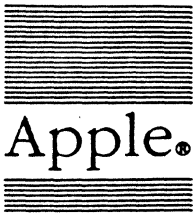

Apple® AppleTalk® for VMS

Bridge Control Program Guide

Apple Computer, Inc.

20525 Mariani Avenue
Cupertino, California 95014
(408) 996-1010

Contents

Preface

About This Manual

This manual provides a functional description of the AppleTalk® for VMS Bridge Control Program, including command definitions and operating instructions. The Bridge Control Program is provided as a network management support utility, for use with release version 1.5 or later of AppleTalk for VMS.

❖ *Note:* No separate installation is required for the Bridge Control Program; it is installed automatically during the installation of AppleTalk for VMS.

Intended audience

This manual is intended for programmers who wish to make use of AppleTalk for VMS services in software development, as well as system managers who may be responsible for operating the AppleTalk for VMS programs. The guide assumes that the reader is fluent in VAX/VMS and data communication principles. This is ***not*** a tutorial.

Structure of this document

This manual is organized into two chapters, as follows:

- Chapter 1 provides an overview of the AppleTalk Bridge Control Program, and a description of the program startup and operating modes.
- Chapter 2 provides a functional description of Bridge Control Program commands, divided into commands that operate on bridge ports and those that operate on the Bridge Process.

Associated documents

The following manuals from Digital Equipment Corporation document the use of VAX/VMS system services.

- *Introduction to VAX/VMS System Routines*
- *VAX/VMS Run-Time Library Routines Reference Manual*
- *VAX/VMS System Services Reference Manual*

The following manuals from Apple Computer, Inc. document the AppleTalk network architecture, the interface provided to client processes of AppleTalk, the architecture of the AppleTalk for VMS system, and the services and interface it provides to client processes.

- Sidhu, Gursharan S., Richard F. Andrews, and Alan B. Oppenheimer, *Inside AppleTalk* (Apple Programmer's and Developer's Association)
- *Inside Macintosh,* Volume II, Chapter 10, "The AppleTalk Manager"
- *Inside Macintosh,* Volume IV, Chapter 23, "The AppleTalk Manager"
- *Inside Macintosh,* Volume V, Chapter 28, "The AppleTalk Manager"
- *AppleTalk for VMS Architecture and Implementation*
- *AppleTalk for VMS Protocol Support Library Reference Manual*
- *AppleTalk for VMS Installation and Operation Guide*

Chapter 1

Program Overview and Operation

Program overview

The AppleTalk Bridge Control Program is an interactive network management application that operates on the Bridge Processes of VAX/VMS virtual AppleTalk networks. The Bridge Control Program allows the display of AppleTalk for VMS internetwork routing tables and port statistics, and the manipulation of bridge port handlers.

❖ *Note:* No separate installation is required for the Bridge Control Program; it is installed automatically during the installation of AppleTalk for VMS.

The Bridge Control Program performs six principal functions:

- locates an AppleTalk for VMS Bridge Process on the internet and designates it as the object of subsequent program operations
- displays the routing table of the currently designated Bridge Process
- lists and describes all open ports on the current Bridge Process
- initializes a bridge port
- opens a bridge port
- closes a bridge port

Program operation

Two methods exist to invoke the AppleTalk Bridge Control Program: Startup Mode and Command Mode.

Startup Mode

The Bridge Control Program is accessed in Startup Mode from the Digital Command Language (DCL) prompt, by typing:

```
RUN ATK$ROOT:[APPLETALK]ATKBCP
```

where `ATK$ROOT:[APPLETALK]` is the directory in which `ATKBCP.EXE` resides. This is the default directory used during installation of AppleTalk for VMS.

The following startup sequence is then displayed:

```
VN: Controller ID (Return for A):
Enter Bridge Name (Return for "="):
Enter Zone Name for bridge (Return for this zone, "=" to lookup):
```

The **VN: controller ID** is defined at the time of loading the Virtual AppleTalk Driver(s). If multiple VN: drivers are installed, they are named A, B, C, and so on. Since only one such driver is generally installed, VN: controller A is the default controller, and is selected by simply typing a carriage return.

The **bridge name** is the DECnet node name (as defined by the logical SYS$NODE) of the VAX on which the Bridge Process resides, followed by `ATK/VMS Bridge`, as shown:

```
Nodename ATK/VMS Bridge
```

If DECnet is not installed or not currently running, then `Nodename` is left blank. The bridge name may be entered if known, or a carriage return may be entered to accept any Bridge Process that is located in the specified zone.

The **zone name** prompt allows the user to specify the zone in which the desired Bridge Process is running. Typing a carriage return begins a search for the bridge in "this zone" (the zone in which the Bridge Control Program is currently running).

Typing an equal sign, =, in response to the `Enter Zone Name` prompt causes the Bridge Control Program to look for a Bridge Process in *all* zones (this procedure is illustrated in the description of the `Find_Bridge` command; see Chapter 2).

Once the desired Bridge Process has been selected, it becomes "known" to the Bridge Control Program as the bridge on which all subsequent commands operate. A new bridge may be selected by using the `Find_Bridge` command.

When this startup sequence has been completed, the Bridge Control Program's command prompt line is displayed as below:

```
F)ind_Bridge  R)outes  P)orts  O)pen_Port  C)lose_Port  I)nit_Port
```

Command Mode

Command Mode enables individual program functions (for example, display Routes) to be invoked directly from the DCL prompt. The Bridge Control Program must first be installed as a foreign command to DCL, using the following syntax:

```
BCP :== $ATK$ROOT:[APPLETALK]ATKBCP.EXE
```

where `ATK$ROOT:[APPLETALK]` is the directory in which `ATKBCP.EXE` resides. This is the default directory used during installation of AppleTalk for VMS.

Once installed in this manner, the Bridge Control Program may be started from DCL by using the `BCP` command, as follows:

- To start the Bridge Control Program and invoke the startup sequence described in Startup Mode above, at the DCL prompt, type:

  ```
  BCP
  ```

- To directly invoke any one of the functions in the Bridge Control Program's command prompt line, at the DCL prompt, type:

  ```
  BCP command
  ```

  where **command** is one of the following (each may be shortened to its initial letter):

  ```
  Find
  Routes
  Ports
  Open
  Close
  Init
  ```

- To specify output from the Bridge Control Program as screen-oriented or line-oriented (for example, for output to a printer), at the DCL prompt, type:

  ```
  BCP [command]/qualifier
  ```

  where **command** is optional, and **/qualifier** represents one of the following:

`/HARDCOPY`	displays output in line-oriented mode
`/SCREEN`	displays output in screen-oriented mode

  The Bridge Control Program always checks to see what type of terminal is in use. If the terminal is a screen device capable of handling ANSI control sequences, the display is screen-formatted. Otherwise it is line-oriented as if for hard-copy devices.

❖ *Note:* Following each Command Mode operation, the program returns to the DCL prompt.

Chapter 2

Bridge Control Program Commands

As noted in Chapter 1, the six program commands can be accessed directly from the DCL prompt, or by making a selection from the command prompt line inside the Bridge Control Program:

```
F)ind_Bridge  R)outes  P)orts  O)pen_Port  C)lose_Port  I)nit_Port
```

Bridge Process commands

The `Find_Bridge`, `Routes`, and `Ports` commands are described below as "Bridge Process" commands. They are concerned with locating and reporting on AppleTalk for VMS Bridge Processes. The balance of Bridge Control Program commands operate on specified bridge *ports*, and are described in the section "Port Commands."

The Find_Bridge command

Bridge Control Program commands operate on the Bridge Process that has been designated as the "current" bridge. This may be any AppleTalk for VMS Bridge Process on the internet, and is designated either during program startup or by using the `Find_Bridge` command. The `Find_Bridge` command enables the user to dynamically locate and perform operations on a specific AppleTalk for VMS Bridge Process.

The `Find_Bridge` command causes the following prompt sequence to be displayed:

```
Enter Bridge Name (Return for "="):
Enter Zone Name for Bridge (Return for this zone, "=" to lookup):
```

The **bridge name** may be entered if known (see Chapter 1, "Startup Mode," for syntax), or a carriage return may be entered to select any bridge that is located in the designated zone.

The **zone name** prompt allows the user to specify the zone in which the desired Bridge Process is running. Typing a carriage return will begin a search for a bridge in "this zone" (the zone in which the Bridge Control Program is currently running). If "this zone" is selected, the program will display the following:

```
Performing lookup, please wait...
Bridge Control Listener found: Bridgename:ATK/VMS Bridge @*
```

where `Bridgename` is the AppleTalk Name Binding Protocol (NBP) name of the Bridge Process. Its type is always "`ATK/VMS Bridge`", and in this case the zone name shown is "`*`", indicating "this zone."

Typing an equal sign, `=`, in response to the `Enter Zone Name` prompt will cause the Bridge Control Program to look for a Bridge Process in *all* zones. The number of zones found will be displayed, and a series of prompts will follow, successively naming each zone and asking whether to search that zone for a bridge. As soon as a Bridge Process is encountered, its name is displayed and the search is discontinued. This bridge becomes the object of the program's subsequent operations.

Example:

```
Enter Bridge Name (Return for "=")  Return
Enter Zone Name for Bridge (Return for this zone, "=" to lookup)  =

Total number of zones = 2
Look for bridges in zone "DeptA" (Return for NO):  <cr>
Look for bridges in zone "DeptB" (Return for NO):  YES  <cr>

Performing lookup, please wait...
Bridge Control Listener found: Bridgename:ATK/VMS Bridge @DeptB
```

If no bridge is located, the program exits to the DCL prompt, as below:

```
Performing lookup, please wait...
Unable to locate Bridge Control Listener process in Zone "DeptB"
$ (DCL prompt)
```

The Routes command

The `Routes` command causes the routing table for the currently designated bridge to be displayed, as shown in the example that follows. This table lists all the networks on the internet that the Bridge Process has discovered via the Routing Table Maintenance Protocol (RTMP), as well as associated status and routing specifications for each network. Following the table are descriptions of each field of data in the Routes display.

```
F)ind_bridge R)outes P)orts O)pen_Port C)lose_Port I)nit_Port: R
Show routing information for which network <return for all>?  <cr>

8 Network(s) in Routing Table

Net     Hops State Next IR          Zone Name         Port Name
------ ---- ----- ---------------- ----------------- ------------
2701    03   01    080089D00595     Twilight Zone     vaxoneELAP1
270F    03   01    080089D00595     Twilight Zone     vaxoneELAP1
2712    05   01    080089D00595     Combat Zone       vaxoneELAP1
2714    01   01    AA0004000804     VAX Lab           vaxoneELAP1
2720    04   01    080089D00595     Main Zone         vaxoneELAP1
2721    06   01    080089D00595     Main Zone         vaxoneELAP1
2722    07   01    080089D00595     Main Zone         vaxoneELAP1
2727    00   01    Dir Connect      Bozone            vaxoneVLAP1
```

Net

This value represents the network number in hexadecimal notation.

Hops

These values show the number of hops, or additional bridges that must be traversed, to route a packet from the current bridge to the network named in the Net column. A network that is 15 or more hops away will show a value of `0F` in this column, exceeding the maximum number that may be reached in AppleTalk internets.

State

The code numbers 01, 02, 03, and 04 represent the states Good, Suspect, Bad, and Deleted. One of these states is assigned to each network during each pass of the Routing Table Maintenance Protocol (RTMP) aging process. If the route to this network is broken, the state will eventually change to 04 (Deleted) as the network entry is aged from the routing table. For a description of the RTMP states and aging process, refer to *Inside AppleTalk* and *AppleTalk for VMS Architecture and Implementation.*

Next IR

Next IR is the address of the next internet router, or bridge, through which a packet must be routed from the current bridge to reach this destination network. It is represented as a hexadecimal number.

If Next IR lists `Dir Connect`, then the network is a virtual AppleTalk network inside the current bridge's local host, and the connecting port is a VLAP port.

Zone name

This is the user-defined zone name of the zone on which this network resides. If the route to this network is broken, the zone name will be `<Unknown>`.

Port name

This is the user-defined ASCII port name, assigned at the time of opening the port. If the route to this network is broken, the port name will be `<Deleted>`.

The Ports command

The `Ports` command causes the display of a table that lists all currently open ports on the designated bridge, as shown in the example that follows. The port specification fields in this table are defined in the following sections.

```
F)ind_bridge R)outes P)orts O)pen_Port C)lose_Port I)nit_Port: P
Show Port Information for which port <return for all>? <cr>

3 Port(s)

Port  Net   Node  Type  Flags  Physical Address  Port Name
----- ----- ----- ----- ------ ----------------- ----------------
1     7777  02    02    03     02                vaxoneVLAP1
2     0000  00    01    02     AA0004000404      vaxoneELAP1
3     0000  00    04    04     01                vaxoneDLAP1
```

Port

This is a numeric index of the displayed ports only. The first port is numbered port 1 and all listed ports are numbered sequentially. *This number does not correspond to any port ID, and is only valid for the current display.*

Net

This is the network number of the network connected to this port. The number will be 0000 if the port is not an AppleTalk port.

Node

This is the node ID given to the host system on which the port's bridge (the current bridge) resides. This number will be 0000 if the port is not an AppleTalk port.

Type

The port type is represented by a code number from the following table:

Code number	Port type
01	ELAP
02	VLAP
03	AHLAP
04	DLAP

Flags

Flag bits are set depending on current port parameters. The value in this column is constructed by combining the bits of applicable conditions from the following table:

Flag bit	Condition
01 (hex)	DDP-addressable net
02	On-line
04	Closed

Physical address

This is the listed port's physical network address on the network to which it is connected. This address has meaning to the link access mechanism employed by that network, and is equivalent to the Node ID field for AppleTalk networks, such as VLAP.

Port name

The user-defined ASCII port name, assigned at the time of opening the port.

Port commands

The `Init_Port`, `Open_Port`, and `Close_Port` commands described below are "port" commands, which control the active status of specified Bridge Process ports. A discussion of bridge port parameters, which define individual port types, precedes the descriptions of port commands.

Bridge port parameters

AppleTalk for VMS bridge ports have associated **parameters**, defined by their respective port drivers. These parameters must be accessed by the Bridge Process at the time of initializing or opening the port.

- *Note:* For information concerning the specific requirements of port drivers, including specific parameters associated with initializing and opening different port types, refer to the *AppleTalk for VMS Protocol Support Library Reference Manual,* Appendix A.

INIT parameters

A port handler must be initialized before it can be opened. During the **INIT** (port initialization) process, the Bridge Control Program accesses the following port parameters, whose values are defined by the port driver type.

Port driver file name: The port driver file name is the file name of a port driver shareable image (for instance, `ATKELAP` for an Ethernet connection).

Port information string: The port information string is a port-dependent information string. Depending on the driver specifications for the port type, the port information string may or may not be required.

OPEN parameters

During the **OPEN** process (opening a bridge port), the Bridge Control Program accesses the following port parameters, whose values are defined by the port driver type.

Port name: The port name is a user-defined ASCII character string that uniquely identifies a particular port.

Port driver file name: The port driver file name is the file name of a port driver shareable image. This is the same name as used in the INIT parameter.

Zone name: The zone name is the name of the AppleTalk zone in which the port's host network is located. The zone name is optional and only valid for ports connected to AppleTalk-speaking networks.

Port information string: The port information string is a port-dependent information string. Depending on the driver specifications for the port type, the port information string may or may not be required.

The Init_Port command

The `Init_Port` command allows a port on the currently designated bridge to be initialized.

❖ *Note:* A bridge port must be initialized before it can be opened.

The following prompt sequence is displayed when `Init_Port` is selected:

```
Initialize which port?
```

Enter the **port driver file name** of one of the available port drivers (for instance, the ATKELAP driver for a backbone Ethernet connection).

```
Enter any port-specific information:
```

The **port-specific information** is dependent on the particular port driver type selected. Refer to the appropriate port driver description in the *AppleTalk for VMS Protocol Support Library Reference Manual,* Appendix A.

The Open_Port command

The `Open_Port` command allows a port on the currently designated bridge to be opened.

❖ *Note:* A bridge port must be initialized before it can be opened (see the `Init_Port` command for instructions).

The following prompt sequence is displayed when `Open_Port` is selected:

```
Port name to assign:
Open which port driver?
In which zone?
Port-specific information?
```

The **port name** to assign can be any character string up to 15 characters long, and will remain assigned as an identifier for the port until it is closed.

The **port driver** to designate is the port driver file name of one of the available port drivers (for instance, the ATKDLAP driver for a DECnet half bridge connection).

The **zone** and **port-specific information** prompts are dependent on the particular port driver type selected. Refer to the appropriate port driver description in the *AppleTalk for VMS Protocol Support Library Reference Manual,* Appendix A.

The Close_Port command

The `Close_Port` command allows a port on the currently designated bridge to be closed.

❖ *Warning:* Under no circumstances should the VLAP port ever be closed. This is the port through which you and all other processes are communicating with the Bridge Process over the VAX virtual AppleTalk network.

The following prompt is displayed when `Close_Port` is selected:

```
Close which port?
```

Enter the **port name** of the port you wish to close, ***as defined at the time of opening the port*** (this is *not* the port driver file name).

THE APPLE PUBLISHING SYSTEM

This Apple manual was written, edited, and composed on a desktop publishing system using the Apple Macintosh™ Plus and Microsoft® Word. Proof and final pages were created on the Apple LaserWriter® Plus. POSTSCRIPT®, the LaserWriter page-description language, was developed by Adobe Systems Incorporated.

Text type is ITC Garamond® (a downloadable font distributed by Adobe Systems). Display type is ITC Avant Garde Gothic®. Bullets are ITC Zapf Dingbats®. Some elements, such as program listings are set in Apple Courier, a fixed-width font.