
**BASIC TROUBLESHOOTING
OF NETWORK SERVICES**

XEROX

Network Administration Library

Changes are periodically made to this document. Changes, technical inaccuracies, and typographic errors will be corrected in subsequent editions.

The content of this booklet is based on the Services 10.0 Release.

A Customer Comment Form is provided in this Network Administration Library. If this form has been removed, address comments to:

Xerox Canada Inc.
5650 Yonge Street
North York, Ontario
M2M 4G7

Warning: As to equipment manufactured prior to October 1, 1983, such equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause interference to radio communications. As permitted by regulation, it had not been tested for compliance with the limits for Class A compliance with the limits for Class A computing devices pursuant to Subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

As to equipment manufactured after October 1, 1983, such equipment complies with the requirements in Part 15 of FCC Rules for Class A computing devices. Such equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

**Customer Support Center
3000 Steeles Ave East
Markham, Ontario
L3R 4T9**

1) Toronto Local	1 - 416 - 477 - 9912	
2) Ontario Watts	1- 800 - 387 - 0448	
3) West / Atlantic	1 - 800 - 387 - 4311	
4) Quebec	1 - 800 - 387 - 4300	**** FRENCH ****

© 1986 by Xerox Corporation All rights reserved

Printed in Canada.

Xerox® and 873, 6085, 8000, 8010, 8011, 8044, 8045, 8046, Diablo, and Memorywriter are trademarks of Xerox Corporation.

IBM® and 3270, 3276, 4341, and 6670 are trademarks of IBM Corporation.

Copyright protection claimed includes all forms and matters of copyrightable material and information now allowed by statutory or judicial law or hereinafter granted, including without limitation, material generated from the software programs which are displayed on the screen such as icons, screen displays looks, etc.

Purpose This booklet provides guidelines for troubleshooting problems with services and servers on your network.

Intended audience This publication is intended for System Administrators who are responsible for maintaining services and servers on your network.

Before you read this booklet There is some general information that you will need to be familiar with before you can understand this booklet. Read the "Services Executive" section in the *Server Operation and Maintenance* booklet, and the *Introduction to Network Administration* booklet. These publications can be found in the *Network Basic Services* volume.

(This page intentionally blank)

1. Introduction	1
2. Isolating the problem	5
Verifying the problem (Entry level)	7
Checking the Internetwork Routing Service link (IRS level 1)	10
Checking the local Internetwork Routing Service (IRS level 2)	13
Checking the remote Internetwork Routing Service (IRS level 3)	15
Checking the server (Server level 1)	18
Performing corrective action at the server (Server level 2)	21
Checking the workstation (Workstation level)	23
Checking the network (Network level 1)	27
Narrowing the problem to a system on the network (Network level 2)	30
Assuring a system's connection to the network (Network level 3)	32
3. Server on-line diagnostics	35
Testing the Communication Interface Unit	36
Testing the dialer	38
Running the echo test	40
Testing the floppy disk drive	43
Using the List Servers command	44
Testing an RS-232C port	45
Testing the terminal	48
Using the Show Ethernet Statistics command	50
4. Server recovery	57
5. Disk diagnostics	59
Running fixed disk diagnostics	60
Using the Boot command	63
Performing fault analysis	64
Logging on	65
Using the Quit command	66
Running removable disk diagnostics	67

6. Scavenging the services volume	79
Recovering from an inconsistent file system	82
Recovering from a disk label check	85
Recovering from an unrecoverable disk error	86
Scavenge log messages	90
7. Maintenance panel codes	93
Maintenance panel code listing	95
Appendix	
A. Forms	A - 1
Index	INDEX - 1

List of figures

1	Network configuration	7
2	Entry level flowchart	9
3	Internetwork routing	10
4	IRS level 1 flowchart	12
5	Local Internetwork Routing Service	13
6	IRS level 2 flowchart	14
7	Remote Internetwork Routing Service	15
8	IRS level 3 flowchart	17
9	Server network	18
10	Server level 1 flowchart	20
11	Server network	21
12	Server level 2 flowchart	22
13	Workstations on the network	23
14	Workstation level flowchart	25
15	Network level 1 flowchart	28
16	Network level 2 flowchart	31
17	Network level 3 flowchart	33

(This page intentionally blank)

This booklet provides guidelines for troubleshooting problems with services and servers on your network. If you cannot solve the problem, call the Network Support Center (NSC) at 1- 800 - NSC - 8000

Be sure to have the following information about your site:

- The site layout and description.
- The version of software in use on each network device involved.
- The serial or processor numbers of the workstation or server suspected of causing the problem.
- A description of the problem, including the maintenance panel code, the error message you are receiving, and/or a description of the error symptoms.

The Network Support Center will help you solve the problem. If the problem is diagnosed as hardware-related, the Network Support Center will have you call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site. If the problem is diagnosed as software-related or operational, call your Systems Analyst.

This booklet consists of the following sections:

- **Introduction** - Includes an overview of this booklet, descriptions of the various chapters, text conventions, and general troubleshooting guidelines.
- **Isolating the problem** - Includes descriptions and flowcharts for identifying the cause of a problem.
- **Server on-line diagnostics** - Provides step-by-step instructions for testing server hardware and services.
- **Server recovery** - Provides guidelines for recovering from error situations using disk diagnostics and scavenging.
- **Disk diagnostics** - Provides step-by-step instructions for testing the server disk(s).
- **Scavenging the services volume** - Provides instructions for performing a file scavenge and responding to scavenge messages.
- **Maintenance panel codes** - Describes actions to be performed when maintenance panel codes other than 8000 are displayed.

Use the flowcharts and descriptions in the "Isolating the problem" section to pinpoint the cause of the problem. The descriptions and flowcharts contain troubleshooting methods to narrow the cause of the problem to a specific part of the network. The descriptions and flowcharts also provide suggestions for solving the problem and references to procedures in the remaining chapters for testing specific areas of network hardware and software.

Sometimes the solution to a problem is as simple as starting a service or checking a connection. In other cases, the solution to a problem may require the assistance of the Network Support Center.

General troubleshooting guidelines

You should review these questions prior to using the troubleshooting descriptions or following the flowcharts in the "Isolating the problem" section.

1. Are you working with a specific service, or do you know what action you want to take?

If **Yes**, proceed either to the specific action, or go to the service-specific booklet for more details.

If **No**, continue with this list.

2. Does the maintenance panel show a number other than 8000?

If **Yes**, proceed to the section titled "Maintenance panel codes."

If **No**, continue with this list.

3. Is the problem caused by inadequate information for using a function of the server or workstation?

If **Yes**, try to find the answer through the available help, training, and reference materials. If you cannot find the answer, call the Network Support Center.

If **No**, continue with this list.

4. Does a 6085/8010 workstation feature seem to be unusable?

If **Yes**, are you certain the feature has been purchased? If the feature has been purchased, call the Network Support Center.

If **No**, continue with this list.

5. Is a 6085/8010 workstation displaying a message indicating that a service is not operating correctly?

If **Yes**, refer to the appropriate descriptions or flowcharts in the "Isolating the problem" section.

If **No**, continue with this list.

6. Is the problem related to only one system (workstation or server)?

If **Yes**, see the Workstation level or Server level descriptions or flowcharts in the "Isolating the problem" section.

If **No**, see the Network level descriptions or flowcharts in the "Isolating the problem" section.

(This page intentionally blank)

2. Isolating the problem

This section presents two methods to help you isolate a problem. Both present the same information, but in different ways. The methods are:

- Descriptions - providing written procedures for troubleshooting strategies and pointers to the diagnostic procedures in the remaining chapters.
- Flowcharts - using graphic symbols to illustrate troubleshooting strategy.

Use the version best suited to your problem-solving style. At first, you may find the descriptions easier to use. As you become more familiar with isolating problems, you may prefer the visual memory-joggers of the flowcharts.

Start with the entry level description or flowchart and follow the instructions. The actions indicated for each step are correct only if the previous steps have been followed.

Here are the troubleshooting levels for both the descriptions and the flowcharts. The description title corresponds to the flowchart level. Each section lists the descriptive procedures first with its accompanying flowchart immediately following.

<u>Description</u>	<u>Flowchart</u>
Verifying the problem	Entry level (Figure 2)
Checking the Internetwork Routing Service link	IRS level 1 (Figure 4)
Checking the local Internetwork Routing Service	IRS level 2 (Figure 6)
Checking the remote Internetwork Routing Service	IRS level 3 (figure 8)
Checking the server	Server level 1 (Figure 10)
Performing corrective action at the server	Server level 2 (Figure 12)
Checking the workstation	Workstation level (Figure 14)
Checking the network	Network level 1 (Figure 15)
Narrowing the problem to a system on the network	Network level 2 (Figure 16)
Assuring a system's connection to the network	Network level 3 (Figure 17)

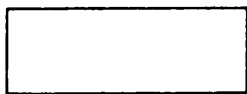
Using the flowcharts

The flowcharts describe a sequence of troubleshooting procedures. Symbols are used to indicate actions and decisions. The steps are illustrated with graphic symbols joined by lines. The flowcharts map troubleshooting paths, with checkpoints along the way. The lines show the order in which the steps should be performed. Read the flowcharts from top to bottom. Sometimes a series of steps branch out to the side and then down. Begin with Figure 2, Entry level flowchart, and refer to the other flowcharts as directed.

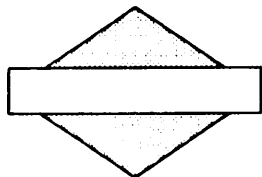
Flowchart symbols



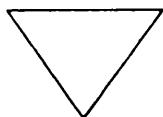
An oval indicates the beginning or end of a series of steps. Each oval contains "Begin," "Done," or a reference to another section of the booklet.



The rectangle indicates an action to be performed, such as running a test or making a check. The action is stated briefly in the rectangle. For an explanation of the action in greater detail, refer to the corresponding description.



The diamond indicates a place where you make a decision. This is a question with a yes or no answer. The "yes" and "no" paths are marked near the appropriate point of each diamond.



A triangle indicates a place where a flowchart is continued from a previous page or continued to the next page. Each triangle is marked "next page" or "Cont."

Verifying the problem (Entry level)

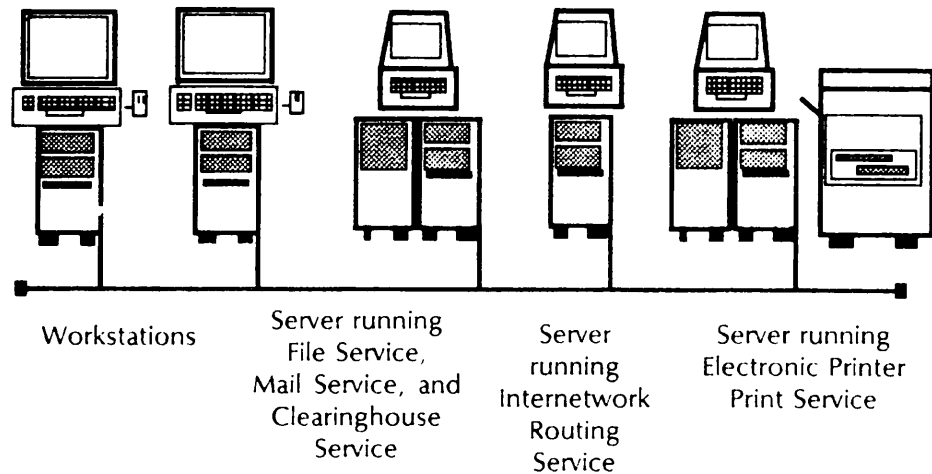


Figure 1. Network configuration

In this procedure, you isolate the problem to a specific server or workstation and narrow your focus to a smaller number of possibilities for the problem.

The first step toward problem isolation is to verify that a problem exists. A reported problem may be a momentary failure or a mistake on the user's part. Problem solving begins with duplicating the problem.

Procedure

1. Retry the operation that is causing the problem, following the same steps that led you to the failure.

Check any error messages that are displayed, using the appropriate documentation for the system being used. If the problem cannot be recreated, you are done. Consider the failure an intermittent error on the part of the machine or the operator.

2. Determine if the problem involves two systems (workstations, servers, or both) physically attached to the same length of Ethernet cable.

You need to know this because different problem-solving procedures are needed if elements are located on different lengths of cables. Note the workstation experiencing the problem. Identify the service the workstation is trying to use and the server on which that service is located. Check your site plan, which should show the location of Ethernet cable and machines connected to it. Are the workstation and server both on the same cable?

If the two machines are on different cables (but not necessarily different networks), go to the "Checking the Internetwork Routing Service link (IRS level 1)" section or Figure 4, IRS level 1 flowchart. If the two machines are on the same physical cable, try to access a different service

on the same physical cable. Do this from the original workstation.

3. Determine if the problem involves only a particular service or server.

If a person at the same workstation can access another service, then the workstation does not have a problem communicating over the network. This eliminates a large number of possible causes.

If another service can be accessed, go to the "Checking the server (Server level 1)" section or Figure 10, Server level 1 flowchart. At this point, you know there is a problem with the service or the server. If another service cannot be accessed, continue with the steps below.

4. Retry the operation that originally caused the problem at another workstation.

By doing this, you can either eliminate the original workstation as the cause of the problem or you can eliminate the server and/or service involved.

When you recreate the problem at another workstation, be certain it is on the same physical length of cable. Also be certain the operation is performed exactly as it was on the original workstation.

If the other workstation can perform the action, you know the service is working, and the problem is most likely with the original workstation. Go to the "Checking the workstation (Workstation level)" section or Figure 14, Workstation level flowchart. If the other workstation cannot do the action, there is most likely a problem with the service, the server, or the network.

5. Verify that a Clearinghouse Service is started for the domain.
6. Go to the server running the Clearinghouse Service.
7. Type **List Services** and press <RETURN>.

If the Clearinghouse Service is stopped or if the appropriate service is not started, go to the "Checking the server" description or to Figure 10, Server level 1 flowchart. If the Clearinghouse Service is started, go to the "Checking the network (Network level)" section or to Figure 15, Network level 1 flowchart.

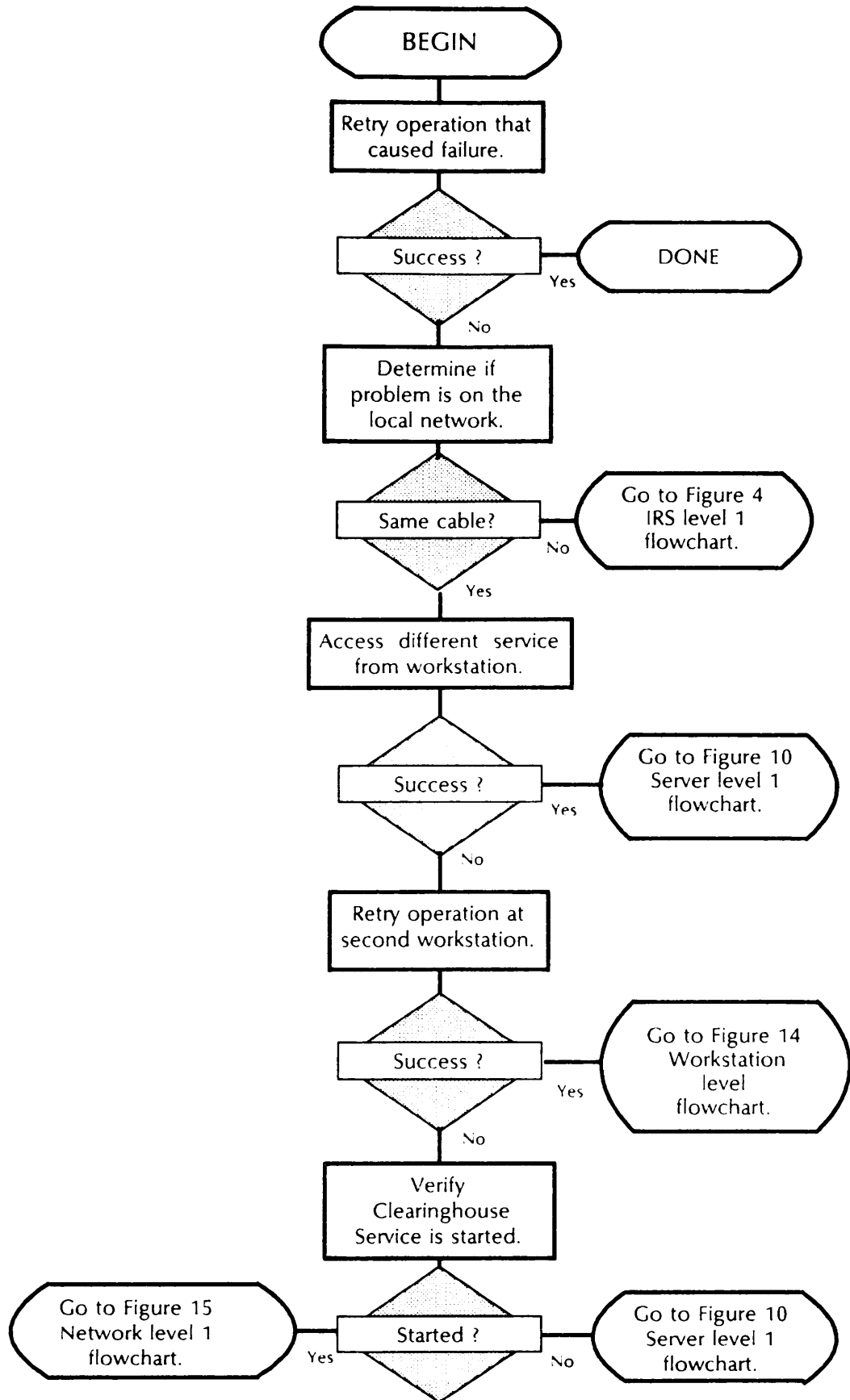


Figure 2. Entry level flowchart

Checking the Internetwork Routing Service link (IRS level 1)

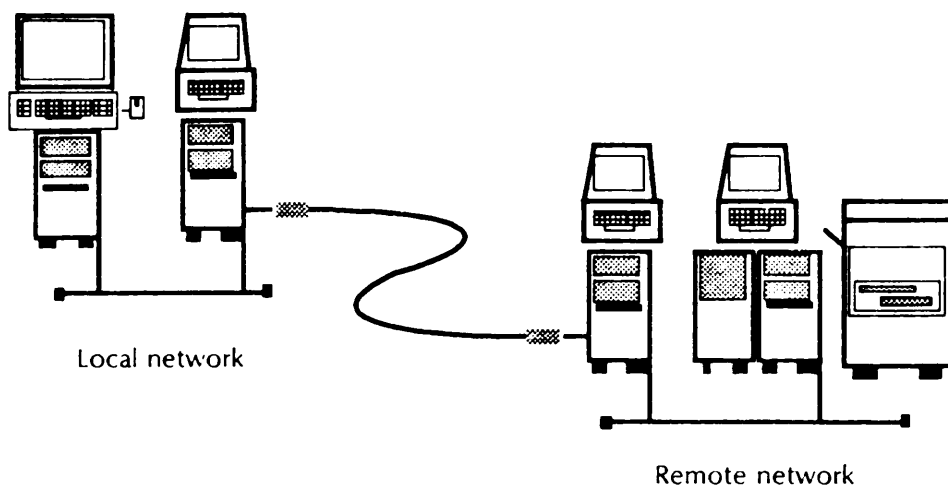


Figure 3. Internetwork routing

You have narrowed the focus to an Internetwork Routing Service link. Now check whether the problem is in the workstation or the Internetwork Routing Service link.

You need to confirm that the problem you have encountered is not due to a workstation problem. If you can reach a different service located on the same network cable as the workstation, you know that the workstation is capable of communicating and the problem is in the internetwork.

Procedure

1. Access a different service located on the same cable as the workstation.

If the attempt fails, go to the "Checking the workstation (Workstation level)" section or Figure 14, Workstation level flowchart. If the attempt succeeds, you have proven proper workstation operation and you can begin checking the internetwork link structure. Run an echo test, which sends a signal from one system to another and then echoes or sends the signal back, to determine if the systems can communicate. Steps for running an echo test are found in the "Server on-line diagnostics" section.

2. Run an echo test from the workstation to the server supporting the Internetwork Routing Service.

If the echo test has a response rate of less than 99 percent, go to the "Checking the local Internetwork Routing Service (IRS level 2)" section or to Figure 6, IRS level 2 flowchart.

If the echo test response rate is 99 percent or better, you know that the workstation can communicate with the Internetwork Routing Service. This indicates that the network is functioning and the problem is in the Internetwork Routing Service link. You can check this

communication link by running an echo test to the server running the Internetwork Routing Service on the remote network.

3. Run the echo test from the workstation to the server with the remote Internetwork Routing Service. You might be able to bypass an echo test by typing the **List Routes** command at the server running the local Internetwork Routing Service to verify that the link is established. The display posts the network number for the Internetwork Routing Service. By knowing the other network number, you can verify the connection.

If the echo test has a response rate of less than 95 percent, go to the "Checking the remote Internetwork Routing Service (IRS level 3)" section or to Figure 8, IRS level 3 flowchart. If the echo test response rate is 95 percent or better, you know that the remote Internetwork Routing Service and the workstation can communicate. This means that the internetwork link is good. Use an echo test to find out if you can communicate with the server on the remote network running the service that cannot be accessed.

4. Run an echo test from the workstation to the server running the service that cannot be accessed.

If the echo test has a response rate of less than 95 percent, contact the System Administrator at the remote network. He or she must determine if a problem exists with the server on the remote side.

An echo test response rate of 95 percent or better indicates that the two systems can talk to one another. Perhaps the workstation is using incorrect information about the remote service. This could prevent a successful connection. Check that the service is started. If the service is started but cannot be accessed, perhaps all of the sessions are in use at the moment.

5. Replace the icon involved on an 6085/8010 desktop.
6. Retry the operation.

If the operation fails, the service on the remote network may have a problem. Contact the System Administrator at the remote network to help isolate the problem further.

If the operation succeeds, you have solved the problem.

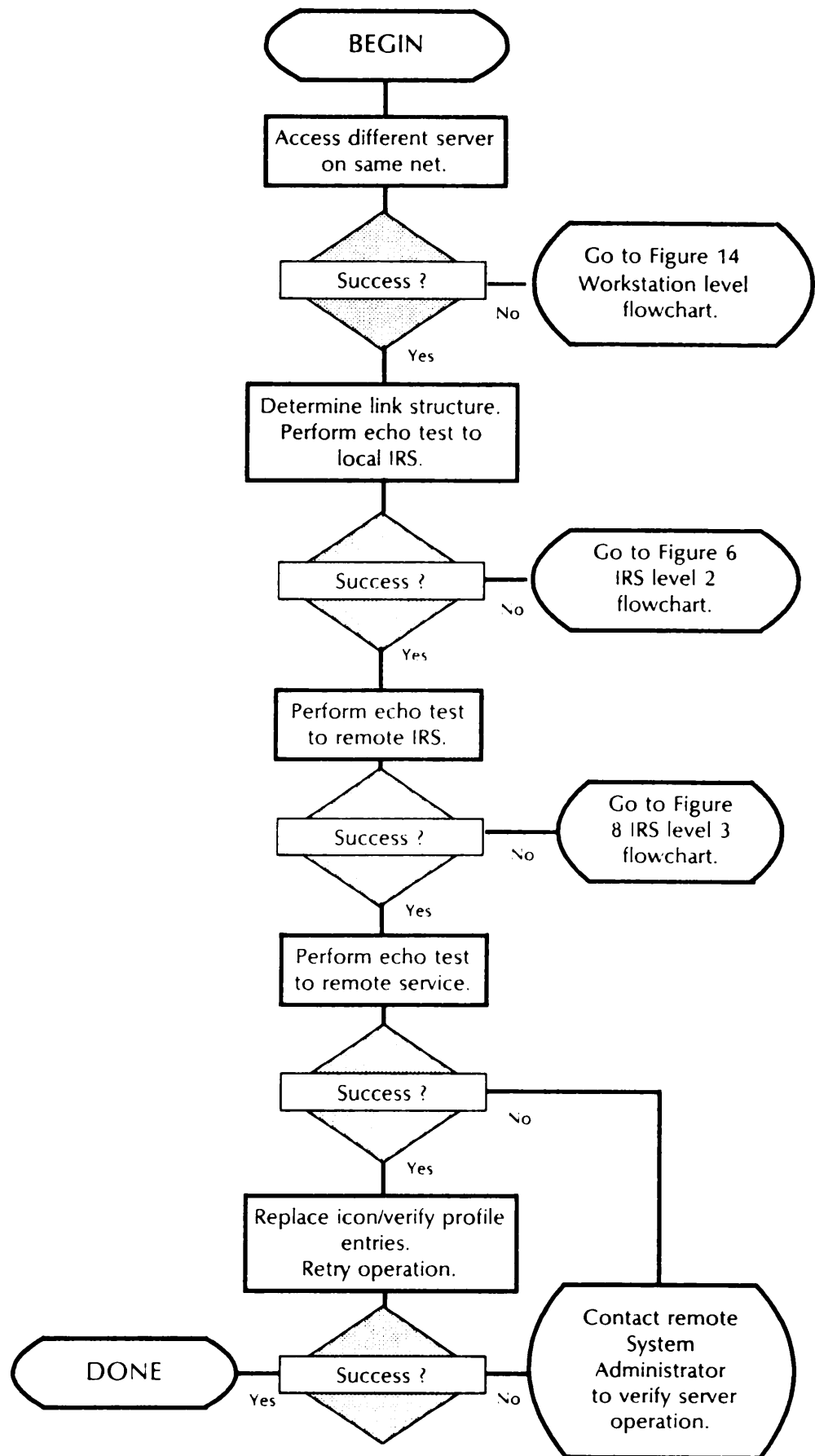


Figure 4. IRS Level 1 flowchart

Checking the local Internetwork Routing Service (IRS level 2)

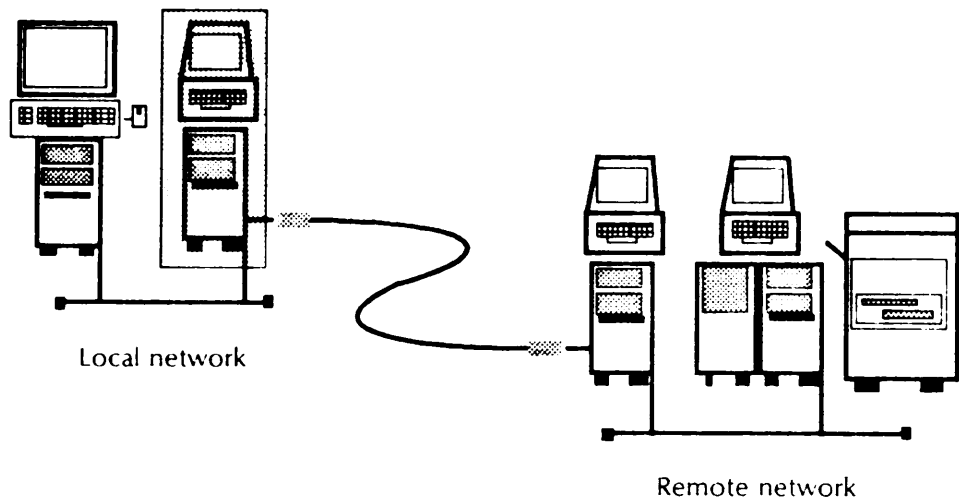


Figure 5. Local Internetwork Routing Service

You have narrowed the focus to an internetwork link. Now, check the local server running the Internetwork Routing Service.

So far, the workstation and network seem to be functioning normally. This suggests that the local server running the Internetwork Routing Service is the cause of the problem. Check the server hardware by running the disk diagnostics. Although disk diagnostics do not test the function of individual services on a server, disk diagnostics can give an indication of server hardware problems.

Procedure

Use the diagnostics disk to test the server hardware. Refer to the "Disk diagnostics" section for information on running disk diagnostics.

1. Run diagnostics on the server providing the local Internetwork Routing Service.

If the diagnostics fail, go to the recovery guidelines in the "Server recovery" section of this booklet.

If the diagnostics pass, continue with the following steps. In addition to identifying problems, diagnostics can repair problems.

2. Reboot the system. (An incomplete reboot requires you to go to the "Maintenance panel codes" section to complete the action.)

3. Try the operation again.

If the operation fails, call the Network Support Center.

If the operation succeeds, you have solved the problem.

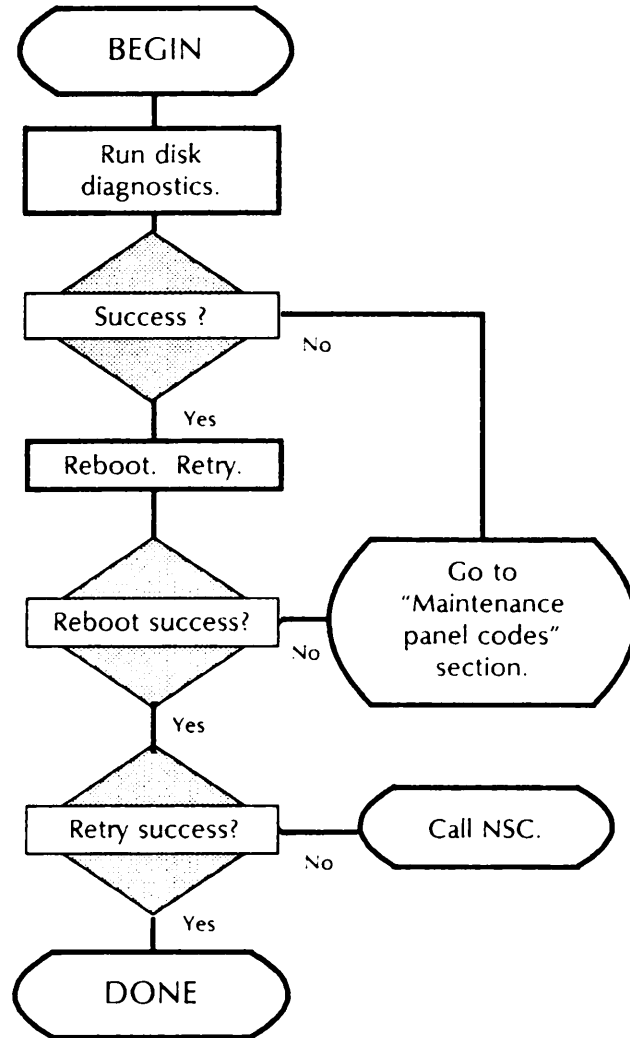


Figure 6. IRS level 2 flowchart

Checking the remote Internetwork Routing Service (IRS level 3)

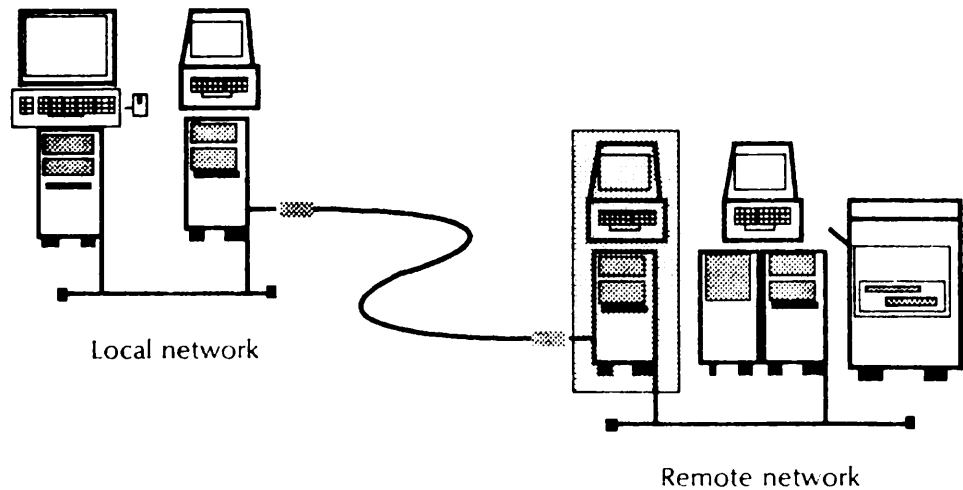


Figure 7. Remote Internetwork Routing Service

You have narrowed the apparent cause to the server running the remote Internetwork Routing Service. Now, check the remote server running the Internetwork Routing Service.

You have checked that the workstation and the network are functioning normally. Apparently, the remote server running the Internetwork Routing Service has a problem. Now, check the RS-232C port on the remote server.

Procedure

You can perform the RS-232C port test to check the RS-232C port on the server in question, provided the modems support the test. Refer to the "Server on-line diagnostics" section for details on running the RS-232C port test.

1. Run a remote RS-232C test on the circuit of the server running the remote Internetwork Routing Service.

If the test succeeds, both the local Ethernet link and the phone lines are operational. The problem is likely to be with the server on the remote network. Contact the System Administrator for that network; he or she needs to continue the problem-solving process.

If the test fails, there is a communications failure somewhere between the two servers running the Internetwork Routing Service. By re-running the RS-232C test in the local mode, you can determine if the problem is with the local side of the link or the remote side of the link. If this test succeeds then the local link works, and the problem is either with the remote system or with the phone line.

2. Run the local RS-232C test.

If the test succeeds, contact the System Administrator at the remote network. He or she should also run a local RS-232C test. If the test succeeds, the remote System Administrator should contact the phone company. If the test fails, the problem is local.

3. Check your circuit registration form and verify the correct information for the application.

The test could fail because the circuit is not registered correctly.

4. Check circuit/port registration information as registered in the specific communication service.

If the registration is wrong, make the corrections and restart the services involved. This should solve the problem. If the registration is correct, there may be a problem with the server. To check the server, use the diagnostics floppy disk. Use of this floppy disk is documented in the "Disk diagnostics" section.

5. Run disk diagnostics using the diagnostic floppy disk.

If the disk diagnostics fail, go to the recovery guidelines in the "Server recovery" section of the booklet.

If the disk diagnostics succeed, check the modem for proper operation. Refer to the appropriate modem documentation for further troubleshooting techniques, or call your modem representative.

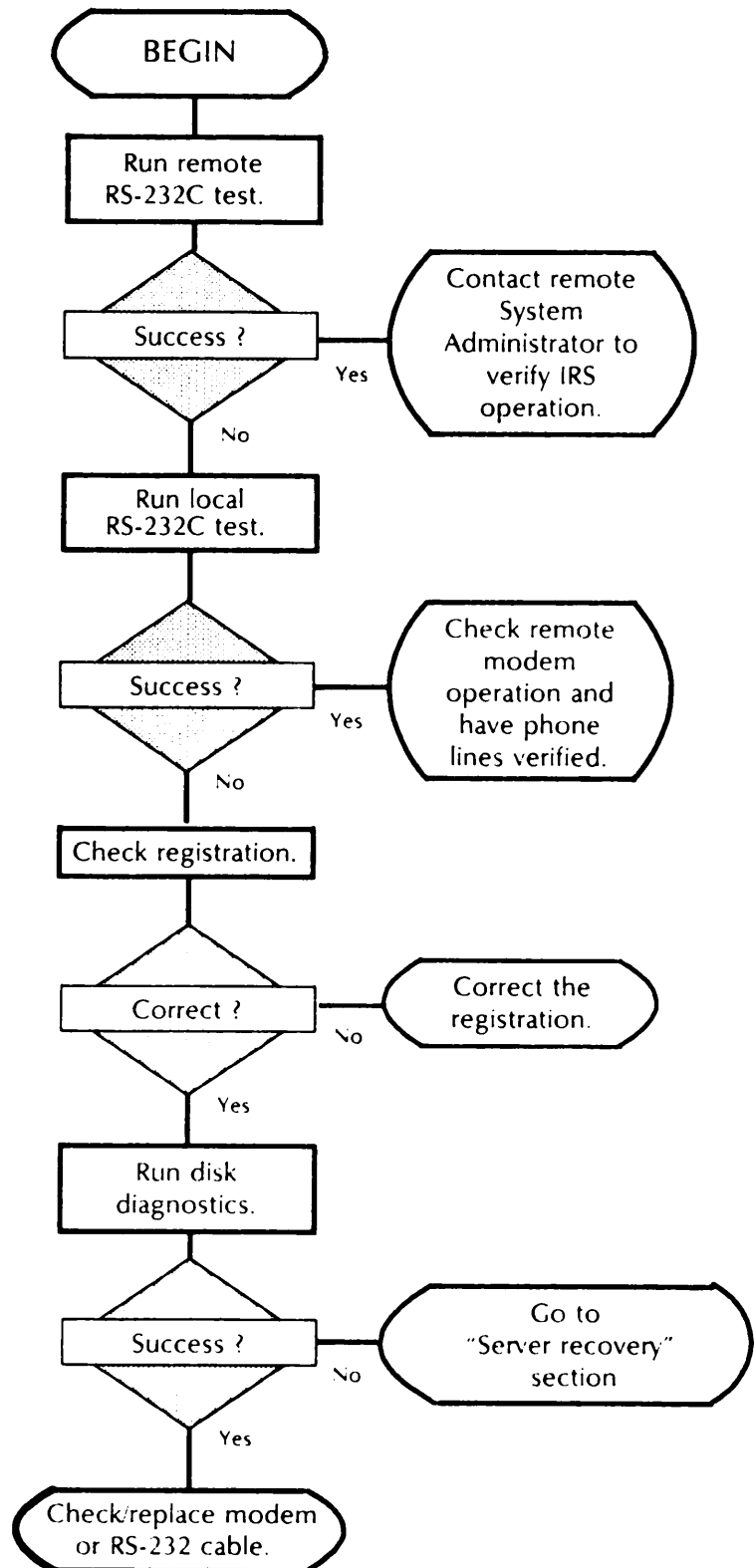


Figure 8. IRS level 3 flowchart

Checking the server (Server level 1)

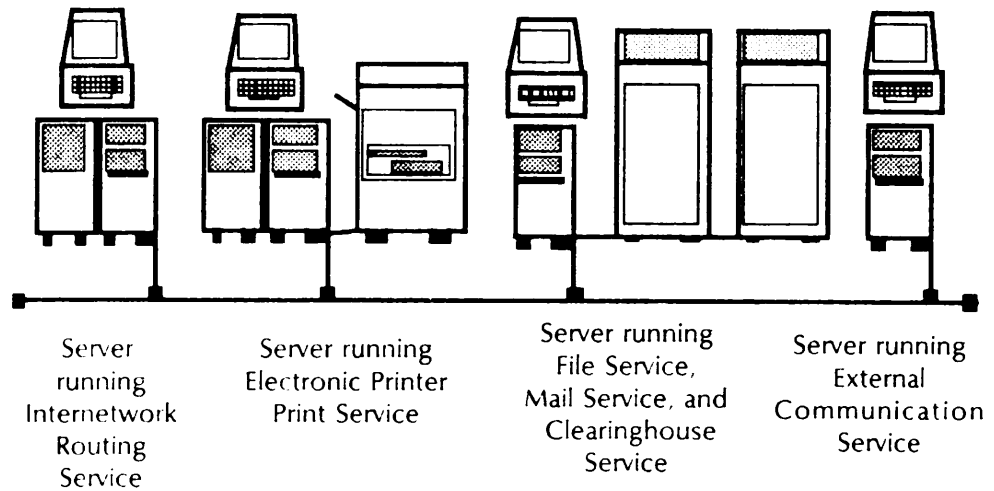


Figure 9. Server network

You have narrowed the apparent cause to a particular service. Now, you check the server running the service that could not be used.

So far, you have verified that the workstation is capable of communicating and that the network is functioning. Your focus is now on the server running the service that could not be used.

Verify that the service in question is started. At the server in question, you can use the **List Services** command to check the status of the service. You don't need be logged on in a specific context.

Procedure

1. Type **List Services** and press <RETURN>.

If the service is started, check that the registration at the Clearinghouse Service is correct. If the information is not correct, make the corrections and try the operation again. If the operation is successful, you have solved the problem.

Continue with step 2 if the service is not started.

2. Type **Start Service** to restart the service in question. To start the service you must be logged on and enabled. (The service displays a message when started.)

If the service starts, try the original operation that detected the problem again. If the operation works, you have solved the problem.

If the retry fails, check that the registration at the Clearinghouse Service is correct. If the information is not correct, make the corrections and try the operation again. If the retry is successful, you have solved the problem.

If the service does not start, there may be a problem with the server. Proceed to Figure 12, Server level 2 flowchart.

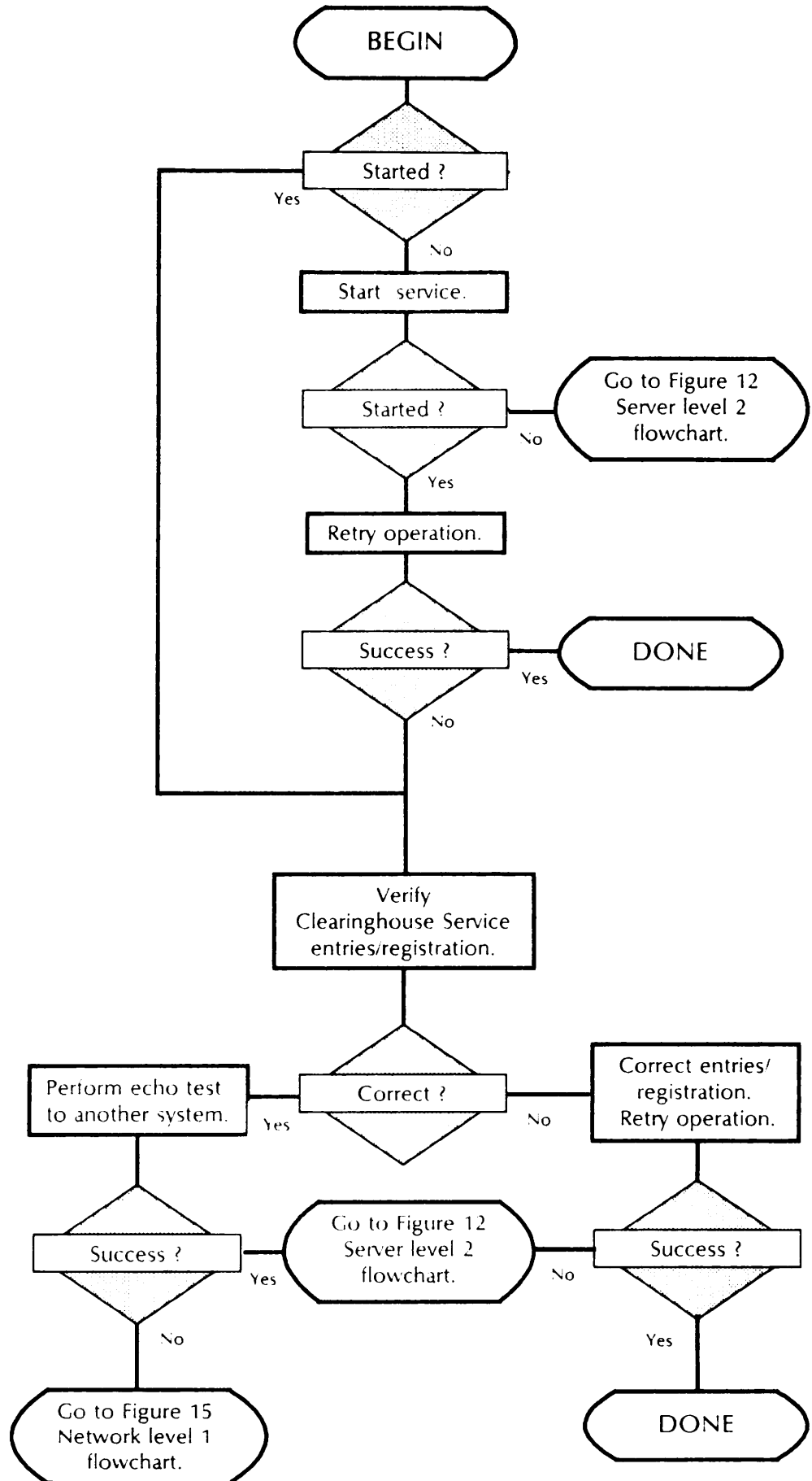


Figure 10. Server level 1 flowchart

Performing corrective action at the server (Server level 2)

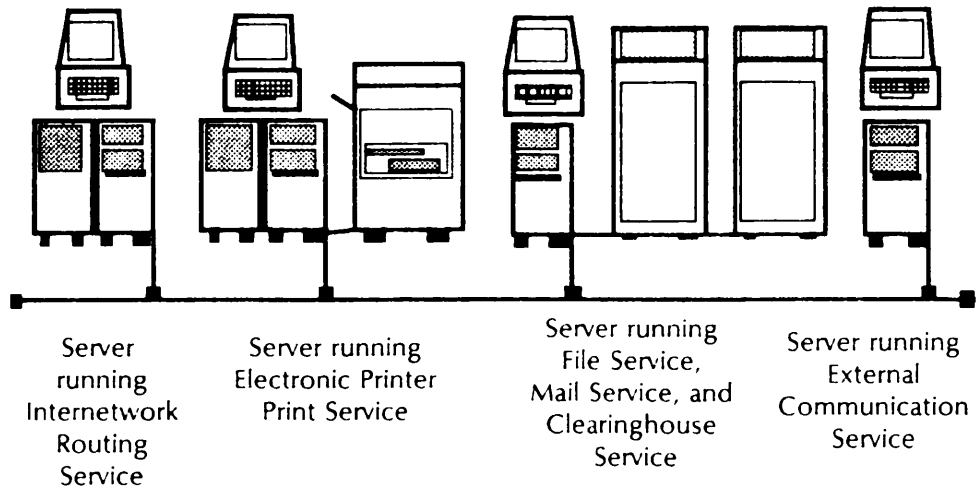


Figure 11. Server network

After finding that the service cannot be started, you may decide to try corrective action at the server. This can include booting the server and possibly running diagnostics.

If the service cannot be started, there may be a problem with the server and you may need to reboot the machine. To provide the minimum interruption to your user community, you should always use the **Stop Service** command to stop the services on the server involved. The **Stop Service** command stops the service after the last active user has finished using it. After rebooting, try to start the service and try the operation again. If the service does not start, run diagnostics on the server.

Procedure

Follow this procedure only if the service is not started.

1. Type **Stop Service** and press <RETURN>.
2. Type **N** to the "Disconnect active users?" prompt. This stops the service after the last active user has finished.
3. Reboot the server by pressing and releasing the **B RESET** button. This forces the processor to reset, and may clear the problem.

If the normal startup prompts do not appear, follow the recovery procedures outlined in the "Server recovery" section. If those procedures do not work, call the Network Support Center.

If the normal start-up prompts appear, type **N** and choose third interrupt point before running services.

4. Log on and enable in any context.

5. Type the **Start Service** command and select the service involved.

If the service does not start, run diagnostics on the server. If the diagnostics fail, follow the recovery procedures outlined in the "Server recovery" section, and then call the Network Support Center.

If the service starts, continue with the next step.

6. Return to the original workstation and retry the operation that originally detected the problem when the service has restarted.

If the retry fails, the problem appears to be with the server. Call the Network Support Center.

If the retry succeeds, you have solved the problem.

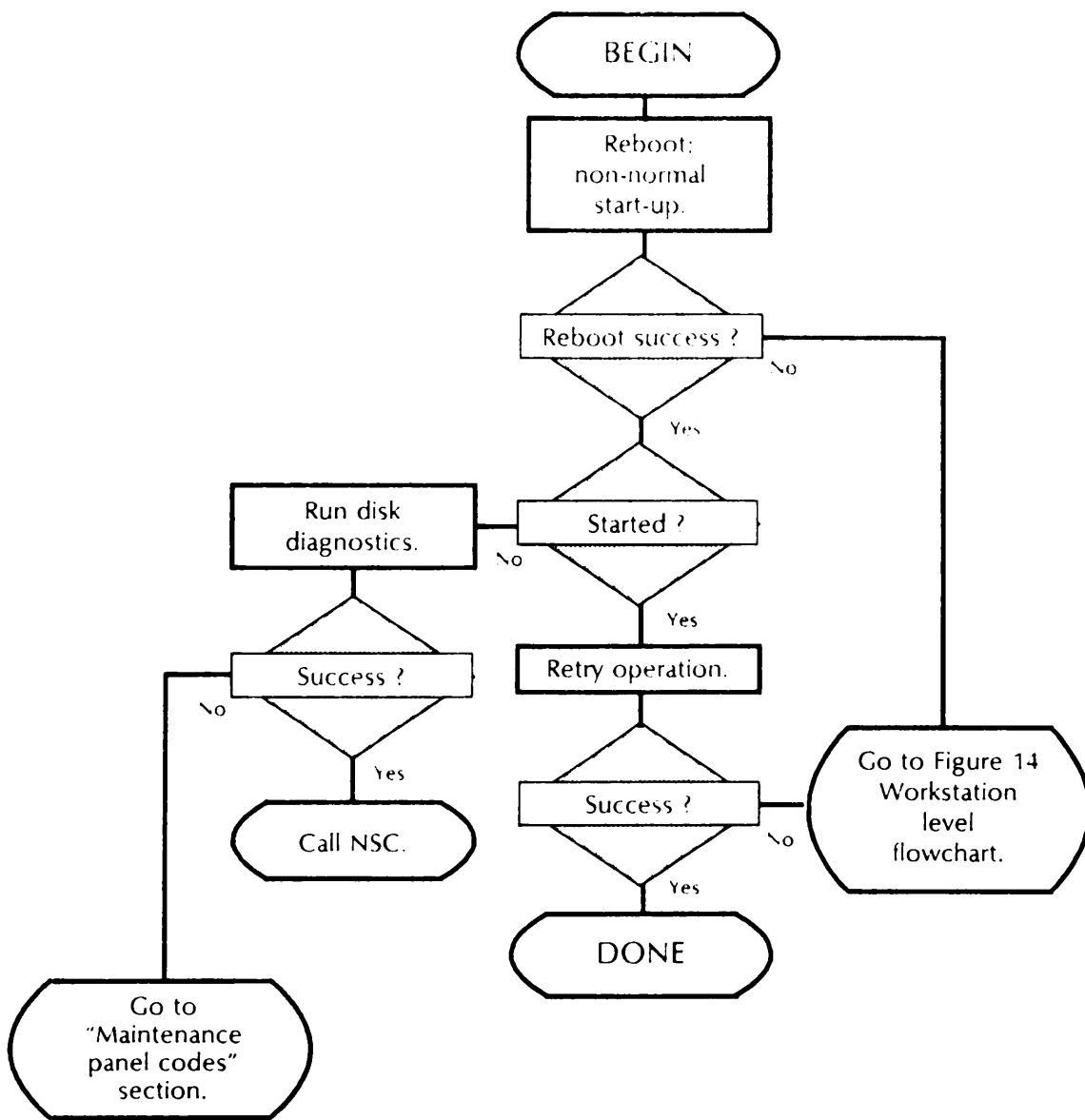


Figure 12. Server level 2 flowchart

Checking the workstation (Workstation level)

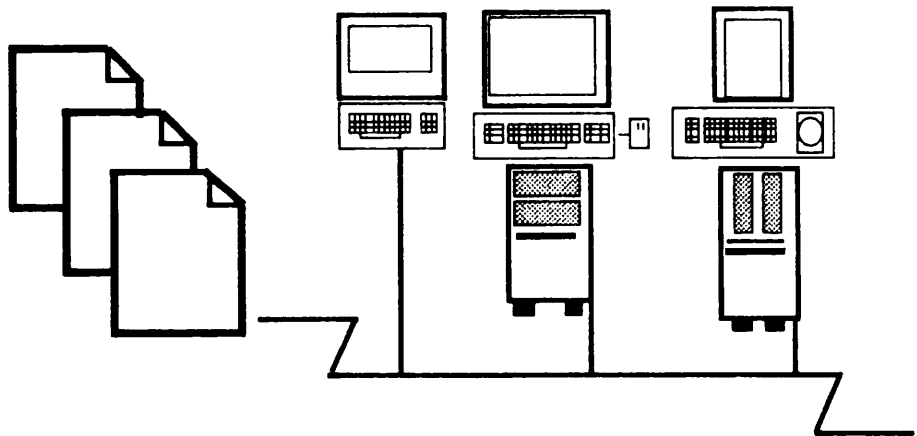


Figure 13. Workstations on the network

You have narrowed the apparent cause to the workstation. Now, isolate the problem further.

If you suspect that there is a problem with a workstation, your first step is to verify that the workstation is on the network. Run an echo test from the server to the workstation.

Procedure

1. Run an echo test from the server to the workstation. This test is described in the "Server on-line diagnostics" section.

If the echo test fails with a rate below 99 percent, go to the "Checking the network (Network level 1)" section or Figure 15, Network level 1 flowchart.

If the echo test succeeds with a rate of 99 percent or more, you can assume that the workstation is at fault. Determine if the workstation is using incorrect information about the service it is trying to access (such as incorrect Xerox 860 profile page information, or 6085:8010 icons that could have been retrieved before a change was made to the service).

2. At the workstation, replace the icon or profile entry that is being used in the operation.
3. Try the operation again.

If the operation succeeds, the problem has been solved.

If the operation fails, there may be a problem with the workstation. Continue with the following steps.

4. Reboot the workstation. During reboot, the workstation runs through diagnostics, which can clear some software problems.

If the system fails to restart, follow the recovery procedures in the appropriate documentation for that workstation.

If the system restarts, continue with the following steps.

5. Try the operation that caused the problem again.

If the operation succeeds, the problem is solved.

If the operation fails, continue with the following steps.

6. Run diagnostics on the workstation.

Refer to the "Workstation Diagnostics" subsection of the "Diagnostics" section, located in the *VP Series Reference Library*.

If the diagnostics fail or indicate a problem, refer to the "Workstation diagnostics" again for instructions.

If diagnostics completes successfully, continue with the following steps.

7. Try the operation again.

If the operation succeeds, the problem is solved.

If the operation fails, proceed to the next step.

8. Reload the workstation software and try the operation again.

If the operation succeeds, the problem is solved.

If the operation fails, call the Network Support Center.

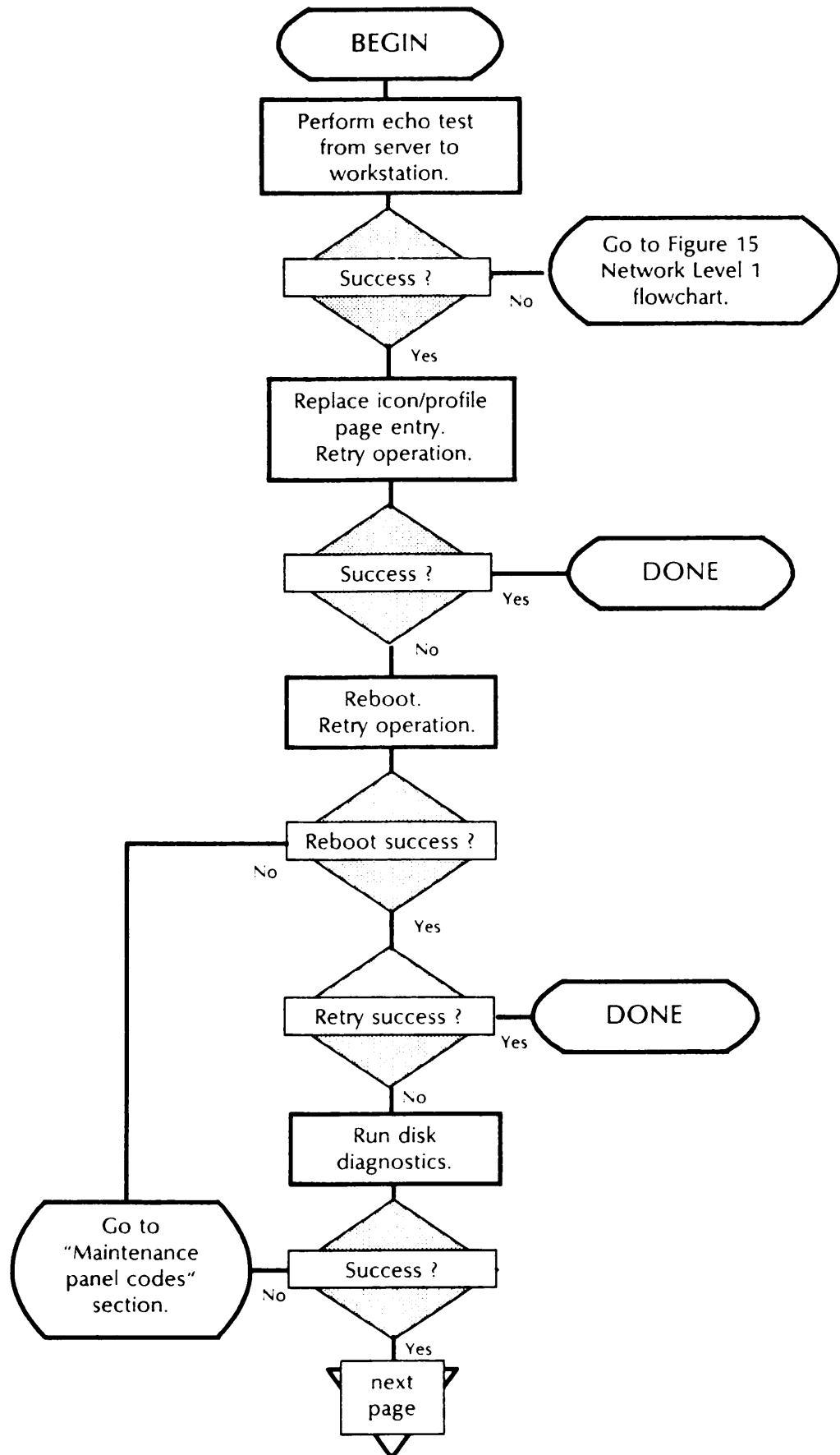


Figure 14. Workstation level flowchart

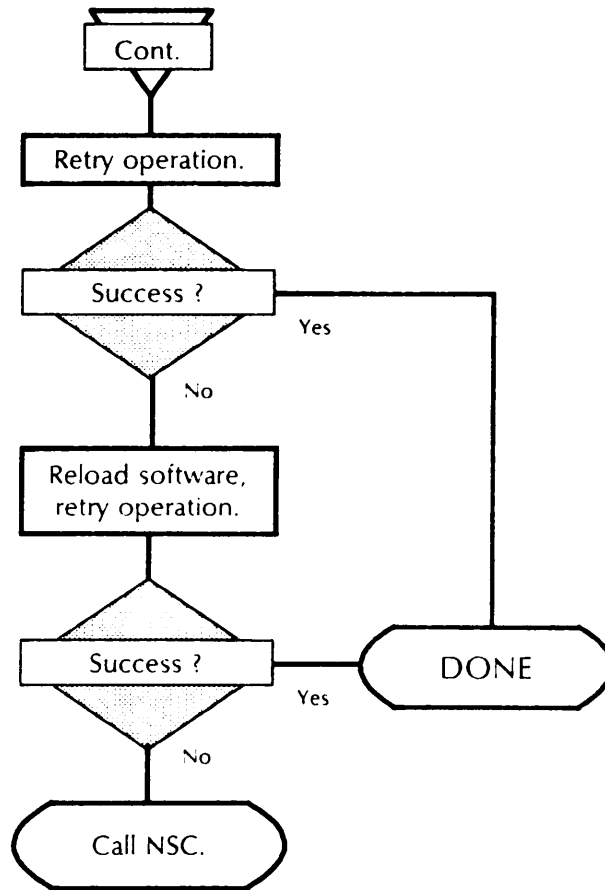
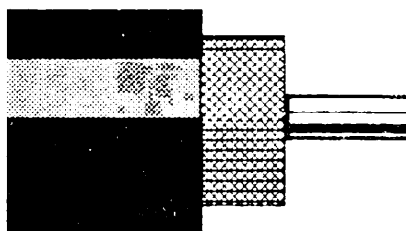


Figure 14. Workstation level flowchart (continued)

Checking the network (Network level 1)



You have narrowed the apparent cause to the network. Now, isolate the problem further.

You need to determine what area of the network is causing the problem: a workstation or server, the Ethernet cable, or a repeater. Start at the system you last worked with (workstation if coming from the "Checking the workstation (Workstation level)" section; or server, if coming from the "Checking the server (Server level 1)" section) and run diagnostics using the diagnostics floppy disk.

Procedure

1. Run diagnostics at the system in question.

If the system passes diagnostics, and a repeater is installed on the network between the server and the workstation experiencing the problem, check the repeater. Verify that the repeater has power by checking to see if the power indicator is lighted. If power is off, turn it back on and try the operation again. If power is on, call the Network Support Center for a resolution. For any other case in which the diagnostic test passes, go to the "Narrowing the problem to a system on the network (Network level 2)" section or Figure 16. Network level 2 flowchart.

If the diagnostic test fails and the maintenance panel displays 0322, go to the recovery procedures found in the "Server recovery" section. If the diagnostic test fails and the maintenance panel displays any code other than 0322, continue with the following step.

2. Run diagnostics at a second workstation on the same network.

If the diagnostic test passes, go to the "Assuring a system's connection to the network (Network level 3)" section or to Figure 17. Network level 3 flowchart. Also, if the diagnostic test fails and the maintenance panel displays any code other than 0322, go to the "Assuring a system's connection to the network (Network level 3)" section or to Figure 17. Network level 3 flowchart.

If the diagnostic test fails and the maintenance panel displays 0322, the problem may be with the workstation. Call your local Xerox service department to have a Xerox Customer Service Engineer sent to your site.

Note: MP code 0322 is normally a single workstation problem. However, if all workstations or servers on the network are displaying 0322 the problem is probably the network itself. In this case the network contractor should be called. The contractor should perform an ohmic test on the cable to determine if there is an open or a short, and then take the appropriate repair action.

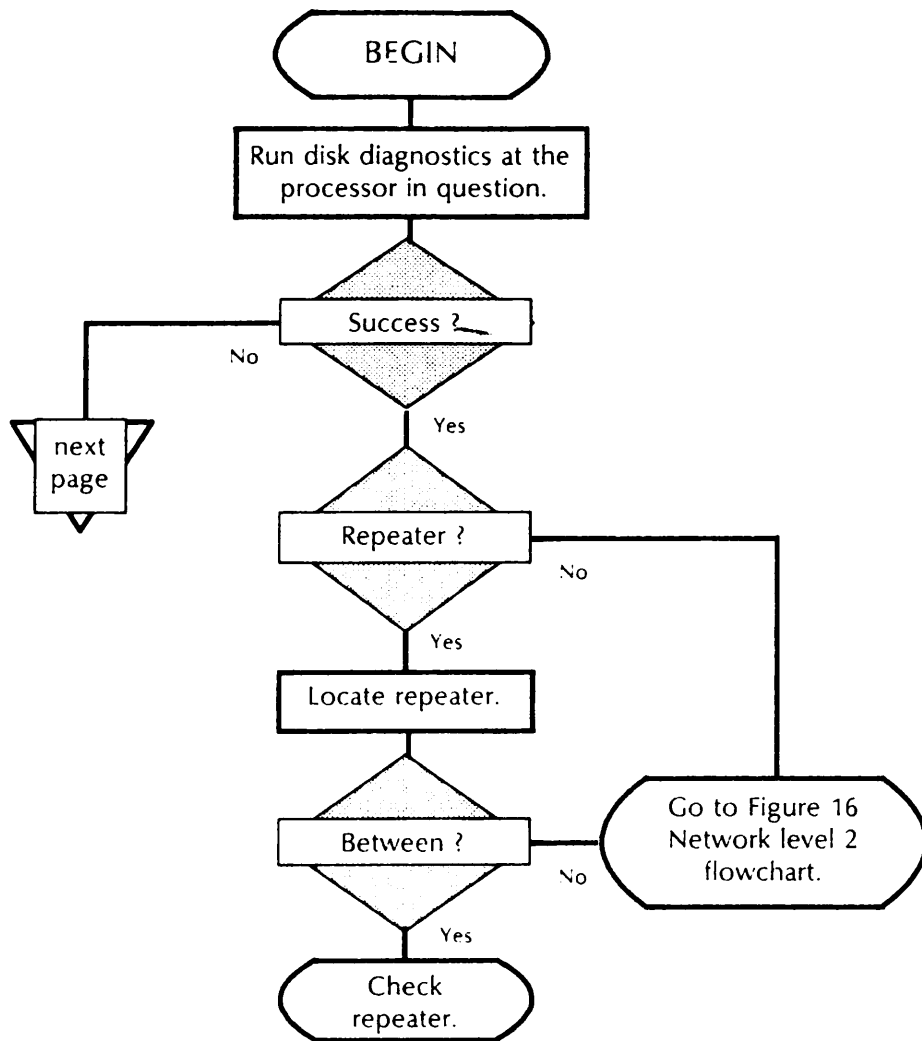


Figure 15. Network level 1 flowchart

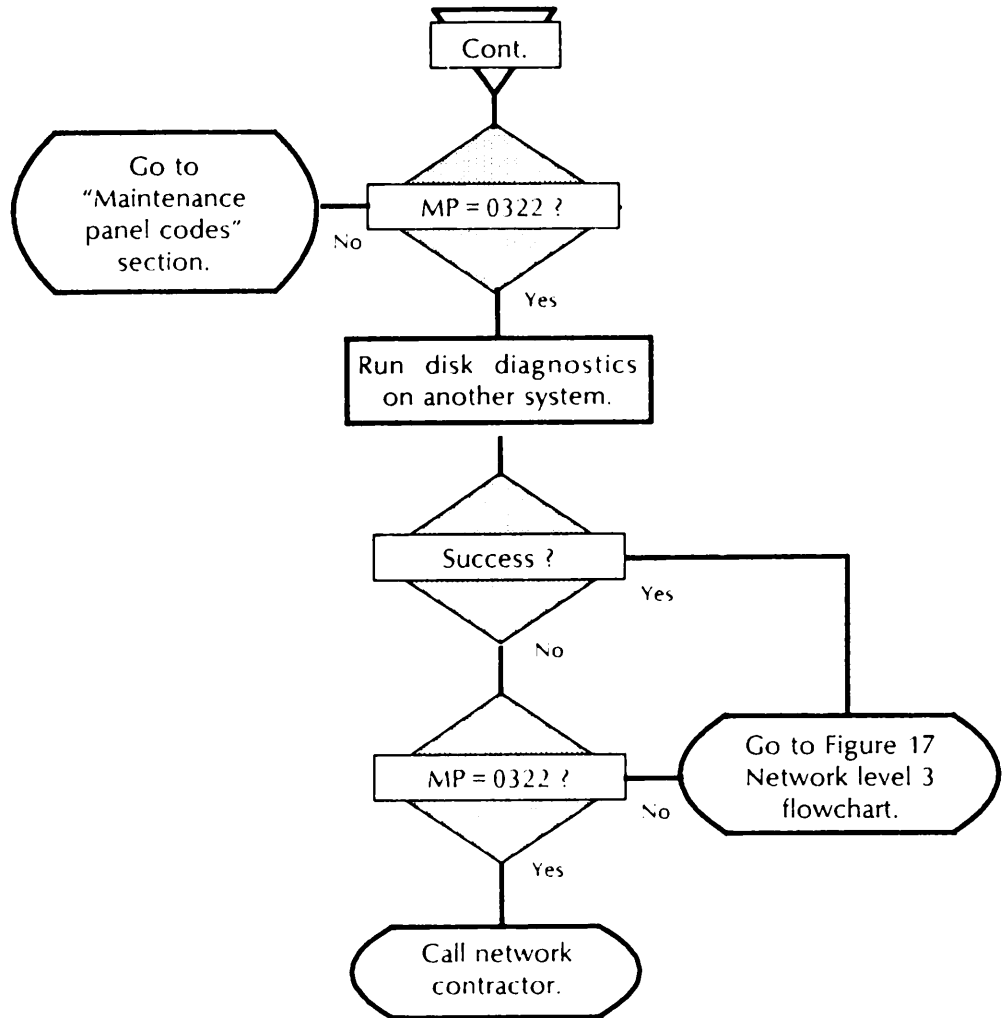
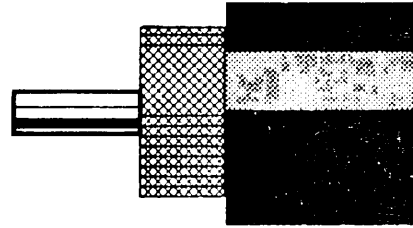


Figure 15. Network level 1 flowchart (continued)

Narrowing the problem to a system on the network (Network level 2)



You know that at least one system of the two involved is functioning correctly. Next, determine if the other system is working correctly. For example, if you are working with the problem of a workstation communicating with a server and you have tested the server, now test the workstation.

Procedure

1. Run diagnostics on the remaining processor in question.

If the diagnostic test fails and the MP code displays 0322, go to the "Assuring a system's connection to the network (Network level 3)" section or Figure 17, Network level 3 flowchart.

If the diagnostic test fails and the MP code displays any code other than 0322, refer to the appropriate recovery procedures described in the "Maintenance panel codes" section.

If the diagnostic test passes and both systems function normally as individual units, check the communication between the systems. Run an echo test between the workstation and server providing the Clearinghouse Service. The echo test checks the communication path between the workstation and the network. Refer to the "Server on-line diagnostics" section for information on running an echo test.

2. Run an echo test between the workstation and the server providing the Clearinghouse Service.

An echo test return rate that is lower than 99 percent indicates a workstation equipment problem. Call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) dispatched to your site.

An echo test return rate of 99 percent or higher indicates that the workstation is communicating with the network. Continue with the next step.

3. Retry the original operation that caused the problem.

If the operation succeeds, the problem is solved.

If the operation fails, go to the "Assuring a system's connection to the network (Network level 3)" section or Figure 17, Network level 3 flowchart.

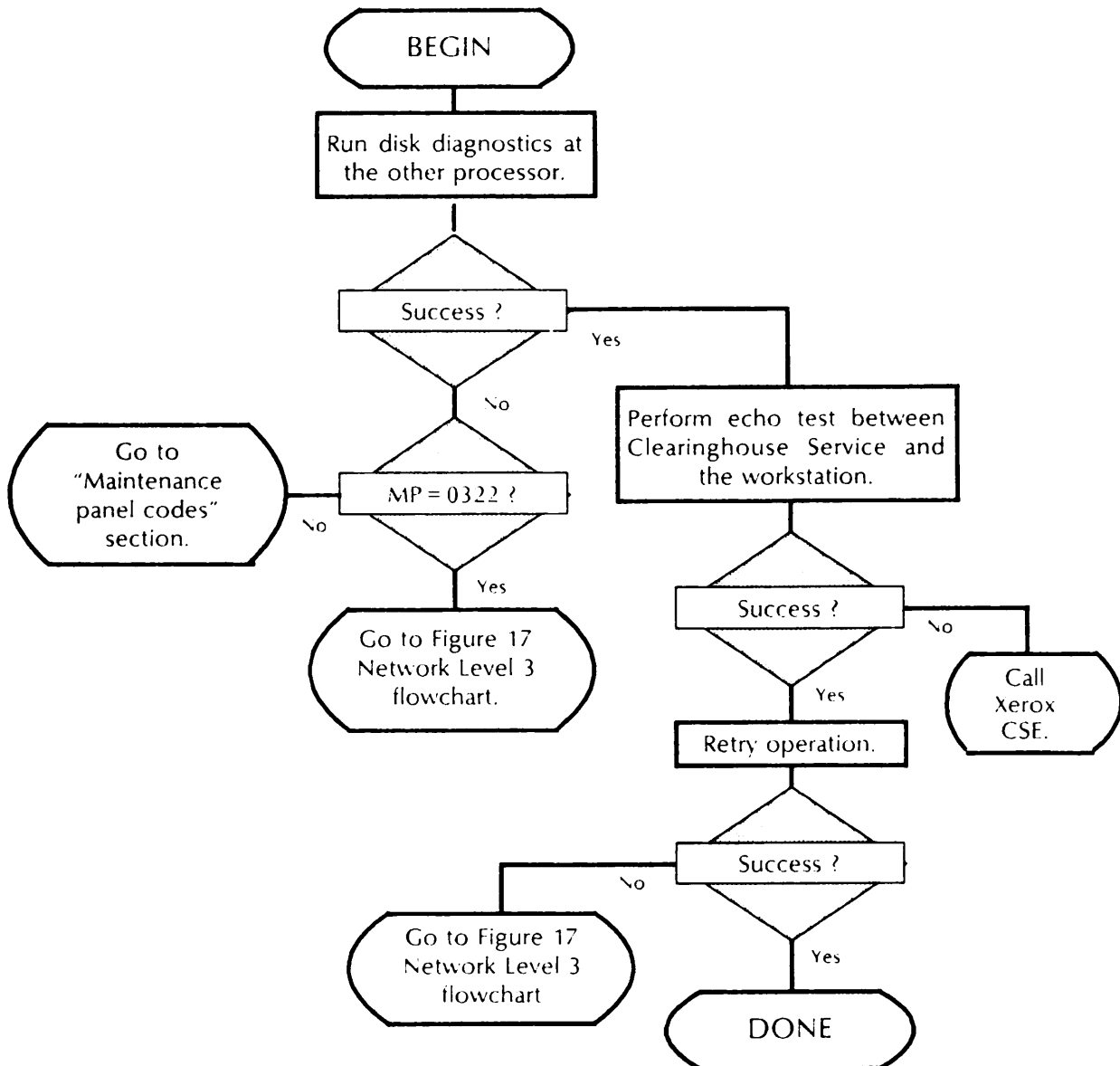
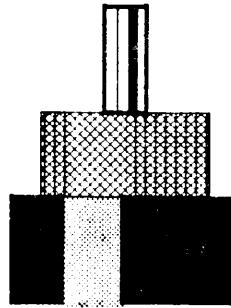


Figure 16. Network level 2 flowchart

Assuring a system's connection to the network (Network level 3)



Diagnostics indicate that the system is unable to "sense" the network. Most frequently, this is caused by a loose transceiver (the device that attaches the main Ethernet cable to the processor's drop cable).

Locate the transceiver of the processor in question. Use your site plan to match the location of the processor on the drawing with the processor in question. Determine the location of the appropriate transceiver.

Check that a small red light on the transceiver is on. If the transceivers are visible at your site, you can probably do this yourself. If the transceivers are not visible, you may need help from the network contractor.

Procedure

1. Locate the proper transceiver.
2. Verify that the indicator (red light) is on.

If the transceiver light is not on, first check to be certain that the drop cable is connected both to the system and to the transceiver. If the cable is not connected, plug it in. Then, turn the system off for a minute, and turn it back on. If the transceiver does not light, the supply of power to the transceiver is interrupted. Call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site.

If the transceiver light is now on, the connection may have been loose.

3. Re-run diagnostics.

If diagnostics stops at the maintenance panel (MP) code 0322, call your local Xerox service department to have a Xerox Customer Service Engineer sent to your site.

Note: MP code 0322 is normally a single workstation problem. However, if all workstations or servers on the network are displaying 0322, the problem is probably the network itself. In this case the network contractor should be called. The contractor should perform an ohmic test

on the cable to determine if there is an open or a short, and then take the appropriate repair action.

If any other maintenance panel code is displayed, refer to the recovery procedures in the "Maintenance panel codes" section.

If diagnostics succeeds, continue with the next step.

4. Try the original operation again.

If the operation fails, call the Network Support Center.

If the operation succeeds, you have solved the problem.

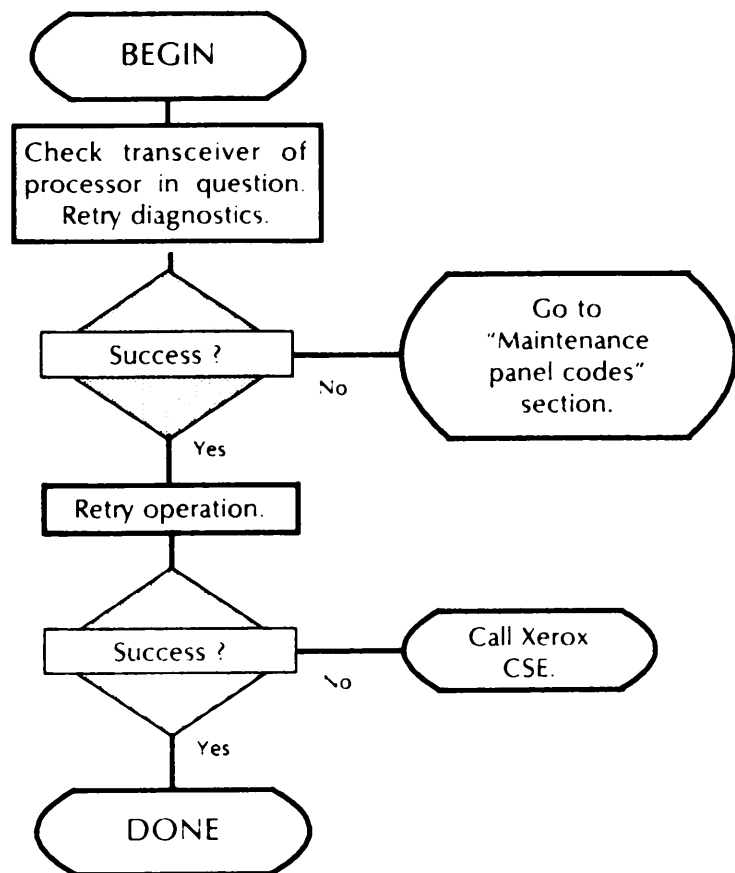


Figure 17. Network level 3 flowchart

(This page intentionally blank)

3. Server on-line diagnostics

System Administrators can use the server on-line diagnostics to test and monitor the network. These diagnostic tests can aid in troubleshooting network problems. Server on-line diagnostics are available when the **Test** command is used.

This chapter contains the following on-line server diagnostic tests and commands:

- Testing the Communication Interface Unit
- Testing the dialer
- Running the echo test
- Testing the floppy disk drive
- Using the **List Servers** command
- Testing an RS-232C port
- Testing the terminal
- Using the **Show Ethernet Statistics** command

Note: For a list of the tests and commands, type ? and press <RETURN> at the input prompt (>).

Testing the Communication Interface Unit

Use the Communication Interface Unit (CIU) test to check the function of the Xerox 873 CIU if it is suspected as the cause of a communication problem with the network. The test checks whether the CIU is properly attached to the Ethernet network and whether it can send packets on the network. When the CIU's processor number and boot message are displayed, the test has completed successfully.

The echo and RS-232C tests can be used to further check the Communication Interface Unit. Refer to Figures 4, 6, and 8, and the accompanying descriptive sections in the "Isolating the problem" section for additional suggestions to identify the cause of the problem.

To perform the CIU test, use the **Test** command at any server on the same Ethernet network of the CIU to be tested. The External Communication Service (ECS) must be started to perform this test.

Comment: For this test, the CIU being tested does not have to be registered with the owning External Communication Service (ECS). The Communication Interface Unit processor number can be retrieved via the CIU test and later entered into the owning ECS. However, at least one CIU must be registered with the ECS.

To test a Xerox 873 CIU, use this procedure at any server on the same Ethernet network as the CIU to be tested.

Procedure

1. Type **Test** and press <RETURN>.
2. Type **CIU** and press <RETURN>.
3. Respond to the prompts.
4. A message appears telling you to boot the 873 Communication Interface Unit. You do this by turning the key on the front of the unit. The 873 CIU also boots if you switch the power off and then on again.

CAUTION: Booting disconnects the phone line and may cause data loss if the line is in use. You should boot when the ports on the 873 Communication Interface Unit are not in use. Before starting the test, use the **Stop Service** command to stop services which may be using the ports on the CIU to be tested.

5. The processor number of the 873 CIU is displayed if the boot request is received. If the "owning" External Communication Service was not started when this test was performed, you must reboot the unit to begin operation.
6. If you boot the Communication Interface Unit and the following message is displayed: "No boot request was

received within the time limit," the CIU may not be functioning properly. Call the Network Support Center.

> TestRETURN

Test > CIURETURN

Now manually boot the unit. The test will take 2 minutes.
Press Break key to abort.

The following is the CIU's processor number:

949-187-944-448 = 15640000520000 = 0DD0002A000H

The boot request was for run files.

The 873 will be booted.

Testing the dialer

Use the dialer test to check the function of an automatic calling unit (auto-dialer) attached to the server's local RS-366 port, or to an RS-232C port on a CIU controlled by the server. You use this test, for example, if a dialer is suspected as the cause of a problem with a network communication path. The maintenance panel displays 8000 throughout the dialer test. The Clearinghouse Service is not consulted and does not need to be available.

To test an auto-dialer attached to the server's local RS-366 port or an RS-232C port on a Communication Interface Unit, use this procedure at the server.

Procedure

1. Type **Test** and press <RETURN>.
2. Type **Dialer** and press <RETURN>.

The test lists the dialers controlled by the server's External Communication Service.

A message is displayed if no auto-dialers are registered with the External Communication Service or if the External Communication Service is not started. Check the registration with the External Communication Service, or start the External Communication Service. Dialing errors reported by the RS-366 local server port may indicate a problem with the dialer. If there is a problem with the dialer, call the Network Support Center.

3. Enter your choice number. Press <RETURN>.

```
>TestRETURN
Test>DialerRETURN
Select dialer to be tested.
1 LocalPort (phone number 457-8901)
2 CIUPort1 (TTY emulation, 1200 bps)
3 CIUPort2 (TTY emulation and dial-in)
Enter choice number: 2RETURN
Will you be calling an auto-answer modem? (Y/N): Y RETURN
Enter the number of auto-answer modem: 5671209RETURN
Dialing...
The Auto-Dialer reports "success."
Done
```

Note: A LocalPort is a local 8000 port. A CIUPort is a port on a Communication Interface Unit.

4. Answer the "Will you be calling an auto-answer modem?" message by typing **Y** or **N** and pressing <RETURN>.

To check the automatic calling unit hardware by calling a nearby telephone, type **N** to the prompt. Then give the number of a nearby phone.

Will you be calling an Auto-answer modem? (Y/N): NRETURN
Enter the number of a nearby telephone to be called: 567-1209 RETURN

Note: Calling a nearby telephone tests the automatic calling units dialing capability (often making the test easier to use). This method of testing does not exercise the automatic calling unit's answer-back tone detection capability.

The messages "The Auto-Dialer reports success" and "Done" indicate that the dialer is functioning properly. Refer to Figures 4, 6, and 8, and the accompanying descriptive sections in the "Isolating the problem" section for additional suggestions to identify the problem.

Running the echo test

Use the echo test to determine the state of the communication path between servers, Communication Interface Units, networked 860s, 6085s and 8010s in an internetwork. The communication path can include workstations, servers, Ethernet networks, and telephone lines. For example, if you suspect a problem with a network communication path between servers, use the echo test to check the connection between the destination (receiving) server and source (sending) server.

Procedure

1. Type **Test** and press <RETURN>.
2. Type **Echo** and press <RETURN>
3. Enter the network and processor identification numbers of the destination test partner. Use the **List Servers** command to display a list of possible test partners.

The network addresses required for the echo destination can be specified either by entering the Clearinghouse Service name or by entering the network and host address. If required, a default domain and organization are supplied from the server's name. For workstations, enter the network address of the workstation. Addresses can be entered in decimal, octal, or hexadecimal notation. Examples of the standard notation (network number).(host address). are:

- 1-345.64-128-241. in decimal notation where 1-345 is the network number and 64-128-241 is the host address, separated by a period.
 - 2501B.364502361B. in octal notation
 - 541H.3D284F1H. in hexadecimal notation. The first digit of a hexadecimal number must be a numeral or a leading zero
4. Respond to the subsequent prompts, pressing <RETURN> after each response.

```

> TestRETURN
Test> EchoRETURN
Echo source:
  1 Local
  2 Remote
Enter choice number: 1RETURN
Echo destination name or address: 2-852-131-428RETURN
Display real-time feedback? (Y/N): NRETURN
Data Pattern:
  1 Incrementing
  2 All 0's
  3 All 1's
  4 Constant
Enter choice number: 1RETURN
Minimum packet size in bytes (2-512): 2RETURN
Maximum packet size in bytes (2-512): 512RETURN
Wait for response before sending next packet? (Y/N): Y RETURN

```

Intermediate results are displayed approximately every 45 seconds during the course of the test.

```

Intermediate Results:
  167 Total number of packets attempted
  150 Total number of good packets received
  3   Number of timed-out packets ( displayed if > 0)
  7   Number of late packets ( displayed if > 0)
  2   Number of unexpected packets ( displayed if > 0)

```

The echo test sends echo packets until you press <BREAK>. At the completion of the test, the final results are displayed. These include how many packets were echoed and what percentage of these echoes were successful.

Here is an example of the test parameters that display.

```

May 1, 1984 19:09:21 Echo Test Parameters

Local Network Address: OurDomain:OurOrg
  = 0-060.2-852-139-519. = 74B.25200030777B. = 3CH.0AA003aFFH.
Echo Source: OurDomain:OurOrg
  = 0-060.2-852-139-519. = 74B.25200030777B. = 3CH.0AA003aFFH.
Echo Source is local.
Echo destination: 2-852-131-428
  = 0.2-852-131-428. = 0B.25200011144B. = 0H.0AA001264H.
Echo partners are on different networks.
Data pattern: Incrementing
Minimum packet size in bytes: 2
Maximum packet size in bytes: 512
The test will wait for a response before sending the next packet.
Echo test is started. Press Break key to stop.

```

Final results are displayed when you stop the test by pressing <BREAK> or by pressing <CTRL> and <C>.

```

Final Results:
200 Total number of packets attempted
183 Total number of good packets received
3  Number of timed-out packets ( displayed if > 0)
7  Number of late packets ( displayed if > 0)
2  Number of unexpected packets ( displayed if > 0)
10 Average round trip delay in milliseconds
97 Percent packets transmitted that were received correctly
Done.

```

Comment: The packets sent in an echo test vary in size, starting with small packets, increasing up to the selected maximum, and then starting over. The maximum packet size is 299 bytes or less.

If the echo test is used with a CIU as the test partner, the CIU should already be booted by the External Communication Service.

By default, the test waits for a response to the previous packet before sending the next packet. If you type **N** to the "Wait for response before sending next packet?" prompt, the test sends echo request packets independently of echo response reception. The rate of transmission for the request packets is set by the delay parameter.

Percentages

When the final results are displayed, check the percentage of packets transmitted that were received correctly. When you test with another machine on your network, the effectiveness should normally exceed 96 percent. If the test is conducted over telephone lines, the effectiveness may be less than 96 percent. Refer to the "Internetwork Routing Service level" figures 4, 6, and 8; and "Network level" figures 15, 16, and 17, and their accompanying descriptions in the "Isolating the problem" section for additional suggestions to help identify the cause of the problem.

If the percentage of packets received correctly is low (below 95 percent), there may be a problem with the communication path. The CIU and RS-232C tests may be helpful in further isolating the problem.

Messages

The message "Echo to self not allowed" is displayed if the source and destination addresses are the same. The echo test exercises a connection between servers. Specify a different destination server.

If the source or destination address is not valid, the test displays the message "Network address invalid." Use the **List Servers** command to display a list of all the servers registered in the Clearinghouse Service under a particular domain and organization.

Testing the floppy disk drive

The floppy test checks the function of the floppy disk drive. The standard test for the floppy disk drive checks that the drive can read, write, and seek properly.

Use this test as part of a routine maintenance program to clean the floppy disk drive read/write heads, and check the floppy disk drive for proper operation.

Procedure

1. Type **Test** and press <RETURN>.
2. Type **Floppy** and press <RETURN>.
3. Type the number corresponding to the standard test and press <RETURN>.
4. Respond to the prompts.

```
> TestRETURN
Test > FloppyRETURN
Choose test to be performed:
1 Clean Read/Write Heads
2 Standard Test
3 Display Summary Log
4 Format Diskette
5 Exercise Floppy
6 Command File Test
Enter choice number: 2RETURN
Please remove diskette from the unit and leave door open.
Type any character when this is done.
Please insert Diagnostic Diskette.
Note: Any other diskette will cause erroneous results.
Type any character when this is done.
Done.
```

Note: An error message indicates that the floppy disk drive may need service. Call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site.

Using the List Servers command

The **List Servers** command lists all of the servers registered in the Clearinghouse Service under a specific domain and organization. The list includes names, addresses (in decimal, octal, and hexadecimal formats) and descriptions of servers. This test can be used to select a destination server for an echo test.

Messages are displayed if the Clearinghouse Service cannot be contacted or if no servers are found in the database. This may indicate communication problems between the local server and the nearest Clearinghouse Service for the domain and organization requested.

Procedure

1. Type **Test** and press <RETURN>.
2. Type **List Servers** and press <RETURN>.
3. Enter the listing pattern and press <RETURN>. You can use the wild card asterisk when specifying the pattern for listing.

```
> TestRETURN
Test > List ServersRETURN
Pattern: *RETURN
Servers matching "*:OurDomain:OurOrg"
Pesky (IRS, ECS server in room 101)
  = 60.252-123-455 = 74B.2520000456B. = 3CH.234AAH.
Tundra (T300 FS server in room 101)
  = 60.252-123-458 = 74B.2520000476B. = 3CH.237AAH.
Done.
```

Testing an RS-232C port

Use the RS-232C test to check the function and performance of the RS-232C interface. The test determines if the RS-232C port on a local or remote server running the Internetwork Routing Service (or other communication service) is functioning correctly. Many of the parameters available to you for controlling the RS-232C test are similar to those in the echo test.

You can test an RS-232C port only if all installation procedures have been performed. The test must be run from the server that is running the service which "owns" the port to be tested.

Note: This test requires either installing a loopback plug on the RS-232C port of the workstation, or setting the modem to loopback mode.

Procedure

1. Log on and enable in the specific communication service context.

Note: If the RS-232C port you are testing is used for IBM 3270 emulation, terminate communication with the IBM 3270 host by typing the External Communication Service **Stop IBM 3270 Emulation** command.

If the RS-232C port you are testing is used for internetwork routing, terminate communication to remote networks by entering the Internetwork Routing Service's **Stop Circuit** command. Remember to type the **Start IBM 3270 Emulation** or **Start Circuit** command when you have completed running the RS-232C test.

You must be logged on and enabled in the Internetwork Routing Service context to use the **Stop Circuit** and **Start Circuit** commands.

2. Type **Test** and press <RETURN>.
3. Type **RS-232C** and press <RETURN>.
4. Respond to the prompts and press <RETURN>.

When testing the server's local RS-232C port, messages are displayed at the beginning of the test to indicate that the data set ready (DSR) and clear to send (CTS) signals are received. When testing a port on a Communication Interface Unit, no DSR or CTS messages are displayed. Intermediate results are displayed every 45 seconds to indicate the number of correct transmissions.

```
> TestRETURN
Test > RS232CRETURN
  Choose RS232C port to be tested:
  1 LocalPort (attached to 271-0565)
  2 CIUPort3 (Used for Greeter only)
  Enter choice number: 1RETURN
  Properties of selected port:
    LocalPort (attached to 271-0565)
    -- name and description. Some ports don't have names.
    Port usage: IRS
    Line speed: 2400 bps
    Port hardware: local port
    Port usage is bit-synchronous.
  Choose mode:
  1 Asynchronous
  2 Bit-synchronous
  2 Byte-synchronous
  Enter choice number: 2RETURN
  Data pattern:
  1 Incrementing
  2 All 0's
  3 All 1's
  4 Constant
  Enter choice number: 4RETURN
  Enter constant value (0-255): 170RETURN
  Minimum packet size in bytes (2-600): 2RETURN
  Maximum packet size in bytes (2-600): 600RETURN
```

You can stop the RS-232C test and display final results by pressing <BREAK>.

```
167 Total number of packets sent okay (not displayed for asynchronous port)
500 Total number of bytes sent okay
167 Total number of good packets received okay
490 Total number of bytes received okay
  3 Device errors
  7 Transmit errors
  5 Bad data
  2 Missing data
  2 CRC errors
  97 Percent data transmitted that were received correctly
Done.
```

Check the final results for the percentage of packets correctly received. If the percentage is 97 percent or better, the Ethernet link and the phone lines are operational. See the "Internetwork Routing Service level" figures 4, 6, and 8, and "Network level" figures 15, 16, and 17, and the accompanying suggestions to help identify the cause of the problem.

Error messages are displayed if no ports are configured, the External Communication Service is not started, or if the DSR signal was not received. The RS-232C circuit may have incorrect information registered in the Internetwork Routing Service. Check your circuit registration form and verify the information. Check circuit registration information as registered in the Internetwork Routing Service. The problem may be in the server on the remote network.

4. If the keyboard response is correct and the video display is aligned and clear, the server terminal is functioning properly. See Figure 13, and the accompanying description for additional suggestions to help identify the cause of the problem.

If the keyboard response is not correct or the video display is not in focus or aligned properly, there may be a problem with the server terminal. Call the Network Support Center.

Using the Show Ethernet Statistics command

Use the **Show Ethernet Statistics** command when other diagnostic procedures, such as the echo test, lead you to suspect that a server is experiencing communication problems.

Procedure

1. Type **Test** and press <RETURN>.
2. Type **Show Ethernet Statistics** and press <RETURN>.
3. Type the number corresponding to the interval choice and press <RETURN>.

Statistics since server was rebooted This option displays the statistics for the service's Ethernet network activity since the server was last booted.

Incremental statistics since reset This option displays the statistics for the service's Ethernet network activity since the statistics counters were reset.

Note: When TTY emulation is used for remote administration, incremental Ethernet statistics cannot be gathered over separate remote executive sessions. If the user selects the "Incremental statistics since reset" option, then only those Ethernet statistics gathered since the statistics counter was reset during that particular remote session are shown. When the statistics counter is reset, baseline statistic information is recorded with the current executive and used to calculate incremental statistics. When a remote session is closed, the baseline statistic information is lost because the remote executive no longer exists.

Reset statistics counters This option resets the statistics counters to 0. This option does not ask for a server to be specified. Instead, the server specified as part of the last reset option is used.

```

> TestRETURN
Test> Show Ethernet StatisticsRETURN
Interval choices:
  1 Statistics since server was rebooted
  2 Incremental statistics since reset
  3 Reset statistics counters
Enter choice number: 1RETURN
Statistics at 5-May-84 10:10:45 since server was booted

  2 days, 2 hours, 3 minutes, 34 seconds (since 3-May-84 15:45:32)
    12 Packets sent
     3 Bytes sent
    ...
Done.

```

The statistics indicate the status of communication on the Ethernet network. If the statistics coincide with the level of network activity, the network should be operational. See

Figures 15, 16, and 17, and accompanying descriptions for additional suggestions to help identify the cause of the problem.

If the statistics do not reflect network activity, there may be a problem with the Ethernet network. Call the Network Support Center.

Messages

When you use the **Show Ethernet Statistics** command, you occasionally encounter informational or error messages. These messages are listed on the following pages. The message that you see on your screen appears in boldface type. Your action appears below the message.

Ethernet problem indicators

These statistics represent events that are deviations from normal Ethernet transmission. Communication problems are sometimes difficult to diagnose because communication paths are complex, often consisting of products from many vendors such as telephone companies, modem manufacturers, and other data processing equipment manufacturers.

Error conditions are rarely significant in small numbers. Do not consider their occurrence problematic unless the frequency exceeds the thresholds mentioned in the following descriptions. Examine error conditions when other diagnostic methods indicate concern with the station's ability to communicate on the Ethernet network. They should also be monitored occasionally as a preventative maintenance task.

Ethernet Station Load Statistics

These statistics are useful for monitoring the activity level of the server. Use the statistics in comparison with previously recorded statistics or Ethernet problem indicators.

Ethernet Operational Events

These statistics may be useful if an echo test with a workstation fails, and performing an echo test with other workstations is inconvenient or not possible. Examine Ethernet operational events to determine which station is not communicating successfully.

Ethernet problem indicators

Software Receive Overrun

Indicates the number of packets this station was unable to receive due to insufficient buffering. This usually means that this station has been too busy, especially during heavy bursts of traffic on the network. If the number of packets received is more than 5 percent, the server may be supporting too many services.

Contact your Systems Analyst.

Packets With Bad CRC

Indicates the number of packets received with a cyclic redundancy checking (CRC) error. Normally this is due to a collision, and the number should increase with increased collisions.

If the number is more than 5 percent of the packets received, especially if the count does not correspond to the number of collisions, call your local Xerox Service Department to have a Xerox Customer Service Engineer (CSE) sent to your site.

Bad Alignment, CRC OK

Indicates the number of packets received but not aligned on a byte boundary. Cyclic redundancy checking (CRC) is normal.

If the number is more than 5 percent of the packets received, call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site.

Bad CRC, Bad Alignment

Indicates the number of packets received with bad alignment and bad CRC. Most likely this is due to a collision.

If the number is more than 5 percent of the packets received, especially if the count does not follow collisions, call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site.

Packet longer than 600 bytes

Indicates the number of packets received that are longer than a packet.

Verify the existence of a transmitter of a different vendor; otherwise, call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site.

Hardware Receive OverRun

Indicates the number of packets that could not be received because the hardware is too slow.

If the number is more than 5 percent of the packets received, call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site.

Bad Receive Status

Indicates the total number of packets received with bad status, including bad CRC, bad alignment, packet too long, and receive overrun.

If the number is more than 5 percent of the packets received, call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site.

Ethernet Quiet

Indicates the number of periods (5 seconds) during which no packet passes by on the Ethernet network. Normally there are always some packets passing over the Ethernet network.

Late Collision

Indicates the number of packets in which a collision occurred during the latter part of the packet transmission. A station failed to sense that the Ethernet network is busy due to hardware failure or faulty design.

If the number is more than 1 percent of the packets sent, call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site.

Hardware Send UnderRun

Indicates the number of packets not transmitted due to the inability of the sending hardware to maintain 10 megabits per second.

If the number is more than 5 percent of packets sent, call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site.

Bad Send Status

Indicates the number of packets not transmitted due to too many collisions, or the inability of the sending hardware to maintain 10 megabits per second.

If the number is more than 5 percent of packets sent, call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site.

Stuck Output

Indicates the number of packets not transmitted because the Ethernet network appeared continuously busy for 2.5 seconds.

If the number is more than 1 percent of the packets sent, call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site.

Ethernet load statistics

Packets Forwarded

Indicates the number of packets forwarded to other networks by the Internetwork Routing Service.

Words Forwarded

Indicates the number of 16-bit words forwarded to other networks by the Internetwork Routing Service.

Packets Received

Indicates the number of packets destined for this station and received with good status. This count includes broadcast packets.

Words Received

Indicates the number of 16-bit words destined for this station and received with good status. This count includes broadcast packets.

Packets Sent

Indicates the number of packets transmitted successfully from the options board. There is no indication that the packet was actually transmitted to the Ethernet network.

Words Sent

Indicates the number of 16-bit words transmitted successfully.

Packets sent after <n> collision(s)

Indicates the number of packets transmitted successfully after one or more collisions (the packets transmitted to the Ethernet network successfully in attempt $n + 1$). This message is also an indication of the load on the Ethernet network, if all components are operating properly. Collisions are commonplace on a busy network.

If the number is greater than 10 percent of the packets sent and there are fewer than 50 stations on the network, call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site.

Too Many Collisions

Indicates the number of packets unable to transmit due to excessive collisions. Excessive collisions should be rare.

If the number is greater than 10 percent of the packets sent and there are fewer than 50 stations on the network, call your local Xerox service department to have a Xerox Customer Service Engineer (CSE) sent to your site.

Ethernet operational events

Echo server words echoed

Indicates the number of words (16 bits each) echoed by the built-in echo server.

Echo server packets echoed

Indicates the number of packets echoed by the the built-in echo server. This counter is useful for diagnosing why an echo test has failed.

(This page intentionally blank)

Use the following steps to resolve problems for all services, with the exception of the Print Service. Refer to the "Messages" section of the *Print Service* booklet in the *Network Shared Services* volume to resolve Print Service problems.

Procedure

1. Make note of the events leading up to the problem.

Write down any codes appearing in the maintenance panel, the services running on the server, how full the server is, and any details that may help identify the problem.

2. Display the backstop log with the **Show Backstop Log** command, and determine the type of error.

Record all information displayed on the screen. In particular, note if there are disk label check or unrecoverable disk errors.

If there is an unrecoverable disk error, note the disk page number. Use the table below to identify the area where the page is located.

<u>Server</u>	<u>First Cylinder</u>	<u>Backstop Area</u>	<u>System Area</u>	<u>User Area</u>
10 megabytes	00000-00127	00128-04628	04629-10629	10630 +
29 megabytes	00000-00223	00224-04724	04725-10725	10726 +
42 megabytes	00000-00127	00128-04628	04629-12629	12630 +
80 megabytes	00000-00149	00150-04650	04651-15651	15652 +
300 megabytes	00000-00569	00570-05070	05071-30071	30072 +

3. Choose a course of action based on your findings in the previous step.

For a disk label check error

- Install the server software.
- Run disk diagnostics. Refer to Chapter 5, "Disk diagnostics," for the disk diagnostics procedure. Respond to the disk diagnostics messages as appropriate. Boot the system. If the problem persists, call the Network Support Center.
- Scavenge the disk. Refer to Chapter 6, "Scavenging the services volume," for the procedure. This procedure takes several hours on large disks.

For an unrecoverable disk error in the backstop or system area

- Run disk diagnostics. Refer to Chapter 5, "Disk diagnostics" for the procedure. Respond to the disk diagnostics messages as appropriate. Boot the system. If the problem persists, call the Network Support Center.
- Install the server software.

For an unrecoverable disk error in the user area

- Run disk diagnostics. Respond to the disk diagnostic messages as appropriate. Boot the system.
- If the problem persists, scavenge the disk. Refer to Chapter 6, "Scavenging the services volume," for the procedure. This procedure takes several hours on large disks. If the problem persists, call the Network Support Center.

For an unrecoverable disk error in the first cylinder area

- Try installing the software. If the problem persists, call the Network Support Center.

For all other conditions

- Run disk diagnostics. Respond to the disk diagnostics messages as appropriate. Boot the system. If the problem persists, call the Network Support Center.

This chapter describes the procedures to run diagnostic tests on fixed and removable disks. The diagnostics floppy contains tests for checking the operation of the server processor, memory, and rigid disk.

There are two types of rigid disks, fixed and removable, which require different floppies for testing. Be sure to use the appropriate diagnostic floppy disk for the type of rigid disk being tested. Rigid disk types are:

- Fixed disk (10, 29, and 42 Mb)
- Removable disk (80 and 300 Mb)

The removable disk diagnostics test has six test options that you select from an options list after initial procedures. They are:

- Running a confidence test
- Formatting a disk pack
- Running the physical volume scavenger
- Using the bad page utility
- Displaying the bad page table
- Using the **Exit** option

This chapter presents the diagnostic procedures, and other helpful procedures in the following order:

- Running fixed disk diagnostics
- Using the **Boot** command
- Performing fault analysis
- Logging on
- Using the **Quit** command
- Running removable disk diagnostics

The "Server recovery" section describes the situations in which disk diagnostics can be helpful in correcting problems.

Running fixed disk diagnostics

The fixed disk diagnostic floppy disk verifies the operation of the processor, memory, and the rigid disk(s) of servers with 10, 29, and 42 Mb fixed disks. Be sure to use the fixed disk diagnostic floppy disk for the tests.

Procedure

1. Insert the fixed disk diagnostic floppy disk into the floppy disk drive.
2. Press the ALT B and B RESET buttons on the server.
3. Release the B RESET button. The numbers on the maintenance panel will begin to cycle.
4. Continue to hold down the ALT B button until the maintenance panel displays 0005. Then release the ALT B button.

Note: If the numbers on the maintenance panel cycle beyond 0005 before you are able to release ALT B, wait for them to cycle back to 0005 or start again, pressing both buttons.

5. The diagnostics program displays the following message:

THIS IS THE BOOT DIAGNOSTICS VERSION 6.0
THIS CONFIRMS THAT THE NETWORK ADMINISTRATOR DISPLAY
IS OPERATIONAL

The diagnostics program begins by setting the time of day. If a time service is not available and the server contains a valid time, the program displays the time and requests confirmation from the user. If the server does not contain the time or you do not confirm the time, the program asks you for the local time and local time parameters (time zone and daylight savings time information). You can respond to the prompts with a question mark (?) for a more complete explanation.

If the real-time clock cannot be set successfully, the error message "Real time clock failure" appears. Refer to the *Server Software Installation* booklet in the *Network Basic Services* volume for information on setting the time.

After the time is set, the fault analysis, media scan, and list new bad pages diagnostics are performed. The storage capacity of the disk drive, the version of the diagnostic program, and the results of diagnostics are displayed.

```

29 Megabyte Storage Diagnostic Program 6.0 of 31 AUG, 84 16:30
> Fault Analysis
MP code: 1799
Examining physical volume
> Media Scan
Pass: 2
> List New Bad Pages
The following pages are bad
Please make note and contact your Xerox Network Support Center
..... Page ..... Area ..... Volume .....
..... 40781 ..... Data ..... User .....
Warnings (or Successful Completion)

```

Comment: If the server is working correctly after the diagnostics are run, you can reboot the system by pressing and releasing B RESET or typing **Boot** to return to normal operation.

This is a list of the maintenance panel codes displayed by the diagnostics for each fixed disk capacity.

- 1199 for a 10 Mb fixed disk
- 1799 for a 29 Mb fixed disk
- 1499 for a 42 Mb fixed disk

You must reboot the server for normal operation to display the 8000 maintenance panel code.

If you must terminate this operation before completion, press <BREAK> on the server display terminal. Then press and release B RESET on the server to return to normal operation.

If your display reports new bad pages, note the pages and call the Network Support Center.

If the physical volume scavenger tries to recover data from bad pages, these messages are displayed:

```

Examining physical volume
Running PV scavenger
Attempting safe repair
Attempting risky repair

```

If bad pages are found during the list bad pages test, these messages are displayed:

The following pages are marginal
xxxxx Field Volume
The following pages are bad
xxxxx Field Volume
Please make note and contact your Xerox Network Support Center

If diagnostics completes successfully but service is required, warnings are displayed with explanatory messages. For example:

Physical volume has irreparable damage
Physical volume needs forward conversion
Please reconstruct bad page table
Please re-install software

Using the Boot command

Enter this command after running diagnostics tests to return the server to normal operation.

Typing the **Boot** command is the same as pressing the boot button (B RESET). This enables you to leave the diagnostics and boot the server for normal operation. Upon receiving the **Boot** command, the server displays normal boot messages and prompts you to start services.

Procedure

1. Type **Boot** and press <RETURN>.
2. Type **Y** to the "Normal Startup?" prompt and press <RETURN>.

Performing fault analysis

The **Fault Analysis** command detects and isolates rigid disk errors.

Procedure

1. Type **Fault Analysis** and press <RETURN>. You are prompted to enter the MP code number of the test you wish to run.
2. Press <RETURN> to select all tests.

```
> Fault AnalysisRETURN
      Enter MP code (1610-1750)RETURN
MP code: 1199
      Loop until error (Y/N): NRETURN
>
```

Upon successful completion of the test, the program asks whether to loop until finding an error. If you type **Y**, the program runs the test(s) again until it finds an error, or until you press <BREAK>. If fault analysis completes successfully but service is required, warnings are displayed after explanatory messages.

```
Examining physical volume
Running PV scavenger
Attempting safe repair
Attempting risky repair
```

If a test fails, a code is displayed in the maintenance panel. Refer to the "Maintenance panel codes" chapter for the appropriate recovery action. The program asks whether to loop on that error. If you type **Y**, the program loops until either the error no longer exists, or until you press <BREAK>.

After the command terminates, you can power down the server or type the **Quit** and **Boot** commands, depending upon the recovery action.

Logging on

The **Logon** command provides access to the server display terminal and various levels of operator privileges for running diagnostics. Under special circumstances you may be requested by the Network Support Center to perform a diagnostic test which requires special access.

To perform a test requiring special access, log on using a special password given to you by the Network Support Center.

Procedure

1. Type **Logon** and press <RETURN>.
2. Type the user name and password given to you by the Network Support Center. Press <RETURN>.
3. Perform the test under the direction of the Network Support Center. Upon completion, your special status is displayed. Perform additional diagnostics as necessary under the direction of the Network Support Center.

```
> LogonRETURN
Enter user name: XeroxRETURN
Enter password: *****RETURN
Operator privileges: Technical Specialist or Analyst
```

Using the Quit command

The **Quit** command stops diagnostics without causing a boot operation. The disk read/write heads move to the diagnostic cylinder to protect data during power-off.

This command can be entered when you finish running diagnostics and you do not want to boot the server for normal operation. For instance, use this command if you are preparing to power down the server.

Procedure

1. Type **Quit** and press <RETURN>.
2. Proceed to the next step in your troubleshooting strategy when "Done" is displayed.

Running removable disk diagnostics

The removable disk diagnostic floppy verifies the operation of the processor, memory, and rigid disk(s) of servers with 80 and 300 Mb removable disks. Be sure to use the removable disk diagnostic floppy for these tests.

Procedure A. Setting up the removable disk diagnostics

1. Insert the removable disk diagnostic floppy into the floppy disk drive.
2. Press the ALT B and B RESET buttons on the server.
3. Release the B RESET button. The numbers on the maintenance panel begin to cycle.
4. Continue to hold down the ALT B button until the maintenance panel displays 0005. Then release the ALT B button.

Note: If the numbers on the maintenance panel cycle beyond 0005 before you are able to release ALT B, wait for them to cycle back to 0005, or start again, pressing both buttons.

5. The diagnostics program displays the following message:

```
LARGE CAPACITY DISK DIAGNOSTIC [Version 6.0 of 15-Dec-83]
A '?' will further explain the menu options.
A 'BREAK' will return to the prior menu.
```

6. The display asks who is running the test:

```
PERSON RUNNING THE TEST
1. User
2. Network Administrator
3. Tech Rep
Enter choice number:
```

Type the number corresponding to "Network Administrator." These tests are displayed:

```
TEST SELECTION
1. Confidence Test
2. Format Disk
3. Physical Volume Scavenger
4. Bad Page Utility
5. Display Bad Page Table
6. Exit
Enter choice number:
```

You can type ? to display a brief explanation of the tests.

Comment: The following sections begin at the 'Test Selection' step (as if they started with step 7).

Procedure B. Running a confidence test

The confidence test performs a nondestructive verification of the disk unit(s). You can test multiple units. The test looks for hard errors and excessive soft errors. If an error occurs, a special code is displayed in the maintenance panel, indicating a failing status bit or a specific error condition. The last errors are kept in the error log. If a problem is suspected with a server's removable disk, this test can be run to check the operation of the disk.

1. Type the number corresponding to "Confidence Test" and press <RETURN>. The confidence test displays the large capacity disk configuration.

LARGE CAPACITY DISK CONFIGURATION

First Unit = 30MB
 Second Unit = 80MB
 Third Unit = Not Ready
 Fourth Unit = Not Found

Is the above configuration correct? (Y/N): **Y RETURN**

If the displayed configuration is not correct, you are prompted to try the test again.

Please attempt to correct the problem.
 Reboot the diagnostic floppy diskette and try again.
 If the problem persists, please get assistance from service.
 Type any character to continue:

If the selected unit is not ready or write protected, the following message is displayed:

Second Unit

Please Attempt to make the Unit not write protected and try again.
 Reboot the diagnostic floppy diskette and try again.
 If the problem persists, please get assistance from service.
 Type any character to continue:

2. Type **Y** or **N** and press <RETURN>. The program displays the passes to run, the unit(s) being tested, the type of unit being tested (on single unit test), the run time for the test, and the name of subtest being run (This changes with each subtest).

If the test runs successfully, a message stating this is displayed.

```

CONFIDENCE TEST
Passes to run: 2RETURN
Running: Third Unit   Unit Type: 80MB   Run Time: 5 mins.: 20secs
SUBTEST
Read Header Check

```

If an error occurs, the maintenance panel displays an error code and these messages:

```

Please call service for assistance and report
the Maintenance Panel Code and the data on the screen.
Thank you.

```

3. Press <BREAK> to display the soft error count per head.

```

HEAD ERROR COUNT DISPLAY
Passes executed: 1
HEAD NUMBER      ERROR COUNT
Head: 0          2
Head: 1          0
Head: 2          0
Head: 3          22
Head: 4          1
Type any character to continue:

```

Note: The last errors are logged in the error log. The last commands, including errors, are logged in the trace table so that a technician can get exact information on the type of error, the error location, and the command sequence when the error occurred.

4. Type any character to return to the test selection menu.

Procedure C. Formatting a disk pack

The format disk option formats the selected disk pack and runs a selected number of passes. Each pass writes and verifies 15 different data patterns. If the format disk operation finds a bad page while formatting, the page is logged in the bad page table. Use this procedure to prepare a new disk pack for operation.

CAUTION: Formatting a disk pack destroys all previously recorded information. If the disk pack has previously been formatted and contains data, copy the data to a backup disk before formatting.

1. Type the number corresponding to "Format Disk" and press <RETURN>. This menu is displayed:

If you type ?, a "Please look for numbering on the units" message is displayed.

2. Type the number of the disk to be formatted and press <RETURN>. If an invalid entry is selected, you get an "Invalid Entry" message.

```

FORMAT DISK
UNIT TO BE SELECTED
1. First Unit
2. Second Unit
3. Third Unit
4. Fourth Unit
5. Exit
Enter choice number:

```

The program verifies that the selected unit is found, ready, and not write-protected. If a unit is not found or not ready, these messages are displayed:

```

First Unit
Please Attempt to make the Unit ready.
Reboot the diagnostic floppy diskette and try again.
If the problem persists, please get assistance from service.
Type any character to continue:

```

3. Type any character to return to the beginning of the test. If the unit is write-protected, these messages are displayed:

```

First Unit
Please Attempt to make the Unit not write protected and try again.
If the problem persists, please get assistance from service.
Type any character to continue:

```

If the selected unit is present, ready, and not write-protected, you are asked for the number of passes to run.

If you type ?, this message is displayed:

```

Each pass writes 15 different data patterns.
The supported pass count is 1 through 32000.

```

4. Press <BREAK> to return to the test selection menu. If an invalid entry is selected, the "Invalid Entry" message is displayed:

If a valid entry is typed, you get a warning message.

```

WARNING! The following action will be destructive.
Do you still wish to continue (Y/N): YRETURN

```

5. Press <BREAK> to return to the test selection menu. Type N to return to the beginning of the diagnostic test. Type Y to continue with the format operation.

Type Y again to reconfirm.

The unit to be formatted, the passes to run, and the run time are displayed. Each bad page is also displayed.

FORMATTING FIRST UNIT

Passes: 1 Run Time: xx hrs xx mins

Bad Page Page: 12277 Cylinder: 81 Head: 2 Sector: 17

When formatting is complete and there are bad pages, the bad page table is created and stored on the selected disk unit. The "Logging Bad Pages" message is displayed.

When formatting is successfully completed, you see a corresponding message.

6. Type any character to return to the beginning of the test. If cylinder zero contains a bad page, these messages are displayed:

Bad Page in cylinder zero.
Please try another disk pack.
If the problem persists, please get assistance from service.
Type any character to continue:

If too many bad pages are found, these messages are displayed:

Too many bad pages.
Please try another disk pack.
If the problem persists, please get assistance from service.
Type any character to continue:

If a hard error occurs, these messages are displayed:

Formatting failed.
Please call service for assistance and report the Maintenance Panel Code and the data on the screen.
Thank you.

Procedure D. Running the physical volume scavenger

Run the physical volume scavenger to correct disk errors, to verify that the disk hardware is functional, or to repair a broken physical volume. The physical volume scavenger attempts to recreate the base page or a logical volume marker page in error.

Note: Run this test only when you are instructed to do so by the Network Support Center.

1. Type the number corresponding to "Physical Volume Scavenger" and press <RETURN>.
2. Type the number corresponding to the unit to be tested and press <RETURN>. The test runs automatically.
3. If the test completes successfully, remove the floppy disk from the floppy disk drive and reboot the server. Otherwise, report the results of the test to the Network Support Center and ask for further instructions.

Comment: If the selected removable disk unit is not ready or cannot be found, you receive a prompt asking if you want to call for service. If you still wish to continue, type any character when the "Type any character to continue" prompt appears.

Procedure E. Using the bad page utility

Use the bad page utility to log a bad page into the bad page table and rewrite broken headers.

1. Type the number corresponding to "Bad Page Utility" and press <RETURN>.

```
BAD PAGE UTILITY
1. Manual Bad Page Log
2. Rewrite Bad Page (erases Label and Data)
3. Exit
Enter choice number:
```

Type ? for a brief explanation of the menu selections.

The bad page utility provides these selections:

- Manual bad page log - this option lets you log a bad page into the bad page table manually. This operation is required under certain disk fault conditions.
- Rewrite bad page - this option lets you rewrite a bad page which has been corrupted due to a hardware failure. It is required under certain disk fault conditions.

CAUTION: This option should only be used under the direction of a Xerox Technical Specialist or a Xerox Systems Analyst.

- Exit - this option redisplay the diagnostic menu.

2. Type the number corresponding to the function to be performed (log, rewrite, or exit) and press <RETURN>.

Manual bad page log

CAUTION: This option should only be used under the direction of a Xerox Technical Specialist or a Xerox Systems Analyst.

```

MANUAL BAD PAGE LOG
UNIT TO BE SELECTED
1. First Unit
2. Second Unit
3. Third Unit
4. Fourth Unit
5. Exit
Enter choice number:

```

1. If you type ?, you get the "Please look for numbering on the units" prompt.

Type the number corresponding to the "Exit" prompt or press <BREAK> to return to the bad page utility menu. If an invalid entry is selected, the "Invalid Entry" message is displayed.

If a unit is not found or not ready, these messages are displayed:

```

Third Unit
Please Attempt to make the Unit ready.
Reboot the diagnostic floppy diskette and try again.
If the problem persists, please get assistance from service.
Type any character to continue:

```

If a unit is write-protected, these messages are displayed:

```

Third Unit
Please Attempt to make the Unit not write protected and try again.
If the problem persists, please get assistance from service.
Type any character to continue:

```

2. Type the number of the page to be logged and press <RETURN>.
3. Press <BREAK> to return to the bad page utility menu. Type ? to display the range of values.

```

The supported number is 0 to 122249. (for a 80MB drive)
or:
The supported number is 0 to 464549. (for a 300MB drive)

```

If the bad page number is not a valid page number, you get an "Invalid Entry" message.

If the bad page is in cylinder 0, you get these messages:

```
Bad Page in cylinder 0.  
Please try another Disk Pack.  
Type any character to continue:
```

4. Type any character to return to the bad page utility menu. If a valid bad page number (not in cylinder 0) is entered, you are requested to confirm with a **Y** or **N**.

Type **Y** to log the page into the bad page table. Type **N** if you do not want to log the page into the bad page table.

5. Type **Y** to the prompt to Exit.

Rewrite bad page

```
REWRITE BAD PAGE  
UNIT TO BE SELECTED  
1. First Unit  
2. Second Unit  
3. Third Unit  
4. Fourth Unit  
5. Exit  
Enter choice number:
```

1. Type the number of the bad page unit. Press **<RETURN>**. If you type **?**, you get a "Please look for numbering on the units" message.

Type the number corresponding to the "Exit" prompt and press **<RETURN>** or press **<BREAK>** to return to the bad page utility menu. If an invalid entry is selected, you get an "Invalid Entry" prompt.

The program verifies that the selected unit is found, ready, and not write-protected. When a character is entered after the message, the program returns to the bad page utility menu. If a unit is not found or not ready, these messages are displayed:

Third Unit
Please Attempt to make the Unit ready.
Reboot the diagnostic floppy diskette and try again.
If the problem persists, please get assistance from service.
Type any character to continue:

If the unit is write-protected, these messages are displayed:

Third Unit
Please Attempt to make the Unit not write protected and try again.
If the problem persists, please get assistance from service.
Type any character to continue:

2. The unit and the page to be logged are displayed.

You can press <BREAK> to redisplay the bad page utility menu. If you type ?, these messages are displayed:

The supported number is 0 to 122249. (for a 80MB drive)
or:
The supported number is 0 to 464549. (for a 300MB drive)

If the entered bad page number is not a valid page number, the "Invalid Entry" message is displayed.

3. If a valid bad page number is entered, type **Y** or **N** and press <RETURN> in response to the confirmation prompt.

Type **Y** and press <RETURN> to rewrite the page. Type **N** and press <RETURN> if you do not want to rewrite the page.

4. Type **Y** and press <RETURN> to redisplay the bad page utility menu. Type **N** and press <RETURN> to rewrite the bad page.

Exit? (Yes/No): **Y RETURN**

Procedure F. Displaying the bad page table

Use the **Display Bad Page Table** command to display the bad pages on the removable disk (logged with the "Format disk" or the "Manual bad page log" options). Use this command to check the number of bad spots on the disk pack and to verify that the proper pages are logged when using the "Manual bad page log" option.

1. Type the number corresponding to "Display Bad Page Table" and press <RETURN>.

```
BAD PAGE DISPLAY
UNIT TO BE SELECTED
 1. First Unit
 2. Second Unit
 3. Third Unit
 4. Fourth Unit
 5. Exit
Enter choice number:
```

2. Type the number of the bad page display unit. Press <RETURN>. If you type ?, this message is displayed:

```
Please look for numbering on the unit.
```

The program verifies that the selected unit is found and ready. When a character is typed after the message, the program returns to the beginning of the test. If the unit is found and ready, the bad pages are displayed.

```
BAD PAGE DISPLAY      FIRST UNIT
Bad page: 1200 Cylinder: 8 Head: 0 Sector: 0
Bad page: 1277 Cylinder: 8 Head: 2 Sector: 17
Bad page: 1200 Cylinder: 8 Head: 2 Sector: 17
Type any character to continue:
```

3. Type any character to return to the display options menu.

Note: If you type the number corresponding to the "Exit" prompt or press <BREAK>, the program returns to the display options menu.

If an invalid entry is typed, you get the "Invalid Entry" message. If a unit is not found or not ready, these messages are displayed:

```
First Unit
Please Attempt to make the Unit ready.
Reboot the diagnostic floppy diskette and try again.
Type any character to continue:
```

If there are no bad pages logged on the disk, these messages are displayed:

```
BAD PAGE DISPLAY      FIRST UNIT
The Bad Page Table is empty.
Type any character to continue:
```

Procedure G. Using the Exit option

The Exit option stops the disk diagnostic program.

Use this option to stop running diagnostics before returning to normal operation or further troubleshooting. When "Done" is displayed, you can boot for normal operation or proceed with troubleshooting.

1. Type the number corresponding to "Exit" and press <RETURN>. Upon successful completion, "Done" is displayed.
2. Continue with the next step in your troubleshooting strategy.

(This page intentionally blank)

6. Scavenging the services volume

Scavenge a damaged disk volume to rebuild the structure of the file system.

Scavenging repairs the file system after a system failure by determining the cause of the problem and the area where it occurred. Users and/or technicians can then take the appropriate steps to resolve the problem once it has been determined.

The disk's file system can become damaged due to software failure, hardware failure, or a power loss. If this happens, the software generally detects this situation and displays a message at the server indicating that you should run scavenge when the system restarts.

This chapter describes the procedures for resolving these situations:

- Recovering from an inconsistent file system
- Recovering from a disk label check
- Recovering from an unrecoverable disk error

A file system inconsistency is usually determined during initialization. When the file system becomes inconsistent, it is likely that the server will not be able to open the volume. In this event, the server displays this message: "Inconsistent File System. Please Scavenge."

System failures caused by unrecoverable disk errors and disk label checks are determined by finding the entries in a server's backstop log after the system failure.

There are many variables that determine the correct recovery procedures you should use, especially for an unrecoverable disk error and disk label check. A disk label check is similar to an unrecoverable disk error, except that the diagnostic procedures are not required. Such variables as where the bad page is located, and what services you have running on your server will determine your final options. An inconsistent file system error requires that you apply the instructions in "Recovering from an inconsistent file system" section.

Scavenging a disk

The scavenge operation continues until the program restores the file system. These are estimates of the time needed to run scavenge for each disk capacity.

- 10 Mb fixed disk: 5 - 10 minutes
- 29 Mb fixed disk: 10 - 20 minutes
- 42 Mb fixed disk: 15 - 45 minutes
- 80 Mb removable disk: 15 minutes - 1 hour
- 300 Mb fixed/removable disk: 30 minutes - 4 hours

Note: On systems with removable disks, scavenging can be run as a background process. You can scavenge the primary volume by booting from a secondary volume, typing the **Scavenge** command, and specifying the primary volume as the drive to scavenge. You can scavenge a secondary volume after booting from the primary volume, typing the **Scavenge** command, and specifying the desired secondary volume as the drive to scavenge.

There are two kinds of scavenge operations: normal and non-normal. The procedures in this chapter describe which type of scavenge operation you will need to perform.

Normal scavenge

A normal scavenge repairs inconsistent portions of the file system.

When a normal scavenge is applied, the volume is brought back to a useful condition, if possible, through a minimum of automatic recovery procedures. Occasionally, the normal scavenge operation will determine the need for a page-level scavenge and apply one automatically. When this happens, a message indicating this is displayed during the scavenge, and also recorded in the scavenger log.

Other times, a normal scavenge will fail to repair the volume because it does not detect a need for an extended scavenge. This situation is apparent when you retry the procedure that caused the problem or error message.

Note: It is highly recommended that an experienced person apply these procedures, as they are complex.

Non-normal scavenge

A non-normal scavenge has two options: page-level scavenge and extended scavenge.

When running a non-normal scavenge, the user may select either the page level option or the extended scavenge option, or both.

- Page-level scavenge: Repairs page-level inconsistencies of the file system.
- Extended scavenge: Completely rebuilds the file system so that all inconsistent parts are repaired, including those that were missed by a previous normal scavenge.

Recovering from an inconsistent file system

After you receive an "Inconsistent File System" error message, run a normal scavenge. The normal scavenge will have failed to fix the problem if, following its completion, the volume cannot be opened when retried; or after opening the volume, the system crashes with the same message. If this occurs, run a non-normal scavenge and select the "Extended Scavenge" option.

If you have a multiple drive server, a file system inconsistency is indicated during a normal server startup. During a normal, error-free startup, a message is displayed indicating when each volume comes on-line. If a volume cannot come on-line, that message will not be displayed (you can also use the **List Volumes** command to determine which volumes are on-line).

To determine whether a volume that did not come on-line during startup is inconsistent, type **Open Volume** and specify the drive number. If the volume is inconsistent, you will receive an "Inconsistent file system" error message. Proceed with the normal scavenge procedures below. You will be prompted to specify the volume number requiring the repair during the scavenge procedure.

Procedure

1. Boot the server while the maintenance panel displays 0001.
2. Type N to the "Normal Startup?" prompt and press <RETURN>.

```
Series 8000 Network Services Executive, Version 10.0 of (date)(time)
Copyright (C) 1981, 1982, 1983, 1984, 1985, 1986_ by Xerox Corporation
All rights reserved.
Restart reason: User Restart
Normal Startup? (Y/N): NRETURN
```

3. Type the numbers corresponding to the "Interrupt before opening primary volume" and "Interrupt before running services" options and press <RETURN>. You don't want to run any of the services in case there is an error in a particular service's database.

```
Enter interrupt point
1 Interrupt before opening primary volume
2 Interrupt before processing profile
3 Interrupt before running services
Enter choice number: 1,3RETURN
```

4. Type **Scavenge** and press <RETURN>.
5. If you have a multi-drive server, you are asked which drive you want to scavenge. Specify the number of the

volume you were attempting to open when you received the error message.

6. Specify a normal scavenge by responding **Y** to the prompt.
7. Confirm by typing **Y** to the confirmation prompt and press **<RETURN>**.

```
> ScavengeRETURN
Normal scavenge? (Y/N): YRETURN
The File System will be scavenged.
Confirm (Y/N): YRETURN
Scavenge started on 10-Apr-86 15:11:14
Scavenging directories...done
Building data structures...done
Rebuilding directories...done
Writing log...done
79 files found.
Total elapsed time for scavenge: 34 seconds
```

8. Type **Proceed** and press **<RETURN>** when the scavenge is completed. This will bring the server to interrupt 3, "Interrupt before running services." Stand by to make sure that the scavenge operation fixed the problem. If the server is now able to open the primary volume and continue with its normal initialization process, you have succeeded in fixing the problem.
9. If the server is still unable to open the volume, you should try an extended scavenge by repeating steps 1-3, and proceeding with step 4 until you are asked to specify a normal scavenge. Enter **N** in response to the "Normal Scavenge?" prompt, select the number corresponding to the "Extended scavenge" option, and confirm the operation. If you are still unable to open the volume after this, call the Network Support Center.

```
> ScavengeRETURN
Normal scavenge? (Y/N): NRETURN
Additional scavenge option(s) to be applied
1 Page-level scavenge
2 Extended scavenge
Enter one or more choices: 2RETURN
The File System will be scavenged.
The extended scavenge option will be applied during this scavenge
Confirm (Y/N): YRETURN
Scavenging drive 0
Scavenge started 13-Apr-86 9:34:46
Scavenging directories...done
Building data structures...done
Rebuilding directories...done
Writing log...done
55 files found.
Total elapsed time for scavenge: 5 min 44 sec
```

10. If the scavenge procedure uncovered some problems, a message will be displayed indicating this. You can view a report of problems found by using the **Show Scavenger Log** command. Continue with the following steps to view the log.
11. Type **Show Scavenger Log**. Look for any entries ending in ".bcd." If one is listed, you will have to reinstall the service that was damaged (the service appears before .bcd). If the Mail Service was damaged, *do not re-install software*. There is a separate repair procedure for the Mail Service that is described in the, "Repairing the Mail Service database" section in the *Mail Service* booklet.
12. After you have completed the repair procedures (if required), start the server by typing **Proceed**.
13. After the server startup is complete, view the scavenger log again at your 6085/8010 remote administration window so that you can capture and store it in your server statistics folder.

Recovering from a disk label check

A disk label check can be thought of and treated like an unrecoverable disk error except for one important difference: a disk label check is a software error, not a hardware error. Therefore, it is not necessary to run diagnostics or be concerned about hardware problems as you would be if it were an unrecoverable disk error.

Procedure

The page number and drive number are reported with the error. The drives are numbered 0 through 3 instead of 1 through 4. Record this information and skip to step 2 in the following procedure, "Recovering from an unrecoverable disk error," to determine which volume contains the bad page. Skip the diagnostics in step 3 and continue with step 4.

Recovering from an unrecoverable disk error

CAUTION: Do not attempt to run the scavenge until the Xerox Customer Service Engineer (CSE) has run all diagnostic tests to ensure that no hardware problem exists. Scavenging the volume when the hardware is unstable could cause major data loss.

Procedure

1. Run diagnostics (again, have the Xerox CSE do this).
2. Determine the volume on which the error occurred. If the bad page error is on a multi-drive server, also determine the drive. (This is reported with the error.) Use the table below to determine if the page is in the user, system, scavenge, or backstop volume. (Make sure the technician gives you this information.)

Services	Cylinder 0	Backstop	System	User
10 Mb	00000-00127	00128-04628	04629-10629	10630-16138
29 Mb	00000-00223	00224-04724	04725-10725	10726-45022
42 Mb	00000-00127	00128-04628	04629-12629	12630-45022
80 Mb	00000-00149	00150-04650	04651-15651	15652-122098
300 Mb	00000-00569	00570-05070	05071-33071	30072-463879

Note: A server may have up to four drives. Services numbers these drives 1,2,3,4, but the operating system numbers them 0,1,2,3. In the backstop error messages where the drive is specified, the numbering is in the operating systems scheme. In the Services Executive where commands are entered, the numbering is in the services numbering scheme. This can be confusing so take care that you have identified the correct drive for the recovery procedures. If in doubt, call the Network Support Center for help. This is particularly important when recovering from hardware problems, since running the system with damaged hardware will likely result in further hardware damage, in addition to data loss.

3. Run diagnostics again. Attempt to find a page error matching the page reported in the crash. The technician should fix the page if necessary.

4. Determine the action depending on which volume contains the bad page. Refer to the table in step 2. The recovery action depends on where the page is on the volume. You do not always have to run a scavenge to recover. Instructions for the different situations are listed below:

If the page is the first page of a volume: Do not mark that page bad. There is a good chance, however, that the volume cannot be recovered, and that the disk must be re-partitioned. Before doing so, call the Network Support Center for any additional input they may have regarding your server's configuration. Refer to the *Server Software Installation* booklet section entitled "Partitioning the server disk" if you are instructed to re-partition.

If the page lies within cylinder 0: The pack should be considered unusable. Copy the data (if possible) and discard the pack. Before doing anything, however, contact the Network Support Center. Refer to the section entitled "Backing up the File Service volume using the Copy Volume command" in the *File Service* booklet for instructions on copying the data from the damaged volume.

Note: Cylinder 0 is guaranteed to be 100% reliable. It is very rare for a page to go bad.

System or backstop volume: If the page is in the system or backstop volume, re-install software.

User Volume: If the page is in the user volume, run the scavenger and select the page-level scavenging option. Follow these instructions.

1. Boot the server when the maintenance panel displays 0001 and select a non-normal startup.
2. If you are scavenging the **primary volume**, type the numbers corresponding to the "Interrupt before opening primary volume" and "Interrupt before running services" options and press <RETURN >.
 - If you are scavenging an **auxiliary volume** on a multiple drive server, the other drives can remain on-line while the damaged secondary drive is being scavenged. It is best to do this especially if your server supports the only local Clearinghouse Service and has a co-resident Mail Service, although it will slightly affect the server's performance.
 - If you want to stop all services before running the Scavenger, select the first interrupt point, "Interrupt before opening primary volume." Keep in mind the consequences of stopping a Mail Service or Clearinghouse Service. Refer to the Mail Service booklet section entitled "Stopping the Mail Service."
 - If you wish to run co-resident services while running the scavenger, log on and enable (type **Run Service** and run the Clearinghouse Service first if it is a co-resident service), type **Run Service**, and select a non-normal File Service startup. Run any other co-resident services normally. Open the volumes that don't have to be scavenged, place them on-line, and start the File Service.

3. Type **Scavenge**. If you have a multi-drive server, you are asked which drive you want to scavenge. Specify the number of the volume you were attempting to open when you received the error message. Type **N** to the "Normal Scavenge?" prompt and press <RETURN>.
4. Enter the number corresponding to "Page-level scavenge" and press <RETURN>.
5. Confirm the operation.
6. When the scavenge is completed, you may receive this message: "Please see scavenge log for problems found." It is very important for you to view the scavenger log to determine whether you have to follow additional recovery procedures.
 - If the primary volume was just scavenged, type **Proceed** and go to step 7.
 - If a secondary volume was just scavenged go directly to step 7.
7. Type **Show Scavenger Log** and press <RETURN>. Enter the last number listed in response to the prompt, as it would correspond to the log just created (an example of this command appears on the next page).

- If your server is running the Mail Service, check the log to see if there were bad pages repaired in any Mail Service database files (any file matching the pattern: MS*). If this is the case, you will have to invoke the "Repair database" option of the Mail Service.

Refer to the section entitled "Repairing the Mail Service database" in the *Mail Service* booklet for the procedure. If there are other services on your server that were not damaged, start them first and then invoke the Mail Service repair operation.

- If your server is running the Clearinghouse Service, check the scavenger log to see if there were bad pages repaired in any Clearinghouse Service database files (any file matching the pattern: CHS*). If so, the Clearinghouse database must be deleted.

Expunge the Clearinghouse Service with the **Expunge Service** command, and then re-install the Clearinghouse software. Refer to the section entitled "Removing the Clearinghouse Service from a server" in the *Clearinghouse Service* booklet for the expunge procedure.

!Show Scavenger LogRETURN

Select Scavenger Log

- 1 Scavenge of 2-Feb-86 13:56:48
- 2 Scavenge of 21-Mar-86 9:34:46

Enter choice number: 2

Scavenge of 21-Mar-86 9:34:46

Total elapsed time for scavenge: 2 hours, 9 minutes 43 seconds

An extended scavenge was done.

No page-level scavenge was requested.

No page-level scavenge was done.

The scavenge was complete

Total files on volume: 10369

Total problems on volume: 10

Tests.For.Selection

File ID: 0 0 0 6645B 0

Type: Unknown Network Service file type - 4226

Total problems: 1

Error 8- invalid attribute value
attribute type: position-----
CalendarEntityAlphaImpl.bcd

File ID: 0 0 0 6647B 0

Type: Unknown Network Service file type - 4101

Total problems: 1

Error 8 - invalid attribute value
attribute type: position-----
Landscape.Fields

File ID: 0 0 0 6650B 0

Type: Unknown Network Service file type - 100001

Total problems: 1

Error 8 - invalid attribute value
attribute type: position

Scavenger log messages

When an error is encountered during a scavenge, the system enters a message pertaining to the error in the scavenger log and attempts to correct the problem. This is a list of possible entries that might appear in the scavenger log after a scavenge operation.

The problems indicated by the messages should have been corrected by the scavenge program already. If the problem was not resolved, restore the file or files represented by the error messages.

In the message descriptions that follow, you see these terms:

- NSFile - Any file (document, folder, file drawer) that is stored on a server. If the file can contain another file, it is referred to as a directory.
- Leader page - A part of the internal structure of the file that contains the attributes of the file.
- Segment - A piece of a file.
- Segment directory - A list of the segments in a file.
- Children - Any file(s) contained in a file drawer, folder, or divider. For example, a document contained in a file drawer is the child of that file drawer.
- Orphan - The remaining contents of a file drawer, folder, or divider after the file drawer, folder, or divider has been deleted. The remaining contents are placed in an "orphan directory," which is called "Scavenge of <date>."

Error 1 - changed to directory

An NSFile (file A) that was not a directory has been made one because another NSFile (file B) claimed to be contained within it. After scavenging, file A is a directory and contains file B.

Error 2 - duplicate page

During scavenging, several disk pages were discovered that claimed to be the same page of an NSFile. The scavenger arbitrarily chose one of these pages as valid. The other was deleted.

Error 3 - duplicate segment ID

The contents of the segment directory within an NSFile indicated two segments with the same identifier (which must be unique for all segments of an NSFile). One of the two was modified to the value indicated to make it unique.

Error 4 - file deleted

No corrective action was taken to save a file because of other problems encountered, so the file was deleted. In all cases, at least one other problem accompanies this one.

Error 5 - illegal attribute value

An illegal value was encountered by the scavenging program. The value of the attribute was reset to a default (legal) value.

**Error 6 - illegal attribute value
for nondirectory**

The reported attribute contained a value not allowed for an NSFile which is not a directory. The value of such an attribute was reset to a default (legal) value.

Error 7 - illegal segment ID	An entry of the segment directory within an NSFile contained an invalid value for a segment identifier. The scavenger changed the bad value to a valid and unique one.
Error 8 - invalid attribute value	The value encountered by the scavenging program for this attribute did not represent a valid value (for example, strings with illegal characters). The value of the attribute was reset to a default (valid) value.
Error 9 - deleted leader extension	Because of other problems, the leader extension of an NSFile had to be deleted.
Error 10 - missing leader extension	An NSFile indicated that it had an extended leader but none was found. The indication of an extended leader was reset for this file.
Error 11 - reinserted leader extension	A leader extension file was detached from its primary NSFile and was re-attached by the scavenging program.
Error 12 - leader extension has wrong type	The leader extension file indicated by the content of an NSFile leader was not of the proper type. The bad leader extension file was deleted and the NSFile leader was changed to indicate that the leader is no longer extended.
Error 15 - loop in hierarchy	An NSFile was encountered which claimed to be a child of one of its descendents. The loop was broken.
Error 16 - missing pages	After reconstructing the mapping of files to the pages representing their contents, the indicated pages were not found. Each such page was reinitialized with null values.
Error 17 - orphan file	An NSFile was encountered which had no valid parent. The file was relegated to an orphan folder constructed to hold those files.
Error 19 - orphan page	During scavenging, a disk page was encountered which did not appear to belong to any file, but appeared to contain data. The contents of the page were lost.
Error 20 - orphan segment	No NSFile could be found that contained a valid segment entry for the indicated segment, and the NSFile designated within the segment did not indicate a valid NSFile. The orphaned segment was deleted.
Error 21 - deleted segment	Because of other reported problems, it was necessary to delete the indicated segment.
Error 22 - missing segment	The segment directory of an NSFile indicated a segment file which could not be located. The entry for the segment was deleted from the segment directory.
Error 23 - reinserted segment	The indicated segment was reinserted into the segment directory of an NSFile.
Error 24 - segment has wrong type	The file designated by the content of a segment directory entry was not of the proper type. The entry was removed and the file deleted.
Error 27 - string is too long	The value of a string attribute exceeded the maximum allowable length for string values. The value was truncated to a length not exceeding the allowable maximum.

- Error 28 - too many segments** The segment directory of an NSFile contained too many entries. The count of entries was reduced to the maximum allowed and extraneous entries were ignored.
- Error 29 - unreadable pages** Certain pages representing the content of a file could not be read from the disk. An attempt was made to rewrite the contents of each such page to allow them to be read. However, if this failed, the file containing the pages was lost.
- Error 30 - bad variable attributes** The storage area for variable-length attributes (string attributes such as name, owner, and so forth) was ill-formed and could not be recovered. Previous values for these attributes were lost, and their new values were nulled (appear uninitialized).
- Error 31 - wrong number of children** The number of children indicated for a directory disagreed with the actual number found by scavenging. The value of this attribute was corrected.
- Error 32 - wrong segment ID** The segment identifier within a segment directory entry did not agree with that contained within the segment file itself. The identifier within the segment file was changed to agree with the segment directory entry.
- Error 33 - wrong data size in bytes** The stored value for the size of the file in bytes did not agree with the actual number of bytes found. The value of this attribute was set to the actual number of bytes found. This is reported when the contents of the file have incorrect information.
- Error 34 - wrong stored size in bytes** The stored value for the size of the file in pages did not agree with the actual number of pages found. The value of this attribute was set to the actual number of pages found. This is reported when the stored size (content plus attributes) has incorrect length.
- Error 37 - new root created** The root of the file system was lost and recreated.
- Error 38 - orphan directory created** This directory was created to hold orphan files.

7. Maintenance panel codes

If a code other than 8000 is displayed on the server maintenance panel, look up the code in the following Maintenance panel code listing. Record the code. Note the Recovery Key number that corresponds to the maintenance panel code. Using the Recovery Key Explanation, perform the action that corresponds with the recovery key number.

Recovery Key explanation

Use the Recovery Key actions on the next page in conjunction with the "Maintenance panel code listing." Look up the maintenance panel code in the listing. Note the Recovery Key number next to the code. Look up the Recovery Key in the listing and perform the recommended recovery action.

Comment: If, after trying the recommended action, you still experience a problem, call the Network Support Center.

<u>Key</u>	<u>Recovery Action</u>
1	None necessary; the code indicates status only.
2	Check to see if the alternate boot button has been released.
3	Record the code, reboot if necessary, and try the operation again. If the retrieval succeeds, treat the code as an intermittent failure. Otherwise, run diagnostics and then call the Network Support Center.
4	Record the code and reboot. If rebooting succeeds, treat the code as an intermittent failure. Otherwise, run diagnostics and then call the Network Support Center.
5	Run diagnostics and then call the Network Support Center.
6	Reload the error analysis software. If that fails, reinstall the software from the floppy disks.
7	Reload the error analysis software.
8	Ensure that the floppy disk is in the drive and the door is closed.
9	Insert the head-cleaning disk and press the ALT B button.
10	Record the code and call the Network Support Center. Note: Do not reboot or retry the operation.
11	Record the code and run disk diagnostics. Then try the operation again. If the operation succeeds, treat the code as an intermittent failure. Otherwise, call the Network Support Center.
12	Clean the read/write heads of the floppy disk drive if they have not been cleaned recently, and then try the operation again. If the read/write heads have been cleaned recently, call the Network Support Center.
13	Run scavenge with the page-level scavenge option. CAUTION: To protect your database, you should run disk diagnostics before scavenging.
14	Record the code, reboot if necessary, and try the operation again. If this fails, reinstall software.
15	Reset the time. Boot the first system software installation floppy.
16	Report the problem, using the "Problem Report" from Appendix A. Try to find a workaround if the problem recurs.
17	Remove the head-cleaning disk and reboot.

Maintenance panel code listing

MP Code: 0000	Recovery Key: 2	MP Code: 0138	Recovery Key: 1
MP Code: 0001	Recovery Key: 2	MP Code: 0139	Recovery Key: 1
MP Code: 0002	Recovery Key: 2	MP Code: 0140	Recovery Key: 1
MP Code: 0003	Recovery Key: 2	MP Code: 0141	Recovery Key: 1
MP Code: 0004	Recovery Key: 2	MP Code: 0142	Recovery Key: 1
MP Code: 0005	Recovery Key: 2	MP Code: 0149	Recovery Key: 1
MP Code: 0006	Recovery Key: 2	MP Code: 0150	Recovery Key: 1
MP Code: 0007	Recovery Key: 2	MP Code: 0151	Recovery Key: 4
MP Code: 0008	Recovery Key: 2	MP Code: 0154	Recovery Key: 3
MP Code: 0009	Recovery Key: 2	MP Code: 0155	Recovery Key: 3
MP Code: 0010	Recovery Key: 2	MP Code: 0167	Recovery Key: 3
MP Code: 0060	Recovery Key: 4	MP Code: 0168	Recovery Key: 3
MP Code: 0061	Recovery Key: 4	MP Code: 0169	Recovery Key: 3
MP Code: 0062	Recovery Key: 4	MP Code: 0170	Recovery Key: 4
MP Code: 0065	Recovery Key: 4	MP Code: 0171	Recovery Key: 4
MP Code: 0066	Recovery Key: 4	MP Code: 0172	Recovery Key: 4
MP Code: 0067	Recovery Key: 4	MP Code: 0173	Recovery Key: 8
MP Code: 0068	Recovery Key: 4	MP Code: 0174	Recovery Key: 4
MP Code: 0069	Recovery Key: 4	MP Code: 0175	Recovery Key: 4
MP Code: 0070	Recovery Key: 4	MP Code: 0176	Recovery Key: 4
MP Code: 0071	Recovery Key: 4	MP Code: 0177	Recovery Key: 4
MP Code: 0072	Recovery Key: 4	MP Code: 0178	Recovery Key: 4
MP Code: 0073	Recovery Key: 4	MP Code: 0179	Recovery Key: 4
MP Code: 0074	Recovery Key: 4	MP Code: 0190	Recovery Key: 1
MP Code: 0075	Recovery Key: 4	MP Code: 0191	Recovery Key: 1
MP Code: 0076	Recovery Key: 1	MP Code: 0192	Recovery Key: 1
MP Code: 0077	Recovery Key: 1	MP Code: 0193	Recovery Key: 1
MP Code: 0081	Recovery Key: 4	MP Code: 0194	Recovery Key: 1
MP Code: 0082	Recovery Key: 4	MP Code: 0199	Recovery Key: 1
MP Code: 0083	Recovery Key: 4		
MP Code: 0087	Recovery Key: 1	MP Code: 0200	Recovery Key: 1
MP Code: 0089	Recovery Key: 3	MP Code: 0201	Recovery Key: 4
MP Code: 0090	Recovery Key: 3	MP Code: 0202	Recovery Key: 4
MP Code: 0091	Recovery Key: 3	MP Code: 0203	Recovery Key: 4
MP Code: 0092	Recovery Key: 3	MP Code: 0204	Recovery Key: 3
MP Code: 0099	Recovery Key: 1	MP Code: 0205	Recovery Key: 3
		MP Code: 0206	Recovery Key: 4
MP Code: 0100	Recovery Key: 1	MP Code: 0207	Recovery Key: 4
MP Code: 0111	Recovery Key: 4	MP Code: 0208	Recovery Key: 4
MP Code: 0112	Recovery Key: 4	MP Code: 0217	Recovery Key: 3
MP Code: 0113	Recovery Key: 4	MP Code: 0218	Recovery Key: 3
MP Code: 0114	Recovery Key: 3	MP Code: 0219	Recovery Key: 3
MP Code: 0115	Recovery Key: 3	MP Code: 0220	Recovery Key: 4
MP Code: 0116	Recovery Key: 1	MP Code: 0221	Recovery Key: 4
MP Code: 0117	Recovery Key: 3	MP Code: 0222	Recovery Key: 4
MP Code: 0118	Recovery Key: 3	MP Code: 0223	Recovery Key: 8
MP Code: 0120	Recovery Key: 4	MP Code: 0224	Recovery Key: 4
MP Code: 0121	Recovery Key: 4	MP Code: 0225	Recovery Key: 4
MP Code: 0122	Recovery Key: 4	MP Code: 0226	Recovery Key: 4
MP Code: 0123	Recovery Key: 8	MP Code: 0227	Recovery Key: 4
MP Code: 0124	Recovery Key: 4	MP Code: 0228	Recovery Key: 4
MP Code: 0125	Recovery Key: 4	MP Code: 0229	Recovery Key: 4
MP Code: 0135	Recovery Key: 1	MP Code: 0240	Recovery Key: 1
MP Code: 0136	Recovery Key: 1	MP Code: 0241	Recovery Key: 1
MP Code: 0137	Recovery Key: 1	MP Code: 0242	Recovery Key: 1
		MP Code: 0243	Recovery Key: 1
		MP Code: 0244	Recovery Key: 1
		MP Code: 0249	Recovery Key: 1

MP Code: 0250	Recovery Key: 1	MP Code: 0406	Recovery Key: 5
MP Code: 0251	Recovery Key: 4	MP Code: 0407	Recovery Key: 5
MP Code: 0252	Recovery Key: 4	MP Code: 0408	Recovery Key: 5
MP Code: 0253	Recovery Key: 4	MP Code: 0409	Recovery Key: 5
MP Code: 0260	Recovery Key: 1	MP Code: 0410	Recovery Key: 5
MP Code: 0270	Recovery Key: 4	MP Code: 0411	Recovery Key: 5
MP Code: 0271	Recovery Key: 4	MP Code: 0412	Recovery Key: 5
MP Code: 0272	Recovery Key: 4	MP Code: 0413	Recovery Key: 5
MP Code: 0273	Recovery Key: 8	MP Code: 0414	Recovery Key: 5
MP Code: 0274	Recovery Key: 4	MP Code: 0415	Recovery Key: 5
MP Code: 0275	Recovery Key: 4	MP Code: 0416	Recovery Key: 5
MP Code: 0276	Recovery Key: 4	MP Code: 0417	Recovery Key: 5
MP Code: 0277	Recovery Key: 4	MP Code: 0418	Recovery Key: 5
MP Code: 0278	Recovery Key: 4	MP Code: 0419	Recovery Key: 5
MP Code: 0279	Recovery Key: 4	MP Code: 0420	Recovery Key: 5
MP Code: 0285	Recovery Key: 1	MP Code: 0421	Recovery Key: 5
MP Code: 0286	Recovery Key: 1	MP Code: 0422	Recovery Key: 5
MP Code: 0287	Recovery Key: 1	MP Code: 0423	Recovery Key: 5
		MP Code: 0424	Recovery Key: 5
MP Code: 0301	Recovery Key: 5	MP Code: 0425	Recovery Key: 5
MP Code: 0302	Recovery Key: 5	MP Code: 0426	Recovery Key: 5
MP Code: 0303	Recovery Key: 5	MP Code: 0427	Recovery Key: 5
MP Code: 0304	Recovery Key: 5	MP Code: 0428	Recovery Key: 5
MP Code: 0305	Recovery Key: 5	MP Code: 0429	Recovery Key: 5
MP Code: 0306	Recovery Key: 5	MP Code: 0430	Recovery Key: 5
MP Code: 0307	Recovery Key: 5	MP Code: 0431	Recovery Key: 5
MP Code: 0308	Recovery Key: 5	MP Code: 0432	Recovery Key: 5
MP Code: 0309	Recovery Key: 5	MP Code: 0433	Recovery Key: 4
MP Code: 0310	Recovery Key: 5	MP Code: 0434	Recovery Key: 4
MP Code: 0311	Recovery Key: 5	MP Code: 0435	Recovery Key: 4
MP Code: 0312	Recovery Key: 5	MP Code: 0436	Recovery Key: 4
MP Code: 0313	Recovery Key: 5	MP Code: 0437	Recovery Key: 4
MP Code: 0314	Recovery Key: 5	MP Code: 0438	Recovery Key: 4
MP Code: 0315	Recovery Key: 5	MP Code: 0439	Recovery Key: 4
MP Code: 0316	Recovery Key: 5	MP Code: 0440	Recovery Key: 4
MP Code: 0317	Recovery Key: 5	MP Code: 0441	Recovery Key: 4
MP Code: 0318	Recovery Key: 5	MP Code: 0442	Recovery Key: 4
MP Code: 0319	Recovery Key: 5	MP Code: 0443	Recovery Key: 4
MP Code: 0320	Recovery Key: 5	MP Code: 0444	Recovery Key: 4
MP Code: 0321	Recovery Key: 5	MP Code: 0445	Recovery Key: 4
MP Code: 0322	Recovery Key: 5	MP Code: 0446	Recovery Key: 4
MP Code: 0323	Recovery Key: 5	MP Code: 0447	Recovery Key: 4
MP Code: 0324	Recovery Key: 5	MP Code: 0448	Recovery Key: 4
MP Code: 0325	Recovery Key: 5	MP Code: 0499	Recovery Key: 5
MP Code: 0326	Recovery Key: 5		
MP Code: 0327	Recovery Key: 5	MP Code: 0500	Recovery Key: 1
MP Code: 0380	Recovery Key: 5	MP Code: 0501	Recovery Key: 1
MP Code: 0381	Recovery Key: 5	MP Code: 0502	Recovery Key: 1
MP Code: 0382	Recovery Key: 5	MP Code: 0505	Recovery Key: 3
MP Code: 0383	Recovery Key: 5	MP Code: 0506	Recovery Key: 3
MP Code: 0399	Recovery Key: 5	MP Code: 0507	Recovery Key: 3
		MP Code: 0508	Recovery Key: 3
MP Code: 0400	Recovery Key: 5	MP Code: 0509	Recovery Key: 1
MP Code: 0401	Recovery Key: 5	MP Code: 0510	Recovery Key: 3
MP Code: 0402	Recovery Key: 5	MP Code: 0511	Recovery Key: 3
MP Code: 0403	Recovery Key: 5	MP Code: 0512	Recovery Key: 1
MP Code: 0404	Recovery Key: 5	MP Code: 0513	Recovery Key: 1
MP Code: 0405	Recovery Key: 5	MP Code: 0514	Recovery Key: 1

MP Code: 0809	Recovery Key: 5	MP Code: 0970	Recovery Key: 1
MP Code: 0810	Recovery Key: 5	MP Code: 0975	Recovery Key: 1
MP Code: 0811	Recovery Key: 5	MP Code: 0980	Recovery Key: 1
MP Code: 0812	Recovery Key: 5	MP Code: 0981	Recovery Key: 4
MP Code: 0813	Recovery Key: 5	MP Code: 0990	Recovery Key: 1
MP Code: 0814	Recovery Key: 5		
MP Code: 0815	Recovery Key: 5	MP Code: 1000	Recovery Key: 1
MP Code: 0816	Recovery Key: 5	MP Code: 1010	Recovery Key: 1
MP Code: 0817	Recovery Key: 5	MP Code: 1011	Recovery Key: 3
MP Code: 0899	Recovery Key: 5	MP Code: 1012	Recovery Key: 3
		MP Code: 1013	Recovery Key: 3
MP Code: 0900	Recovery Key: 1	MP Code: 1014	Recovery Key: 3
MP Code: 0901	Recovery Key: 3	MP Code: 1015	Recovery Key: 3
MP Code: 0902	Recovery Key: 3	MP Code: 1016	Recovery Key: 3
MP Code: 0903	Recovery Key: 3	MP Code: 1017	Recovery Key: 3
MP Code: 0904	Recovery Key: 3	MP Code: 1018	Recovery Key: 3
MP Code: 0905	Recovery Key: 5	MP Code: 1030	Recovery Key: 1
MP Code: 0906	Recovery Key: 5	MP Code: 1031	Recovery Key: 3
MP Code: 0907	Recovery Key: 5	MP Code: 1040	Recovery Key: 1
MP Code: 0909	Recovery Key: 3	MP Code: 1041	Recovery Key: 3
MP Code: 0910	Recovery Key: 1	MP Code: 1042	Recovery Key: 3
MP Code: 0911	Recovery Key: 3	MP Code: 1070	Recovery Key: 1
MP Code: 0912	Recovery Key: 3	MP Code: 1071	Recovery Key: 3
MP Code: 0913	Recovery Key: 3	MP Code: 1072	Recovery Key: 3
MP Code: 0914	Recovery Key: 5	MP Code: 1080	Recovery Key: 1
MP Code: 0915	Recovery Key: 3	MP Code: 1081	Recovery Key: 3
MP Code: 0916	Recovery Key: 5	MP Code: 1090	Recovery Key: 1
MP Code: 0917	Recovery Key: 1	MP Code: 1091	Recovery Key: 3
MP Code: 0919	Recovery Key: 3		
MP Code: 0920	Recovery Key: 1	MP Code: 1100	Recovery Key: 1
MP Code: 0921	Recovery Key: 14	MP Code: 1102	Recovery Key: 3
MP Code: 0922	Recovery Key: 3	MP Code: 1110	Recovery Key: 1
MP Code: 0923	Recovery Key: 3	MP Code: 1113	Recovery Key: 3
MP Code: 0924	Recovery Key: 3	MP Code: 1120	Recovery Key: 1
MP Code: 0925	Recovery Key: 3	MP Code: 1121	Recovery Key: 11
MP Code: 0927	Recovery Key: 4	MP Code: 1140	Recovery Key: 1
MP Code: 0928	Recovery Key: 4	MP Code: 1141	Recovery Key: 3
MP Code: 0930	Recovery Key: 1	MP Code: 1142	Recovery Key: 3
MP Code: 0931	Recovery Key: 5	MP Code: 1143	Recovery Key: 3
MP Code: 0932	Recovery Key: 14	MP Code: 1150	Recovery Key: 1
MP Code: 0933	Recovery Key: 5	MP Code: 1151	Recovery Key: 3
MP Code: 0934	Recovery Key: 5	MP Code: 1191	Recovery Key: 5
MP Code: 0935	Recovery Key: 5	MP Code: 1192	Recovery Key: 3
MP Code: 0936	Recovery Key: 1	MP Code: 1193	Recovery Key: 3
MP Code: 0937	Recovery Key: 15	MP Code: 1199	Recovery Key: 1
MP Code: 0938	Recovery Key: 5		
MP Code: 0939	Recovery Key: 1	MP Code: 1200	Recovery Key: 1
MP Code: 0940	Recovery Key: 1	MP Code: 1210	Recovery Key: 1
MP Code: 0946	Recovery Key: 13	MP Code: 1211	Recovery Key: 3
MP Code: 0947	Recovery Key: 1	MP Code: 1212	Recovery Key: 3
MP Code: 0948	Recovery Key: 11	MP Code: 1213	Recovery Key: 3
MP Code: 0949	Recovery Key: 3	MP Code: 1214	Recovery Key: 3
MP Code: 0950	Recovery Key: 1	MP Code: 1215	Recovery Key: 3
MP Code: 0951	Recovery Key: 1	MP Code: 1216	Recovery Key: 3
MP Code: 0952	Recovery Key: 1	MP Code: 1217	Recovery Key: 3
MP Code: 0953	Recovery Key: 4	MP Code: 1218	Recovery Key: 3
MP Code: 0960	Recovery Key: 1	MP Code: 1230	Recovery Key: 1
MP Code: 0965	Recovery Key: 3	MP Code: 1231	Recovery Key: 3

MP Code: 1240	Recovery Key: 1	MP Code: 1510	Recovery Key: 1
MP Code: 1241	Recovery Key: 3	MP Code: 1511	Recovery Key: 3
MP Code: 1242	Recovery Key: 3	MP Code: 1512	Recovery Key: 3
MP Code: 1260	Recovery Key: 1	MP Code: 1514	Recovery Key: 3
MP Code: 1261	Recovery Key: 3	MP Code: 1515	Recovery Key: 3
MP Code: 1262	Recovery Key: 3	MP Code: 1516	Recovery Key: 3
MP Code: 1265	Recovery Key: 1	MP Code: 1517	Recovery Key: 3
MP Code: 1266	Recovery Key: 3	MP Code: 1518	Recovery Key: 3
MP Code: 1270	Recovery Key: 1	MP Code: 1530	Recovery Key: 1
MP Code: 1271	Recovery Key: 3	MP Code: 1531	Recovery Key: 3
MP Code: 1280	Recovery Key: 1	MP Code: 1540	Recovery Key: 1
MP Code: 1281	Recovery Key: 3	MP Code: 1541	Recovery Key: 3
MP Code: 1290	Recovery Key: 1	MP Code: 1542	Recovery Key: 3
MP Code: 1292	Recovery Key: 3	MP Code: 1560	Recovery Key: 1
MP Code: 1295	Recovery Key: 1	MP Code: 1561	Recovery Key: 3
MP Code: 1297	Recovery Key: 11	MP Code: 1562	Recovery Key: 3
MP Code: 1299	Recovery Key: 1	MP Code: 1565	Recovery Key: 1
		MP Code: 1566	Recovery Key: 3
MP Code: 1300	Recovery Key: 1	MP Code: 1570	Recovery Key: 1
MP Code: 1310	Recovery Key: 1	MP Code: 1571	Recovery Key: 3
MP Code: 1311	Recovery Key: 3	MP Code: 1580	Recovery Key: 1
MP Code: 1312	Recovery Key: 3	MP Code: 1581	Recovery Key: 3
MP Code: 1313	Recovery Key: 3	MP Code: 1590	Recovery Key: 1
MP Code: 1314	Recovery Key: 3	MP Code: 1592	Recovery Key: 3
MP Code: 1315	Recovery Key: 3	MP Code: 1595	Recovery Key: 1
MP Code: 1316	Recovery Key: 3	MP Code: 1597	Recovery Key: 11
MP Code: 1317	Recovery Key: 3	MP Code: 1599	Recovery Key: 1
MP Code: 1318	Recovery Key: 3		
MP Code: 1330	Recovery Key: 1	MP Code: 1600	Recovery Key: 1
MP Code: 1331	Recovery Key: 3	MP Code: 1610	Recovery Key: 1
MP Code: 1340	Recovery Key: 1	MP Code: 1611	Recovery Key: 3
MP Code: 1341	Recovery Key: 3	MP Code: 1612	Recovery Key: 3
MP Code: 1342	Recovery Key: 3	MP Code: 1613	Recovery Key: 3
MP Code: 1370	Recovery Key: 1	MP Code: 1614	Recovery Key: 3
MP Code: 1371	Recovery Key: 3	MP Code: 1615	Recovery Key: 3
MP Code: 1372	Recovery Key: 3	MP Code: 1616	Recovery Key: 3
MP Code: 1380	Recovery Key: 1	MP Code: 1617	Recovery Key: 3
MP Code: 1381	Recovery Key: 3	MP Code: 1618	Recovery Key: 3
MP Code: 1390	Recovery Key: 1	MP Code: 1630	Recovery Key: 1
MP Code: 1391	Recovery Key: 3	MP Code: 1631	Recovery Key: 3
		MP Code: 1640	Recovery Key: 1
MP Code: 1400	Recovery Key: 1	MP Code: 1641	Recovery Key: 3
MP Code: 1402	Recovery Key: 3	MP Code: 1642	Recovery Key: 3
MP Code: 1410	Recovery Key: 1	MP Code: 1670	Recovery Key: 1
MP Code: 1413	Recovery Key: 3	MP Code: 1671	Recovery Key: 3
MP Code: 1420	Recovery Key: 1	MP Code: 1672	Recovery Key: 3
MP Code: 1421	Recovery Key: 11	MP Code: 1680	Recovery Key: 1
MP Code: 1440	Recovery Key: 1	MP Code: 1681	Recovery Key: 3
MP Code: 1441	Recovery Key: 3	MP Code: 1690	Recovery Key: 1
MP Code: 1442	Recovery Key: 3	MP Code: 1691	Recovery Key: 3
MP Code: 1443	Recovery Key: 3		
MP Code: 1450	Recovery Key: 1	MP Code: 1700	Recovery Key: 1
MP Code: 1451	Recovery Key: 3	MP Code: 1702	Recovery Key: 3
MP Code: 1491	Recovery Key: 5	MP Code: 1710	Recovery Key: 1
MP Code: 1492	Recovery Key: 3	MP Code: 1713	Recovery Key: 3
MP Code: 1493	Recovery Key: 3	MP Code: 1720	Recovery Key: 1
MP Code: 1499	Recovery Key: 1	MP Code: 1721	Recovery Key: 11
		MP Code: 1740	Recovery Key: 1

MP Code: 1741	Recovery Key: 3	MP Code: 1918	Recovery Key: 4
MP Code: 1742	Recovery Key: 3	MP Code: 1919	Recovery Key: 4
MP Code: 1743	Recovery Key: 3	MP Code: 1921	Recovery Key: 4
MP Code: 1750	Recovery Key: 1	MP Code: 1922	Recovery Key: 4
MP Code: 1751	Recovery Key: 3	MP Code: 1923	Recovery Key: 4
MP Code: 1791	Recovery Key: 5	MP Code: 1924	Recovery Key: 4
MP Code: 1792	Recovery Key: 3	MP Code: 1925	Recovery Key: 4
MP Code: 1793	Recovery Key: 3	MP Code: 1926	Recovery Key: 4
MP Code: 1799	Recovery Key: 1	MP Code: 1927	Recovery Key: 4
		MP Code: 1928	Recovery Key: 4
MP Code: 1800	Recovery Key: 1	MP Code: 1929	Recovery Key: 4
MP Code: 1810	Recovery Key: 1	MP Code: 1930	Recovery Key: 4
MP Code: 1811	Recovery Key: 3	MP Code: 1931	Recovery Key: 4
MP Code: 1812	Recovery Key: 3	MP Code: 1932	Recovery Key: 4
MP Code: 1813	Recovery Key: 3	MP Code: 1933	Recovery Key: 4
MP Code: 1814	Recovery Key: 3	MP Code: 1934	Recovery Key: 4
MP Code: 1815	Recovery Key: 3	MP Code: 1935	Recovery Key: 4
MP Code: 1816	Recovery Key: 3	MP Code: 1936	Recovery Key: 4
MP Code: 1817	Recovery Key: 3	MP Code: 1937	Recovery Key: 4
MP Code: 1818	Recovery Key: 3		
MP Code: 1830	Recovery Key: 1	MP Code: 2000	Recovery Key: 1
MP Code: 1831	Recovery Key: 3	MP Code: 2001	Recovery Key: 5
MP Code: 1840	Recovery Key: 1	MP Code: 2002	Recovery Key: 5
MP Code: 1841	Recovery Key: 3	MP Code: 2003	Recovery Key: 5
MP Code: 1842	Recovery Key: 3	MP Code: 2004	Recovery Key: 5
MP Code: 1860	Recovery Key: 1	MP Code: 2005	Recovery Key: 5
MP Code: 1861	Recovery Key: 3	MP Code: 2006	Recovery Key: 5
MP Code: 1862	Recovery Key: 3	MP Code: 2007	Recovery Key: 5
MP Code: 1865	Recovery Key: 1	MP Code: 2008	Recovery Key: 5
MP Code: 1866	Recovery Key: 3	MP Code: 2011	Recovery Key: 5
MP Code: 1870	Recovery Key: 1	MP Code: 2012	Recovery Key: 5
MP Code: 1871	Recovery Key: 3	MP Code: 2013	Recovery Key: 5
MP Code: 1880	Recovery Key: 1	MP Code: 2014	Recovery Key: 5
MP Code: 1881	Recovery Key: 3	MP Code: 2015	Recovery Key: 5
MP Code: 1890	Recovery Key: 1	MP Code: 2016	Recovery Key: 5
MP Code: 1892	Recovery Key: 3	MP Code: 2017	Recovery Key: 5
MP Code: 1895	Recovery Key: 1	MP Code: 2018	Recovery Key: 5
MP Code: 1897	Recovery Key: 11	MP Code: 2021	Recovery Key: 5
MP Code: 1899	Recovery Key: 1	MP Code: 2022	Recovery Key: 5
		MP Code: 2023	Recovery Key: 5
MP Code: 1900	Recovery Key: 4	MP Code: 2024	Recovery Key: 5
MP Code: 1901	Recovery Key: 4	MP Code: 2025	Recovery Key: 5
MP Code: 1902	Recovery Key: 4	MP Code: 2026	Recovery Key: 5
MP Code: 1903	Recovery Key: 4	MP Code: 2027	Recovery Key: 5
MP Code: 1904	Recovery Key: 4	MP Code: 2028	Recovery Key: 5
MP Code: 1905	Recovery Key: 4	MP Code: 2031	Recovery Key: 5
MP Code: 1906	Recovery Key: 4	MP Code: 2032	Recovery Key: 5
MP Code: 1907	Recovery Key: 4	MP Code: 2033	Recovery Key: 5
MP Code: 1908	Recovery Key: 4	MP Code: 2034	Recovery Key: 5
MP Code: 1909	Recovery Key: 4	MP Code: 2035	Recovery Key: 5
MP Code: 1910	Recovery Key: 4	MP Code: 2036	Recovery Key: 5
MP Code: 1911	Recovery Key: 4	MP Code: 2037	Recovery Key: 5
MP Code: 1912	Recovery Key: 4	MP Code: 2038	Recovery Key: 5
MP Code: 1913	Recovery Key: 4	MP Code: 2041	Recovery Key: 5
MP Code: 1914	Recovery Key: 4	MP Code: 2042	Recovery Key: 5
MP Code: 1915	Recovery Key: 4	MP Code: 2043	Recovery Key: 5
MP Code: 1916	Recovery Key: 4	MP Code: 2044	Recovery Key: 5
MP Code: 1917	Recovery Key: 4	MP Code: 2045	Recovery Key: 5

MP Code: 2718	Recovery Key: 5	MP Code: 3034	Recovery Key: 5
MP Code: 2719	Recovery Key: 5	MP Code: 3035	Recovery Key: 5
MP Code: 2720	Recovery Key: 5	MP Code: 3036	Recovery Key: 5
MP Code: 2721	Recovery Key: 5	MP Code: 3051	Recovery Key: 5
MP Code: 2722	Recovery Key: 5	MP Code: 3053	Recovery Key: 5
MP Code: 2723	Recovery Key: 5	MP Code: 3057	Recovery Key: 5
MP Code: 2724	Recovery Key: 5	MP Code: 3074	Recovery Key: 5
MP Code: 2725	Recovery Key: 5	MP Code: 3075	Recovery Key: 5
MP Code: 2726	Recovery Key: 5	MP Code: 3076	Recovery Key: 5
MP Code: 2727	Recovery Key: 5	MP Code: 3078	Recovery Key: 5
MP Code: 2728	Recovery Key: 5	MP Code: 3079	Recovery Key: 5
MP Code: 2729	Recovery Key: 5	MP Code: 3081	Recovery Key: 5
MP Code: 2730	Recovery Key: 5	MP Code: 3082	Recovery Key: 5
MP Code: 2731	Recovery Key: 5	MP Code: 3083	Recovery Key: 5
MP Code: 2732	Recovery Key: 5	MP Code: 3084	Recovery Key: 5
MP Code: 2733	Recovery Key: 5	MP Code: 3085	Recovery Key: 5
MP Code: 2734	Recovery Key: 5	MP Code: 3086	Recovery Key: 5
MP Code: 2735	Recovery Key: 5	MP Code: 3095	Recovery Key: 12
MP Code: 2736	Recovery Key: 5	MP Code: 3096	Recovery Key: 3
MP Code: 2737	Recovery Key: 5		
MP Code: 2738	Recovery Key: 5	MP Code: 3101	Recovery Key: 12
MP Code: 2739	Recovery Key: 5	MP Code: 3107	Recovery Key: 12
MP Code: 2740	Recovery Key: 5	MP Code: 3123	Recovery Key: 12
MP Code: 2741	Recovery Key: 5	MP Code: 3124	Recovery Key: 12
MP Code: 2742	Recovery Key: 5	MP Code: 3125	Recovery Key: 12
MP Code: 2744	Recovery Key: 5	MP Code: 3126	Recovery Key: 12
MP Code: 2746	Recovery Key: 5	MP Code: 3128	Recovery Key: 12
MP Code: 2748	Recovery Key: 5	MP Code: 3129	Recovery Key: 5
MP Code: 2752	Recovery Key: 5	MP Code: 3131	Recovery Key: 12
MP Code: 2753	Recovery Key: 5	MP Code: 3132	Recovery Key: 12
MP Code: 2754	Recovery Key: 5	MP Code: 3133	Recovery Key: 12
MP Code: 2755	Recovery Key: 5	MP Code: 3134	Recovery Key: 12
MP Code: 2756	Recovery Key: 5	MP Code: 3135	Recovery Key: 12
MP Code: 2762	Recovery Key: 5	MP Code: 3136	Recovery Key: 12
MP Code: 2764	Recovery Key: 5	MP Code: 3149	Recovery Key: 12
MP Code: 2766	Recovery Key: 5	MP Code: 3151	Recovery Key: 12
MP Code: 2770	Recovery Key: 5	MP Code: 3157	Recovery Key: 12
MP Code: 2771	Recovery Key: 5	MP Code: 3173	Recovery Key: 12
MP Code: 2772	Recovery Key: 5	MP Code: 3174	Recovery Key: 12
MP Code: 2773	Recovery Key: 5	MP Code: 3175	Recovery Key: 12
MP Code: 2774	Recovery Key: 5	MP Code: 3176	Recovery Key: 12
MP Code: 2790	Recovery Key: 5	MP Code: 3178	Recovery Key: 12
MP Code: 2791	Recovery Key: 5	MP Code: 3179	Recovery Key: 12
		MP Code: 3181	Recovery Key: 12
MP Code: 3001	Recovery Key: 5	MP Code: 3182	Recovery Key: 12
MP Code: 3005	Recovery Key: 5	MP Code: 3183	Recovery Key: 12
MP Code: 3007	Recovery Key: 5	MP Code: 3184	Recovery Key: 12
MP Code: 3009	Recovery Key: 5	MP Code: 3185	Recovery Key: 12
MP Code: 3021	Recovery Key: 5	MP Code: 3186	Recovery Key: 12
MP Code: 3024	Recovery Key: 5	MP Code: 3199	Recovery Key: 12
MP Code: 3025	Recovery Key: 5		
MP Code: 3026	Recovery Key: 5	MP Code: 3201	Recovery Key: 12
MP Code: 3027	Recovery Key: 5	MP Code: 3207	Recovery Key: 12
MP Code: 3028	Recovery Key: 5	MP Code: 3223	Recovery Key: 12
MP Code: 3029	Recovery Key: 5	MP Code: 3224	Recovery Key: 12
MP Code: 3031	Recovery Key: 5	MP Code: 3225	Recovery Key: 12
MP Code: 3032	Recovery Key: 5	MP Code: 3226	Recovery Key: 12
MP Code: 3033	Recovery Key: 5	MP Code: 3228	Recovery Key: 12

MP Code: 3229	Recovery Key: 12	MP Code: 3426	Recovery Key: 12
MP Code: 3231	Recovery Key: 12	MP Code: 3428	Recovery Key: 12
MP Code: 3232	Recovery Key: 12	MP Code: 3429	Recovery Key: 12
MP Code: 3233	Recovery Key: 12	MP Code: 3431	Recovery Key: 12
MP Code: 3234	Recovery Key: 12	MP Code: 3432	Recovery Key: 12
MP Code: 3235	Recovery Key: 12	MP Code: 3433	Recovery Key: 12
MP Code: 3236	Recovery Key: 12	MP Code: 3434	Recovery Key: 12
MP Code: 3251	Recovery Key: 12	MP Code: 3435	Recovery Key: 12
MP Code: 3257	Recovery Key: 12	MP Code: 3436	Recovery Key: 12
MP Code: 3273	Recovery Key: 12	MP Code: 3451	Recovery Key: 12
MP Code: 3274	Recovery Key: 12	MP Code: 3457	Recovery Key: 12
MP Code: 3275	Recovery Key: 12	MP Code: 3473	Recovery Key: 12
MP Code: 3276	Recovery Key: 12	MP Code: 3474	Recovery Key: 12
MP Code: 3278	Recovery Key: 12	MP Code: 3475	Recovery Key: 12
MP Code: 3279	Recovery Key: 12	MP Code: 3476	Recovery Key: 12
MP Code: 3281	Recovery Key: 12	MP Code: 3478	Recovery Key: 12
MP Code: 3282	Recovery Key: 12	MP Code: 3479	Recovery Key: 12
MP Code: 3283	Recovery Key: 12	MP Code: 3481	Recovery Key: 12
MP Code: 3284	Recovery Key: 12	MP Code: 3482	Recovery Key: 12
MP Code: 3285	Recovery Key: 12	MP Code: 3483	Recovery Key: 12
MP Code: 3286	Recovery Key: 12	MP Code: 3484	Recovery Key: 12
		MP Code: 3485	Recovery Key: 12
		MP Code: 3486	Recovery Key: 12
MP Code: 3301	Recovery Key: 12		
MP Code: 3307	Recovery Key: 12	MP Code: 3501	Recovery Key: 12
MP Code: 3323	Recovery Key: 12	MP Code: 3507	Recovery Key: 12
MP Code: 3324	Recovery Key: 12	MP Code: 3523	Recovery Key: 12
MP Code: 3325	Recovery Key: 12	MP Code: 3524	Recovery Key: 12
MP Code: 3326	Recovery Key: 12	MP Code: 3525	Recovery Key: 12
MP Code: 3328	Recovery Key: 12	MP Code: 3526	Recovery Key: 12
MP Code: 3329	Recovery Key: 12	MP Code: 3528	Recovery Key: 12
MP Code: 3331	Recovery Key: 12	MP Code: 3529	Recovery Key: 12
MP Code: 3332	Recovery Key: 12	MP Code: 3531	Recovery Key: 12
MP Code: 3333	Recovery Key: 12	MP Code: 3532	Recovery Key: 12
MP Code: 3334	Recovery Key: 12	MP Code: 3533	Recovery Key: 12
MP Code: 3335	Recovery Key: 12	MP Code: 3534	Recovery Key: 12
MP Code: 3336	Recovery Key: 12	MP Code: 3535	Recovery Key: 12
MP Code: 3349	Recovery Key: 12	MP Code: 3536	Recovery Key: 12
MP Code: 3351	Recovery Key: 12	MP Code: 3549	Recovery Key: 12
MP Code: 3357	Recovery Key: 12	MP Code: 3551	Recovery Key: 12
MP Code: 3373	Recovery Key: 12	MP Code: 3557	Recovery Key: 12
MP Code: 3374	Recovery Key: 12	MP Code: 3573	Recovery Key: 12
MP Code: 3375	Recovery Key: 12	MP Code: 3574	Recovery Key: 12
MP Code: 3376	Recovery Key: 12	MP Code: 3575	Recovery Key: 12
MP Code: 3378	Recovery Key: 12	MP Code: 3576	Recovery Key: 12
MP Code: 3379	Recovery Key: 12	MP Code: 3578	Recovery Key: 12
MP Code: 3381	Recovery Key: 12	MP Code: 3579	Recovery Key: 12
MP Code: 3382	Recovery Key: 12	MP Code: 3581	Recovery Key: 12
MP Code: 3383	Recovery Key: 12	MP Code: 3582	Recovery Key: 12
MP Code: 3384	Recovery Key: 26	MP Code: 3583	Recovery Key: 12
MP Code: 3385	Recovery Key: 12	MP Code: 3584	Recovery Key: 12
MP Code: 3386	Recovery Key: 12	MP Code: 3585	Recovery Key: 12
MP Code: 3399	Recovery Key: 12	MP Code: 3586	Recovery Key: 12
		MP Code: 3599	Recovery Key: 12
MP Code: 3401	Recovery Key: 12		
MP Code: 3407	Recovery Key: 12	MP Code: 3601	Recovery Key: 12
MP Code: 3423	Recovery Key: 12	MP Code: 3607	Recovery Key: 12
MP Code: 3424	Recovery Key: 12	MP Code: 3623	Recovery Key: 12
MP Code: 3425	Recovery Key: 12		

MP Code: 3624	Recovery Key: 12	MP Code: 3807	Recovery Key: 12
MP Code: 3625	Recovery Key: 12	MP Code: 3823	Recovery Key: 12
MP Code: 3626	Recovery Key: 12	MP Code: 3824	Recovery Key: 12
MP Code: 3628	Recovery Key: 12	MP Code: 3825	Recovery Key: 12
MP Code: 3629	Recovery Key: 12	MP Code: 3826	Recovery Key: 12
MP Code: 3631	Recovery Key: 12	MP Code: 3828	Recovery Key: 12
MP Code: 3632	Recovery Key: 12	MP Code: 3829	Recovery Key: 12
MP Code: 3633	Recovery Key: 12	MP Code: 3831	Recovery Key: 12
MP Code: 3634	Recovery Key: 12	MP Code: 3832	Recovery Key: 12
MP Code: 3635	Recovery Key: 12	MP Code: 3833	Recovery Key: 12
MP Code: 3636	Recovery Key: 12	MP Code: 3834	Recovery Key: 12
MP Code: 3651	Recovery Key: 12	MP Code: 3835	Recovery Key: 12
MP Code: 3657	Recovery Key: 12	MP Code: 3836	Recovery Key: 12
MP Code: 3673	Recovery Key: 12	MP Code: 3851	Recovery Key: 12
MP Code: 3674	Recovery Key: 12	MP Code: 3857	Recovery Key: 12
MP Code: 3675	Recovery Key: 12	MP Code: 3873	Recovery Key: 12
MP Code: 3676	Recovery Key: 12	MP Code: 3874	Recovery Key: 12
MP Code: 3678	Recovery Key: 12	MP Code: 3875	Recovery Key: 12
MP Code: 3679	Recovery Key: 12	MP Code: 3876	Recovery Key: 12
MP Code: 3681	Recovery Key: 12	MP Code: 3878	Recovery Key: 12
MP Code: 3682	Recovery Key: 12	MP Code: 3879	Recovery Key: 12
MP Code: 3683	Recovery Key: 12	MP Code: 3881	Recovery Key: 12
MP Code: 3684	Recovery Key: 12	MP Code: 3882	Recovery Key: 12
MP Code: 3685	Recovery Key: 12	MP Code: 3883	Recovery Key: 12
MP Code: 3686	Recovery Key: 12	MP Code: 3884	Recovery Key: 12
		MP Code: 3885	Recovery Key: 12
		MP Code: 3886	Recovery Key: 12
MP Code: 3701	Recovery Key: 12		
MP Code: 3707	Recovery Key: 12	MP Code: 4200	Recovery Key: 1
MP Code: 3723	Recovery Key: 12	MP Code: 4201	Recovery Key: 1
MP Code: 3724	Recovery Key: 12	MP Code: 4202	Recovery Key: 1
MP Code: 3725	Recovery Key: 12	MP Code: 4203	Recovery Key: 1
MP Code: 3726	Recovery Key: 12		
MP Code: 3728	Recovery Key: 12	MP Code: 4500	Recovery Key: 1
MP Code: 3729	Recovery Key: 12	MP Code: 4501	Recovery Key: 1
MP Code: 3731	Recovery Key: 12	MP Code: 4510	Recovery Key: 1
MP Code: 3732	Recovery Key: 12	MP Code: 4520	Recovery Key: 1
MP Code: 3733	Recovery Key: 12	MP Code: 4527	Recovery Key: 1
MP Code: 3734	Recovery Key: 12	MP Code: 4528	Recovery Key: 1
MP Code: 3735	Recovery Key: 12	MP Code: 4529	Recovery Key: 1
MP Code: 3736	Recovery Key: 12	MP Code: 4540	Recovery Key: 1
MP Code: 3749	Recovery Key: 12	MP Code: 4545	Recovery Key: 5
MP Code: 3751	Recovery Key: 12	MP Code: 4598	Recovery Key: 1
MP Code: 3757	Recovery Key: 12	MP Code: 4599	Recovery Key: 1
MP Code: 3773	Recovery Key: 12		
MP Code: 3774	Recovery Key: 12	MP Code: 5550	Recovery Key: 1
MP Code: 3775	Recovery Key: 12	MP Code: 5551	Recovery Key: 1
MP Code: 3776	Recovery Key: 12	MP Code: 5552	Recovery Key: 1
MP Code: 3778	Recovery Key: 12	MP Code: 5553	Recovery Key: 1
MP Code: 3779	Recovery Key: 12	MP Code: 5554	Recovery Key: 1
MP Code: 3781	Recovery Key: 12	MP Code: 5555	Recovery Key: 1
MP Code: 3782	Recovery Key: 12	MP Code: 5556	Recovery Key: 1
MP Code: 3783	Recovery Key: 12	MP Code: 5557	Recovery Key: 1
MP Code: 3784	Recovery Key: 12	MP Code: 5558	Recovery Key: 1
MP Code: 3785	Recovery Key: 12		
MP Code: 3786	Recovery Key: 12	MP Code: 7001	Recovery Key: 9
MP Code: 3799	Recovery Key: 12	MP Code: 7002	Recovery Key: 8
		MP Code: 7003	Recovery Key: 7
MP Code: 3801	Recovery Key: 12		

MP Code: 7004	Recovery Key: 7
MP Code: 7500	Recovery Key: 1
MP Code: 7501	Recovery Key: 13
MP Code: 7502	Recovery Key: 13
MP Code: 7503	Recovery Key: 13
MP Code: 7504	Recovery Key: 5
MP Code: 7505	Recovery Key: 5
MP Code: 7508	Recovery Key: 13
MP Code: 7511	Recovery Key: 3
MP Code: 7512	Recovery Key: 3
MP Code: 7513	Recovery Key: 3
MP Code: 7516	Recovery Key: 10
MP Code: 7528	Recovery Key: 3
MP Code: 7530	Recovery Key: 3
MP Code: 7601	Recovery Key: 5
MP Code: 7602	Recovery Key: 5
MP Code: 7603	Recovery Key: 5
MP Code: 8000	Recovery Key: 1
MP Code: 8888	Recovery Key: 5
MP Code: 9158	Recovery Key: 3
MP Code: 9950	Recovery Key: 1

(This page intentionally blank)

A

answer-back tone detection 39
 Assuring a system's connection to the network
 (Network level 3) 32–34
 auto-answer modem 38
 auto-dialer 38–39

B

Backstop Log area 57
 Boot command 63, 61, 64
 booting 21

C

Checking the Internetwork Routing Service link (IRS
 level 1) 10–12
 Checking the local Internetwork Routing Service (IRS
 level 2) 13–14
 Checking the network (Network level 1) 27–29
 Checking the remote Internetwork Routing Service
 (IRS level 3) 15–17
 Checking the server (Server level 1) 18–20
 Checking the workstation (Workstation level) 23–26
 checkpoints in flowcharts 6
 CHS 89
 CIU testing 36
 retrieving processor number 36

CIUPort 38

code listings 95–116

COMMANDS

Boot 63, 61, 64
Display Bad Page Table 76
Expunge Service 88
Fault Analysis 64
List Routes 11
List Servers 3, 5, 40, 42, 44
List Services 8, 9, 18
List Volumes 82
Logon 65
Open Volume 82
Proceed 83–84, 88
Quit 64, 66
Run Service 87
Scavenge 80, 82
Show Backstop Log 57
Show Ethernet Statistics 35, 50
Show Scavenger Log 84, 88
Start Circuit 45
Start IBM 3270 Emulation 45
Start Service 18, 22
Stop Circuit 45

Stop IBM 3270 Emulation 45

Stop Service 21, 36

configuration of the disk 68
 confirmation 60
 contractor tests 28
 corrupted page 72
 CTS signal 45

D

detection of an error 79
 diagnostics,
 availability of 35
 disk 59–64, 67–68
 disconnect of phone line 36
 disk
 configuration 68
 file system damaged 79
 label check 85
 pack formatting 69
 scavenging 80
 size info 57
Display Bad Page Table command 76
 Displaying the bad page table 76–77
 DSR signal 45

E

emulation of IBM 3270 45
 Ethernet
 checkout 32–33
 echo test 40–42
 statistics 50–51
Expunge Service command 88

F

Fault Analysis command 64
 flowchart symbols 5
 form
 circuit registration 47
 Formatting a disk pack 69–71

H

headers
 rewriting broken 72
 hexadecimal numbers 40

I

inconsistent file system error 79–82
 indicator
 repeater power 27
 transceiver 32

intermittent errors 7

L

- List Routes** command 11
- List Servers** command 3, 5, 40, 42, 44
- List Services** command 8, 9, 18
- List Volumes** command 82

LocalPort 38

Logon command 65

Logging on 65

loopback mode 45

M

Maintenance panel code listing 95

modem testing 45

multiple drive numbering 86

server error 82

N

Narrowing the problem to a system on the network (Network level 2) 30–31

network address required for echoing 40

nondestructive verification of disk 68

O

octal notation 40

Open Volume command 82

P

packet 42

page-level scavenge 81

percentage of packets 42

Performing corrective action at the server (Server level 2) 21–22

Performing fault analysis 64

power-off 66

PROCEDURES

Assuring a system's connection to the network (Network level 3) 32–34

Checking the Internetwork Routing Service link (IRS level 1) 10–12

Checking the local Internetwork Routing Service (IRS level 2) 13–14

Checking the network (Network level 1) 27–29

Checking the remote Internetwork Routing Service (IRS level 3) 15–17

Checking the server (Server level 1) 18–20

Checking the workstation (Workstation level) 23–26

Logging on 65

Narrowing the problem to a system on the network (Network level 2) 30–31

Performing corrective action at the server (Server level 2) 21–22

Performing fault analysis 64

Recovering from a disk label check 85

Recovering from an inconsistent file system 82

Recovering from an unrecoverable disk error 86

Running fixed disk diagnostics 60

Running removable disk diagnostics 67–78

Displaying the bad page table 76–77

Formatting a disk pack 69–71

Running a confidence test 68–69

Running the physical volume scavenger 72

Setting up the removable disk diagnostics 67–68

Using the bad page utility 72–75

Using the Exit option 77

Running the echo test 40

Testing the Communication Interface Unit 36–37

Testing the dialer 38–39

Testing the floppy disk drive 43

Testing an RS-232C port 45–47

Testing the terminal 48–49

Using the bad page utility 72–75

Using the Boot command 63

Using the List Servers command 44

Using the Quit command 66

Using the Show Ethernet Statistics command 50–56

Verifying the problem (Entry level) 7–9

Proceed command 83–84, 88

processor

identification number 40

testing 67

Q

Quit command 64, 66

R

rebuild 79

Recovering from a disk label check 85

Recovering from an inconsistent file system 82–84

Recovering from an unrecoverable disk error 86–89

recreate 7–8, 72

removable disk

diagnostic floppy 67

scavenging 80

repeater installed 27

retrieving CIU processor number 36

RS-232C

checking port 15–16

testing 45–47

Running a confidence test 68–69

Running fixed disk diagnostics 60

Running removable disk diagnostics 67–77

Running the echo test 40

Running the physical volume scavenger 72

Run Service command 87

S

Scavenge log messages 90

Scavenge command 80, 82

scavenging a disk 79–81

server

checking 18–19

performing corrective

- action 21–22
- running diagnostics 13–14
- Setting up the removable disk diagnostics 67–68
- Show Backstop Log** command 57
- Show Ethernet Statistics** command 35, 50
- Show Scavenger Log** command 84, 88
- Start Circuit** command 45
- Start IBM 3270 Emulation** command 45
- Start** command 18, 22
- Stop** command 45
- Stop IBM 3270 Emulation** command 45
- Stop Service** command 21, 36

T

- terminal testing 48

- Testing the Communication linterface Unit 36–37

- Testing the dialer 38–39

- Testing the floppy disk drive 43

- Testing an RS-232C port 45–47

- Testing the terminal 48–49

- transceiver testing 32

- transmission

- indication of 45

- rate of 42

- TTY emulation 50

U

- unrecoverable disk errors 57, 79, 85

- recovering from 86

- Using the bad page utility 72–75

- Using the Boot command 63

- Using the Exit option 77

- Using the List Servers command 44

- Using the Quit command 66

- Using the Show Ethernet Statistics command 50–56

V

- valid address 42

- valid time 60

- Verifying the problem (Entry level) 7–9

W

- workstation

- isolating the problem 7–12

- write-protected error 70, 73, 75

(This page intentionally blank)

This section contains the problem report form that was referenced in section 7, "Maintenance panel codes."

You may want to make copies of this form and fill it out by hand. It is important to update this form with service or network configuration changes as they occur.

Fill out the form completely and attach any documentation needed to explain the problem or support the enhancement requested.

To help us expedite a response to you, please include complete address information, including submitter name, mail stop branch, street address, and city and state.

Keep a copy of your completed problem report.

Type of request

Use the following definitions and enter the corresponding letter in the "Type of Request" field:

- Problem report (A) - Problem that causes a crash or inconvenience and irritates user.
- Request for enhancement (B) - Suggestion for system improvement.
- Documentation error (C) - Inaccurate or confusing passage from the help, training, or reference materials.

Impact

Please use the following definitions and enter the corresponding number in the "Impact" field:

- 1 Fatal - Problem causes persistent crash, a "lock up," or prevents a work from being done. Consistent or frequent crashes or problems; not a one-time, non-recurring error.
- 2 Serious - Occasional crash or other error that makes it difficult, but not impossible, to get a job done. Problem necessitates a complex workaround or causes other inefficiencies.
- 3 Moderate - Problem causes an inconvenience, adds steps to a job, or makes the system confusing to a user, but does not prevent work from being done.
- 4 Annoying - A nuisance problem that irritates user, but does not prevent constructive work from being done.

The following documentation should always accompany a problem report when available:

- Error log entries (scavenger logs, or system error analysis logs)
- Maintenance panel codes
- Messages
- Sample printouts, or a floppy disk containing a copy of the problem document
- Other information or samples that enable someone else to duplicate the error

PROBLEM REPORT

Date: _____ Test Mgr. Name: _____
Type of Request (A, B, or C): _____ Mail Stop/Branch: _____
A Problem Report Street Address: _____
B Enhancement Request City and State: _____
C Documentation Error Intelnet #: _____
Outside Phone #: _____

Customer Name: _____

Software Level: _____

Hardware (8010, Comm Server, Character Printer, 29 Mb File Server, etc.): _____

Problem Area or Feature (Records Processing, Text Editing, Mail, Fonts, Equation Typing, Documentation, Document Storage/Retrieval, etc.): _____

Description (Use Page 2 of 2, if necessary). Give details leading up to the problem, and report any error messages, status codes, or log entries that relate to the problem in the order in which they occurred):

IMPACT: _____ (1 Fatal 2 Serious 3 Moderate 4 Annoying)

FREQUENCY: _____ (A Every time B Intermittent C Only once)

Attempted Solutions (Use Page 2 of 2, if necessary). Describe as you did the initial problem, including status codes, messages, log entries, etc.):

Documentation Testcase Disk attached: _____

For Internal Use Only

Customer Assurance Number: _____

Screened by: _____

AR Number: _____

Date: _____

Date: _____ Name: _____

Problem Area or Feature: _____

Description (Continued):

Attempted Solutions (Continued):