessary, adjust the other three key parameters to the
      needs of the destination terminal by entering one or more of
      the following commands, inserting the values appropriate for
      the terminal:

> **setd (!<destination port number>) baud = <baud rate>**
> **setd (!<destination port number>) parity = <parity setting>**
> **setd (!<destination port number>) databits = <databits setting>**

      For example, to set up port 8 for communication at 2400
      baud, odd parity, and 7 databits, enter the commands:

> **setd (!8) baud = 2400**
> **setd (!8) parity = odd**
> **setd (!8) databits = 7**

      The system responds to each command with the "parameters
      saved" message.

      You can also enter these three SETDefault commands on a sin-
      gle line. For example:

> **setd (!8) baud = 2400 parity = odd databits = 7**

10.   To test whether the destination port parameter settings meet
      the needs of the terminal, power on the destination terminal
      and press the carriage return key.

      If the welcome message and prompt appear on the terminal
      screen, the server is communicating successfully with the
      terminal. If no welcome message and prompt appear, verify
      that the parameters are set appropriately for the require-
      ments of the terminal.

11.   To verify that communication is effective in both direc-
      tions, enter this command on the destination terminal:

> **show address**

      The server responds with an address display similar to the
      one generated on the screen of the first terminal. The port
      number at the end of the address, however, is the port
      number of the destination terminal.

After you have finished testing the installation, you will use
the general procedure described in this subsection to set the
default parameters for all ports on each Communications Server.
First, however, you should complete the test procedures described
in the rest of this section and read the background information
on system configuration in Section 5.0.

4.3.4 Making a Test Connection

Once you have established communication between the Communications Server and two attached terminals, you should make a test connection between the two terminals.

A connection between two terminals has little use in a working system, but it is a simple and reliable test during network installation.

To make a test connection between the source terminal attached in Section 4.3.2 and the destination terminal attached in Section 4.3.3, follow these steps:

1.   If necessary, press the carriage return key on the source terminal to place the port in Command mode (indicated by a Communications Server prompt on the screen).

2.   When a connection is established through a Communications Server, the destination port must be in Listening mode. If you just finished the procedures in Section 4.3.3, the destination port may still be in Command mode.

     If necessary, put the destination port in Listening mode by entering this command on the source terminal keyboard:

          listen (!<destination port number>)

     For example, if the destination terminal is attached to port 8, enter the command:

          listen (!8)

     In most cases, an "at" sign (@) appears on the destination terminal screen.

     Do not press any keys on the destination terminal until instructed to do so in step 4.

3.   To make the connection, enter this command on the source terminal:

          connect !<destination port number>

     For example, if the destination terminal is attached to port 8, enter the command:

          connect !8

     As soon as you press the carriage return key, the server displays this message on the source terminal:

          Connecting . . .

If the connection is successful, the server adds an affirma-
tion of the connection:

> Session 1 -- connected to <address>

If any other message appears, see the troubleshooting guide
in Section 6.0.

4.   Once the connection is established, any characters typed on
      the keyboard of the source terminal appear only on the
      screen of the destination terminal, and vice versa.

      Test the connection by typing a few characters on the source
      keyboard and then typing a few characters on the destination
      keyboard. (You will probably have to press the line feed
      key in addition to the carriage return key in order to start
      a new line.)

      While communication continues between the two terminals,
      both ports are in a state called "Data Transfer mode".

5.   From the source terminal, suspend the tranfer of data
      between the two   ports by pressing the combination of keys
      necessary to generate the character "control-caret".   On
      many keyboards, you generate this character by holding down
      the control key and the shift key while pressing the number
      key that has a caret symbol (^) as the upper case character.
      On VT100-type terminals, you generate this character by
      holding down the control key and shift key while pressing
      the key marked with a tilde (~) as the upper case character.

      The system responds by displaying a Communications Server
      prompt on the source terminal screen.   This prompt indicates
      that the port is back in Command mode.

6.   To terminate the connection, enter the DisConnect command:

      disconnect

      The Communications Server responds with the message:

> Disconnecting . . . Session 1 disconnected
>   from <address>

If the procedure described here is successful, you have demon-
strated that the Communications Server is capable of supporting
communication between two attached terminals. The next step is
to establish a connection between a terminal port and a host
port, as is described in the following subsection.

4.3.5 Connecting to a Host Port

The terminal-to-terminal connection described in the previous subsection is useful only for testing the system. A more likely connection on a working network is a connection between a terminal attached to one port on a Communications Server and a host attached to another port.

If the Communications Server being installed will support at least one host port, follow the procedure in this section. If the Communications Server being installed will support only non-host devices, skip this section and proceed to the network checkout procedures in Section 4.4.

To attach a host to a Communications Server and establish a connection to it, follow these steps:

1. First verify that the host is configured for communication with a terminal on the line that will be attached to the Communications Server.

    The best way to test this is to attach a terminal directly to the host, using the same connector on the host that will be attached to the Communications Server. Make any necessary adjustments to the host or the terminal so that the devices interact properly with a direct connection.

2. Disconnect the cable between the terminal and the host.

3. Connect both devices to ports on a single Communications Server. Use cables that meet the specifications in Figure 2-1 in Section 2.2.

    To minimize the amount of port reconfiguration that will be necessary, attach the terminal to one of the ports listed in Table 4-1 or 4-2 as a terminal port and the host to one of the ports listed as a host port.

4. From one of the terminals used in Section 4.3, configure the two ports for communication with the newly attached devices. Follow the procedures presented in Section 4.3.3 for inspecting and adjusting port parameters.

    The critical parameters for a host port are the same as for a terminal port (DeVice, BAud, PARIty, and DataBits), with the addition of three others: FlowControlFrom, FlowControlTo, and UseDTRin. The DeVice parameter on the host port should be set to "Host". The settings of the other parameters depend on the needs of the host. The default settings of the FlowControlFrom, FlowControlTo, and UseDTRin parameters are appropriate for most hosts. See Section 5.0 for more information on parameters.

5. When the ports are properly configured, enter the Connect
    command on the terminal:

    connect !<host port number>

    As soon as you enter the Connect command and press the car-
    riage return key, the server displays this message on the
    source terminal:

        Connecting . . .

    If the connection request is successful, the server adds an
    affirmation of the connection:

        Session 1 connected to <address>

6. When the connection is established, the host interacts with
    the remote terminal the same way it would interact with a
    terminal connected directly to it.

    If necessary, press the carriage return key to initiate com-
    munication with the host. If the host's response appears on
    the terminal screen, the connection has been established.

    Log into the host or perform any other tests necessary to
    confirm that the two devices are communicating.

7. When testing is complete, suspend the transfer of data
    between the host and the terminal by pressing the combina-
    tion of keys necessary to generate a "control-caret" on the
    terminal keyboard (refer to step 5 in Section 4.3.4).

8. When a Communications Server prompt appears on the terminal
    screen, enter the disconnect command:

    disconnect

    The server responds with the message:

        Disconnecting ... Session 1 disconnected
                                from <address>

The terminal-to-host connection completes the checkout of an
individual Communications Server. If there are additional
servers in the network, install and test the other servers, fol-
lowing the procedures presented in Section 4.3. Then perform the
network checkout procedures described in Section 4.4.

When you have verified that all network hardware is working
correctly, connect all other devices to the servers that will
support them and, if necessary, reconfigure the device ports.
Refer to Section 5.0 for more information on port and system con-
figuration.

4.4 Network Checkout Procedures

Although a single Communications Server can be used by itself as
a data switch, most Communications Servers are used in conjunc-
tion with other servers to make connections across a network.

Each new server added to a network must be tested with the other
devices to verify that it is properly connected. Attach the
servers to the network one at a time and test each unit before
adding another.

This section describes two test procedures. The first test veri-
fies that the server is communicating with the network. The
second test verifies that the server can support a connection
across the network.

4.4.1 Attaching a Server to the Network

To attach a server to an Ethernet, follow these steps:

1.   Remove the diskette from the drive.

2.   Power off the Communications Server.

** WARNING **

> Connecting or disconnecting the cable between the
> server and the transceiver while the server is
> powered on can damage both the transceiver and the
> server.

3.   Install a cable with 15-pin, D-Series, subminiature connec-
      tors between a transceiver on the Ethernet and the trans-
      ceiver connector on the server's back panel.

      On the CS/1, the transceiver connector is labeled "TRANS-
      CEIVER" and is in the upper right-hand corner of the back
      panel. On the CS/100, the transceiver connector is labeled
      "XCEIVER" and is on the left-hand side of the back panel.

4.   Start up the server according to the procedure in Section
      4.3.1.   If the server does not pass the self-test diagnos-
      tics, refer to the troubleshooting guide in Section 6.0.

The most common network installation problem is incorrectly
installed taps and transceivers. To simplify troubleshooting,
Bridge Communications, Inc., recommends that you identify two
working transceivers and test each Communications Server on one
of those transceivers. After you have demonstrated that a server
is functional, move it to its permanent transceiver and test it
again.

4.4.2 Using the Network Map Display

To verify that each attached server is successfully communicating with the network, follow these steps:

1.   Enter this command on one of the terminals attached to the new server:

    show netmap

    The system responds with a list of Ethernet addresses representing all Communications Servers, or "stations", on the network. The first address is the address of the server to which the terminal is attached.

    Figure 4-5 illustrates a network map display.

NETWORK MAP

%0800020000013	%080000200035A	%0800002000706
%08000200029D	%08000020004C1	%08000020000066B
%08000020001C5	%08000020000027E	%08000020004F6
%08000020000015C	%0800002000017	%0800002000261
%08000200015E	%08000020004A0	%08000020004AE

Figure 4-5 Sample Network Map Display

2.   Compare the Ethernet addresses in the list with the Ethernet addresses of the servers on the network.

    If all attached servers appear in the list, the new server is communicating successfully with the network.

    If more than one server is already attached and running, but only the address of the new server appears in the list, then the new server is not correctly attached to the network. Refer to the troubleshooting guide in Section 6.0.

Repeat this procedure for each new server attached to the network.

4.4.3 Making a Connection Across the Network

The most common function of a Communications Server is to support connections across the network between two devices connected to different servers.

The simplest way to verify that a newly installed server is capable of supporting such a connection is to make a connection from a terminal on a Communications Server that is known to be working to a terminal on the new server.

To make the test connection, follow these steps:

1. Determine the Ethernet address of the new server by entering this command on a terminal connected to that server:

    show address

2. Put the terminal on the new server in Listening mode by entering the Listen command on that terminal:

    listen

    An "at" sign (@) appears on the terminal screen.

3. Enter the Connect command on the source terminal:

    connect <address>

    Use the full address displayed in step 1. The address must start with a percent sign, followed by the new server's 12-digit Ethernet address, an exclamation point, and the port number of the destination terminal. For example, to make a connection to a terminal attached to port 7 on the server with Ethernet address 080002000013, enter the command:

    connect %080002000013!7

4. Test and terminate the connection by following steps 4 through 6 in Section 4.3.4.

4.5 Installation of Remaining Devices

If you have followed all of the procedures described in this section, each Communications Server is now installed on the Ethernet, and at least two devices are connected to each server.

Once you have demonstrated that the servers are working, you should connect all other devices to the Communications Servers that will support them. Follow the port configuration procedures described in Section 4.3.3 to adjust the parameters of each port to the needs of the device supported by that port.

To simplify ongoing network maintenance, Bridge recommends that you make a list of the devices attached to each port on each server, with notes about any special configuration requirements. Update the list whenever you change the network configuration. Refer to Section 5.0 for more detailed recommendations.

4.6 Additional Testing Procedures

The steps presented in Sections 4.3 and 4.4 are the minimum checkout procedures that should be performed in every new installation. In a large installation, Bridge Communications, Inc., recommends a more thorough set of testing procedures, using specialized testing tools.

In an installation with at least one CS/1, a software package called the Packet Generator can be used to send continuous streams of packets across up to 32 circuits at a time.

Other testing packages include the INTK-1 and INTK-100 installation tool kits; specialized kits for servers with the bisynchronous, V.35, and 422 interface options; and a diskette alignment kit. Contact Bridge Communications, Inc., or your service representative for more information.

5.0 CONFIGURATION

This section summarizes the basic software configuration pro-
cedures.

In most installations, software configuration includes three
kinds of information:

◙   Individual port parameters

◙   Rotary numbers and clearinghouse names

◙   Macro files

Only the configuration of individual port parameters is absolute-
ly necessary to the functioning of the Communications Server.
The general port configuration procedure is described in the
tutorial in Section 4.3.3. Additional information on port param-
eters is provided in Sections 5.1 and 5.2.

Rotaries, clearinghouse names, and macro files are described in
Sections 5.3 and 5.4.

Refer to the Communications Server User's Guide for descriptions
of other configurable options provided by the Communications
Servers.

5.1 Port Configuration

Each device supported by a Communications Server is attached to
the server through one of the ports on the back panel. Since
different devices have different communication requirements, the
Communications Server must have an accurate record of the
attached devices and their requirements.

To track the needs of the various devices, the server keeps a
table of parameters for each port. The port parameters are
altered through commands issued on a terminal attached to one of
the terminal ports.

To streamline the process of entering commands, the Communica-
tions Server recognizes the minimum unambiguous abbreviation of
command names, parameter names, and parameter settings. In this
guide, these key words are written in a mixture of upper and
lower case characters. Upper case characters represent letters
that must be typed when the word is entered; lower case charac-
ters represent optional letters.

Figure 5-1 illustrates a sample port parameter table. The system
displays the full default parameter table in response to the SHow
DefaultParameters command.

```
* DefaultParameters for PortId !22
    ...................Port Transmission & VTP Characteristics...................
    AccessGroup = ( 1 )          AccessWord = ( 1 )          BUffersize = 82
    DeVice = ( Terminal, Glass )
    InterAction = ( Verbose, Echo, MacroEcho, NoLFInsert )
    InitMacro = ""              MaxSessions = 2             PRIvilege = LocalNM
    .......................Port Physical Characteristics.......................
    BAud = 9600                 BSPad = None                CRPad = None
    FFPad = None                LFPad = None                TabPad = None
    DataBits = 8                DUplex = Full               LinePRotocol = ASynchronous
    PARIty = None               StopBits = 1
    UseDCDout = ( AlwaysAssert, NoToggle )                  UseDTRin = Ignore
    ................Session Transmission and VTP Characteristics.................
    BReakAction = ( InBand )  BReakChar = Disabled       DataForward = None
    ECHOData = OFF            ECHOMask = ( AlphaNum, CR, Term, COntrol, Punct )
    ECMChar = ^^             EOM = Disabled             FlowControlFrom = Xon_Xoff
    FlowControlTo = Xon_Xoff  IdleTimer = 2             LFInsertion = None
    MOde = Transparent        XOFF = ^S                 XON = ^Q
    .................Session & User Interface Editing parameters.................
    ERase = ^H                LineERase = ^U
    LocalEDiting = ( CmdEditing, NoDataEditing )           ReprintLine = ^R
    VERBatim = ^V             WordERase = ^W
```

Figure 5-1   Sample Port Parameter Table

5.1.1 Critical Port Parameters

Most configuration parameters are used for access control and user convenience and are not critical to the functioning of the port or the server.

Four of the parameters, however, must be set appropriately before a Communications Server can interact successfully with any device: DeVice, BAud, PARIty, and DataBits. Tables 4-1 and 4-2 in Section 4.0 list the initial default settings of these four parameters for all ports.

Three additional parameters are essential to successful interaction with a host: FlowControlFrom, FlowControlTo, and UseDTRin. The initial default values of these parameters, which are appropriate for most hosts, are:

    FlowControlFrom = XON_XOFF
    FlowControlTo = XON_XOFF
    UseDTRin = AsDTR

If you are having trouble establishing communication through the Communications Server to a host, try adjusting the settings of these three parameters.

Complete documentation on these and all other parameters is provided in Section 7.0 of the Communications Server User's Guide.

5.1.2 Active Parameters and Default Parameters

The default parameters for all ports are stored in the server's memory and in numbered files on the system disk. The default parameters are divided into two categories:

⊠   Port parameters, which are dependent on the needs of the attached device, and which will probably remain constant for a single port.

⊠   Session parameters, which are more likely to vary when the attached device is communicating with different remote devices or running different applications.

When a port becomes active, the system creates a working table of the port's port parameters by copying them from the default parameter file. When a connection to a remote device is established on that port, the server completes the active parameter table by copying the session parameters from the port's default parameter file.

Settings in both the active and default parameter tables can be altered. The SET command changes the setting of an active parameter, and the SETDefault command changes the setting of a default parameter.

Active parameters can be changed only while an active parameter table exists. The change remains in effect only as long the active parameter table is in use (i.e., while the port remains in Command mode or while a connection exists).

Default parameters can be changed at any time. The SETDefault command changes the default parameter table stored on the disk. The change takes effect the next time the system uses the default table to create a new active parameter table.

The tutorials in Sections 4.0 and 7.0 illustrate the situations in which the SET and SETDefault commands are used. Figure 5-2 illustrates how these commands affect the parameter tables stored on the disk and in the server's memory. The commands and the parameters are discussed in more detail in the Communications Server User's Guide.

5.2 Help Features and Shortcuts

The Communications Server interface includes a hierarchical help facility that lists all available commands, parameters, or parameter values upon request. The tutorial in Section 7.1 illustrates how to use the help screens.

The server also provides three different ways to alter parameter settings:

⊗   To change a few specific parameters, use the SET and SETDefault commands described in Sections 4.4 and 5.1.

⊗   To review an entire default parameter table in detail, enter the SETDefault command alone, without specifying any parameter names. The Communications Server displays the names and current settings of all parameters, one at a time. As it displays each parameter, the server prompts you to accept or change the current value. This command is useful when you want to change many parameters for a single port or to review the available parameters.

⊗   To copy an entire parameter table at once, use the SAve and ReaD commands together.

       The SAve command copies a specified parameter table into a specified port parameter file on the disk. For example, to copy the default parameters currently in memory for port 2 into the disk copy of the default file for port 7, enter the command:

           save (!2) dp 7

       The ReaD command copies a specified parameter table into the in-memory copy of a port's parameter table. For example, to copy the default parameters currently stored on the disk for port 2 into the in-memory default parameter table for port 7, enter the command:

           read (!7) dp 2

       These two commands are useful when you are attaching a number of identical devices to different ports on the same server.

       It is important to issue the ReaD and SAve commands together so that the disk and in-memory copies of the default parameter table for a single port match. For more information, refer to the Communications Server User's Guide.

Figure 5-2 illustrates the various copies the system keeps of the port parameter tables and the effects of the SET, SETDefault, SAve and ReaD commands.

Diskette

Default
Parameter
Tables

file 0 file 1 file 2 file 3
file 4   file 5
file 6   file 7
file 8   file 9

read (!7) dp 2

save (!2) dp7

Default
Parameter
Tables

!0 !1 !2 !3 !4
!5 !6 !7 !8 !9

setd (!9) baud = 1200

Active
Parameter
Tables

!0 !1 !2 !3 !4
!5 !6 !7 !8 !9

set (!4) baud = 1200

Communications Server's Memory
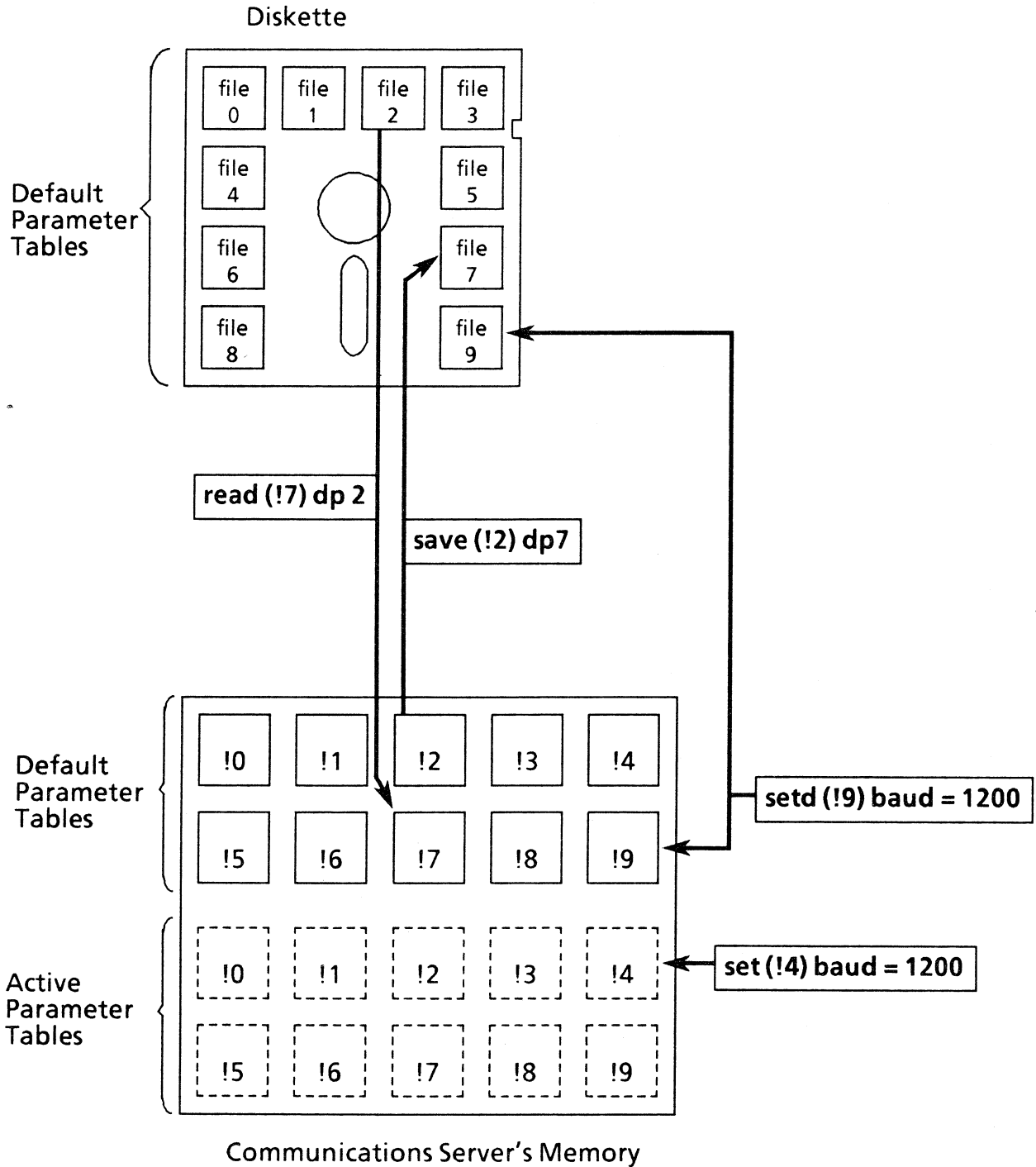
Figure 5-2   Effects of the
ReaD, SAve, SET, and SETDefault Commands

5.3 Rotaries and Clearinghouse Names

To simplify the process of making connections, you can define clearinghouse names to represent ports or groups of ports on the network. Network users can then request connections to specific resources by name, without knowing the actual Ethernet addresses and port numbers of the resources.

To group ports into logical sets, use the ROtary command; to assign a name to a port or group of ports, use the Name command. For example, to assign the clearinghouse name "host1" for ports 8 through 13 on a CS/100, enter this sequence of commands at a terminal port on the CS/100:

```
rotary !128 = !8-!13
name host1 = !128
```

After you enter these commands, the name "host1" means "any available port in the range 8 to 13". A user at a terminal port on any server in the network can make a connection to one of these ports by entering the command:

```
connect host1
```

For more complete information on rotaries and clearinghouse names, refer to Sections 2.0 and 4.0 of the Communications Server User's Guide.

5.4 Macros

You may also want to establish "macro" files for each server. A macro is a named file containing a sequence of commands necessary for accomplishing a specific function on the Communications Server. Using a pre-defined macro, a network user can accomplish a relatively complex task with a single, two-word command.

For example, the following text defines a simple macro named "connect_lqp" that makes a connection between the host's printer port and the letter quality printer:

```
define connect_lqp = (
connect (vaxlpr) lqp
)
```

A network manager can then execute the macro by entering this command:

```
do connect_lqp
```

Refer to the detailed description of the DEFine command in Section 4.0 of the Communications Server User's Guide.

5.5 Configuration Log

To facilitate network maintenance after the system is installed,
you should prepare a list of the devices supported by each port
on each server, with notations about any special device require-
ments.   Figure 5-3 illustrates a sample list for a CS/100 with
ten ports.

Model: CS/100-10
Ethernet address: 080002000456
Clearinghouse name: cs_vax

Port number	Device	Parameter settings
0	vax tty00	standard host
1	vax tty01	standard host
2	vax tty02	standard host
3	vax tty03	standard host
4	vax tty04	standard host
5	vax tty05	standard host
6	vax tty06	standard host
7	dot matrix printer	host ba=1200, pa=even db=7, fcf=cts
8	vax lpr port	standard host
9	ltr quality printer	host ba=1200, pa=even db=7

Clearinghouse names and rotaries:

        vax = !0-!6 = !128
        dmp = !7
        vaxlpr = !8
        lqp = !9

Associated macros:

        connect_lqp
        connect_dmp
        disconnect_lqp
        disconnect_dmp

        Figure 5-3   Sample Port Configuration Record

6.0 TROUBLESHOOTING

This troubleshooting guide lists the most common problems in a new Communications Server installation. To use this guide, find the symptom that most resembles your situation and follow the suggested verification and troubleshooting procedures for that symptom. Table 6-1 summarizes the more detailed troubleshooting procedures contained in the remainder of this section.

The list is organized in approximately the same order that the symptoms are likely to arise. The bootstrap problems appear first, for example, and data transmission problems appear later in the list.

Before using this checklist, look at the server's front panel to see which LEDs, if any, are lit.

Table 6-1 Troubleshooting Checklist Summary

Sec.	Symptom	Likely Causes	Possible Solutions
6.1	Self Test LED blinking	Diskette missing from drive; drive door open; diskette unreadable	Check diskette and drive door
6.2	Self Test LED remains lit	Unseated boards; badly installed tap or transceiver	Reseat boards; tighten or replace hardware
6.3	No welcome message and prompt or wrong prompt	Inappropriate port parameters; loose hardware connection; system has branched into monitor	Adjust parameters; adjust cable; reboot software
6.4	Data Received LED remains lit	Continuous interrupts from attached device(s)	Adjust cable(s)
6.5	Connection request fails	Incorrect address; typing mistake; destination device in wrong state	Reenter command; put destination device in Listening mode
6.6	Station missing from netmap	Badly installed tap or transceiver	Tighten or replace hardware

---

6.1 Self Test LED Blinking

The Self Test LED on the server's front panel blinks during sys-
tem startup when the server is attempting unsuccessfully to boot
from a diskette in the internal disk drive. This usually means
that the diskette is not present in the drive, the drive door is
not closed, or the bootstrap file on the diskette is unreadable.

⊠   If the server has an internal disk drive, verify that the
       diskette is correctly seated in the drive and that the drive
       door is closed. Remove and inspect the diskette.

       On a CS/1, you should be using a copy of the diskette
       labeled SW/1-A/BSC, and the diskette should be inserted with
       the label facing toward the front of the server and to the
       right.   On a CS/100, you should be using a copy of the
       diskette labeled SW/100-A/BSC, and the diskette should be
       inserted with the label facing toward the front of the
       server and up.

       Reinsert the diskette, close the drive door, and press the
       reset switch to repeat the bootstrap procedure.

       If the Self Test LED begins blinking again, the diskette is
       probably unreadable.   Make another copy of the master
       diskette and try booting it. If you are using the master
       diskette, call Bridge Communications, Inc., or the service
       representative for a replacement diskette.

⊠   If you are trying to boot the server from an NCS/100, turn
       off the server, open the lid, and verify that the bootstrap
       option jumpers are set for automatic or network bootstrap.
       See the Planning and Installation Guide for the model of
       server you are using.

       If the bootstrap option jumpers are set correctly, verify
       that the NCS/100 is working. For more information, refer to
       the NCS/100 Installation and Operation Guide.

6.2 Self Test LED Remains Lit

The Self Test LED remains lit during system startup if the server
has failed the automatic self-test diagnostics.

▣   Remove the diskette from the drive and power off the server.
     Disconnect the server from the transceiver.

                    ** WARNING **

        Attaching or detaching the cable between the
        server and the transceiver while the server is
        powered on can damage both the transceiver and the
        server.

     Power on the server, reinsert the diskette, and close the
     drive door.

     If the server passes the startup diagnostics without the
     transceiver connected, then either the transceiver or the
     tap is not working.

     First, try cleaning and tightening the transceiver. If that
     doesn't solve the problem, attach the server to a different
     transceiver or remove and reinstall the transceiver, accord-
     ing to the instructions in the Planning and Installation
     Guides.

▣   If the server does not pass the diagnostics even after it is
     removed from the transceiver, and if the server is a CS/1,
     turn off the server, open the cover, and inspect the seating
     of the boards.   Remove each board by pulling up on the
     extraction levers and reseat each board with a firm, down-
     ward push.

     Power on the server, reinsert the diskette, and close the
     drive door.

     If the server passes the startup diagnostics this time,
     power off the server again and reattach it to its trans-
     ceiver.

▣   If the server still does not pass the diagnostics and if the
     server is a CS/1, open the cover and inspect the self-test
     LEDs on the individual boards.

                    ** WARNING **

        The server is still powered on. Do not touch any
        components or drop anything inside the unit.

     Note any LEDs that are lit on the individual boards inside
     the server. Call the service representative and report the
     problem.

6.3 No Welcome Message and Prompt or Inappropriate Prompt

If the server seems to boot correctly but does not communicate
with an attached terminal, the problem could be with the software
running on the server, the hardware connection between the termi-
nal and the server, or the configuration of the port to which the
terminal is attached.

⊠   Remove and inspect the boot diskette. On the CS/1, you
     should be using a copy of the diskette labeled "SW/1-A/BSC".
     On the CS/100, you should be using a copy of the diskette
     labeled "SW/100-A/BSC".

     The CS/100 is shipped with a utilities diskette labeled
     "SW/100-UTIL". The software on the utilities diskette does
     not support communication with devices attached to any port
     except port 0.

⊠   If the server is running the correct software, press a car-
     riage return on the terminal keyboard while watching the
     Data Received LED on the Communications Server's front
     panel. If the LED does not flicker when a key is pressed,
     then the server is not receiving the signal from the termi-
     nal. Check the cable connection between the server and the
     terminal.

⊠   If the Data Received LED on the server's front panel flick-
     ers when a key is pressed on the terminal, then the physical
     connection is probably all right. Check the baud rate, par-
     ity, and databits requirements of the terminal, and verify
     that the port parameters are set appropriately. Refer to
     Table 4-1 or 4-2 for default port parameter settings.

     The server does not send a prompt to or accept commands from
     a port with a DeVice setting of Host.

⊠   If the server is a CS/1, verify that the terminal cable is
     attached to one of the device ports on the server's back
     panel, not to the console port.

     The CS/1 has two RS-232-C connectors reserved for use as
     console and download ports. If you attach a terminal to the
     console connector (labeled "CONSOLE"), the system branches
     into the MCPU monitor. In this case, an angle-bracket
     prompt appears on the console terminal, and the Communica-
     tions Server does not respond to communication requests from
     devices attached to the device ports.

     If you have inadvertently caused the system to branch into
     the monitor by attaching a console terminal, remove the
     cable from the connector and press the reset switch to
     reboot the server.

    ◻   If the server is a CS/100, verify that all terminal cables meet the specifications in Figure 2-1 in Section 2.2. You can accidentally cause the CS/100 to branch into the MP monitor if you attach a device to port 0 using a cable that has wires connected to both pin 7 and pin 11. In this case, the system waits for two to four carriage returns to be pressed on the terminal attached to port 0, and then displays an angle-bracket prompt on the terminal screen. The server does not respond to communication requests from devices attached to the other ports.

        If you have inadvertently caused the system to branch into the monitor by attaching a console terminal, remove the cable from the connector and press the reset switch to reboot the server.

6.4 Data Received LED Remains Lit

The Data Received LED should flicker each time data is received
from one of the attached devices. If the Data Received LED
flickers when no data is transmitted, then the server is probably
receiving spurious interrupts because of faulty cable connec-
tions.

⊠   Check the cable connections of all attached devices, at both
     the device end and the server end. If one of the cables is
     loose, reattach it securely.

⊠   Verify that the cables contain no wires that are not driven
     by the supported devices. All cables connecting supported
     devices to the server should meet the specifications in Fig-
     ure 2-1 in Section 2.2.

     Specifically, if the server is connected to a host that does
     not support CTS and DTR, verify that the cable connecting
     the server with the host does not have these wires. Wires
     in the cable that are not driven by the device at the other
     end can generate spurious signals.

6.5 Connection Request Unsuccessful

If a connection request is successful, the Communications Server
displays this message:

    Session 1 -- connected to <address>

This section lists the most common error messages that may appear
instead and explains the likely causes.

⊠   "Invalid Connect syntax"

     This message usually indicates a typing mistake in the Con-
     nect command.   Compare the command you entered with these
     examples:

         connect !5
         connect %0800020004be!5
         connect vax

     The first example illustrates a request for a connection to
     a device attached to port 5 on the same Communications
     Server as the source device.

     The second example illustrates a request for a connection to
     a device attached to port 5 on a different Communications
     Server.

     The third example illustrates a request for a connection to
     a port which has been assigned the clearinghouse name "vax".
     In this case, the port can be on either the same or a dif-
     ferent Communications Server.

⊠   "Clearinghouse name not found"

     This message appears if you have entered a clearinghouse
     name that has not been defined. Verify that you are using a
     valid clearinghouse name.

⊠   "Remote is busy"

     This message appears if the destination device is attached
     and powered on but not available as the destination of a
     connection.

     If you are trying to make a connection from a terminal to a
     host, this message probably means that the host port is
     already the destination of another connection.   In this
     case, you cannot make a second connection until the first
     connection is terminated.

     If you are trying to make a test connection from one termi-
     nal to another, this message probably means that the desti-
     nation port is not in Listening mode.   To   put   the

destination port in Listening mode, enter this command on
the destination port:

        listen

An "at" sign (@) appears on the destination terminal screen.
Do not press any other keys on the terminal keyboard until
after the connection is established.

⊗   "Remote is disabled or nonexistent"

This message appears if no device is attached to the desti-
nation port or if the device attached to the destination
port is powered off. If this message appears, first check
the status of the device attached to the destination port.

If the device is present and powered on, verify that the
cable connecting the server and the device meets the specif-
ications in Figure 2-1 in Section 2.2. If the cable does
not provide the necessary signals, the server cannot detect
the attached device.

6.6 Station Missing from Network Map

Ordinarily, the SHow NETMap command displays a list of all servers on a network. If one server is not correctly attached to the network, that server does not appear in the network map generated on the other servers. Conversely, when a server that is not correctly attached generates a network map, the map shows only the address of the server itself.

If one server is missing from the netmap of the other servers, follow this procedure to verify the source of the problem.

1.   Remove the diskette from the drive and power off the server that is missing from the netmap. Disconnect the server from the transceiver.

** WARNING **

      Attaching or detaching the cable between the server and the transceiver while the server is powered on can damage both the transceiver and the server.

2.   Power off a different server that is communicating successfully with the network and disconnect it from its transceiver.

3.   Connect the first server to the transceiver that is known to be working.

4.   Start up the server. Issue the SHow NETMap command on a terminal attached to that server.

      If the new netmap display includes the other servers in the network, the problem is with the original tap or transceiver. First try cleaning and tightening the original transceiver. If that doesn't solve the problem, attach the server to a different transceiver, or remove and reinstall the tap, using the procedures in Section 3.0 of either the Series/1 Planning and Installation Guide or the Series/100 Planning and Installation Guide.

      If the new netmap display is limited to the Ethernet address of the individual server, the problem is with the server itself. Call Bridge Communications, Inc., or the service representative.

7.0 OPERATION TUTORIAL

This section provides a tutorial on establishing a connection across the network and then suspending, inspecting, resuming, and terminating the connection. Most network users need only these five functions of the Communications Server.

Interaction with the network takes place through commands entered on a terminal attached to a device port on a Communications Server. Instructions for attaching a terminal and adjusting the port for interaction with the terminal appear in Section 4.0.

This tutorial assumes that you are using a terminal that is already capable of communicating with the Communications Server and that a working host port is available somewhere on the network.

7.1 Initiating Communication with the Server

To start communicating with a Bridge Communications Server, follow these steps:

1.   If necessary, turn on the terminal.

2.   Press the carriage return key on the terminal keyboard.

      If the terminal is communicating correctly with the Communications Server, the system displays a prompt:

          CS/1>   (on the CS/1)

      or

          CS/100>   (on the CS/100)

      The prompt may or may not be accompanied by a welcome message.

      The Communications Server prompt indicates that the server is ready to accept commands entered on the terminal keyboard.

3.   To request a display of all available commands, enter a question mark, followed by a carriage return:

          ?

      The system responds with a help screen showing all of the available commands and their syntaxes. Figure 7-1 illustrates the display.

```
Connect        <address> [ ECM ] [ Q ]
DEQueue        [<session number>]
DisConnect     [<session number>]
DO             <macro-name>
Echo           <string>
Listen
Pause          [<seconds>]
REMoteSET      <param-name> = <value> ...
REMoteSHow     [<param-name>] ...
RESume         [<session number>]
SET            <param-name> = <value> ...
SHow           <argument> ...
SWitch         [<session number>]
Transmit       <string> | InBandBreak | OutBandBreak
```

Figure 7-1 User Command Help Screen

To streamline interaction, the Communications Server accepts
abbreviations of command and parameter names. The help
screens always show the minimum acceptable abbreviation for
each word in upper case letters. Lower case letters are
optional. To enter the SHow command, for example, you need
to type only the letters "sh". If you prefer, you can type
the entire word "show", or just the first three letters
"sho".

For the most part, this tutorial uses full command names.
When you are more familiar with the Communications Server,
you will probably use abbreviated forms of most commands.

4.   You can request help by entering a question mark any time,
     even in the midst of a command. To demonstrate this
     feature, enter this command:

         set ?

     Remember to follow the command with a carriage return.

     The system responds with a list of all parameter names that
     could follow the SET command.

     Don't worry about what all of these parameters do. If you
     want more information, refer to Section 7.0 of the
     Communications Server User's Guide.

5.   The help facility always tailors its response to the text
      that was entered before the question mark. To demonstrate
      this feature, enter the command:

          set baud = ?

      The system responds with a list of all possible baud set-
      tings.

7.2   Establishing a Connection

To request a connection to another device from a terminal port on
a Communications Server, follow these steps:

1.   Ascertain either the clearinghouse name or the Ethernet
      address and port number of the destination device. Contact
      the network manager for a list of addresses and names, or
      enter this command to display a list of clearinghouse names:

          show chn

      The server responds by displaying a list of clearinghouse
      names defined for the local server. If the host computer is
      connected to a different Communications Server from the ter-
      minal, its clearinghouse name probably does not appear on
      this list.

2.   Enter one of these two forms of the Connect command:

          connect <clearinghouse name>

      or

          connect %<Ethernet address>!<port number>

      For example, if you are trying to access a host with the
      clearinghouse name "vax", enter the command:

          connect vax

      If you are trying to access a host connected to port number
      5 on a Communications Server with Ethernet address
      080002000345, enter the command:

          connect %080002000345!5

      As soon as you enter the connect command and press the car-
      riage return key, the server displays this message on the
      terminal screen:

          Connecting . . .

Depending on the setup of your local network, the Communications Server may prompt for a password before completing the connection. If necessary, contact the network manager for a password.

If the connection request is successful, the server adds an affirmation:

        Session 1 connected to <address>

Once the connection is established, the Communications Server transfers data between the devices at either end of the circuit as if the two devices were directly connected by a cable. If the destination device is a host, for example, the host sends the terminal a login prompt or other message appropriate for a newly active terminal. In the other direction, keystrokes entered on the terminal are sent to the host for processing.

7.3   Suspending, Inspecting, and Resuming a Connection

The terminal that initiated a connection can suspend the transfer of data over the connection in order to issue commands to the Communications Server.

To suspend communication, inspect a connection, and resume communication with the device at the other end of a connection, follow these steps:

1.   Press the combination of keys necessary to generate the character "control-caret" on the terminal keyboard. On most keyboards, you generate this character by holding down the <SHIFT> and <CONTROL> keys while pressing the number key with a caret (^) as the upper case character. On VT100-type terminals, you generate this character by holding down the <SHIFT> and <CONTROL> keys while pressing the key with a tilde (~) as the upper case character.

      The terminal screen displays a Communications Server prompt.

      The character "control-caret" is known as the "ECMChar", or "Enter-Command-Mode Character". After the ECMChar is entered, the Communications Server intercepts characters typed on the keyboard. Instead of sending the data to the device at the other end of the connection, the server interprets them as Connection Service commands.

2.   Verify that the connection still exists by entering the command:

   show sessions

The system responds with a display something like this:

Port/session#	state	Td cnt	Rd cnt
!4	CONCTD	584	25459

This display shows the local port number, its activity status, the number of characters transmitted over the connection, and the number of characters received over the connection.

If no connections exist on the local port, the system responds to the command with the message:

   No active session on portid <number>

3.   Resume communication with the device at the other end of the connection by entering this command:

   resume

The Communications Server resumes transmission of data over the connection. All characters entered on the terminal keyboard are sent to the device at the other end of the connection.

7.4   Terminating a Connection

To terminate an established connection, follow these steps:

1.   If you are logged into a host at the other end of the connection, perform any necessary logout procedures.

2.   Enter the ECMChar (refer to step 1 in Section 7.3).

   The screen displays a Communications Server prompt.

3.   Terminate the connection by entering the DisConnect command:

   disconnect

The system responds with the message:

   Disconnecting...session 1 -- disconnected
                                    from <address>

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