Preface

Objective

The Cisco VCO/4K Hardware Installation Guide describes the procedures for installing and connecting a VCO/4K system. Before installation, read the *Cisco VCO/4K Hardware Planning Guide*, along with the *Cisco VCO/4K Site Preparation Guide*.

Use the checklist in the *Cisco VCO/4K Site Preparation Guide* to verify that the site is prepared according to the guidelines.

Note This document represents the most current information about VCO/4K mechanical assemblies. If you need information pertaining to VCO/4K assemblies, circuit cards, or other components that are not included in this document, see the following URL on Cisco's web site for legacy VCO/4K information:

http://www.cisco.com/univercd/cc/td/doc/product/tel_pswt/index.htm

Audience

This manual is intended for VCO/4K system users and third-party support personnel. If you are unfamiliar with the VCO/4K system, refer to one or more of the related documents listed in the "Related Documentation" section on page viii.

This manual assumes that the host application (if it is a hosted system) is written to conform to the *VCO API Programming Reference Manual*. However, that does not preclude problems occurring between the application and the VCO/4K system.

Each release of the VCO/4K Generic is described in the *Cisco VCO/4K Release Notes* that contain detailed information on changes from one release to the next. If your VCO/4K System includes the SS7 subsystem, refer to the *SS7 Release Notes*.

Conventions

This document uses the following conventions:

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

Caution Means *reader be careful.* In this situation, you might do something that could result in equipment damage or loss of data.

Warning Warning Means *danger.* You are in a situation that could cause bodily injury. Before you work on any equipment, you must be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translated versions of the warning, refer to the *Regulatory Compliance and Safety* document that accompanied the device.

Document Organization and Use

The *Cisco VCO/4K Hardware Installation Guide* is organized as follows:

- Chapter 1, "System Installation," explains how to move, unpack, check for damage, install the system in a cabinet or rack, connect the power, and connect cables.

- Chapter 2, "Peripheral Equipment Installation," describes connection options for VCO/4K peripheral equipment.

- Chapter 3, "Power, Configuration, and Testing," describes connecting power to the Power Entry Module, power-on procedures, and system testing.

- Chapter 4, "Cutover and Acceptance Testing," describes the transition to call handling.

Related Documentation

The following documents are referenced from this guide or contain information that is directly related to system performance and configuration.

Knowledge of PSTN communication protocols is also important.

VCO/4K System

- Cisco VCO/4K System Software Release Note
- Cisco VCO/4K SS7 ISUP Release Notes
- Cisco VCO/4K TCAP Release Notes
- Cisco VCO/4K *Product Overview*
- Cisco VCO/4K Hardware Planning Guide

- Cisco VCO/4K *System Maintenance Manual*
- Cisco VCO/4K Mechanical Assemblies
- Cisco VCO/4K Standard Programming Reference
- Cisco VCO/4K Extended Programming Reference
- Cisco VCO/4K System Administrator's Guide
- Cisco VCO/4K Ethernet Guide
- Cisco VCO/4K Site Preparation Guide
- Cisco VCO/4K Card Technical Descriptions
- Cisco VCO/4K Troubleshooting Guide
- *Ring Generator Instruction Sheet* (included with the ring generator kit)

The VCO/4K documents are available at:

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http://www.cisco.com/univercd/cc/td/doc/product/tel_pswt/
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Third-party Documents

The following third-party documents are recommended by Cisco:

- Theodore Frankel's *ABC Of the Telephone: Traffic Series – Tables For Traffic Management And Design*
- International Telecommunications Union ITU-T Q.931 ISDN documentation
- ANSI T1.113-1992, SS7 ISUP documentation
- OEM manuals supplied with peripheral equipment installed as part of the system configuration
- The documentation set produced for the host computer system
- Documentation for the application software package developed to run on the host

Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at the following sites:

- http://www.cisco.com
- http://www-china.cisco.com
- http://www-europe.cisco.com

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or as an annual subscription.

Ordering Documentation

Cisco documentation is available in the following ways:

- Registered Cisco Direct Customers can order Cisco Product documentation from the Networking Products MarketPlace:

  http://www.cisco.com/cgi-bin/order/order_root.pl

- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:

  http://www.cisco.com/go/subscription

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, in North America, by calling 800 553-NETS(6387).

Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can submit technical comments electronically. Click **Feedback** in the toolbar and select **Documentation**. After you complete the form, click **Submit** to send it to Cisco.

You can e-mail your comments to bug-doc@cisco.com.

To submit your comments by mail, for your convenience many documents contain a response card behind the front cover. Otherwise, you can mail your comments to the following address:

Cisco Systems, Inc.
Document Resource Connection
170 West Tasman Drive
San Jose, CA 95134-9883

Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain documentation, troubleshooting tips, and sample configurations from online tools. For Cisco.com registered users, additional troubleshooting tools are available from the TAC website.

Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information and resources at anytime, from anywhere in the world. This highly integrated Internet application is a powerful, easy-to-use tool for doing business with Cisco.

Cisco.com provides a broad range of features and services to help customers and partners streamline business processes and improve productivity. Through Cisco.com, you can find information about Cisco and our networking solutions, services, and programs. In addition, you can resolve technical issues with online technical support, download and test software packages, and order Cisco learning materials and merchandise. Valuable online skill assessment, training, and certification programs are also available.

Customers and partners can self-register on Cisco.com to obtain additional personalized information and services. Registered users can order products, check on the status of an order, access technical support, and view benefits specific to their relationships with Cisco.

To access Cisco.com, go to the following website:

http://www.cisco.com

Technical Assistance Center

The Cisco TAC website is available to all customers who need technical assistance with a Cisco product or technology that is under warranty or covered by a maintenance contract.

Contacting TAC by Using the Cisco TAC Website

If you have a priority level 3 (P3) or priority level 4 (P4) problem, contact TAC by going to the TAC website:

http://www.cisco.com/tac

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:

http://www.cisco.com/register/

If you cannot resolve your technical issue by using the TAC online resources, Cisco.com registered users can open a case online by using the TAC Case Open tool at the following website:

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:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

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.

System Installation

This chapter describes the procedures for installing and connecting a VCO/4K system. Before installation, read the *Cisco VCO/4K Hardware Planning Guide*, along with the *Cisco VCO/4K Site Preparation Guide.*

Use the checklist in the *Cisco VCO/4K Site Preparation Guide* to verify that the site is prepared according to the guidelines.

It is easier to install the system as it is unpacked. Therefore, move the crated system to the installation location before you begin.

Safety Precautions

Observe the following safety precautions:

- Never install telecommunication circuits during a lightning storm.

- Never install telecommunication connections in wet locations unless the connector is specifically designed for wet locations.

- Never touch uninsulated telecommunication wires or terminals unless the circuit is disconnected at the network interface.

- Use caution when installing or modifying telecommunication circuits.

- Avoid contact with the backplane during the installation process to minimize the risk of injury from hazardous voltages.

- Two or more people are required to position the VCO/4K system. The Occupational Safety and Hazards Administration (OSHA) recommends a lifting weight limit of 40 pounds for women and 75 pounds for men. Observe local, regional, and national safety codes, as well as your company's safety rules and regulations. Refer to the *Cisco VCO/4K Site Preparation Guide* for the dimensions and weights of the systems.

Note To decrease the weight and make the system easier to handle, you can remove the power supply modules from the front of the VCO/4K (see Figure 1-1 and the *Open Me First* documentation packed with the system). This is also explained in the following procedures.

- Use an ESD wrist strap connected to the system for grounding to minimize the risk of damage when removing or replacing a system component.

- A licensed electrician must connect the feeds to the power entry module on the VCO/4K system according to the chart on the inside of the power protection cover.

Unpack and Inspect the System

The VCO/4K system is shipped as a complete unit. All the system components, including circuit cards, power subsystems, and storage subsystems, are mounted in the system. Cisco Systems loads the generic software on the system hard disk(s) and provides generic software copies on 3.5-inch floppy disks.

Peripheral equipment (master consoles, printers, modems) and interconnecting cables ordered through Cisco Systems are identified on the shipping and packing lists and shipped in OEM or separate containers.

Inspect all cartons at the time of delivery for signs of damage during transit. Notify the carrier and your insurance company if there is any shipping damage.

Refer to the *Open Me First* instructions that come with the system for complete instructions on inspecting the container and unpacking the system.

After unpacking the system, inspect all cables and cards. Look for signs of misalignment or abrasion that might have occurred during shipping, or when the system was removed from the shipping container. If the inspection reveals any signs of shipping damage, contact your shipper.

Figure 1-1   Front of VCO/4K
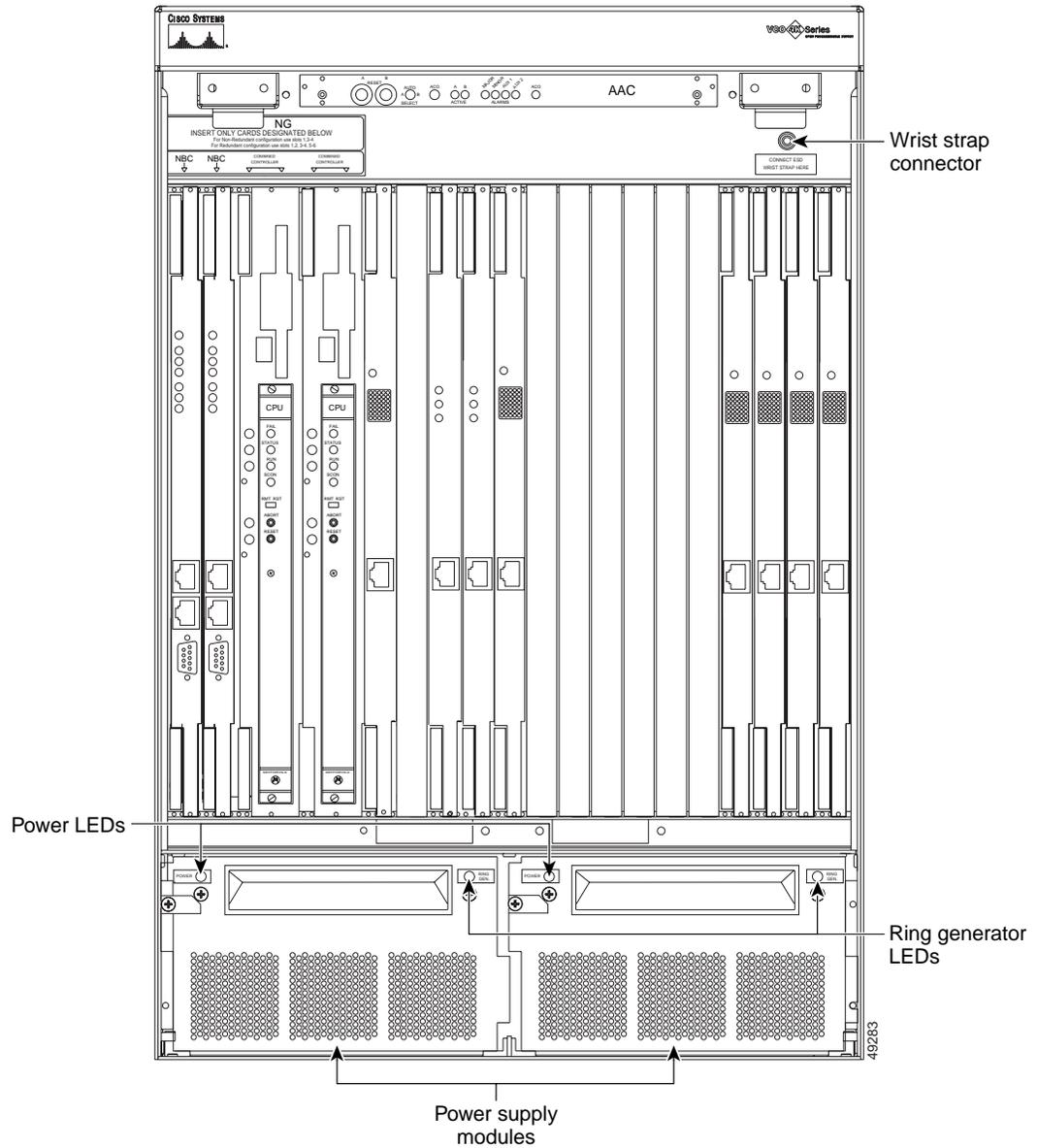
Installing the System

You can install the VCO/4K system in a cabinet or rack, or on a table or the floor. The following sections contain checklists for installing the system in both configurations.

Installing the System in a Cabinet or Rack

If you are installing the system in a cabinet or rack, set up the cabinet or rack and ensure that it is level and secured to the wall or floor before positioning the VCO/4K.
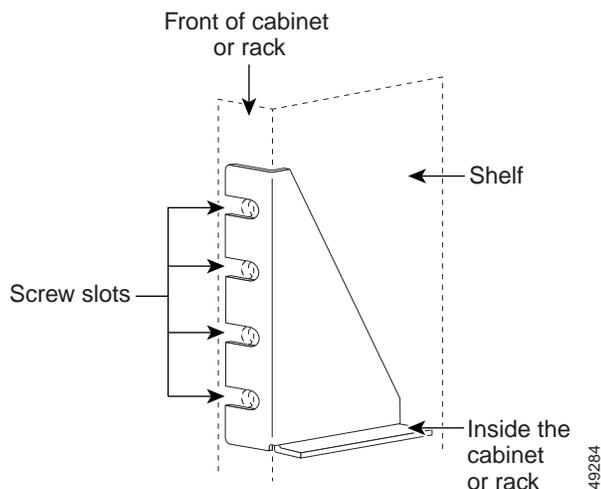
Secure the mounting shelf to the cabinet or rack and secure the mounting brace to the VCO/4K before lifting and placing it in the cabinet or rack.

Securing the Mounting Shelf

When installed in a cabinet or rack, the VCO/4K sits on the mounting shelf (included with the VCO/4K shipment). Secure the shelf to the cabinet or rack by tightening the screws through the screw slots into the cabinet.

Figure 1-2 shows the position of the mounting shelf on the cabinet or rack, and the screw slots.

Figure 1-2   Mounting Shelf

Securing the Mounting Brace

Before installing the VCO/4K in the cabinet or rack, secure the brace at the preferred setback option.

Figure 1-3 shows a mounting brace attached to a VCO/4K. The brace's ears are attached to the front of the cabinet or rack.

Note the setback options that are used for mounting in Figure 1-3. If the mounting brace is attached to the first option, the front of the VCO/4K is flush with the front of the cabinet or rack. If the brace is attached to the second setback option, the VCO/4K protrudes from the front of the cabinet or rack.

Figure 1-3   Mounting Brace
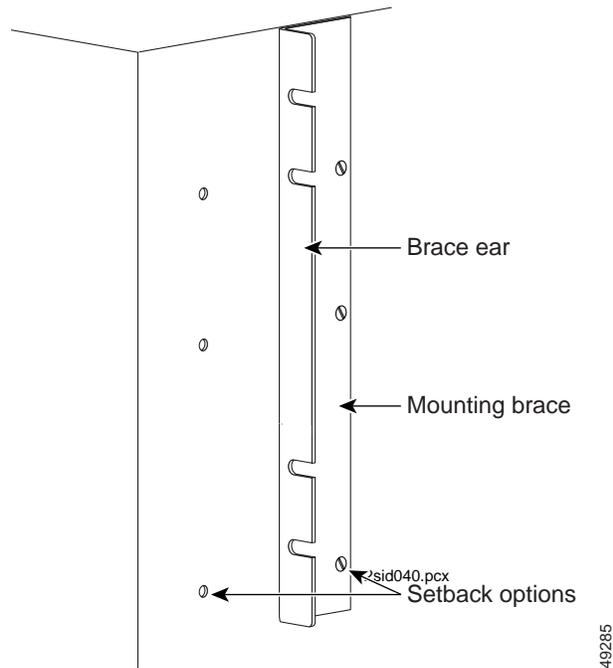
Removing the Power Supply Modules

To make lifting the VCO/4K easier, you can remove the power supply modules with the following steps:

Step 1 Remove the front door as follows:

   a. Unlock the door (if necessary).

   b. Lift up on the two latch handles at the top.

   c. Lift the door up and out.

Step 2 Remove the two mounting screws on each power supply module with a Phillips-head screwdriver.

Step 3 Pull the two power supply modules out to disconnect them from the power backplane.

Mounting the System

After securing the mounting brace and shelf on the cabinet or rack, install the VCO/4K with the following steps:

Step 1 Position the system into the cabinet or rack on the mounting shelf.

⚠

Caution Use a minimum of two people to lift the system.

Step 2 Secure the system to the cabinet or rack by tightening the screws in the screw slots (see Figure 1-2).

Note   Ensure that the VCO/4K is resting securely on the mounting shelf before you tighten the screws.

Step 3   Verify that the fuses are correct before installing the power supply modules.

Each power supply module has one 25-amp fuse, either AC or DC power, and for either 120V at 50 Hz or 60 Hz, or 240V at 50 Hz or 60 Hz. The fuse is in the back of the power supply module.

Step 4   Connect the power supply modules before continuing.

   a. Push the power supply modules in until they connect with the power backplane and are flush with the VCO/4K cabinet.

   b. Secure the four mounting screws to the power supply modules with a Phillips-head screwdriver. Ensure that the black metal tabs are also secured.

Use the following checklist to ensure that each step is completed:

1. ___ Set up or prepare the rack for the system.

2. ___ Install the mounting shelf (included in the optional carton) in the rack.

3. ___ Install the mounting brace (included in the optional carton) on the VCO/4K.

4. ___ Remove the VCO/4K power supply modules from the bottom of the enclosure.

5. ___ Position the VCO/4K in the cabinet or rack.

6. ___ Bolt the VCO/4K to cabinet or rack.

Installing the System on the Floor or Table

If you are installing the system on the floor or a table, ensure that the system is level. Refer to the *Cisco VCO/4K Site Preparation Guide* for information on selecting and preparing an independent location for the VCO/4K.

A separate package contains rubber feet for installing the system on the floor or a table.

Installing the rubber feet on the system requires two people. Use the following steps:

Step 1   One person tilts and holds the enclosure, leaving the other side raised from the floor and the bottom accessible to a second person. Do not tilt the system beyond a 45-degree angle without sufficient leverage or assistance from a third person.

Step 2   The second person screws the rubber feet to the bottom corners of the raised side.

Step 3   After the installer moves out from under the system, lower the enclosure.

Step 4   Repeat Step 1 and Step 2 for the other side.

Step 5   Verify that the fuses are correct before installing the power supply modules.

Step 6   Connect the power supply modules before continuing.

   a. Push the power supply modules in until they connect with the power backplane and are flush with the VCO/4K cabinet.

    b. Secure the four mounting screws to the power supply modules with a Phillips-head screwdriver. Ensure that the black metal tabs are also secured.

Use the following checklist to ensure that each step is completed:

1. ___ Ensure the installation location is level.

2. ___ Remove the VCO/4K power supply modules from the bottom of the enclosure.

3. ___ Install the rubber feet on the bottom of the VCO/4K.

4. ___ Position the VCO/4K.

Connecting Power to Power Entry Module

⚠
Caution   A licensed electrician must connect the feeds to the power entry module on the VCO/4K system according to the chart on the inside of the power protection cover.

Connecting the Power Source

The VCO/4K power subsystem receives electrical power from one three-conductor cable for single-line feed AC operation, two two-conductor cables for dual-line feed DC operation, or one one-conductor cable for single-line feed DC operation, all rated for 600 volts. Use a dedicated feed(s) [i.e., dedicated branch circuit(s)] and sufficiently sized conductors to route the power from a nearby power panel. Terminate the feed as a drop cable or in an appropriate outlet receptacle.

The power supply modules are identical; however, if a ring generator is present, it is installed in the left module. The type of input power (AC or DC) required by the VCO/4K is noted on the front of each power supply module. A label at the rear of your power entry module (PEM) will either specify your system's input power type (see Figure 1-4) or list both possibilities (see Figure 1-5). Always verify by looking at the front of each power supply module. Power travels from the power entry module to the power backplane, then to the power supply module which feeds the VCO/4K chassis.

⚠
Caution   Before connecting power to the VCO/4K, turn off the power switch on the power entry module (see Figure 1-4).

See Table 1-1 for AC and DC wiring connections.

Table 1-1   Input Wiring Connections for AC and DC VCO/4K Systems

Conductor	Terminal
Single Feed –48 VDC (nominal)	
Jumper 1	TB1 to TB4
Jumper 2	TB2 to TB5
Battery return (+)	TB4
Battery (–)	TB5
Ground (optional)	TB3

Table 1-1   Input Wiring Connections for AC and DC VCO/4K Systems (continued)

Conductor	Terminal
Dual Feed –48 VDC (nominal)	
Battery Return A (+)	TB1
Battery A (–)	TB2
Battery Return B (+)	TB4
Battery B (–)	TB5
Ground	TB3
Single Feed 120 VAC (nominal)	
Neutral	TB5
Line	TB2
Ground	TB3
Single Feed 240 VAC (nominal)	
Line 1	TB2
Line 2	TB5
Ground	TB3

Place a voltmeter on the power feed(s) to ensure that the voltage is within the power ratings range (see Figure 1-4, Figure 1-5, and Table 1-2).
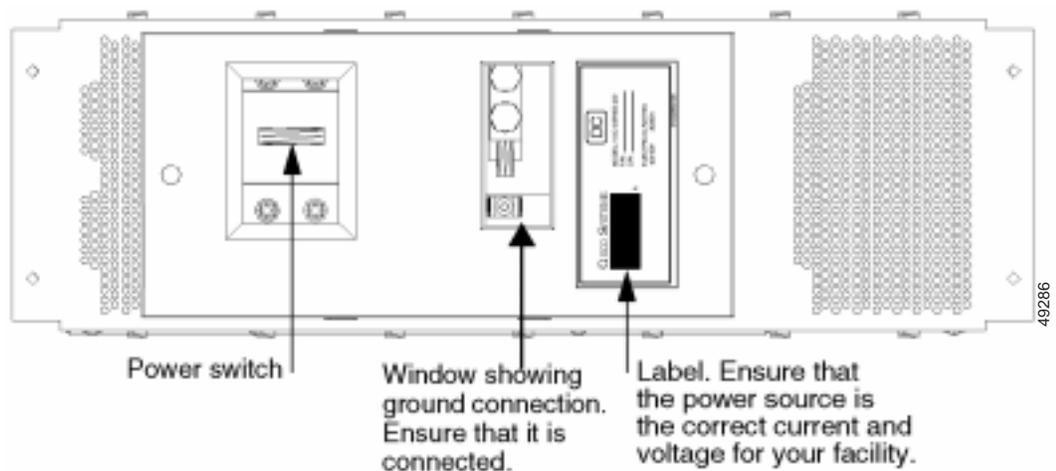
Figure 1-4   Components of the Power Entry Module (Terminal Block) With Input Power Type Specified—Rear of the VCO

Power switch

Window showing ground connection. Ensure that it is connected.

Label. Ensure that the power source is the correct current and voltage for your facility.

Figure 1-5   Components of the Power Entry Module (Terminal Block) Without Input Power Type Specified—Rear of the VCO

Power switch

Window showing ground connection. Ensure that it is connected.

Label.

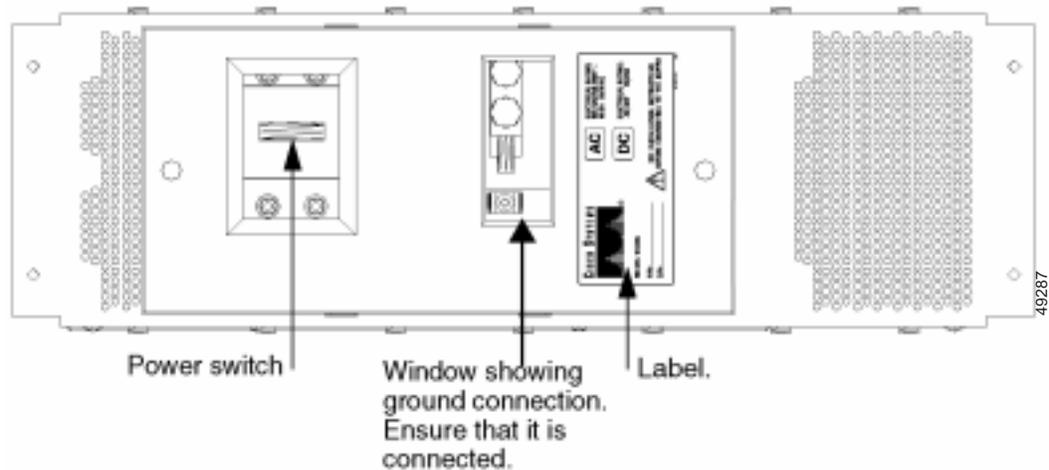*Table 1-2   Power Input Ratings*

Source	Range	Current	Frequency
–48 VDC (per feed)	–40 to –60 VDC	20 amps	DC
120 VAC, single phase	100 to 120 VAC	10 amps	50/60 Hz
240 VAC, single phase	208 to 240 VAC	5 amps	50/60 Hz

Connecting the Power Cable

Warning   **Before you connect the power cable, ensure that the cable is not plugged in to the source.**

The following tools are required to connect the power cable to the power entry module (PEM):

- #2 Phillips-head screwdriver
- 5/16-inch and 7/16-inch nutdrivers
- Wire strippers
- Diagonal cutters
- Crimping tool
- Adjustable torque wrench with 7/16-inch socket

Use the following steps to connect the power cable.

Warning   **Do not open the power entry module (PEM) or you will void your Cisco Systems warranty.**

Step 1   Use a #2 Phillips-head screwdriver to remove the two screws holding the PEM safety cover and remove the safety cover. See Figure 1-6 and Figure 1-7.

Cisco VCO/4K Hardware Installation Guide ▪

Step 2   Strip about 0.5 inch (13 mm) of insulation from the end of each power and ground cable to be connected to the PEM.

Step 3   Slip stripped end of cable into the end of a lug and crimp firmly. Repeat for all cables.

Step 4   Use a 5/16-inch nutdriver to loosen the hex nuts holding the strain relief(s).

Step 5   Feed the power source cables through the strain relief(s).

Step 6   Install each lug at the desired terminal according to the chart on the inside of the PEM safety cover (see Table 1-3). Use two brass 1/4-20 hex head bolts and lockwashers per lug: hand tighten the bolts. Repeat until all lugs are installed.

Note   For a single DC feed, you must install two external jumpers: a/rtn to b/rtn and a/bat to b/bat. Jumpers are supplied in the PEM VCO/4K kit.

Table 1-3   Power Input Board Connections

Power Input Board Connections

Terminal Label	AC Line Feed		Frame gnd	Single Line Feed DC		Dual Line Feed DC			
	AC line 1	AC line2	Frame gnd	DC rtn	DC bat	DC a/rtn	DC a/bat	DC b/rtn	DC b/bat
TB1						X			
TB2	X						X		
TB3			X						
TB4				X				X	
TB5		X			X				X

Step 7   Use an adjustable torque wrench equipped with a 7/16-inch socket to tighten each hex head bolt on every lug to 45 to 61 inches per pound.

Step 8   Secure the cables into the tie wrap mounts below each terminal using the nylon ties supplied in the VCO/4K PEM kit. Slip a tie through the slots in each mount, wrap the tie around the cable, slide the tie through its lock, tighten and cut off the excess.

Step 9   *For AC input only:* If necessary, install a plug on the end of the power cable to mate with the supply receptacle. Refer to the OEM instructions supplied with the connector and Table 1-1.

Splice or plug the power cable from the PEM into the AC feed. Splices must be completed in an approved receptacle or junction box. Secure the receptacle or junction box by installing an appropriate cover before proceeding.

Step 10   Use an ohm meter to measure continuity from the earth ground lug (TB3) to a ground point; resistance should be less than 1 ohm.

Step 11   With the power switch Off at the PEM, apply power to the feed(s) into the VCO/4K switch.

Step 12   Use a voltmeter to test the input voltages (see Table 1-2).

Step 13   Replace the PEM safety cover. Use a #2 Phillips-head screwdriver to replace the two retainer screws.

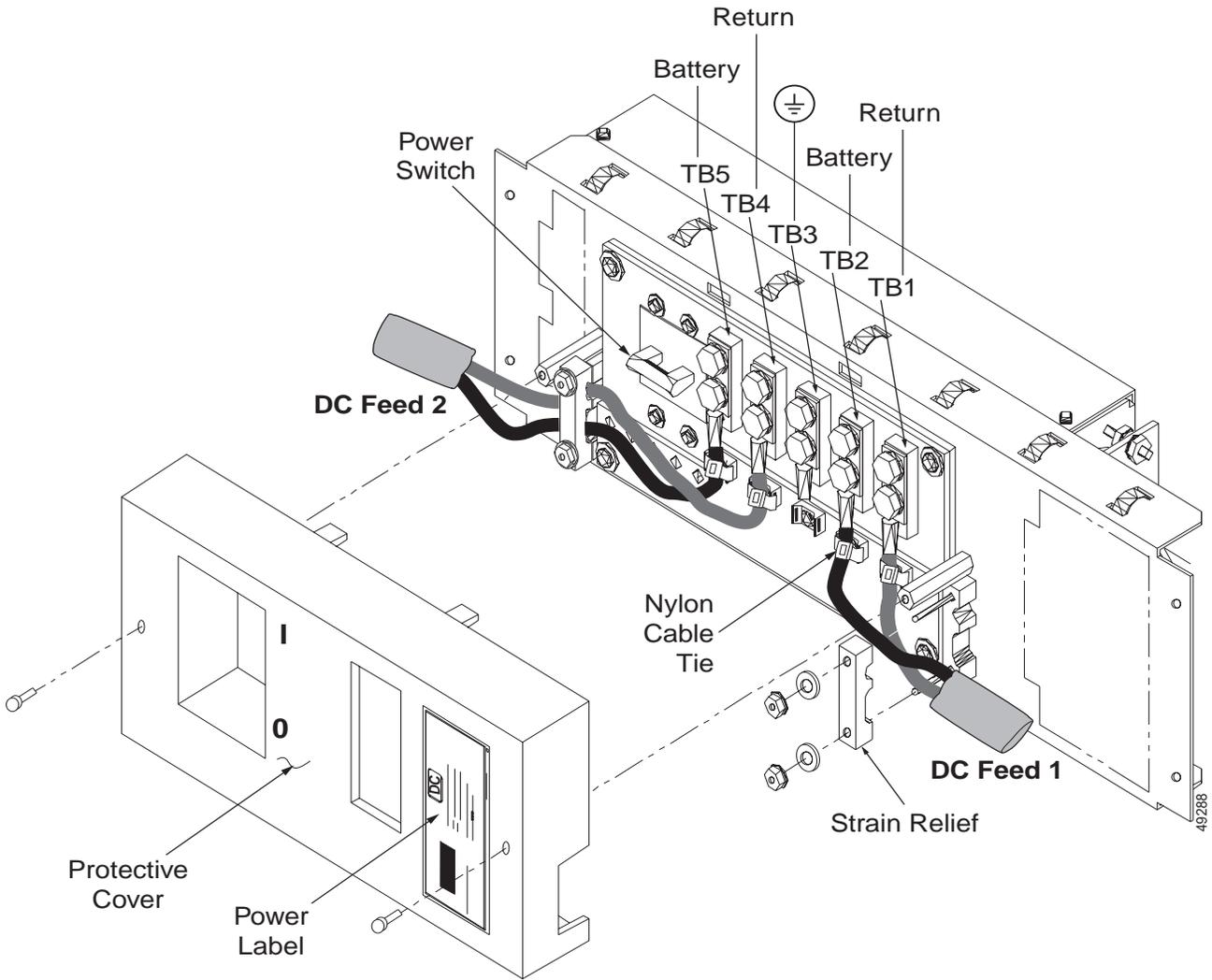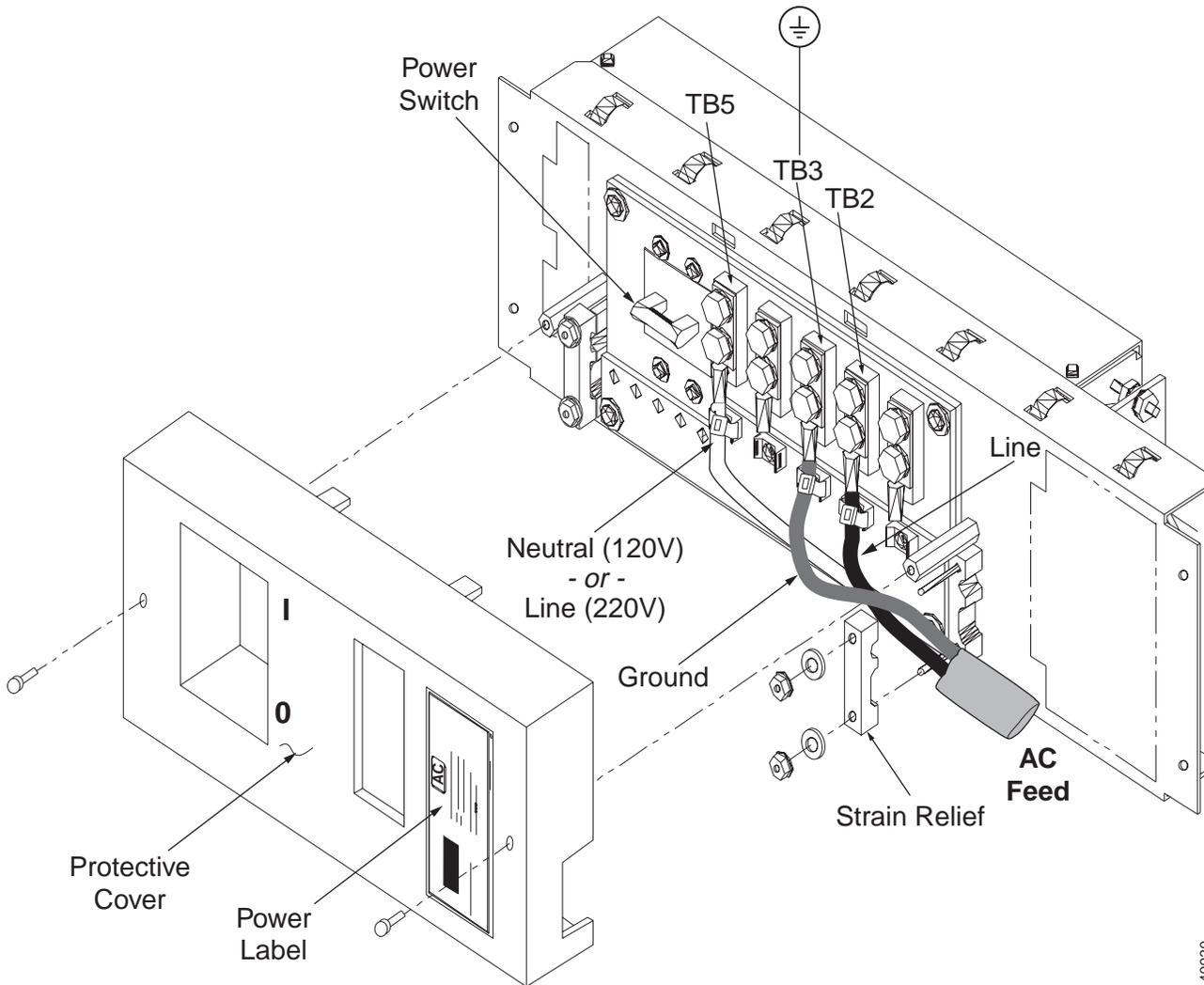*Figure 1-6   Power Entry Module Connections - Dual DC Feeds*

Figure 1-7   Power Entry Module Connections - 120 VAC Feeds

Use the following checklist to ensure that each step is completed:

1. ___ Verify that the fuses are correct before installing power supply modules.

2. ___ Install the power supply modules.

3. ___ Connect the system power supply.

4. ___ Connect the network cables.

5. ___ Connect the peripherals.

6. ___ Connect the external alarms.

7. ___ Connect the VCO/4K to the host computer.

8. ___ Power the system on.

9. ___ Log in.

    a. Set up the terminal.

    b. Set up the database.

    c. Set the timing: external or internal.

    d. Perform the cutover testing.

LED Indicators

There are two LEDs on the front of the power supply module: the power LED on the left side, and the Ring Generator LED on the right side. Figure 1-1 shows the location of the LEDs.

Power LED

The power LED is on the upper left side of the power supply module. When illuminated, it is either green or red.

- Green indicates that the power is on and operation is normal.

- Red indicates a voltage failure, although the interlock switch is closed and the power is on. Replace either the fuse (on back of the power supply module) or the power supply module. See the "Removing the Power Supply Modules" section on page 1-5.

- When the LED is off, or if it glows a faint red (reduced illumination), the interlock switch is open (power to the module is turned off).

Ring Generator LED

The Ring Generator LED is on the upper right side of the power supply module. When illuminated, it is either green or red.

- Green indicates that a ring generator is installed and working correctly.

- Red indicates a ring generator failure.

- When the LED is off, there is no ring generator present in that power supply module.

Ring Generator

The ring generator is active only when it is installed in the left power supply module. Ring generators can be installed in both power supply modules in a redundant system. However, the ring generator in the right power supply module is not connected to the system and is considered a spare. Power loss to the left power supply module results in loss of the ring generator.

Ring Generator Kit

You can order the Ring Generator Kit from Cisco Systems. It includes the ring generator, label, and bracket. The default voltage and frequency setting is 77 VAC. Contact Cisco Systems if voltage and/or frequency requirements in your country are different.

Part Number	Contact your Cisco Systems sales representative
Power	77 VAC
Output	30 volt-amperes

The Ring Generator Kit includes:

- Ring generator
- Bracket assembly:
  - Two screws
  - Two lock washers
  - Bracket
  - Two standoffs
- Two circuit configuration jumpers (JP6 and JP7)

Installing the Ring Generator

Installation procedures for the ring generator are included in the Ring Generator Kit.

> **Note**   Cisco Systems recommends that you store the installation procedures with this installation manual.

Cable Connections

Set up the network interface, as described in the *Cisco VCO/4K Site Preparation Guide*, before moving the system into the equipment room.

> **Note**   Cisco suggests that you consult a cable management expert for help in planning and installing system cables.

Peripheral Equipment Installation

This chapter describes procedures for connecting peripheral equipment to a VCO/4K system.

Options for Connecting Peripheral Equipment

If your VCO/4K has redundant control (two Storage/Control I/O Modules), you have three options for connecting peripheral equipment:

- Manually move peripheral cable connections between one Storage/Control I/O Module and the other as necessary.
- Purchase two sets of peripheral equipment and connect one set to each Storage/Control I/O Module.
- Connect one set of peripheral equipment to both Storage/Control I/O Modules through either a manual or automatic A/B transfer switch.

Figure 2-1 shows the three options.

Figure 2-1   Peripheral Equipment Interconnection Options for a Redundant System
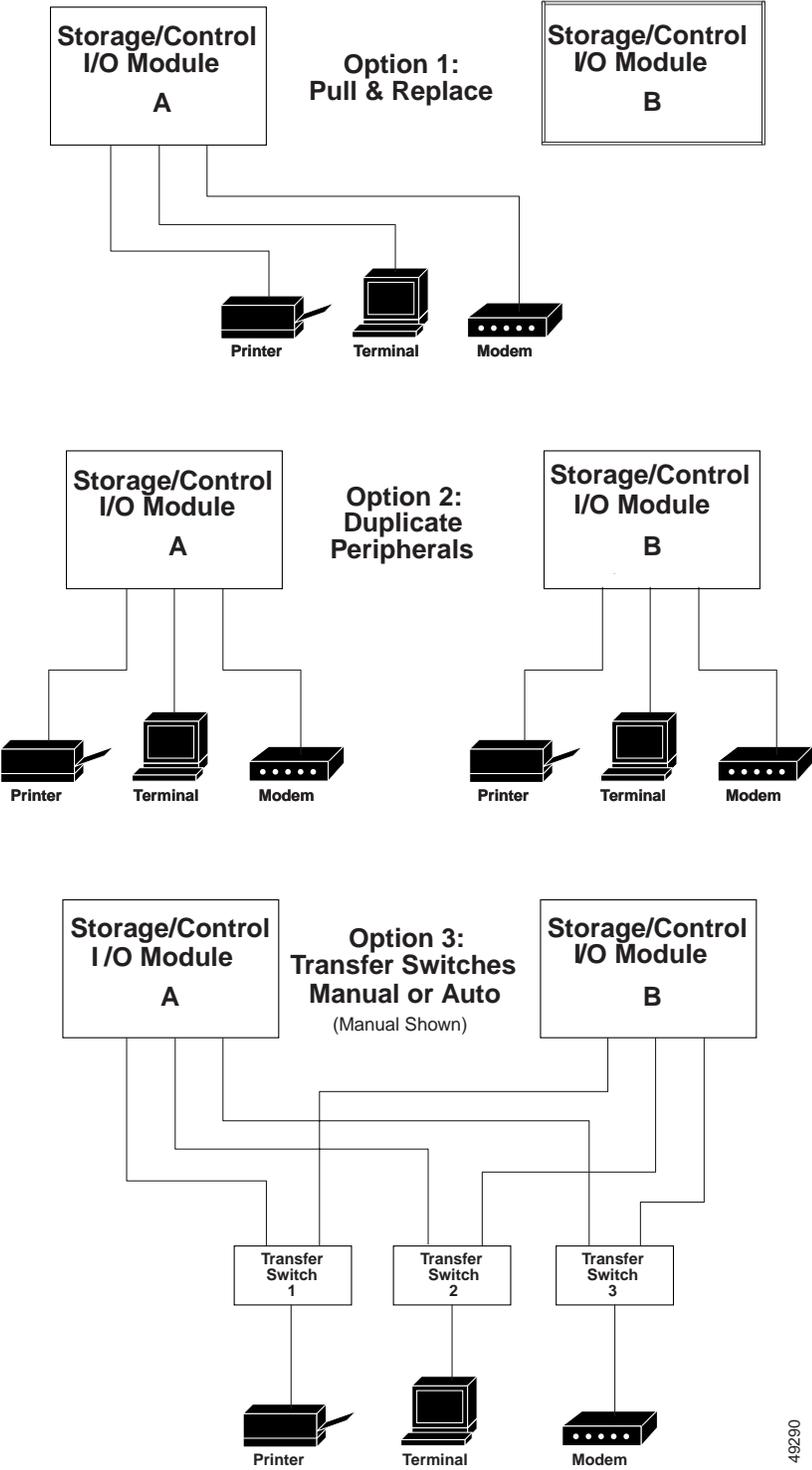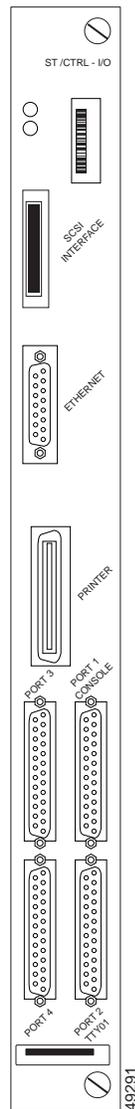
Installing the Master Console

System administrators use the master console screens to create and maintain the database, and perform diagnostic and maintenance procedures. This section describes how to connect the console to the system. The VCO/4K requires a video display terminal (VDT) with VT220/320 emulation as a master console. Cisco Systems supports the following terminals: VT220/320, WYSE Technology WY-185, and WYSE Technology WY-185ES.

The console connects directly to a dedicated serial port (Port 1 Console) on the Storage/Control I/O Module via an EIA/TIA-232 cable (see Figure 2-2).

*Figure 2-2   Storage/Control I/O Module Peripheral Port Assignments*

Use the following steps to install the master console.

> **Note** If you already have a VDT, go to Step 5.

Step 1 Unpack the VDT from its OEM carton and inspect for shipping damage.

Step 2 Position the VDT components on a suitable surface within cable length from the VCO/4K system.

Step 3 Follow the OEM instructions for connecting the keyboard to the VDT.

Step 4 Perform any additional installation steps indicated by the OEM instructions. These may include installing the legend strip on the keyboard or placing peel-and-stick keypad labels on the appropriate keys. Your keypad should match the keypad shown in Figure 2-3.

Figure 2-3   Digit Keypad Labels
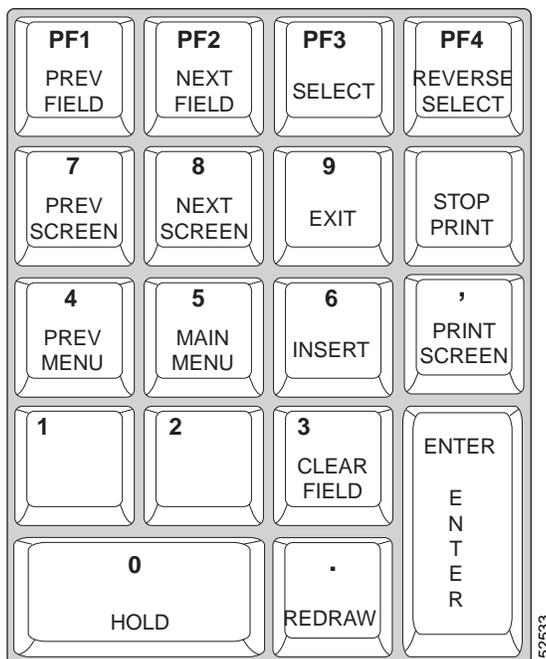
Step 5 Connect the AC line cord from the VDT to a general service AC receptacle.

Step 6 Connect a serial cable (EIA/TIA-232) to the serial communication port on the VDT. Figure 2-4 shows which pins in the cable connector carry the signals.

Figure 2-4   Master Console EIA/TIA-232 Cable Diagram

Storage/Control I/O Module
Serial Port 1/Console   **VT220/320 Console**
(DB25-P)   **(DB25-S)**
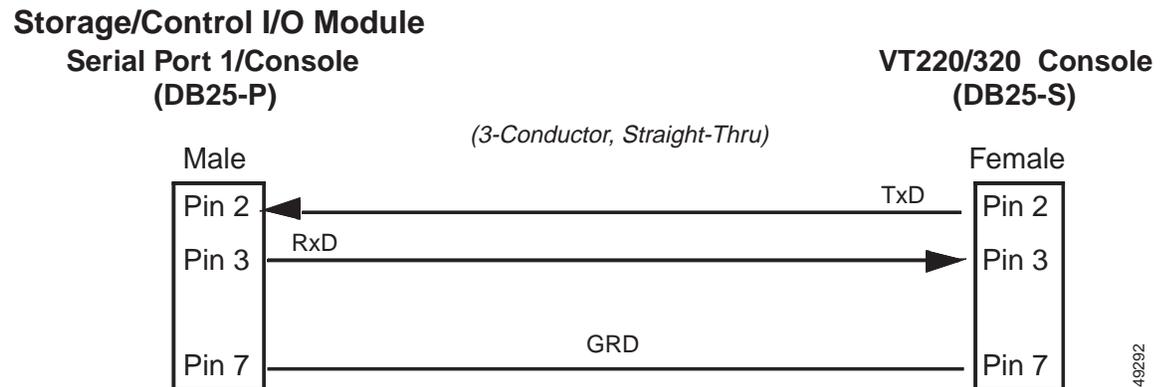
You can use a 25-conductor, straight-through cable to connect a system console to the Storage/Control I/O Module. However, only the conductors shown in Figure 2-4 are used.

If you are connecting the system console to redundant Storage/Control I/O Modules through a transfer switch, go to the "Installing a Manual Transfer Switch" section on page 2-7 (for manual switch) or to the "Installing Automatic External A/B Transfer Switches Units (ASU)" section on page 2-9 (for automatic switch).

Step 7   Connect the serial cable (EIA/TIA-232) connector to the port labeled **Port 1 Console** on the back panel of the Storage/Control I/O Module.

Step 8   To connect a duplicate console to a redundant Storage/Control I/O Module, repeat Step 1 to Step 7.

Installing the System Printer

The system printer produces a hard copy of the database and system log file error and status messages. Administrators can print system reports with the system print utilities.

The VCO/4K system printer must be a parallel printer with a Centronics-type interface. Cisco recommends using a dot-matrix printer with a pin or tractor feed option that accepts continuous feed paper. The default report generation format is 8 1/2 inches by 11 inches (21.6 cm by 27.9 cm).

To install a system printer, follow these steps:

Step 1   Unpack the printer from its OEM carton and inspect it for shipping damage. Remove all packing materials from inside the printer.

Step 2   Position the printer on a suitable surface within cable length from the VCO/4K system.

Step 3   Connect the AC line cord from the printer to a general service AC receptacle.

Step 4   Connect a parallel cable to the interface port on the printer.

A Centronics-to-Centronics cable is available from Cisco to connect the parallel printer interface on the Storage/Control I/O Module.

Step 5   Connect the parallel cable to the port labeled **Printer** on the back of the Storage/Control I/O Module. See Figure 2-2.

Step 6 To connect a duplicate system printer to a redundant Storage/Control I/O Module, repeat Step 1 to Step 5.
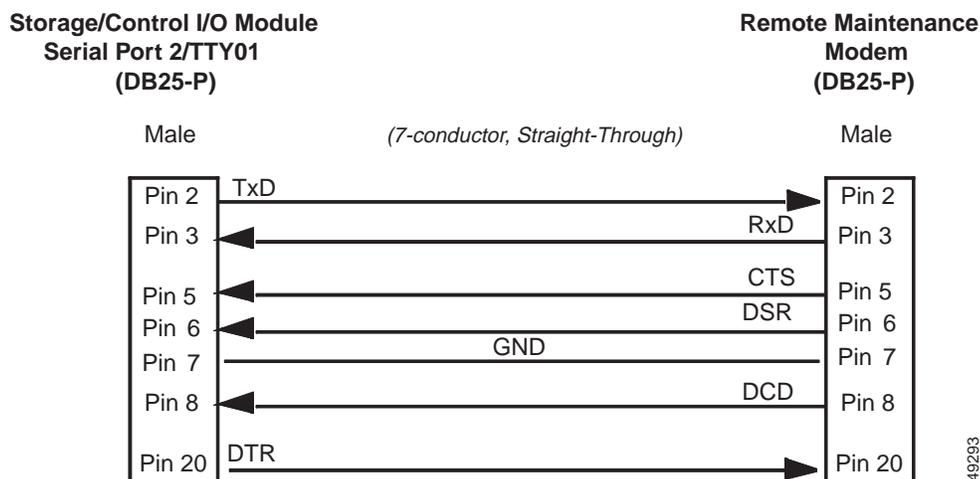
Installing the Remote Maintenance Modem

You can use a serial modem for remote maintenance of a VCO/4K system. Cisco Systems Technical Support can also communicate with the system through a serial modem connection and perform diagnostic inquiries about system operation.

The modem is connected to the PSTN through a business line to the local central office (CO). The CO line is terminated on an RJ-11 modular jack located near the modem. Cisco does not recommend routing the modem through a PBX circuit.

To install a remote maintenance modem, follow these steps:

Step 1 Unpack the modem from its OEM carton and inspect it for shipping damage.

Step 2 Position the modem within cable length from the VCO/4K system and line cord distance from the RJ-11 or RJ-45 modular jack.

Step 3 Connect the power pack to a general service AC receptacle. Plug the DC power cord into the rear of the modem chassis.

Step 4 Set the modem to operate according to the parameters defined in the VCO/4K system database. Refer to the modem OEM manual for more information about setting the modem parameters.

Step 5 Connect a serial cable (EIA/TIA-232) to the serial communication port on the modem. Figure 2-5 shows which pins in the cable connector carry the signals.

Figure 2-5   Remote Maintenance Modem Cable Diagram

Step 6 Connect the serial (EIA/TIA-232) cable connector to the port labeled Port 2 TTY01 on the back of the Storage/Control I/O Module (see Figure 2-2).

Step 7   To connect a duplicate remote maintenance modem to a redundant Storage/Control I/O Module, repeat Step 1 to Step 6.

Routing Peripheral Equipment Through Transfer Switches

Using a transfer switch to route one set of peripheral equipment to two Storage/Control I/O Modules has the following advantages:

- Eliminates the need to manually switch cables from one Storage/Control I/O Module to the other.
- Spares the expense of purchasing a second set of peripheral equipment.

A master console, system printer, and remote maintenance modem can be routed through manual or automatic transfer switches to primary and redundant Storage/Control I/O Modules.

Installing a Manual Transfer Switch

A manual, two-way, serial port transfer switch enables you to switch one EIA/TIA-232 input to either of two outputs. In VCO/4K applications, an A/B transfer switch that is capable of switching all 25 EIA/TIA-232 pins is required between each master console, system printer, and remote maintenance modem and redundant Storage/Control I/O Modules (one A/B switch per peripheral).

The transfer switches can be purchased from several supply houses and are available for desktop and rack-mount installations. In addition to the transfer switches, you need six additional cables to connect the six outputs from the transfer switches directly to redundant Storage/Control I/O Modules. The distance from the transfer switches to the Combined Controller determines the length of the six cables.

To install manual transfer switches, follow these steps:

Step 1   Mount the transfer switches in a convenient location. The location is determined by the transfer switch housing and available mounting space on or near the VCO/4K system. Figure 2-6 shows the manual transfer switch connections.

Figure 2-6   Manual Transfer Switch Connections
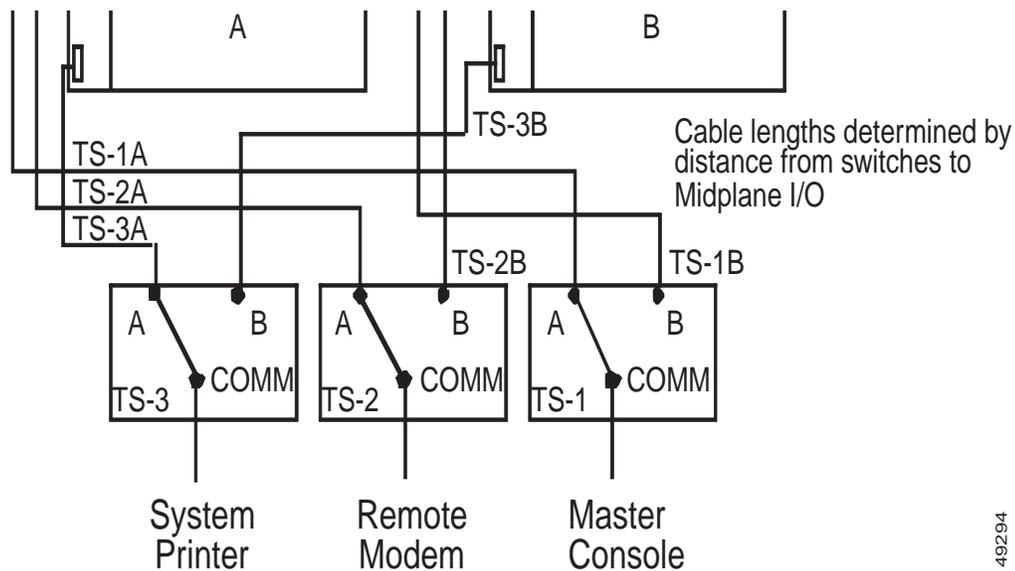
Step 2   Connect the cable from the master console to the input of Transfer Switch 1 (TS-1). Cables from the transfer switch to the master console should be labeled TS-1A and TS-1B.

Step 3   Connect the cable from the remote maintenance modem to the input of Transfer Switch 2. Cables from the transfer switch to the remote maintenance modem should be labeled TS-2A and TS-2B.

Step 4   Connect the cable from the system printer to the input of Transfer Switch 3. Cables from the transfer switch should be TS-3A and TS-3B.

Note   You must use a Centronics-to-DB-25 cable between the transfer switch and system printer. Use a male DB-25-to-Centronics cable from the transfer switch to the VCO/4K system.

Step 5   Route the cables from the Port A outputs of Transfer Switches 1, 2, and 3 (**TS-1A, TS-2A, and TS-3A**) to the connectors on the Storage/Control I/O Module. Connect the cables as shown in Table 2-1.

Table 2-1   Transfer Switch Cable Connections

Peripheral Device	Cable Label	Connector Name
System Console	TS-1A	Port 1 Console
Modem	TS-2A	Port 2 TTY01
System Printer	TS-3A	Printer

Step 6   Route the cables from the Port B outputs of Transfer Switches 1, 2, and 3 (**TS-1B, TS-2B, and TS-3B**) to the connectors on the redundant Storage/Control I/O Module. Connect the cables as shown in Table 2-1.

Step 7   Secure cable connectors to the receptacles on the transfer switches as required.

Step 8   Set all transfer switches to Port A to complete the installation process. For convenient reference, label the front panel of the transfer switches master console (**TS-1**), remote maintenance modem (**TS-2**), and system printer (**TS-3**).

Installing Automatic External A/B Transfer Switches Units (ASU)

> ✎
> **Note**   The following installation procedures apply to the External EIA/TIA-232 A/B Switch and External A/B Switch Drive Cable, available from Cisco Systems.

The ASU switches Pins 2 through 25 between Port A and Port B on a signal from the Alarm Arbiter Card (AAC). One ASU is required for each peripheral device that you need to switch. The peripheral devices (VDT, printer or remote maintenance modem) are cabled to the common port (COM port) of the switch unit.

Six additional cables are required to connect the six outputs from the switches to redundant Storage/Control I/O Modules. The distance from the switches to the Storage/Control I/O Modules determines the length of the six cables.

To install automatic transfer switch units, follow these steps:

Step 1   Mount the transfer switches in a convenient location. The location is determined by the transfer switch housing and the length of the drive cable. Figure 2-7 shows the automatic transfer switch unit connections.

Figure 2-7   Automatic Switching Unit Connections
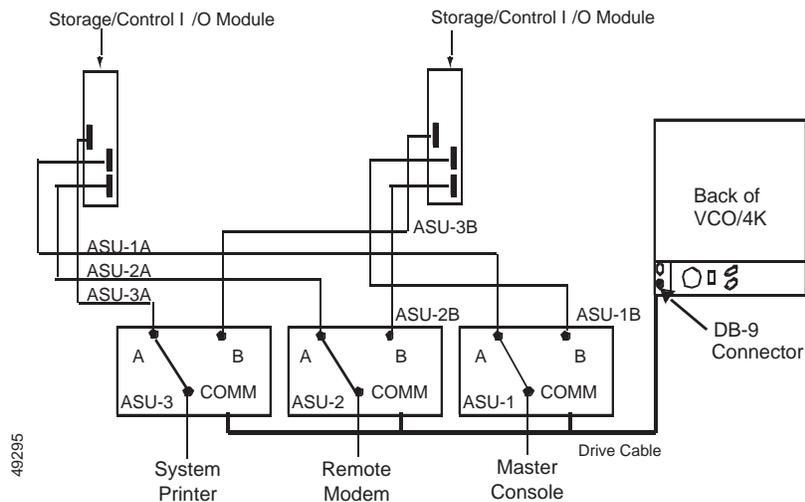
Step 2   Connect the cable from the system console to the COMM Port of ASU-1. Cables from the transfer switch to the Storage/Control I/O Module (Port A and Port B) should be labeled ASU-1A and ASU-1B.

> **Note**   All port connections to the ASUs require male DB-25 connectors.

Step 3   Connect the cable from the remote maintenance modem to the COMM of ASU2. Cables from the transfer switch to the Storage/Control I/O Module should be labeled ASU-2A and ASU-2B.

Step 4   Connect the cable from the system printer to the COMM of ASU-3. Cables from the transfer switch to the Storage/Control I/O Module should be labeled ASU-3A and ASU-3B.

> **Note**   You must use a Centronics-to-DB-25 cable between the transfer switch and system printer. Use a Centronics-to-DB-25 cable from the transfer switch to the VCO/4K system.

Step 5   Route the cables from the Port A outputs of ASU-1A, ASU-2A, and ASU-3A to the connectors on the Storage/Control I/O Module. Connect the cables as shown in Table 2-2.

Table 2-2   Automatic Switch Unit (ASU) Side A Cable Connections

Peripheral Device	Cable Label	Connector Name Storage/Control I/O Module Slots 3 and 4
System Console	ASU-1A	Port 1 Console
Modem	ASU-2A	Port 2 TTY01
System Printer	ASU-3A	System Printer

Step 6   Route the cables from the Port B outputs of ASU-1B, ASU-2B, and ASU-3B to the connectors on the redundant Storage/Control I/O Module. Connect the cables as shown in Table 2-3.

Table 2-3   Automatic Switch Unit (ASU) Side B Cable Connections

Peripheral Device	Cable Label	Connector Name Storage/Control I/O Module Slots 5 and 6
System Console	ASU-1B	Port 1 Console
Modem	ASU-2B	Port 2 TTY01
System Printer	ASU-3B	System Printer

Step 7   Secure cables to the receptacles on the transfer switches as required.

Step 8   Connect the 9-pin, D-subminiature connectors (**J2**, **J3**, and **J4**) of the A/B Switch Drive Cable to the receptacles on the rear of each ASU.

Step 9   Route the cable from the ASUs to the DB-9 connector located at the lower left side on the back of the VCO/4K system.

Step 10   Plug the line cord from each ASU into a 110 VAC, 60-Hz outlet.

Step 11   Set the Select switch on the front panel of each ASU to the **AUTO** position.

Remote Alarm and Remote A/B Switch connectors

The DB-15 external alarm connector is located in the rear of the VCO/4K, next to the power entry module; it is labeled Remote Alarms. The DB-9 remote A/B switch connector is located below the remote alarm connector; it is labeled Remote Switch A/B. See **Figure 2-8.**

Figure 2-8   Remote Alarm and A/B Switch Connectors
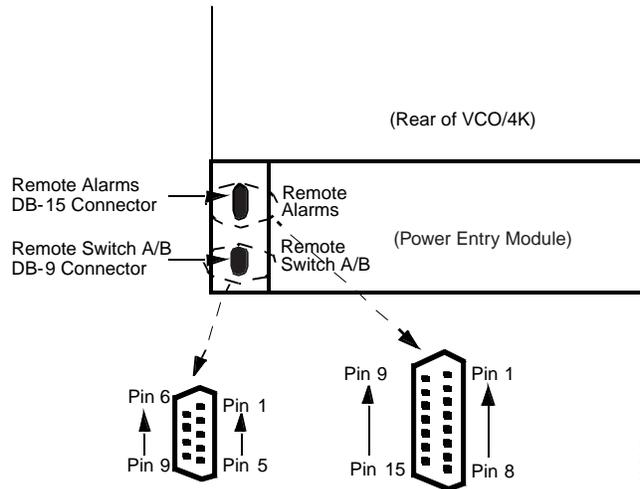
Remote Alarm Connector

Contacts are rated for 0.5 amp @ 24 VDC or 25 VAC (maximum).

⚠️

Caution   Alarm contacts are not rated to handle excessive current. Do not directly connect high current devices (for example, sirens, 110 VAC lamps or bells) to the alarm contacts.

Table 2-4 lists the pin signals for the remote alarm connector.

Table 2-4   Remote Alarm Connector Pinout

Pin	Signal
1	major common
2	minor common
3	aux1 closed
4	aux2 closed
5	major open
6	minor open
7	aux2 common
8	not used
9	major common

Table 2-4   Remote Alarm Connector Pinout (continued)

Pin	Signal
10	minor common
11	aux1 open
12	major closed
13	minor closed
14	aux1 common
15	aux2 open

Remote A/B Switch Connector

Table 2-5 contains the pin signals for the remote A/B switch connector.

Table 2-5   Remote A/B Switch Connector Pinout

Pin	Signal
1	ssel TTL level low = A-side is active high = B-side is active
2-4	not used
5	ground
6-9	not used

Host and SNMP Communication Links

Ethernet communications software provided with the VCO/4K supports TCP/IP communications between the VCO/4K and one or more host computers. Host-controlled applications use SNMP and/or the Cisco VCO/4K host API to communicate with the VCO/4K over the Ethernet connection. The VCO/4K Ethernet communications software supports a single physical link with multiple logical software connections (sockets). For more information concerning software aspects of VCO/4K Ethernet communications, refer to the following documents:

- *Cisco VCO/4K Software Installation Guide*
- *Cisco VCO/4K Ethernet Guide*

Note The VCO/4K system is limited to communication within a single Ethernet LAN. It cannot act as an Ethernet gateway, nor can it route messages through an Ethernet gateway.

The hardware connection for Ethernet communications is facilitated by a DB-15 port on the VCO/4K Storage/Control I/O Module. (See Figure 2-2.) The DB-15 port provides a connection for a thickwire cable to an Ethernet transceiver.

Table 2-6 lists the DB-15 connector pinouts.

Table 2-6   DB-15 Connector Pinouts

Pin	Signal	Signal Name
2	C+	Collision + (Input)
3	T+	Transmit + (Output)
5	R+	Receive + (Input)
6	GND	Ground
9	C–	Collision – (Input)
10	T–	Transmit – (Output)
12	R–	Receive – (Input)
13	+12VF	+12 VDC Power

Cisco recommends that you use an attachment unit interface (AUI) cable between the DB-15 connector and the network transceiver. The transceiver converts the thickwire connection to thinwire or twisted pair which can then be routed to the network architecture used by your supporting host applications. Your Ethernet network determines the transceiver type. Cisco does not provide cables, transceivers, and other link components for the VCO/4K system.

EIA/TIA-232 Serial Connection Wiring Practices

The following describes wiring practices for serial EIA/TIA-232 connections to the Storage/Control I/O Module in each VCO/4K system controller:

- For all cabling between the host computer and the VCO/4K system, use shielded cable and connectors. Cisco recommends a minimum conductor size of 24 AWG. Route cables away from sources of electromagnetic (EMI) and radio frequency interference (RFI). Secure cables in such a manner as to prevent inadvertent physical damage caused by passersby or by other equipment.

- EIA/TIA-232 specifies a maximum cable length of 50 feet (15.24 meters). However, distances of up to 150 feet (46 meters) are readily supported when shielded cabling is used.

- Connections on the VCO/4K end of the cable require DB-25P male connectors. Connector requirements on the host end are dictated by the I/O connections at the host.

Refer to the *Cisco VCO/4K System Administrator's Guide* for information about defining host links.

General Serial Cable/Port Characteristics

The pinouts of each serial EIA/TIA-232 DB-25 connector on the Storage/Control I/O Module are shown in Table 2-7. The signals supported by each connector are similar.

.

Table 2-7   EIA/TIA-232 DB-25 Serial Connector Pinouts, Ports 1, 2, 3, and 4

Pin	Signal Name	Signal Description
2	TxD	Transmit Data
3	RxD	Receive Data
4	RTS[1]	Request to Send
5	CTS[1]	Clear To Send
6	DSR[1]	Data Set Ready
7	GND	Signal Ground
8	DCD[1][2]	Data Carrier Detect
15	TxC[3]	Transmit Clock
17	RxC[3]	Receive Clock
20	DTR[1]	Data Terminal Ready
24	TxC[3]	Transmit Clock

1. Modem support only

2. Not used by serial Port 1

3. Supported on serial Port 4 only

Jumpers on Serial Ports 1 and 2 on the Storage/Control I/O Module allow these ports to be configured as modem (DCE) terminations for connection to a terminal or as terminal (DTE) terminations for connection to a modem.

The factory default settings for the Storage/Control I/O Module support the following cable configurations:

*   Straight-through cables connecting the VCO/4K system to a modem (DTE to DCE)

*   Crossover (null modem) cables connecting the VCO/4K system to a terminal (DTE to DTE)

If other cable configurations or terminations are required, the jumper settings on the CPU card must be modified. Refer to the *Cisco VCO/4K Card Technical Descriptions* for more information about jumper settings.

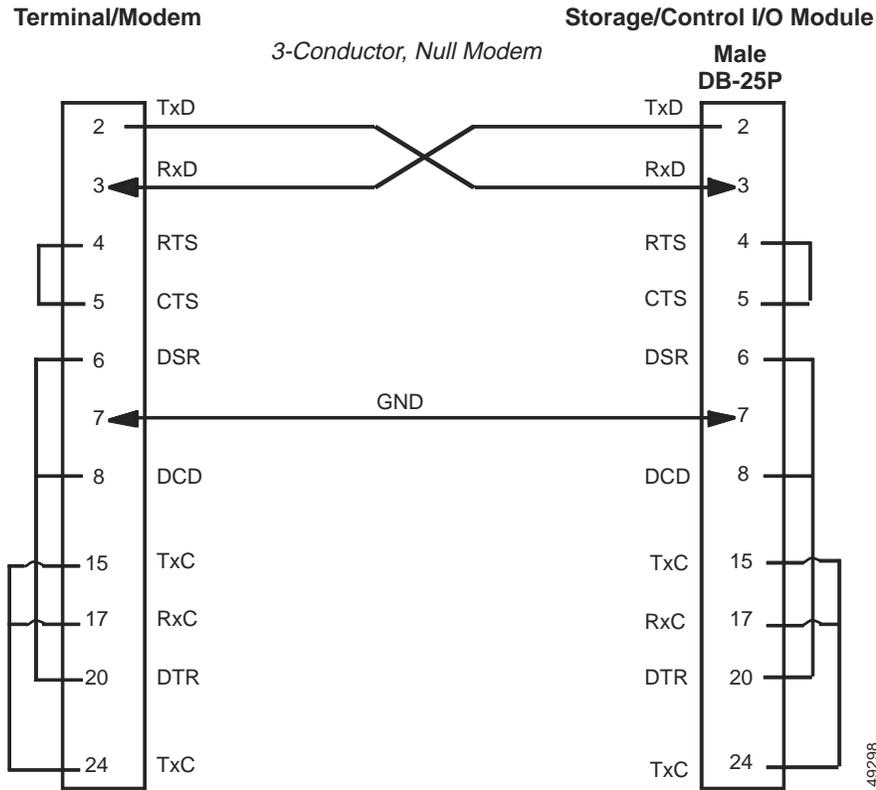Figure 2-9 shows straight-through cable wiring.

Figure 2-9   Straight-Through Cable Wiring Diagram
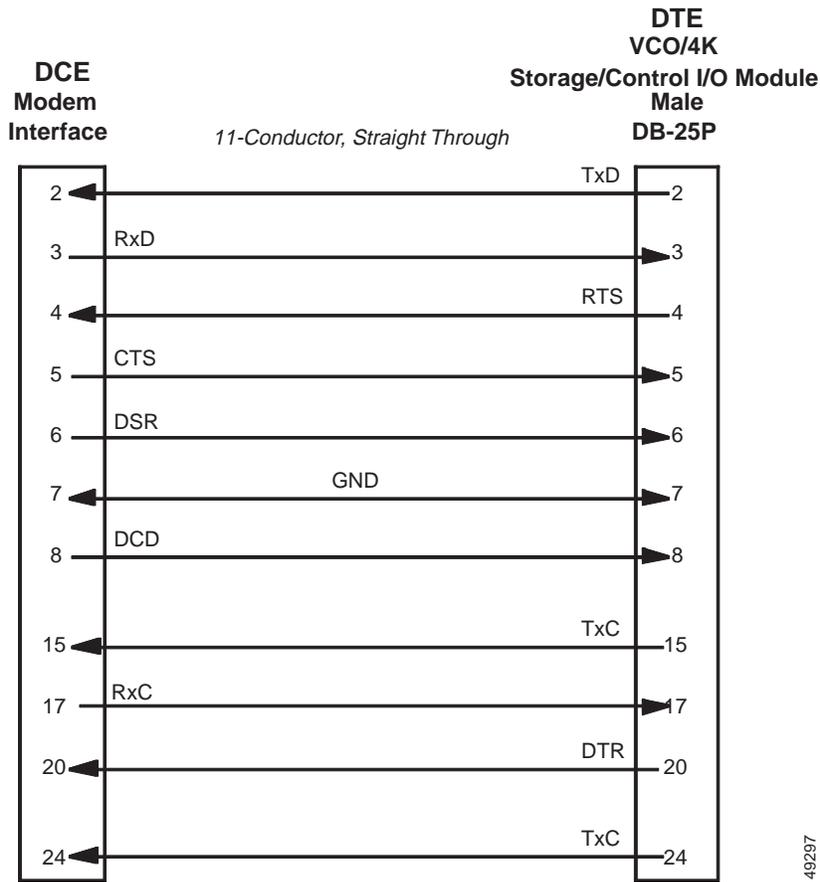
Figure 2-10 shows crossover, null modem cable wiring.

Figure 2-10   Crossover (Null Modem) Cable Wiring Diagram

Terminal/Modem   **Storage/Control I/O Module**

3-Conductor, Null Modem   **Male**
                                                         DB-25P

Terminal/Modem		Storage/Control I/O Module	
2	TxD	TxD	2
3	RxD	RxD	3
4	RTS	RTS	4
5	CTS	CTS	5
6	DSR	DSR	6
7	GND		7
8	DCD	DCD	8
15	TxC	TxC	15
17	RxC	RxC	17
20	DTR	DTR	20
24	TxC	TxC	24

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3

Power, Configuration, and Testing

This chapter describes system initialization procedures from either the hard disk or a floppy disk.

Power-On Procedures

Power on refers to the process of supplying input power to the power subsystem.

> ⚠
>
> **Caution** Do not supply power to the system without first reading the procedures described in this section. Serious damage to the system components can result if the sequence of procedures is not carefully followed or is interrupted. Do not attempt to operate the VCO system until the system enclosure is mounted in a wall rack or installed and leveled.

Power-On Checklist

Use the following checklist before powering on the system. Verify that all items on the list are completed before turning on the power.

1. ____ Environmental control system in equipment room is activated and set for 24-hour operation if applicable.

2. ____ System is installed and secured as required.

3. ____ System is connected to isolated ground facility.

4. ____ –48 VDC output of DC power plant to VCO/4K measures between –48V and –53V (DC models only).

5. ____ Input connections are completed to power subsystem. System main breaker/switch is OFF.

6. ____ Power subsystem is connected.

7. ____ System console is connected to Storage/Control I/O Module and powered on.

8. ____ System printer is connected to Storage/Control I/O Module and powered on.

9. ____ Remote maintenance modem is connected to Storage/Control I/O Module and powered on.

10. ____ Data communications links between the VCO and host computer are completed.

11. ____ Host computer is powered on and initialized with communication and application software.

Alarm Arbiter Card Settings

The Alarm Arbiter Card (AAC) is located at the top of the system enclosure. It serves as a control point for system resets. Use the switches on the front panel to reset the system controller, and to select which system controller is to be the master controller (in redundant systems). Status LEDs show which system controller is currently active, in addition to alarm conditions and power supply failures.

Figure 3-1 shows the location of the AAC.

Figure 3-1   Alarm Arbiter Card Location

AAC card
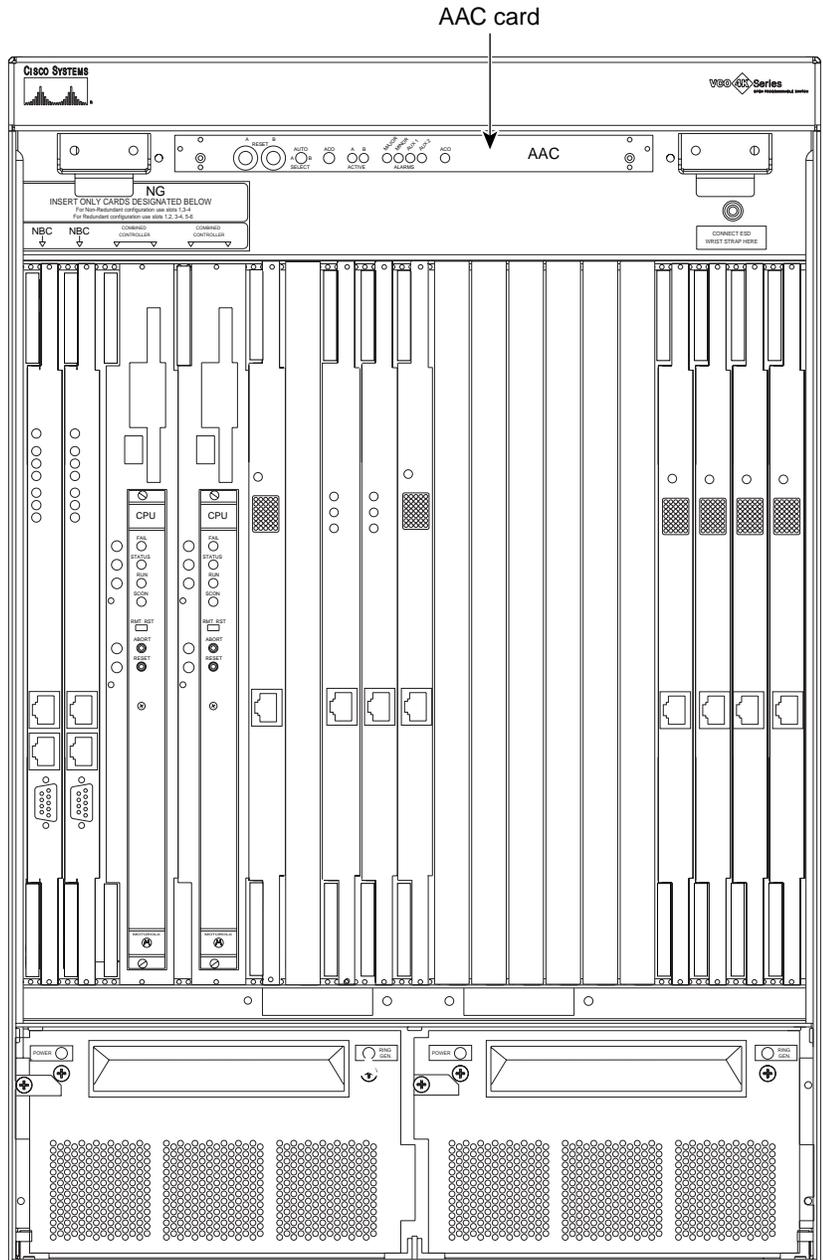
Before turning the power on, verify that the AAC switches are set as follows:

- AAC SELECT is set to AUTO (middle position)

    AUTO — The AUTO setting works for both nonredundant and redundant systems as follows:

    – In a nonredundant system, AUTO always chooses side-A.

    – In a redundant system, AUTO chooses side-A as the default. If there is a problem with side-A, it switches to side-B.

    A — Selecting A (side-A) has the same result in a redundant and a nonredundant system. Side-A is always active.

    B — Selecting B (side-B) results in the following:

    – In a nonredundant system, the system does not initialize.

    – In a redundant system, side-B is activated.

- ALARM CUT OFF (ACO) enabled (left – ACO LED illuminated)

When the system is powered on, the LED for the Active system controller illuminates.

Note If your VCO is equipped with Automatic Switching Units, moving the Select switch on the AAC from Side A to Side B after the system is powered on transfers control of the peripheral equipment from one Combined Controller card to the other.

## System Power-On Procedures

To provide power to a VCO/4K system:

Step 1 Turn off the main power switch (down).

The VCO's main power switch is in the rear of the VCO on the power entry module. Ensure that the power switch is down. See Figure 1-4 or Figure 1-5 to identify the main power switch.

Step 2 Connect or plug in the input power cable at the source.

Step 3 Turn the main power switch on (up position).

Step 4 Check the power LED on the power supply module. If you have a redundant system, check the power LEDs on each of the power supply modules. Refer to Figure 3-2 for the location of the power LED(s).

Ensure that the LED labeled **POWER** on each power supply module is illuminated green.

Note If any of the power LEDs fail to illuminate, or if any LED illuminates red, turn the main power switch off and on.

Figure 3-2   Location of Power LEDs
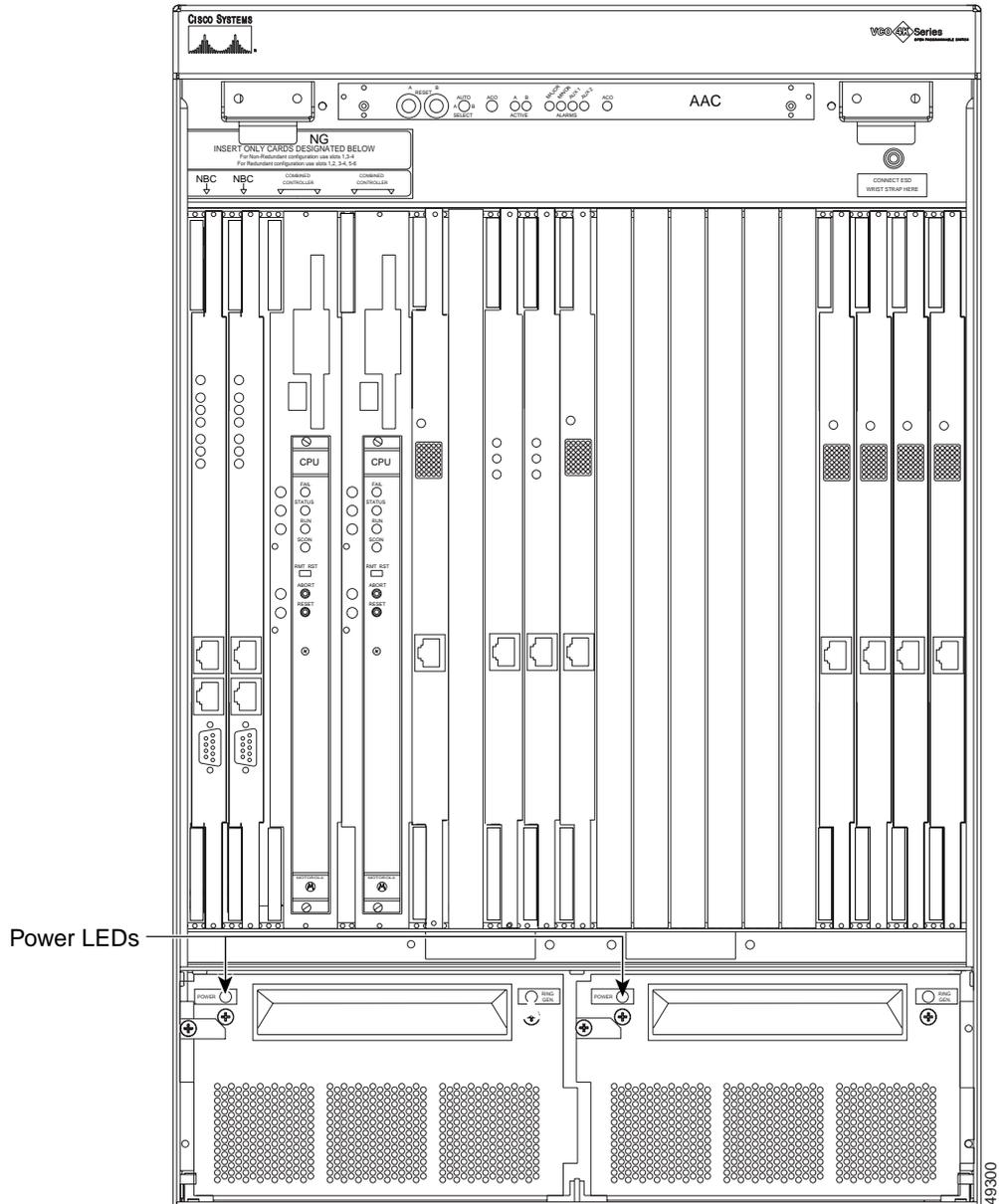
Power LEDs

The power supply LEDs are on the left side of each power supply module, which are located on the bottom front of the VCO as shown in Figure 3-2.

- When there is no power to the power supply module, the LED is not illuminated.
- A green LED indicates that the operation is normal.

- A red LED warns that there are voltages in the power supply module that are over or under the requirements. (Refer to the *Cisco VCO/4K Mechanical Assemblies* or call Cisco Systems for support.)

Combined Controller and NBC3 Initialization

After the Combined Controller and the NBC3 are initialized and self-tests are completed, the active system controller always tries to initialize the system from the boot device specified by the File System Configuration utility (refer to the *Cisco VCO/4K System Administrator's Guide* for more information). In new systems, the hard disk drive is factory-specified as the boot device and the sequence of events automatically occurs (see the "System Initialization" section on page 3-5.)

If the system fails to initialize, a message on the master console requests a floppy disk in floppy drive A. For more information about booting from a floppy disk, refer to the *Cisco VCO/4K System Administrator's Guide.*

Note The system console is configured after the initial power is supplied to the VCO/4K and the checks are complete. The default console configuration is 9600 baud, 8 bits/char, 1 stop bit and no parity. These defaults should enable you to view any messages displayed on the console during the initial power-on phase of the install.

System Initialization

When power is supplied to the system, the system firsts checks to determine if a floppy disk is inserted into the drive. If a disk is there, the system checks for the files necessary to boot the system from the floppy disk. If no disk is present or the boot files are not on the floppy, the system tries to read the boot files from the hard disk. If the boot files are on the hard drive, the system begins the tasks necessary for normal system operation.

Note The hard disk(s) is initialized and the generic software is loaded at the factory. Although initializing the hard disk should not be necessary, you can reinitialize the hard disk using the Generic Installation floppy diskettes supplied with the system (refer to the *Cisco VCO/4K System Administrator's Guide* for more information).

LED States During System Initialization

The green hard disk drive access LED on the front of the combined controller blinks ON and OFF, indicating that files are being read.

The MAJOR alarm LED on the AAC remains illuminated during most of the initialization process. Interface and service circuit cards in the subracks illuminate all three LEDs on their front panels. As card self-tests are completed, the red and yellow (major, minor alarm) LEDs are extinguished, leaving the green LED on the AAC illuminated. The green LED on each subrack card is extinguished as each card is brought into active service.

Failure of a card self-test causes the red LED or a combination of LEDs to illuminate on its front panel, indicating a major alarm. The card does not attempt to bring itself back into active service. Refer to the *Cisco VCO/4K Card Technical Descriptions* for complete descriptions about LED states for each card type.

The three LEDs on NBC3 cards remain illuminated for a much longer period of time. Their All-LEDs-ON state lasts from system reset until all self-tests and program download sequences are complete. When the system is successfully booted, all the LEDs on the master NBC3 are extinguished. VCO/4K systems with redundant system control have two NBC3s and at least one DTG-2. The green LED on the Standby NBC3 and DTG-2 remain illuminated. Note that the DTG-2s are mezzanine cards attached to each respective NBC3 card.

For additional details about LED states and troubleshooting information, refer to the *Cisco VCO/4K System Maintenance Manual.*

The master console displays the System Login screen as the controller initialization process continues. However, full system initialization (including downloading of application software to various cards) is not complete until the following message appears on the system message line, in the lower left portion of the master console screen:

```
FRM001 PHASE 3 – SYSTEM INITIALIZATION COMPLETE
```

This information is also written to the system log files.

When all files are transferred to system memory from the hard disk, all LEDs on the port rack circuits cards are extinguished with the exception of standby (redundant) NBC3s and DTG-2s. The green LED on these cards remains illuminated to indicate the standby status.

For more information about LED patterns, refer to the *Cisco VCO/4K Card Technical Descriptions.*

If any of the circuit cards in the Port Subracks fail to activate during the initialization process, an error message identifying the Rack-Level-Slot address of the failed card appears in the bottom left corner of the master console display screen. You can trace card failure to a mismatch between the port subrack and the system database.

If the card fails the self-test, the red LED illuminates. If the card passed the self-test but is not brought into service by the NBC3, the green LED illuminates. The green LED remains illuminated for all cards that are set to Standby status (NBC3 and DTG-2).

Cisco VCO/4K System Messages defines other error messages that may appear. Corrective maintenance procedures appear in the *Cisco VCO/4K System Maintenance Manual.*

System Console Operating Parameters

This section reviews setup parameters for the following video display terminals (VDTs) used as Master Consoles in VCO/4K systems.

- VT220/320
- WYSE Technology WY-185
- WYSE Technology WY-185ES

Setting the Keyboard Type

To use the console, enter a password and access the screens to identify the type of keyboard to be used. To select the keyboard type, do the following:

Step 1   At the Login screen, press CONTROL-K. The following message appears in the bottom right corner of the screen:

```
Keybrd: VT220 (V), Sun (S), Xview (X), Univ (U)
```

Step 2   Press the appropriate letter (in parentheses) to select the keyboard type.

Entering a Password

After you establish the keyboard type, at the System Login screen type **admin** (all lowercase characters) in the Username field. Press the **Enter** key twice to bypass the Password field. The Main menu appears after initial power is supplied to the VCO. The system administrator should enter appropriate usernames, passwords, and access levels on the Password Configuration screen.

For more information about entering system passwords, refer to the *Cisco VCO/4K System Administrator's Guide.*

Setting the System Console Parameters

System console operating parameters are defined in the system database through the Peripheral Configuration screen (refer to the *Cisco VCO/4K System Administrator's Guide* for more information). These operating parameters must match the setup parameters defined for the console. You can set the options, such as display type (normal/reverse video) and key click ON/OFF, to your preference.

This section reviews setup parameters for the following VDTs used as Master Consoles in VCO/4K systems.

Identify the console type and refer to the appropriate section to set up the operating parameters. The following will help you locate the appropriate section:

- VT220 ("VT220 Setup Parameters" section on page 3-8) VT320 ("VT320 Setup Parameters" section on page 3-9)
- WYSE Technology WY-185 ("WYSE Technology WY-185 and 185ES" section on page 3-10)
- WYSE Technology WY-185ES ("WYSE Technology WY-185 and 185ES" section on page 3-10)

Refer to the OEM instructions supplied with the VDT for entering and moving through the setup menus. Compare and, if necessary, change the information in the menu displays to correspond with the VCO requirements contained in the following sections.

Note   VDT communication setup parameters (Baud Rate, Stop Bits, Bits per Character and Parity) must match the values defined in the system database through the Peripheral Configuration screen. Refer to the *Cisco VCO/4K System Administrator's Guide* for more information.

VT220 Setup Parameters

To set up VT220 parameters, do the following:

Step 1   To enter the Set-Up Menus on most VT220 type terminals, press the **Set-Up** key (**F3**) on the keyboard.

Step 2   The Set-Up Directory menu is displayed. Verify that the following parameters are displayed:

```
On Line
Set-Up English
North American Keyboard
```

Commands available under this menu include: **Clear Display, Clear Comm, Reset Terminal, Recall, Save, Default** and **Exit**.

Step 3   Select the Display Set-Up menu and verify that the following parameters are displayed:

```
80 Columns
Interpret Controls
No Auto Wrap
Jump Scroll
Light Text, Dark Screen
Cursor
Block Cursor Style
```

Step 4   Select the General Set-Up menu and verify that the following parameters are displayed:

```
VT200 Mode, 7 Bit Controls (Default)
User Defined Keys Unlocked (Default)
User Feature Keys Unlocked (Default)
Numeric Keypad is the default. Change to Application Keypad.
Normal Cursor Keys is the default. Change to Application Cursor Keys.
No New Line (Default)
```

Step 5   Select the Communications Set-Up menu and verify that the following parameters are displayed:

```
Transmit = 300, 1200, 2400, 4800, 9600 (Default) or 19200
Receive = Transmit (Default)
No XOFF, XOFF at 64
[7 or 8] Bits (8 = Default); [Odd, Even or No] Parity (No = Default); No Check or BLANK
(see note below)
[1or 2] Stop Bit (see note below) (1 Stop = Default)
No Local Echo (Default)
EIA Port, Data Leads Only (Default)
Disconnect, 2 s Delay (Default)
Limited Transmit (Default)
```

Step 6   Select the Keyboard Set-Up menu and verify that the following parameters are displayed:

```
Typewriter keys (Default)
Caps Lock (Default)
Auto Repeat (Default)
Key Click (User Option) (Default)
Margin Bell is the default. Change to No Margin Bell.
Warning Bell (Default)
Break (Default)
No Auto Answerback (Default)
Answerback= (blank) (Default)
Not Concealed (Default)
```

Step 7   Select the Tab Set-Up menu and verify that the following parameters are displayed.

```
Clear All Tabs (Default)
Set 8 Column Tabs (Default)
```

Step 8   Return to the Set-Up Directory menu and select the **Save** command. The **Done** message appears at the bottom of the display when the parameters are saved.

Step 9   Press the **Set-Up** key on the keyboard to exit the terminal Set-Up mode.

VT320 Setup Parameters

To set up VT320 parameters, do the following:

Step 1   To enter the Set-Up Menus on most VT320 type terminals, press the **Set-Up** key (**F3**) on the keyboard.

Step 2   When the Set-Up Directory menu is displayed, verify that the following parameters are displayed:

```
On Line
```

Commands available under this menu include: **Clear Display, Clear Comm, Reset Terminal, Recall, Save, Default** and **Exit**.

Step 3   Select the Display Set-Up menu and verify that the following parameters are displayed:

```
80 Columns
Interpret Controls
No Auto Wrap
Jump Scroll
Light Text, Dark Screen
Cursor
Block Cursor Style
No Status Display
```

Step 4   Select the General Set-Up menu and verify that the following parameters are displayed:

```
VT300 Mode, 7 Bit Controls
VT220 Terminal ID
User Defined Keys Unlocked
User Feature Keys Unlocked
Application Keypad
Application Cursor Keys
No New Line
UPSS DEC Supplemental
```

Step 5   Select the Communications Set-Up menu and verify that the following parameters are displayed:

```
Transmit = 300, 1200, 2400, 4800, 9600 or 19200
Receive = Transmit
No XOFF
[7 or 8] Bits, [Odd, Even or No] Parity, No Check or BLANK
[1or 2] Stop Bit
No Local Echo
EIA Port, Data Leads Only
Disconnect, 2 s Delay
Limited Transmit
```

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Step 6   Select the Keyboard Set-Up menu and verify that the following parameters are displayed:

```
Caps Lock
Auto Repeat
Key Click (User Option)
Margin Bell
Warning Bell
Break
Compose
<x] DEL
" and.. Keys
< > Key
'~ Key
```

Step 7   Select the Tab Set-Up menu and verify that the following parameters are displayed:

```
Clear All Tabs
Set 8 Column Tabs
Tab Fields and Ruler = Default
```

Step 8   Return to the Set-Up Directory menu and select the **Save** command. The **Done** message appears at the bottom of the display when the parameters are saved.

Step 9   Press the **Set-Up** key on the keyboard to exit the terminal Set-Up mode.

WYSE Technology WY-185 and 185ES

To setup the WY-185 and 185ES parameters, do the following:

Step 1   To enter the Set-Up menus on the WYSE terminals, press the **Set-Up** key (**F3**) on the keyboard.

Step 2   Press the right arrow key on the middle keypad to highlight the **Restore Defaults** field.

Step 3   Press the **Enter** key on the right keypad to restore the defaults.

Step 4   Press the **F11** key to enter the Kbd2 menus.

Step 5   The first field should be highlighted on that screen. Press the **Enter** key on the right keypad until Keypad=Application is displayed in the first field.

Step 6   Press the **F4** key to save and exit the Set-Up menus.

Setting the Clock/Calendar

To set the current date and time and date, use the Clock/Calendar Configuration utility on the System Configuration menu.

For more information about the Clock/Calendar Configuration utility, refer to the *Cisco VCO/4K System Administrator's Guide.*

Configuring Peripheral Devices

This section explains how to configure the system printer and the remote maintenance modem.

Configuring the System Printer

The end-of-line (EOL) terminator for the printer interface must be defined in the system database and match the printer setup configuration before using the printer. The EOL terminator is defined in the Peripheral Configuration screen.

Refer to the *Cisco VCO/4K System Administrator's Guide* for more information. Refer to the documentation supplied with the printer to configure the EOL terminator for the printer.

Configuring the Remote Maintenance Modem

Define the modem operating parameters in the system database and match them with the modem operating parameters set in the modem. Modem operating parameters are defined in the Peripheral Configuration screen.

Refer to the *Cisco VCO/4K System Administrator's Guide* for more information on defining the parameters and the Peripheral Configuration screen. Refer to the documentation supplied with the printer to set the modem operating parameters.

Synchronizing to a Timing Source

There are three options on the Maintenance menu's Master Timing Link Selection screen for choosing the timing source.

- **Internal**—Specifies clocking by the NBC3.
- **External**—Specifies clocking by external network synchronization.
- **Incoming**—Specifies clocking from an incoming digital stream.

If not using the default, internal, NBC3 timing source, use the following:

- **Incoming**—An incoming T1/E1 timing source.
- **External**—A central office composite clock (BITS, Building Integrated Timing Supply).

Refer to the *Cisco VCO/4K System Administrator's Guide* for more information.

Using the Internal NBC3 Clock

The internal clocking source on the NBC3 is the default clocking source.

To change the clocking source from a External or Primary/Secondary source to the internal NBC3 clock, choose Internal from the Master Timing Link Selection screen.

Refer to the *Cisco VCO/4K Card Technical Descriptions* for more information on the NBC3 clock.

Synchronizing to a T1 or E1 Timing Source

The VCO/4K systems support T1 synchronization timing source connections with the data stream on a selected port. The synchronization frequency must be 1.544 MHz, 75 Hz. You can select one span for the primary timing link and a different span for the secondary timing link. Use only digital ports (T1 or E1).

The conversion from the PCM waveform to logic level signals and from 2.048 MHz (E1) to 1.544 MHz is done on the port card.

Select the spans from the Master Timing Link Selection screen. Refer to the *Cisco VCO/4K System Administrator's Guide* for more information.

Synchronizing to an External Composite Clock

The VCO/4K system supports synchronization timing source connections through a front panel jack on the Network Bus Controller 3 (NBC3) card. Connection to the external synchronization timing source must comply with the specifications in Table 3-1.

Table 3-1   External Timing Synchronization

Specifications	Value
Synchronization Frequency	64.0 kHz, 3.0 Hz
Signal Level	Composite clock, 60% duty cycle Zero, -0.5 to +0.5V One, <-2.5 or > +2.5V
Signal Characteristics	Rise/fall — 20 ns maximum Optional 130-ohm termination in NBC3 Connector shield is floated at NBC3
Mating Connector	9-pin, D-sub

Connecting to the Timing Source

The BITS clock connector on the faceplate of the NBC3 card is inaccessible in installations where the front door is installed on the chassis in compliance with EMI requirements. Full EMI compliance can be maintained with an available BITS Clock Cable Kit (one for each NBC3 card) that routes the BITS clock signals to a DB-9 connector on a rear faceplate.

Two external cable assemblies are required for systems equipped with redundant NBC3 cards. Cisco Systems does not provide mating cables or connectors.

Note   If the NBC3 is the last connection in a routing of composite clock, insert the J3 jumper to provide a 130-ohm termination to the signal.

After connecting the external timing source, choose **External** from the Master Timing Link Selection screen. For more information about the Master Timing Link Selection screen, refer to the *Cisco VCO/4K System Administrator's Guide*.

Reconnecting to the External Timing Source

If the external timing source is lost, the system uses its internal NBC3 timing source. When the external timing source is restored, manually reset the Master Timing Link selection to **External** if the external timing source is to be used again.

Refer to the *Cisco VCO/4K System Administrator's Guide* for more information.

Creating the Initial System Database

When the VCO/4K is initially booted from the hard disk, generic software and database tables are loaded into system memory. The generic software includes system administration menus that enable system configuration. Some of the hardware configuration information is preloaded at the factory.

Using the system database, the system administrator defines the connection between system components and the telecommunication environment in which the VCO/4K operates.

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Caution   In a redundant configuration, both system controllers must be booted from the hard disk before configuring the system.

During system initialization, configuration data is loaded from the hard disk into RAM. The system controller refers to the database tables as it processes calls and monitors system performance.

When the system is booted from hard disk, any changes made to the database are simultaneously written to RAM and the hard disk and are immediately used to process calls.

Each system is shipped with software that includes generic operating and application software. Installation utilities format the hard disk and create blank lookup tables. The VCO/4K database contains two NBC3 cards and one DTG-2 card in its card table.

Initializing Redundant System Controllers

In redundant system configurations, both controllers must be initialized from the hard disk before you enter configuration information into the system. To initialize redundant system controllers, follow these steps:

Step 1   Power on the system.

Step 2   Simultaneously press **Reset A** and **Reset B** on the AAC to boot both controllers from the hard disk. The VCO/4K automatically initiates file synchronization. Depending on the size of the database, this process can take up to 10 minutes. When the process is complete, the following messages are written to the log file. They also appear on the console.

```
ACT File Sync Complete
STBY File Sync Complete
```

Step 3   You can now enter configuration information into the system database. Ensure that any changes you make are on the active system controller. For information about entering configuration information into the system database, refer to the *Cisco VCO/4K System Administrator's Guide*.

> **Note** Portions of the VCO/4K system database are not redundant (automatically updated on the standby controller). Before operating the VCO/4K with the updated configuration, enter the configuration information on the standby controller for the following screens:
>
> Host Configuration
> Peripheral Configuration
> File System Configuration
> System Trace Configuration

Step 4 When all the configuration information is entered into the system database, back up the hard disk from the Disk Utilities menu. For more information about backing up the hard disk from the Disk Utilities menu, refer to the *Cisco VCO/4K System Administrator's Guide*.

> **Note** If either controller fails to boot from the hard disk, press the **Reset** button on the AAC for the failed controller. If the controller still fails to boot after file synchronization completes, boot the failed controller from floppy disk. For more information about booting a controller from floppy disk, refer to the *Cisco VCO/4K System Administrator's Guide*.

Host Communication Links

When you power on the VCO, configure and send test messages from the host computer through the communication links between the VCO and the host computer to verify the link is up and running. To configure these messages, define data communication operating parameters from the Host Configuration screen.

For information about defining data communication operating parameters from the Host Configuration screen, refer to the *Cisco VCO/4K System Administrator's Guide.*

Testing these messages requires that the host computer is operating with communication software and enabled I/O ports.

> **Note** The host communication ports must match the interface requirements of the host computer and all configuration data must be entered before testing the host communication links.

Test host communication links by enabling the VCO/4K System Trace Configuration utility and echoing host messages back to the host terminal. This type of testing requires that the application and communications software be running on the host computer.

For information about enabling trace and message return facilities, refer to the *Cisco VCO/4K System Administrator's Guide*, *Cisco VCO/4K Standard Programming Reference*, and *Cisco VCO/4K Extended Programming Reference*. Enabling the trace facility causes host messages to be printed on the VCO/4K printer and/or trace files to be printed on the system hard disk. The message return facility loops any host messages back to the host computer.

If the trace and message return facilities fail to communicate with the VCO/4K, a protocol analyzer or other such device may need to be inserted in the communication link(s) to determine where the fault is occurring.

Typical communication link problems during system startup include:

- Incorrect configuration settings in either the host computer or VCO/4K.
- Incorrect pinout connections in the cabling used between the host computer and the VCO/4K.

To verify cabling and configuration settings, refer to the *Cisco VCO/4K Site Preparation Guide* and the *Cisco VCO/4K Ethernet Guide.*

Cutover and Acceptance Testing

This chapter provides an overview of cutover and acceptance testing procedures. Specific procedures are site dependent and are specified in the sales contract and/or the installation plan.

Cutover Procedures

Cutover is the process of activating the system so that telephone calls can be made through the VCO/4K. The system should be fully functional when the cutover process is completed.

Pre-Cutover Checklist

The following checklist of procedures should be completed before starting cutover. All installation procedures contained in other sections of this manual should be completed prior to using this checklist.

1. ____ System is powered on with system controller(s) and hard disk(s) fully initialized. Peripheral equipment is powered on and operational.

2. ____ AAC (Alarm Arbiter Card) in Auto position (VCO/4K redundant systems only; others should be hard-selected to Side-A).

3. ____ VCO/4K database entries have been completed.

4. ____ Backup copies of database have been made to floppy disks. A copy of the database has been printed.

5. ____ Common carrier services (analog and digital) are tested and certified. Carriers have been notified when cutover will occur.

6. ____ Specialized telecommunication equipment has been installed, tested, and certified.

7. ____ Host computer is powered on and loaded with the appropriate application software and communications interfaces.

8. ____ T1/PRI facility is providing bit stream to master timing link.

9. ____ Make test calls for all possible call types.

Verifying the Database

The *Cisco VCO/4K System Administrator's Guide* describes the steps for entering values in the system database. If problems are encountered when test calls are made, recheck the database and host application program before calling Cisco Systems Technical Support. The VCO/4K database must match the exact requirements of the site (lines, trunks, and digital spans) for the system to function properly.

Making Test Calls

After you have initialized the system and if necessary, entered any additional database information, perform a series of test calls that are designed to test all supported call types allowed through the system.

Placing the System In Service

The system should be up and running without a reset for several hours before allowing the system to process calls. Dial-up trunks and direct connect stations should remain idle while test calls are made and the system is allowed to stabilize.

Ideally, set the system to allow a gradual increase in call traffic volume. This may require activating services on a staggered basis.