

## Preface

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### Objective

The *Cisco VCO/4K Conferencing Guide* document describe call scenarios in which more than two parties participate in a single call.

### Audience

This document is intended for all personnel managing VCO/4K system administration functions and system resources.

### Document Organization

This document is organized as follows:

Chapter 1, “Overview,” describes the basic elements of a conference call.

Chapter 2, “Conferencing and Resource Usage,” describes the system resources needed to perform conference calls.

Chapter 3, “Call Processing States,” describes major and supplementary call processing states associated with conference calls.

Chapter 4, “Viewing Conferences via System Administration,” describes VCO/4K system administration functions associated with conference calls.

Chapter 5, “Conferencing Examples,” describes several uses of the VCO4/K conferencing feature.

### Documentation Conventions

This document uses the following convention:



**Note**

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Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.

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## Related Documentation

The messages contained in this document may be encountered while using the following documents:

- *Cisco VCO/4K System Administrator's Guide*
- *Cisco VCO/4K System Messages*
- *Cisco VCO/4K Software Installation Guide*
- *Cisco VCO/4K ISDN Supplement*
- *Cisco VCO/4K System Software Version 5.n(n) Release Notes*

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P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC website to quickly find answers to your questions.

To register for Cisco.com, go to the following website:

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<http://www.cisco.com/tac/caseopen>

## Contacting TAC by Telephone

If you have a priority level 1 (P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following website:

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P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.
- P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.



## Overview

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Conferencing is a scenario in which more than two parties participate in a single call. In addition to line and trunk cards, a switch must be equipped with one or more Service Platform Cards (SPCs) configured for conferencing. There are many uses for conferencing in the switch, including:

- Third-party billed and collect calls (operator services)
- Monitoring of telemarketing personnel performance by a supervisor
- Two-party calls with a consultant
- Multiparty bridging (conference calls)

Conferences are controlled by the host using the Conference Control (\$6D) command. A single conference can support up to eight two-way (talk and listen) parties, or up to seven two-way parties and an unlimited number of one-way (listen only) parties (up to the maximum number of network interface ports in the system). A switch can support up to 128 simultaneous conferences. The input level from and output level to each conference party can be adjusted by the host at any point during a conference.

## Conference Control (\$6D) Command

The Conference Control (\$6D) command allows the host to perform the following functions:

- Reserve a conference

Up to eight conference ports can be set aside for use by a specific conference. Line and trunk ports are not affected. No parties are involved in a reserved conference; each party must be individually added. Reserving a conference also sets up the conference structure that allows conferencing to take place. Conference structures are discussed later in this chapter.
- Start a conference

When a conference is started, conference ports are allocated, a conference structure is set up, and voice paths are summed to create a conference. The number of conference ports allocated corresponds to the number of parties (both one-way and two-way) specified in the command.
- Tear down a conference

When a conference is torn down, conference parties are removed from the conference, the conference ports are returned to the resource group and marked as available, and the conference structure is torn down.
- Add parties to a conference

One or more parties can be added to an existing conference.

- Delete parties from a conference

One or more parties can be deleted from a conference without affecting the other parties. Parties removed from a conference can be idled or placed in setup state.

- Adjust input/output levels

Input levels to the conference and output levels from the conference can be adjusted for each party when it becomes part of a conference or at any time thereafter.

The system assigns a number to a conference structure when it is set up. This number remains as an identifier until the conference is either torn down or all conference parties are deleted or hang up. The host must reference the conference by number whenever any action (other than starting or reserving a conference) is to be performed. Commands to reserve or start a conference should always specify Return All in the Network Control byte of the Network Header. Refer to the *Cisco VCO/4K Standard Programming Reference* and *Cisco VCO/4K Extended Programming Reference* for information on the Network Header. When this is done, the conference number is returned to the host in byte offset 5 of the command.

Reserved conference ports remain reserved until the conference is torn down. If a line/trunk port is deleted from a reserved conference, the conference port to which it was linked remains reserved.

For more information on system command and report structure and usage, refer to the *Cisco VCO/4K Standard Programming Reference* and *Cisco VCO/4K Extended Programming Reference*.



## Conferencing and Resource Usage

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Two types of system resources participate in a conference: conference ports and line/trunk ports. Individual port selection and function within the conference is different for each of the two types.

### Conference Ports

A conference port is allocated to a conference by the system when it receives a host command to reserve, start, or add. A maximum of eight conference ports can be allocated to a single conference. One conference port is required for each two-way conference party. A single conference port is required for all one-way conference parties (one-way parties share a single port). All conference ports must belong to a single resource group. Individual conference ports cannot be specified for use by the host. If a conference port is not reserved, in use, or deactivated (a card is taken out-of-service or a port is deactivated), it is considered available for use in a conference.

### Reserving a Port for a Conference

When the host issues a command to reserve a conference, the system establishes the conference structure and assigns a number to the conference. The conference structure is the chain of conference ports that is used to bridge the attached line/trunk ports participating in the conference. Reserved conference ports remained allocated to the conference and organized in the conference structure until the conference is torn down. Deleting line/trunk ports from a conference has no effect on reserved conference ports. The conference structure retains its assigned conference number until the conference is torn down.

### Starting a Conference

Commands that specify to start a conference immediately establish the conference structure and attach the indicated line/trunk ports. The host cannot start a conference without specifying the line/trunk ports that represent the conferencing parties. When a party is deleted from a conference, the associated conference port is made available unless it was reserved for the conference before its line/trunk port was added. When the conference is torn down, all affected conference ports are again considered available.

## Output Level Adjustment

The output level from a conference port to one or more line/trunk ports and the input level to the summation from each line/trunk port can be adjusted by the host. The output level of the conference port can be decreased by 3 dB.

## Line/Trunk Ports

Line/trunk ports provide input to and receive the output from a conference. These ports become parties to a conference when the system receives a host command to start or add to a conference. The host must supply the port address of the line/trunk port when an action is required. There are no conference-related restrictions on line/trunk resource grouping. The conference command does not support hunting of a line or trunk port to add to the conference.

## Starting/Adding a Port

A line/trunk port can become part of a conference under the following conditions:

- If COS = T or 2 (with internal COS = T), port must be in CP\_SETUP, CP\_WANS, or CP\_STAB MState
- If COS = O or 2 (with internal COS = U), port must be in CP\_SETUP, CP\_STAB, or CP\_WTFSUP MState
- If COS = AT, AO, or A2, port must be in CP\_SETUP, CP\_STAB (A2 port is marked with internal COS = T or COS = U), or in CP\_IDLE MState and off hook

These conditions allow for the following call scenarios:

- Three ports seize into the switch and are set to CP\_SETUP state. These three ports can be placed into a three-way conference.
- Four ports are already involved in two stable calls: A with B and C with D. Port E seizes in and goes to CP\_SETUP. The host can place ports A, D, and E into a three-way conference. Ports B and C can either be forced to idle or set to CP\_SETUP for later action.
- A conference exists among ports B, C, and D. An attendant (COS = A2) originates a call out of the switch to port A. Before final answer is detected from port A (port is in CP\_WTFSUP), it is added to the conference. When final answer is detected, port A is added to the voice path summations for the conference.

While a port is in a conference, the system assigns it an internal COS of C. The port retains its incoming or outgoing characteristics as defined by the COS in the system database. While in the conference, the port remains in the CP\_SETUP MState. When a port in CP\_STAB or CP\_SETUP state is added to a conference, any call disconnect or PSC report bit settings associated with the port are cleared. These bit settings may have been established with a previous Outgoing Port Control (\$69) command.

When a conference is started or when a new port is added, the host command must specify the following information for each port:

- Port address
- Type of voice path
- Adjustment for input from line/trunk to conference (two-way path only)
- Adjustment for output from conference to line/trunk.

If one port in a stable call is added to a conference (or the outgoing port is in CP\_WANS), the other port in the call is placed into CP\_SETUP. The host must take some action on the port left in CP\_SETUP.

## Tearing Down/Deleting a Port

A line/trunk port is removed from a conference automatically when it goes on hook. The port is marked CP\_GARD (depending on card type), then to CP\_IDLE. When using a command to remove a line/trunk port from a conference, the host can either force the port to idle or leave it active awaiting further host action.

If a port is deleted from an active conference, the host command must specify the port address and whether to idle the port or leave it active. If idled and the COS is not A, Permanent Signal processing is begun for the port. If the port is to be left active, it goes to CP\_SETUP state and remains there until further host action is taken.

When a conference is torn down, the host command must specify the ports that are to remain active. If no port information is included in the command, Permanent Signal processing is begun for all ports in the conference by default, except for those with COS = A.

## Input Level Adjustment

The input level from the line/trunk into the conference can be adjusted at any point while the port is a two-way party to the conference. The output level from the associated conference port to the line/trunk port can also be adjusted. When a level adjustment is required, the host command must specify the following information for each port:

- Port address
- Adjustment for input from line/trunk to conference
- Adjustment for output from conference to line/trunk

Fifteen preset adjustments allow the input level from each line/trunk port to be decreased by as much as 15 dB and increased by up to 6 dB.

## Conference Structure

The system arranges all system resources participating in a conference into a conference structure. A conference structure consists of all conference ports used by a single conference and their associated line/trunk ports. A conference structure can have up to eight conference ports. The system assigns a number to every conference structure when it is set up. The host must reference this number in all subsequent commands affecting a conference.

A two-way party to a conference hears the summation of all other members of the conference, plus its own voice input through the sidetone of the telephone equipment being used. One conference port is used for each two-way party. Figure 2-1 shows the structure for a conference with eight two-way parties. Note that this is the maximum number of two-way parties that can be accommodated by a single conference structure.

Figure 2-1 Two-Way Conference Structure

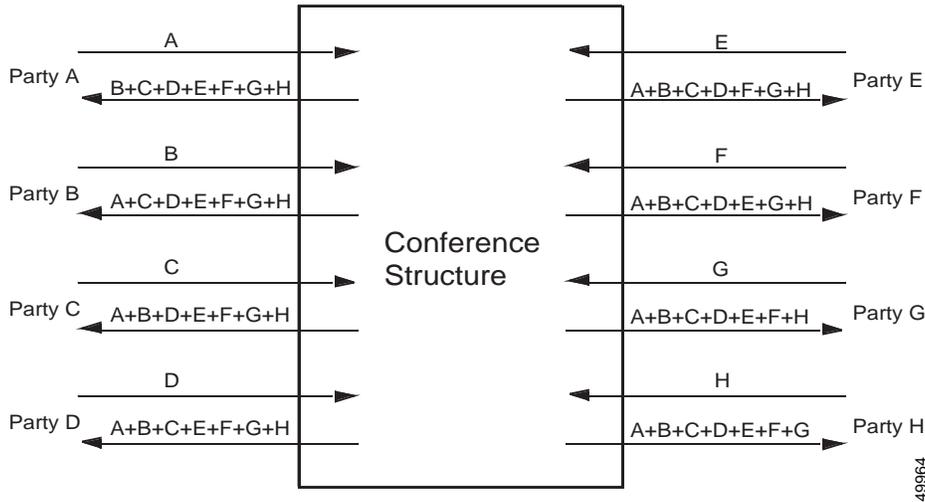
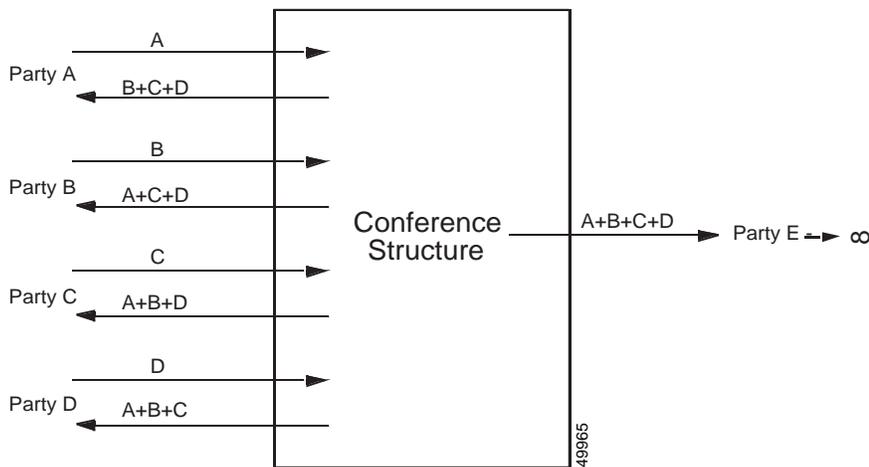


Figure 2-2 shows how one-way conference parties share a single conference port. Although these one-way parties also hear their voices through sidetone, it is not input to the conference. Any output adjustment made to the conference port for any one-way party applies to all other one-way parties in the conference. Any number of ports can listen to the output of a single one-way party.

Figure 2-2 Mixed Conference Structure



## Links and Voice Paths for Conferencing

Call processing allocates resources to a conference based on commands from the host. When a resource is allocated, it is linked into a resource chain for the conference. A conference uses two types of resource chaining. The conference has a primary resource chain containing all conference ports involved in the conference. Additional resource chains associate the conference ports with network interface ports. Resource chains for conference structures are illustrated in the example scenarios in Chapter 5,

“Conferencing Examples.” While a resource is linked into a conference's resource chain, it cannot be used for any other conference or call. Call processing determines when a resource can be dropped from a chain and made available.

A resource can be linked into a conference but not actively participating. This is the case when a conference port is reserved for a conference but has no line/trunk port associated with it. A resource is actively participating in a call if a voice path exists (resource actively sending or receiving in-band signaling), the port is sourcing out-of-band supervision signaling, or the port is waiting for out-of-band supervision. A voice path is a logical system connection that allows the transfer of MF digits, DTMF digits, tones, prompts, or voice information. The conferencing examples in Chapter 5, “Conferencing Examples,” use a voice path diagram to illustrate the voice paths for several conferencing scenarios.

The current links and voice paths for an individual port can be monitored using the system administration Port Display screen described in Chapter 4, “Viewing Conferences via System Administration,” of this document and the *Cisco VCO/4K System Administrator's Guide*. System tones cannot be linked because they are a shared resource. A voice path can be established between a tone and a receiver without a link.





## Call Processing States

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The system internal processing uses a simple state machine representation to track the current condition of all resources in the system. Transitions between states occur as a result of externally generated events (incoming calls, for example), commands from the host, or impulse/outputpulse rule processing.

Two variables are maintained on a per-port basis to track the current state of a port:

- Major States (MStates)
- Supplementary states (SStates)

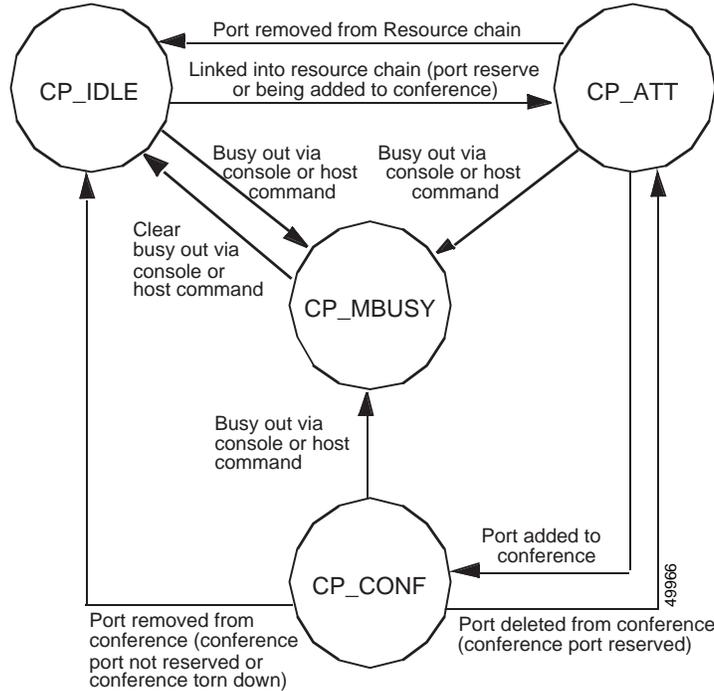
MStates represent points within specific call processing routines. SStates monitor detailed activity within those states. Because of the structure of the state machine and the nature of call processing activity, several SStates can exist simultaneously during a single MState.

The current MState and SState for a port can be viewed using the system diagnostics Port Display screen (refer to the *Cisco VCO/4K System Administrator's Guide*). This screen is especially useful in the debugging process because it shows the actions being performed for a specific port, any impulse/outputpulse rule processing activity, and all links and voice paths (including conferences) associated with that port.

## Conference Port MStates

There are four MStates in conference port call processing. These states are shown in Figure 3-1 and explained in the text that follows. In addition to the MStates listed here, the system uses multiple SStates to track and indicate the status of a conference structure.

Figure 3-1 Conference Port State Diagram



## CP\_IDLE

**Definition:** CP\_IDLE is an MState during which there is no activity on a conference port.

**Transition Event:** Conference port is linked into a chain (host command request to reserve, start, or add).

**New State:** CP\_ATT

- or -

**Event:** Port is put into maintenance busy using either the Card Maintenance function of System Administration (refer to the *Cisco VCO/4K System Administrator's Guide*) or a Change Port Status (\$90) host command (refer to the *Cisco VCO/4K Standard Programming Reference* and the *Cisco VCO/4K Extended Programming Reference*).

**New State:** CP\_MBUSY

## CP\_ATT

Definition:	CP_ATT is an MState during which a conference port is linked into a chain but is not being used. Either the conference port is reserved but has no associated line/trunk port or the conference port plus an associated line/trunk port are being placed into a conference. A reserved port remains in CP_ATT until the conference is torn down by a host command. The SStates that exist under this MState are discussed in the “Conference Port SSTATES” section on page 3-4.
Transition Event:	Host command adds line/trunk port to conference and uses this conference resource port.
New State:	CP_CONF
	- or -
Event:	Conference port is removed from resource chain by a host command (tear down conference) or its card goes OOS.
New State:	CP_IDLE
	- or -
Event:	Port is put into maintenance busy using either the Card Maintenance function of System Administration (refer to the <i>Cisco VCO/4K System Administrator’s Guide</i> ) or a Change Port Status (\$90) host command (refer to the Cisco VCO/4K Standard Programming Reference and the <i>Cisco VCO/4K Extended Programming Reference</i> ). Any call in which this port is participating is torn down.
New State:	CP_MBUSY

## CP\_CONF

Definition:	CP_CONF is an MState during which a conference port has an associated line/trunk port and is actively participating in a conference. The SStates that exist under this MState are discussed in the “Conference Port SSTATES” section on page 3-4.
Transition Event:	Line/trunk port associated with conference port is deleted from conference by a host command or disconnect, or error, or the line/trunk port associated with the conference port is busied out.
New State:	CP_ATT (if conference port was reserved) CP_IDLE (if conference port was not reserved).
	- or -
Event:	Conference is torn down or card on which this conference port resides goes OOS.

New State: CP\_IDLE

- or -

Event: Port is put into maintenance busy using either the Card Maintenance function of System Administration (refer to the *Cisco VCO/4K System Administrator's Guide*) or a Change Port Status (\$90) host command (refer to the *Cisco VCO/4K Standard Programming Reference* and the *Cisco VCO/4K Extended Programming Reference*). Any call in which this port is participating is torn down.

New State: CP\_MBUSY

## CP\_MBUSY

Definition: CP\_MBUSY is an MState during which a conference port is in a maintenance busy condition and cannot be used for a call.

Transition Event: Port is unbusy using either the Card Maintenance function of System Administration (refer to the *Cisco VCO/4K System Administrator's Guide*) or a Change Port Status (\$90) host command (refer to the *Cisco VCO/4K Standard Programming Reference* and the *Cisco VCO/4K Extended Programming Reference*). Any call in which this port is participating is torn down.

New State: CP\_IDLE

## Conference Port SSTATES

The MState CP\_CONF describes all actions that take place during call processing for active conference ports. Several SStates exist under CP\_CONF that represent specific actions being performed by call processing. These SStates can be seen using the system diagnostics Port Display screen. Refer to Chapter 4, "Viewing Conferences via System Administration," of this document and the *Cisco VCO/4K System Administrator's Guide*. This screen is especially useful in the debugging process because it shows what actions are being performed for a specific port, any inpulse/outpulse rule processing activity, and all links and voice paths associated with that port.

Several SStates can exist simultaneously under a single MState. When more than one SState is present, the Diagnostics Port Display combines the names of the SStates. The character(s) that appear next to the SState name indicate the abbreviation that may be seen on the screen for each SState.

## CF\_SET (SET)

Call processing enters this SState when it attempts to perform any action involving a conference port. During this state, call processing is sending instructions to the port.

## CF\_ACK (ACK)

Call processing enters this SState when the conference port acknowledges the instructions sent by call processing.

## CF\_RSVR (R)

Call processing enters this SState when the conference port has been reserved as specified by a host command. The port remains in this state until the conference is torn down by a host command.

## CF\_1WAY (1)

Call processing enters this SState when the conference port is being used for a one-way voice path from a conference. One or more associated line/trunk ports are linked to this conference port. The conference port is also linked to a resource chain containing all conference ports involved in the conference. The port remains in this state as long as the one-way path is established.

## CF\_2WAY (2)

Call processing enters this SState when the conference port is being used for a two-way voice path to/from a conference. One associated line/trunk port is linked to this conference port. The conference port is also linked to a resource chain containing all conference ports involved in the conference. The port remains in this state as long as the two-way path is established.





# Viewing Conferences via System Administration

System administration offers four diagnostic screens to allow visibility into the operation of conference resources. These screens are used primarily in the development and test phase of an application, but can also be used to identify the source of errors in a deployed application.

This chapter provides an example of how information can be obtained from the Card Display, Port Display, Conference Menu, and Conference Display. These screens can be accessed via the system administration Diagnostics menu. Field definitions and full instructions for using each screen are contained in the *Cisco VCO/4K System Administrator's Guide*.

## Example Scenario

For this example, assume ports 1 through 8 on an SPC located at hardware address 1,3,7 have been reserved for an active conference; the port address of port 1 is \$04 08. Six of the conference ports are actively participating in the conference. The remaining two are held so that additional conference parties may be added. The line/trunk ports in Table 4-1 are participating in this conference.

*Table 4-1 System Administration Conference Example—Line/Trunk Ports*

Port Address	RLSP	Port Type
\$00 21	1,1,5,10	T1
\$00 37	1,1,6,8	T1
\$01 3D	1,2,10,6	UTC
\$00 FD	1,2,6,6	UTC
\$00 18	1,1,5,1	T1
\$00 30	1,1,6,1	T1
\$00 67	1,1,8,8	T1

## Card Display of Conference Card

The following information can be obtained using the Card Display screen for an SPC:

- Hardware address, if information is requested by the first port address of the card
- First software port address, if information is requested by hardware address
- In-service/out-of-service state for each conference port

- Card Status (Active, Maintenance, Diagnostic, Out-of-Service)
- Number of communication errors (number of times the NBC detected an error in response to a poll)
- NBC Poll Queue state

Refer to the *Cisco VCO/4K System Administrator's Guide* for a definition of each of these items.

The Card Display screen is accessed from the Diagnostics Menu by typing **B** and pressing **Enter**. The Card Display screen is displayed, with the cursor located in the R,L,S data entry field. To view the display for an SPC, specify the card by R,L,S hardware address.

Figure 4-1 shows the information for the conference card in this example. The system continues to update this information every 10 seconds.

**Figure 4-1 Card Display Screen**

```

                                C A R D       D I S P L A Y
R,L,S 1 3 7      Display Port (Y/N) N 1st Port Adr 408 Card Type   SPC   FW   2.02
Card Status (81) Active                Comm Errors 0   Poll Queue Active

                                1 ---- 8 9 ---- 16 17---- 24 25 ---- 32  ALARM STATES
Port Available                11111111 11111111 11100111 11111101
On (0)/Off (1) Hook          00000000 00000000 00000000 00000000
Diagnostics                   00000000 00000000 00000000 00000000
Voice Path Trace              00000000 00000000 00000000 00000000
Internal Trace                 00000000 00000000 00000000 00000000
Network Trace

                                33 ---- 40 41 --- 48  49 --- 56  57 --- 64
Port Available                11111111 11110111 11111101 11111111
On (0)/Off (1) Hook          00000000 00000000 00000000 00000000
Diagnostics                   00000000 00000000 00000000 00000000
Voice Path Trace              00000000 00000000 00000000 00000000
Internal Trace                 00000000 00000000 00000000 00000000
Network Trace

16-JAN-2000 14:54                                Press Any Key to Halt Screen Updates

```

37627

From the display shown in Figure 4-1, the following information can be derived:

- The first logical port address of the SPC at hardware address 1,3,7 is \$408.
- The card is Active, and being polled as such.
- There have been no CommErrors for this card since system boot.
- Ports 20, 21, 31, 45, and 55 are deactivated and not available for use by the system.
- There are no alarms currently active for this card.

The Port Display screen can be accessed directly from the Card Display screen using the following steps:

- 
- Step 1** Halt the screen updates. The cursor moves to the R,L,S data entry field.
  - Step 2** Press **Next Field** until the cursor moves to the Display Port (Y/N) command field.

- Step 3** Type **Y** and press **Enter**. The Port Display screen is displayed, and the hardware address of the card is shown in the R,L,S,P data entry field. Refer to the “Port Display of Conference Card” section on page 4-3 for more information about using the Port Display screen.
- 

## Port Display of Conference Card

The following information can be obtained for an individual conference port using the Port Display screen:

- Hardware address, if information is requested by port address
- Port address, if information is requested by hardware address
- Current MState and SState (refer to Chapter 3, “Call Processing States”)
- Resource group to which the SPC port belongs
- Conference number in which the port is participating (the Conference field is also used to access the Conference Display screen)
- Links established for this port
- Line/trunk port associated with this conference port
- Various statistical and internal processing information

Refer to the *Cisco VCO/4K System Administrator's Guide* for a definition of these items. You can access the Port Display screen from the Diagnostics menu, the Card Display screen, or the Conference Display screen. To access the Port Display screen from the Diagnostics menu, type **C** and press **Enter**. To access the screen from the Card Display or Conference Display screen, follow the directions detailed in the *Cisco VCO/4K System Administrator's Guide*. Whichever method is used, the Port Display screen is displayed with the cursor located in the R,L,S,P data entry field. To view the display for a conference port, specify the port by either hardware address (R,L,S,P) or port address.

For the purpose of this example, assume the hardware address 1,3,7,5 is entered. The information for this port would then be displayed as shown in Figure 4-2. The system continues to update this information every few seconds.

Figure 4-2 Port Display Screen

```

PORT DISPLAY
R,L,S,P: 1 3 7 5          PA 40C   COS          TRACE: Net   Int 0   Voice 0
CURRENT STATE           In/Outpulse Rule   Token
Major                   CP_CONF           Resource Group   5   Conference 20
Supplementary           CP_R2ACK         Listening To RLSP           PA
Conf/Assoc Port        RLSP 1 1 6 1     PA 30

Port Pointer           1e9630
Dynamic Data Pointer
Start Record Pointer
End Record Pointer
Attempts               1
Completions
Errors/Threshold      /
Rehunts/Threshold     /

Originating Number
Digit Field 1
Digit Field 2

                                CURRENT LINKS
                                R L S P   R L S P
                                1 3 7 8   1 3 7 2
                                1 3 7 7   1 3 7 1
                                1 3 7 6   - - - -
                                1 3 7 4   - - - -
                                1 3 7 3   - - - -
                                - - - -   - - - -

Digit Field 3
Digit Field 4

```

37528

From the display shown in Figure 4-2, the following information can be derived:

- The logical port address for the port at 1,3,7,5 is hexadecimal 04 0C.
- Current MState is CP\_CONF, with an SState of CF\_R2ACK. This indicates the port is actively involved in a conference and the conference port has acknowledged commands to reserve it and establish a two-way voice path. When the line/trunk port goes on hook or is deleted from the conference, the SPC port remains reserved.
- Resource group is 5.
- Conference number is 20.
- Line/trunk port associated with this conference port is located at 1,1,6,1 with a port address of \$00 30.
- Links are established with seven other conference ports on the card located at 1,3,7; ports 1 to 4 and 6 to 8.
- Port has been allocated to a conference once since the beginning of the current statistics period; port table record pointer is 1e9630.

Access the Conference Display screen directly from the Port Display screen with the following steps:

- 
- Step 1** Halt the screen updates. The cursor moves to the R,L,S,P data entry field.
- Step 2** Press **Tab** until the cursor moves to the Conference field. There must be a conference number shown in the field.
- Step 3** Press **Enter**. The Conference Display screen is displayed for that conference number. Refer to the “Conference Display” section on page 4-6 for more information about using the Conference Display screen.
-

## Conference Menu

The Conference Menu screen provides a listing of all conferences in the system. This listing can consist of up to four screens, with each screen containing listings for up to 32 conferences. A conference is listed as long as conference ports are allocated to the conference, regardless of whether any line/trunk ports are associated with the conference. The following information can be obtained using the Conference Menu:

- Total number of active conferences
- Number assigned to each conference (conference number)
- Number of ports allocated to each conference
- Number of ports reserved for each conference but not currently associated with a line/trunk port (unused)
- Number of line/trunk ports with one-way voice paths in each conference
- Number of line/trunk ports with two-way voice paths in each conference

Access the Conference Menu screen from the Diagnostics menu by typing **D** and pressing **Enter**. The Conference menu is displayed, with the cursor located in the Disp data entry field of the first active conference. This field is used to access the Conference Display screen for an individual conference. Figure 4-3 shows what the Conference Menu screen might contain for this example.

*Figure 4-3 Conference Menu Screen*

CONFERENCE MENU											
No	CONF PORTS		LINE S/TRNK S			CONF PORTS			LINES /TRNK S		
	Alloc	Unused	1Way	2Way	Disp	No	Alloc	Unused	1Way	2Way	Disp
1	4	0	0	4		20	8	2	2	5	
2	3	0	0	3		23	8	0	0	8	
4	8	0	7	9		24	6	6	0	0	
5	4	0	1	3		—	—	—	—	—	—
6	4	4	0	0		—	—	—	—	—	—
8	5	1	0	4		—	—	—	—	—	—
9	4	1	1	2		—	—	—	—	—	—
10	8	0	0	8		—	—	—	—	—	—
11	8	5	0	3		—	—	—	—	—	—
12	6	0	2	5		—	—	—	—	—	—
13	8	1	12	6		—	—	—	—	—	—
15	3	1	25	1		—	—	—	—	—	—
16	5	0	0	5		—	—	—	—	—	—
17	8	8	0	0		—	—	—	—	—	—
18	8	0	0	8		—	—	—	—	—	—
19	4	0	6	3		—	—	—	—	—	—

37529

From the display in Figure 4-3, the following information can be derived:

- There are 19 active conferences in the system.
- For conference 20, there are 8 DCC ports allocated.
- For conference 20, there are 2 reserved ports not currently being used.
- For conference 20, there are 2 line/trunk ports with one-way voice paths.
- For conference 20, there are 5 line/trunk ports with two-way voice paths.

More detailed information for any conference listed on the menu can be obtained by accessing the Conference Display screen as described below:

- 
- Step 1** Use the **Prev Field** or **Next Field** key to position the cursor in the Disp field corresponding to the conference number for which you want to display information.
- Step 2** Type any character and press **Enter**.
- 

## Conference Display

The following information can be obtained for an individual conference using the Conference Display:

- Status (Active, Reserved) of the conference
- Number of SPC ports reserved but not in use
- Number of SPC ports in use
- All links for the conference
- Hardware and port addresses of all SPC ports and their associated line/trunk ports
- Number of line/trunk ports listening to an SPC port
- Path type (one-way or two-way voice path)
- Scaling factors (input/output gain/attenuation)

Refer to the *Cisco VCO/4K System Administrator's Guide* for a definition of each of these items.

Access the Conference Display screen from the Diagnostics menu, Port Display screen, or Conference menu. To access the Conference Display screen from the Diagnostics menu, type **E** and press **Enter**. To access the screen from the Port Display or Conference Display screen, follow the directions detailed in the *Cisco VCO/4K System Administrator's Guide*. Whichever method is used, the Conference Display screen is displayed with the cursor located in the Conference No. data entry field.

To view the display for a conference, type the conference number (in this case 20) then press **Enter**. The screen is updated to show the current status of the conference specified (see Figure 4-4).

Figure 4-4 Conference Display Screen

CONFERENCE DISPLAY													
Conference No.				20	Status	Active	Avail.				2	Act.	6
CONFERENCE				PORTS	In	Out	Path				LINE/TRUNK	PORTS	
R	L	S	P	PA	Scale	Scale	Users	Type	R	L	S	P	PA
1	3	7	8	40F			1	2	1	1	6	8	037
1	3	7	7	40E			1	2	1	1	5	1	018
1	3	7	6	40D			2	1	1	2	10	6	13D
								1	1	2	6	6	0FD
1	3	7	5	40C			1	2	1	1	6	1	030
1	3	7	4	40B			1	2	1	1	5	10	021
1	3	7	3	40A			1	2	1	1	8	8	067
1	3	7	2	409									
1	3	7	1	408									

37530

The Conference Display provides a listing of all resources in the conference. From the display in Figure 4-4, the following information can be derived:

- Conference 20 is considered Active.
- Two SPC ports are reserved for conference 20.
- Six SPC ports are in use for conference 20.
- Conference 20 has the following links and voice paths established:
  - All SPC ports (1,3,7,1 to 1,3,7,8 or PA \$04 08 to \$04 0F) linked in a single chain
  - Line/trunk port at 1,1,6,8 (PA \$00 37) is a two-way conference party linked to 1,3,7,8 (PA \$04 0F)
  - Line/trunk port at 1,1,5,1 (PA \$00 18) is a two-way conference party linked to 1,3,7,7 (PA \$04 0E)
  - Line/trunk port at 1,2,10,6 (PA \$01 3D) is a one-way (receive-only) conference party linked to 1,3,7,6 (PA \$04 0D); PA \$01 3D is listening to \$04 0D
  - Line/trunk port at 1,2,6,6 (PA \$00 FD) is a one-way (receive-only) conference party linked to 1,3,7,6 (PA \$04 0D); PA 00 FD is listening to \$04 0D
  - Line/trunk port at 1,1,6,1 (PA \$00 30) is a two-way conference party linked to 1,3,7,5 (PA \$04 0C)
  - Line/trunk port at 1,1,5,10 (PA \$00 21) is a two-way conference party linked to 1,3,7,4 (PA \$04 0B)
  - Line/trunk port at 1,1,8,8 (PA \$00 67) is a two-way conference party linked to 1,3,7,3 (PA \$04 0A)
- DCC ports 1,3,7,2 (PA \$04 09) and 1,3,7,1 (PA \$04 08) are reserved for conference 20 but not currently participating in the conference.
- Two line/trunk ports are listening to SPC port 1,3,7,6 (PA \$04 0D).
- Input/output gain/attenuation has not been specified for any port in this conference.

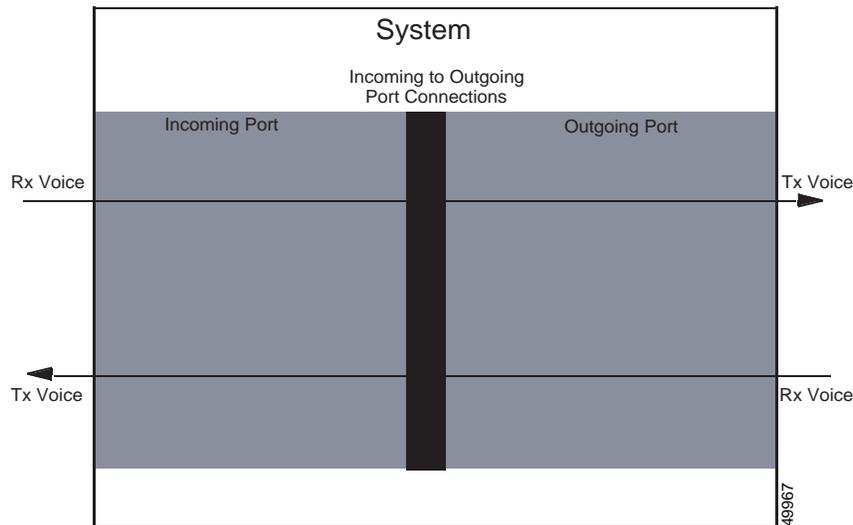


## Conferencing Examples

The four examples that follow illustrate several uses for the system conferencing feature. Each example contains two diagrams—one that illustrates the voice paths established in the conference, and a second that represents the port-to-port relations of the conference structure. The conference structure diagram indicates the number of conference ports required to satisfy the scenario. The command to start and tear down (where necessary) each conference is included in the text.

Information for the Conference Control (\$6D) command and other commands is contained in the *Cisco VCO/4K Extended Programming Reference* and *Cisco VCO/4K Standard Programming Reference*. Voice path diagrams are based on the general format shown in Figure 5-1.

**Figure 5-1** General Voice Path Format



## Two-Party Call With Monitor

A supervisor at a catalog sales company decides to evaluate the performance of a phone-order attendant. Because the supervisor does not want the attendant to be aware of the monitoring, the supervisor arranges a one-way, receive-only connection. The text that follows describes the processing that could take place during this scenario.

Assume a stable call between a caller at address \$21 and an attendant station at address \$56 is in progress (both ports CP\_STAB).

A supervisor with a station at address \$52 wants to monitor the attendant's performance (port is CP\_IDLE with COS = A2). Based on input from the supervisor's computer terminal, the host determines that the stable call above should be placed into a conference in which the ports at addresses \$21 and \$56 are two-way parties and the port at address \$52 is a one-way party (supervisor functioning as a monitor). The following command sets up the conference:

```
6D 00 40 03 00 00 21 00 00 55 00 80 52
```

All three ports are now in CP\_SETUP state. Return All was specified in the Network Control byte of the Network Header; the system returned a conference number of 06 to the host. Figure 5-2 illustrates a two-party call with monitor voice paths. The monitor conference structure is illustrated in Figure 5-3.

The supervisor decides to go on to another activity and signals the host to end the monitor. The following command tears down the conference and leaves the original two parties in CP\_SETUP state. The monitor port is forced to CP\_IDLE and remains off hook.

```
6D 06 20 02 00 00 21 00 00 56
```

The host must now use an Outgoing Port Control (\$69) command to reconnect the original call.

```
69 00 21 C0 00 56 00 00
```

Both ports are already marked as being off hook, so a stable call is immediately established.

Figure 5-2 shows a two-party call with monitor voice paths.

**Figure 5-2 Two-Party Call with Monitor Voice Paths**

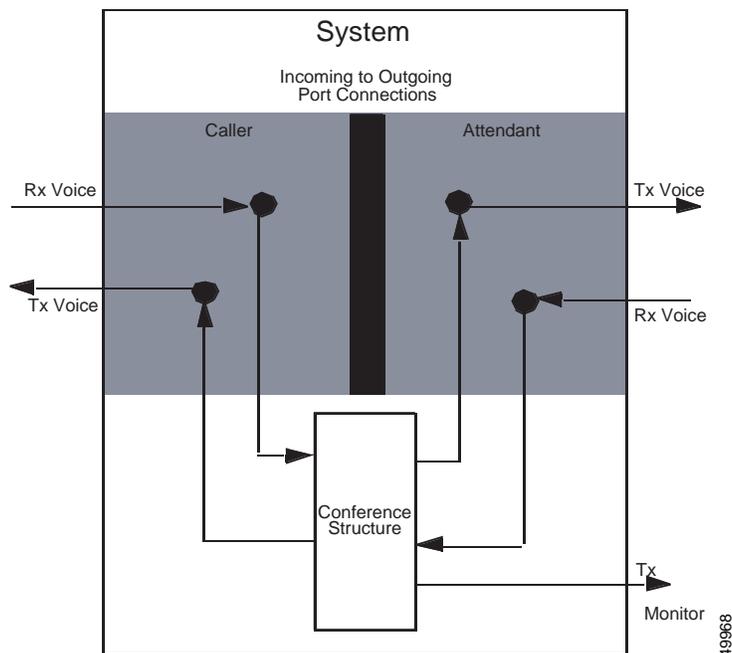
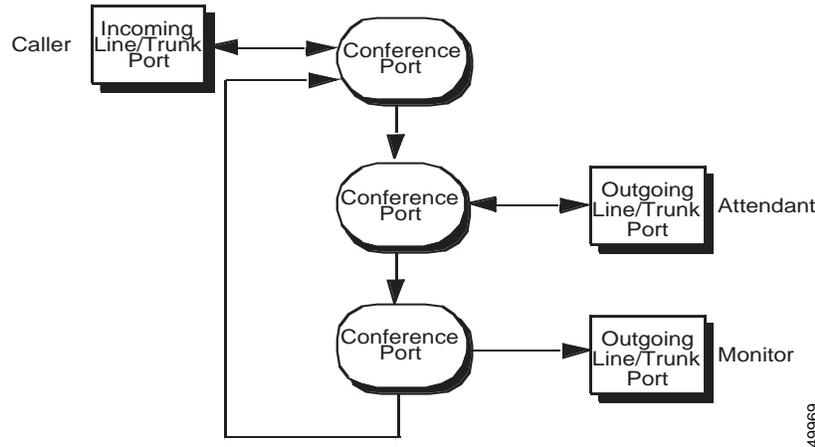


Figure 5-3 shows a two-party call with monitor conference structure.

Figure 5-3 Two-Party Call with Monitor Conference Structure



## Two-Party Call With Consultant

This example is based on the scenario used in the previous example. During a phone order, a disagreement arises between the caller and attendant over an item's current price. The attendant brings the supervisor into the call to resolve the issue. At some point during the discussion the supervisor needs to confer privately with the attendant, after which the supervisor informs the customer of the problem's solution. The text that follows describes the processing that could take place during this scenario.

Assume a stable call between a caller at address \$23 and an attendant station at address \$51 is in progress (both ports CP\_STAB).

It is determined that a consultant at address \$60 should be added to the call (consultant port is CP\_IDLE with COS = A2). Based on input from the attendant's computer terminal, the host determines that the stable call above should be placed into a conference in which all three ports are two-way parties. The following command sets up the conference.

```
6D 00 40 03 00 00 23 00 00 51 00 00 60
```

All three ports are now in CP\_SETUP state. Return All was specified in the Network Control byte of the Network Header; the system returned a conference number of 08 to the host.

At some point in the call, the attendant and consultant need to confer without the caller. A Voice Path Control (\$66) command is used to set the caller to listen to quiet tone. This action has no effect on the conference structure, since the \$66 command does not alter any links or resource chains already in place.

```
66 01 00 23 04 C0
```

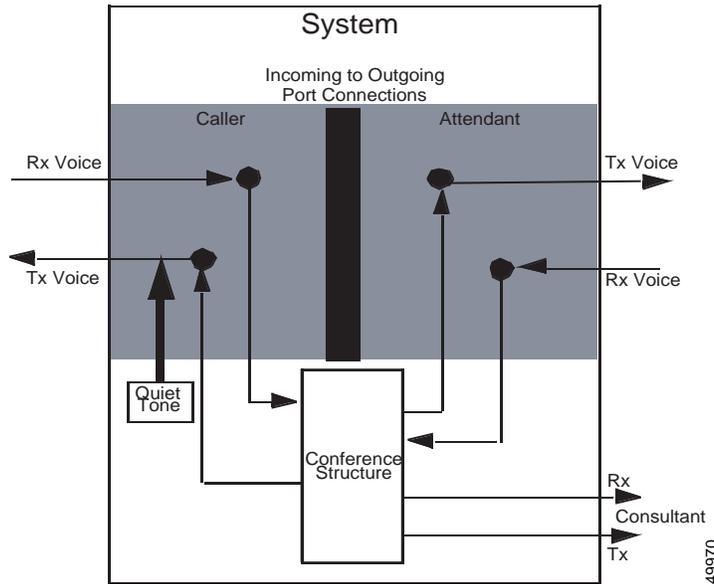
To return the caller to the conference, the following \$66 command is used:

```
66 00 00 23 04 C0
```

The conference ends when all three parties go on hook (hang up). All ports are returned to CP\_IDLE. No host command is required.

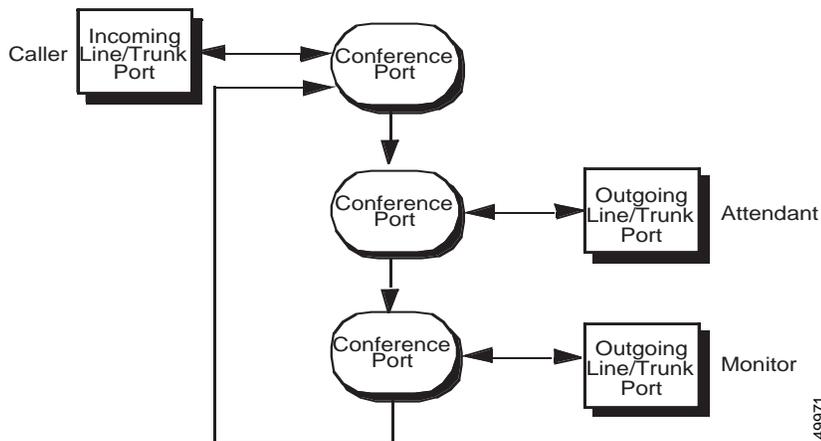
Figure 5-4 shows a two-party call with consultant voice paths.

Figure 5-4 Two-Party Call With Consultant Voice Paths



The conference structure is shown in Figure 5-5.

Figure 5-5 Two-Party Call With Consultant Conference Structure



## Operator Services

The example that follows details an operator service scenario. An incoming caller wants to make a collect call. The caller, operator, and called (third) party enter into a conference until the called party accepts responsibility for the charges, at which point a stable call is established between caller (incoming port) and called party (outgoing port).

The operator at address \$48 (COS = A) answers an incoming call from a caller at address \$16. The caller gives the phone number for the third party. An outgoing port (\$57) is hunted from a resource group and attached to a virtual call generation port by the following \$6A command:

```
6A 00 00 00 FE E0 00 08 CO 57 00 00
```

Return All was specified in the Network Control byte of the Network Header of the \$6A command. The system returns the outgoing port address to the host. Based on input from the attendant's computer terminal, the host determines that the three parties should be placed into a conference in which all three ports are two-way parties. The following command sets up the conference:

```
6D 00 40 03 00 00 16 00 00 48 00 00 57
```

All three ports are now in CP\_SETUP state. Return All was specified in the Network Control byte of the Network Header. The system returned a conference number of 02 to the host.

When the third party answers, the operator asks the party if they will accept the charges. If the third party accepts the charges, the host idles the operator station (removing it from the conference) using the following \$6D command:

```
6D 02 20 02 00 00 16 00 00 57
```

The host then creates a stable call between the caller and the third party with the following \$69 command:

```
69 00 16 D0 57 00 00
```

If the third party refuses to accept the call charges, the host idles the outgoing port (removing it from the conference) using the following \$6D command:

```
6D 02 20 02 00 00 48 00 00 16
```

The host then reconnects the operator and caller with the following \$69 command:

```
69 00 16 D0 48 00 00
```

Once a stable call is established (between either the caller and third party, or the caller and operator), if any party goes on hook, the call ends.

Figure 5-6 shows operator services voice paths.

**Figure 5-6 Operator Services Voice Paths**

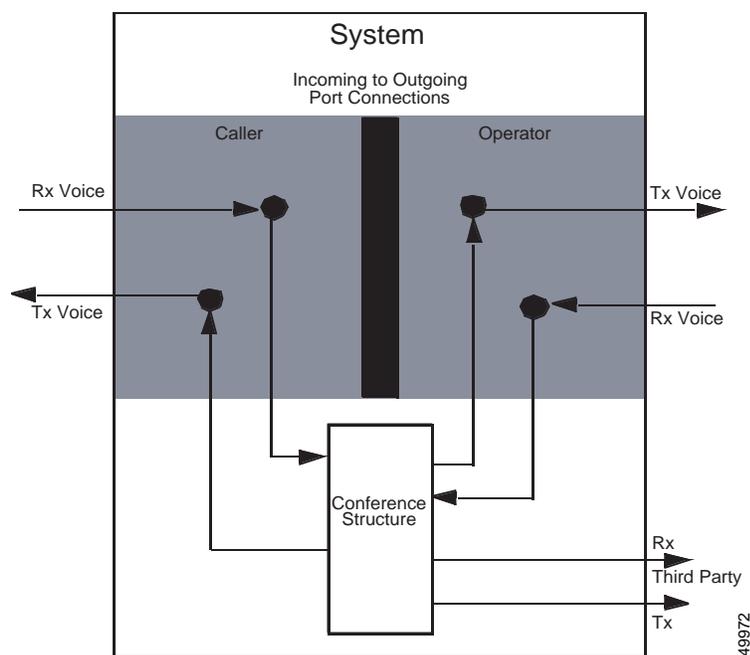
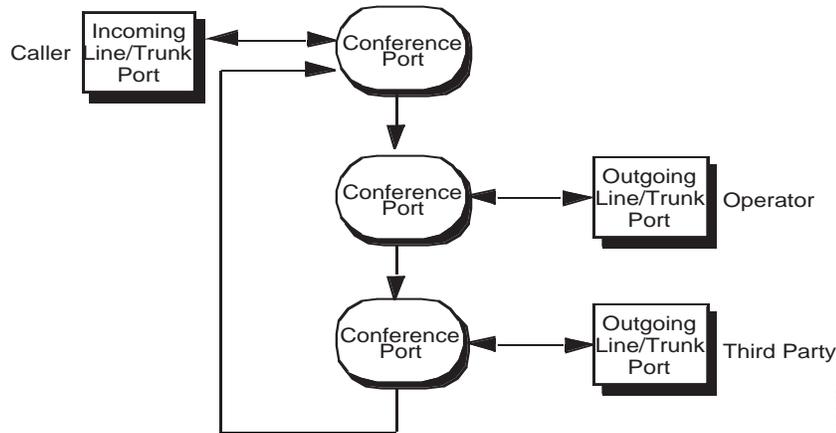


Figure 5-7 shows operator services conference structure.

*Figure 5-7 Operator Services Conference Structure*



## Programmable Attenuation Device (PAD)

Assume a stable call between an incoming port at address \$20 and an outgoing port at address \$50 is in progress (both ports in CP\_STAB state).

The host determines that the input from the incoming port must be increased. The command below starts a conference and raises the incoming port input level by 1.5 dB.

```
6D 00 40 02 F0 00 20 00 00 50
```

Both ports are now in CP\_SETUP state. Return All was specified in the Network Control byte of the Network Header. The system returned a conference number of 06 to the host.

The conference ends when both ends go on hook (hang up). Both ports are returned to CP\_IDLE. No host command is required.

Figure 5-8 shows programmable attenuation device voice paths.

Figure 5-8 Programmable Attenuation Device Voice Paths

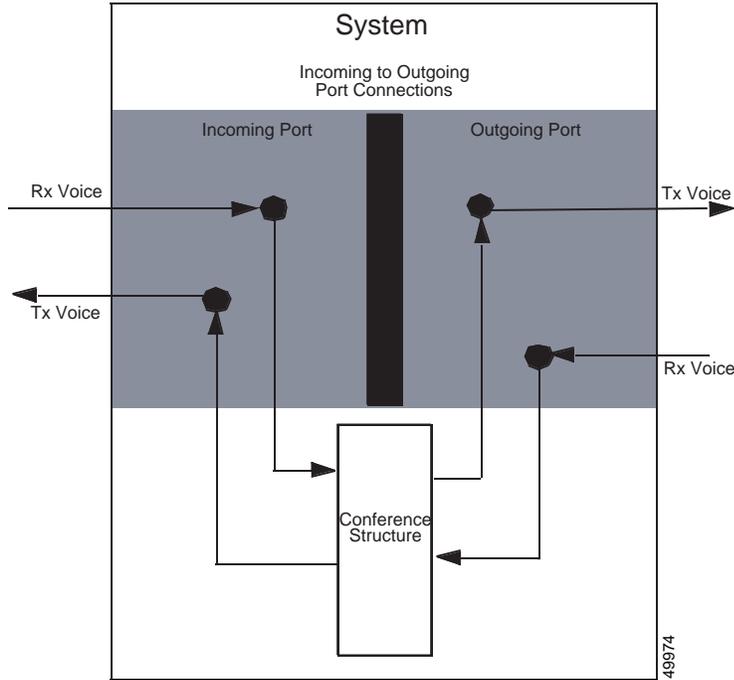


Figure 5-9 shows programmable attenuation device conference structure.

Figure 5-9 Programmable Attenuation Device Conference Structure

