CHAPTER 3

Troubleshooting

This chapter describes periodic maintenance, troubleshooting, and replacement of major IPX components.

Note "IPX" by itself refers to the IPX 8, the single-shelf IPX 16, and the two-shelf IPX 32. When necessary, the designation IPX 8, IPX 16, or IPX 32 differentiates between systems.

The IPX operating system software takes care of most IPX monitoring and maintenance. Preventive maintenance of IPX hardware is minimal. It consists of the following:

- Checking the power supply voltages after adding new cards to make sure the new cards do not overload the current power supplies.
- Washing the air filter in the door every three or four months.

IPX Preventive Maintenance

This section contains preventive maintenance information for the IPX.

Checking Power Supply Voltages

IPX power supply voltages must be checked on a node equipped with a fully configured set of cards. If a power supply voltage is out of tolerance, the power supplies must be replaced one at a time until the voltage levels are correct. (In older IPX systems, power supplies were adjusted to bring them into tolerance. This is now unnecessary.)

Test points for the power supply voltages for IPX 8 and IPX 16 system are on the SCC. Test points for an IPX 32 system are on both the SCC and LEC expansion card.

Washing the IPX 16/32 Air Filter Assembly

Every two months or more often depending on the environment, inspect the air filter assembly for dust buildup. The air filter assembly requires washing to remove dust. The air filter is located in the door of the IPX 16/32 (Figure 3-1).

Remove and clean the IPX 16/32 air filter, as follows:

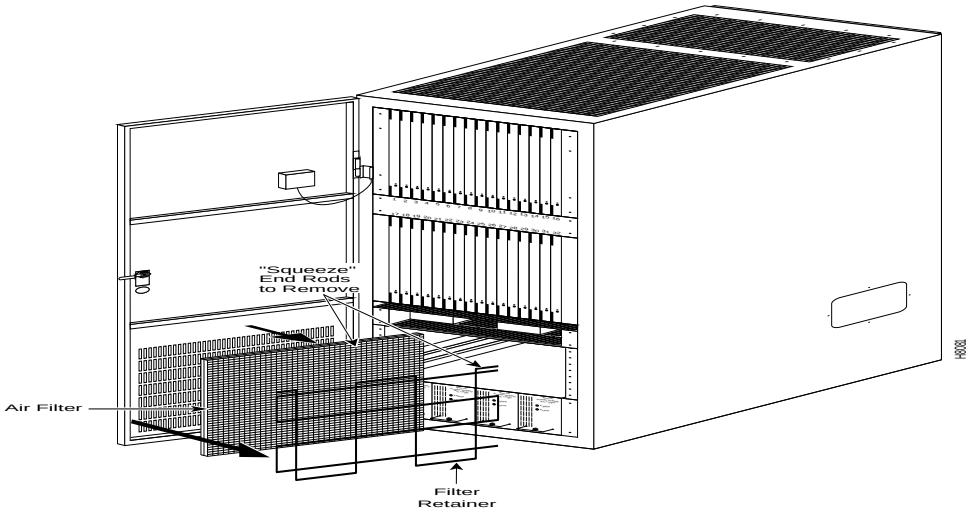
Step 1 A filter retainer keeps the air filter in place. To remove the filter, squeeze the ends of the filter retainer inwards, then lift out the filter retainer and filter.

Step 2 Clean the filter with cold water (use mild detergent if the filter is extremely dirty).

Step 3 Allow the filter to dry before returning it to its frame.

Step 4 Install the filter by sliding it into position in the door channel, and slide the filter retainer into the door channel over the filter.

Figure 3-1 Removing the Air Filter (IPX 16/32)



Washing the IPX 8 Air Filter Assembly

Every two months or more often depending on the environment, inspect the air filter assembly for dust buildup.The air filter sits below the card cage in the IPX 8 cabinet, at the front (Figure 3-2).

Remove and clean the IPX 8 air filter as follows:

Step 1 Open the front door of the IPX 8 cabinet.

Step 2 Locate the air filter assembly at the bottom-front of the IPX 8.

Step 3 A retainer bar at the top of the filter assembly keeps the filter in place (Figure 3-2). Remove the retainer bar by unscrewing the two phillips head machine screws.

Step 4 Grasp the filter and slide it out the top.

Step 5 Clean the filter with cold water (use mild detergent if the filter is extremely dirty).

Step 6 Allow the filter to dry before returning it to its frame.

Step 7 Make sure all three fans are operating. Replace the fan assembly if any fan is not operating properly.

Step 8 Install the air filter by sliding it into the side channels of the filter assembly.

Step 9 Secure the filter retainer bar with the two machine screws.

Figure 3-2 Removing the Air Filter (IPX 8)

Troubleshooting the IPX

This section describes elementary troubleshooting procedures and briefly describes the commands for troubleshooting an IPX node. For detailed description of these commands, refer to the *Command Reference*. This section does not contain an exhaustive set of procedures and does not take into account any of the diagnostic or network tools available to troubleshoot the IPX.

This section contains information about the following:

- Troubleshooting tables for the IPX
- System hardware status (configuring and displaying), including circuit cards, system buses, and power supplies
- CGA relay and forced yellow signal group channel additions
- Channel loopback and connection tests
- Alarm thresholds for statistical line errors, and line error display reporting

Caution Do not independently perform any disruptive tests or repairs on the IPX. Before you troubleshoot the IPX, call StrataCom ISC. In the United States, call 1-800-767-4479, 6:00 AM to 6:00 PM, Pacific Time, Monday through Friday). From any other country, call 1-408-947-6115. ISC can give assistance in locating the fault and provide repair information.

General Troubleshooting Procedures

The IPX runs self-tests continuously to ensure proper function. When the IPX finds an error condition that affects its operation, it downs the affected card or line. It then selects a standby card or redundant line if one is available. In a non-redundant system, no alternate cards are available for the CDP, NTC, ATM, ARC, CIP (upgraded systems), BC-E1, BC-T1, PIC and TXR (upgraded systems), SDP, SDI, LDP, LDI and NPC, so the system comes down if a failure occurs on any of these cards.

The FAIL light on a card indicate that the system has found the card defective in some mode and now considers it as a failed cards. In this situation you would use Table 3-1 to find the cause and obtain the information on replacing the failed component.

Caution When using Table 3-1 for troubleshooting, call StrataCom ISC before performing any disruptive testing or repairs on the IPX. This ensures that you have isolated the correct problem area. It also enables ISC personnel to provide assistance in performing the necessary procedures.

Table 3-1 General Troubleshooting

Symptom		Probable Cause		Remedy	
1.	No indicators on IPX boards lit- console screen blank.	1.	IPX power switch switched off.	1.	Switch on power switch.
		2.	IPX breaker tripped reset the breaker	2.	Switch off, then switch on the power switch to the Check to see if any overload condition exists (shorted connections, crow-barred power supplies).
		3.	IPX power cord dislodged from plug into 208 or 240 VAC receptacle.	3.	Reconnect power cord
		4.	Power supplies not functioning.	4.	Replace power supplies
2.	Front card FAIL indicator lit Note: CIP is used in pre- 7.0 systems.	1.	Front card failed: •CDP card •NPC card •ARC card •NTC card •AIT card •SDP card •LDP card •FRP card •FTC card •MT3 card	1.	Check alarm status of card and remove and replace the front card. NOTE: If an NPC fails in a non-redundant IPX system, the system must be rebooted.
3.	Front card indicator lit - replacement card does not fix problem.	1.	Backplane defective.	1.	If a new card does not fix problem, the backplane may be suspect (uncommon failure). Contact the Stratacom ISC.
4.	SDI card FAIL indicator lit.	1.	SDI card failed: •SDI (RS232) card •SDI (RS449) card •SDI (V.35) card	1.	Check alarm status of card remove and replace the SDI card.
5.	ATM, ARC, CDP, LDI, BC-E1 or BC-T1 FAIL indicator lit-replacement card does not fix problem.	1.	LB backplane defective.	1.	If new card does not fix the problem, contact Stratacom ISC.
					NOTE: All cards plug into the system backplane. If the backplane is defective, it could cause a fault to appear on any card.
6.	Power Supply FAIL indicator lit.	1.	Power supply defective.	1.	Check power supply output Remove and replace power supply if defective.
		2.	SCC wiring or card defective.	1.	If power supplies output check out, then SCC wiring or card is suspect.
				2.	Make sure the plug connection to the SCC card is secure; tighten if it is not.
				3.	If the plug connection is secure and the Power Supply Monitor FAIL indicator is still lit, then remove and replace the SCC card.

Symptom		Probable Cause		Remedy	
7.	Power Supply Monitor FAIL indicator lit.	1.	Defective fan, or fan assembly in enclosure - allowing the temperature in the enclosure to rise above 50° C.	1.	Check that both fans in power shelf are rotating.
				2.	If both fans are not rotating, check the main connection plug to the fan assembly for proper connection, and push in the connector to correct situation.
				3.	If only one fan is rotating, check the interconnecting plugs for proper connection, and push in the connector to correct the situation.
				4.	If the fans in remedies 2 and 3 above are still not functioning, remove and replace the fan assembly.
		2.	Defective temperature sensor wiring or sensor.	1.	Check the cable plug attached to the system backplane and push in the connector to correct the situation.
				2.	Check the wiring between the temperature sensor and the SCC board, and re-solder it if necessary.
				3.	If neither remedy 1 or 2 above does not cure the problem, remove and replace the temperature sensor.
		3.	Defective power supply fan in power supply allowing the power supply temperatures to rise above 50° C.	1.	If the fan assembly is functioning correctly, then the power supply assembly fans are suspect.
				2.	Check to see if the power supply fans are rotating, if not, remove and replace the power supply with the defective fan.
				3.	If power supply fans are functioning, then the power supply temperature sensor is defective. Remove and replace the temperature sensor
		4.	Defective SCC card	1.	If both the enclosure fan assembly and the power supply fans are working correctly (see symptom 6, probable causes 1, 2 and 3), then the SCC card is suspect.
				2.	Remove and replace the SCC card.
8.	Console screen blank, IPX indicator lights lit.	1.	Control terminal switched off.	1.	Switch on the control terminal.
		2.	Control terminal power cord disconnected.	2.	Reconnect the control terminal power cord to 208/240 VAC power outlet.
		3.	RS-232 cable loose or disconnected from the Control Terminal port on the SCC, or from the control terminal.	3.	Reconnect the RS-232 cable to Control Terminal port on the SCC back card or to the control terminal itself.
		4.	Control terminal malfunctioning.	4.	Refer to the control terminal manufacturer's manual.

Symptom		Probable Cause		Remedy	
9.	Printer not functioning	1.	Printer switched off.	1.	Switch on the printer.
		2.	Printer out of paper.	2.	Renew the paper supply.
		3.	Printer power cord disconnected.	3.	Reconnect the printer cord to 208/240 VAC power outlet.
		4.	RS-232 cable loose or disconnected from the Control Terminal port on the SCC or from the printer.	4.	Reconnect RS-232 cable to the Control Terminal port on the SCC back card or to the printer itself.
		5.	Printer malfunctioning.	5.	Refer to the printer manufacturer's manual.
10.	Modem not functioning.	1.	Modem switched off	1.	Switch on the modem.
		2.	Modem power cord disconnected.	2.	Reconnect modem power cord.
		3.	RS-232 cable loose or disconnected from the Control Terminal port on the SCC, or from the modem.	3.	Reconnect the RS-232 cable to the Control Terminal port on the SCC back card or the modem itself.
		4.	Telephone hookup cable disconnected.	4.	Reconnect the telephone hookup cable.
		5.	Modem malfunctioning.	5.	Refer to the modem manufacturer's manual.
		6.	DIP switches not set correctly.	6.	Refer to the modem manufacturer's manual.
11.	DFM is not functional.	1.	DFM has been not been enabled by Stratacom.	1.	Contact the ISC.
12.	DFM has been enabled but still does not function.	1.	DFM only runs on speeds up to 64Kbps.	1.	Readjust the speed.
13.	Background noise or music sounds choppy.	1.	VAD problem.-VDP needs sensitivity adjustment		Contact the ISC.
14.	High speed modem drops to low speed.	1.	ADPCM is taking over.	1.	Contact the ISC.
15.	Bundled (Frame Relay) connections have failed.	1.	One or more bundled connections have failed.	1.	Contact the ISC.

Troubleshooting the IPX Console Alarms

The initial mode of troubleshooting the IPX uses the console alarms displayed on the console screen. Table 3-2 provides you with a procedure for isolating the alarms and thereby isolating the fault. Any repair to the IPX must be performed by StrataCom-qualified personnel.

Caution When using Table 3-2 for troubleshooting, call the StrataCom ISC before performing any disruptive testing, or attempting to repair the IPX, to ensure that you have isolated the correct problem area, and also to enable ISC to provide you with assistance in performing the necessary procedures.

Note When returning defective components to StrataCom, refer to Appendix D.

Table 3-2 Troubleshooting the IPX Console Alarms

Symptom	Probable Cause	Remedy
MAJOR/MINOR alarm flashing on affected console screen.	• Failed connection • Failed circuit lines • Failed trunks • Failed cards • Unreachable node • High error rate on circuit lines or trunks.	1. Use **dspnw** command to identify the node(s).
		2. Use **vt** command to place yourself at the affected node, and use **dspalms** to identify the alarm type.
		a.If the alarm display indicates a **failed connection**, go to probable cause 1.
		b.If the alarm display indicates a **failed circuit line**, go to probable cause 2.
		c.If the alarm display indicates a **failed trunk**, go to probable cause 3.
		d.If the alarm display indicates a **failed card,** go to probable cause 4.
		e.If the alarm display indicates an unreachable node, go to probable cause 5.
	1. Failed connection.	1. Use the **dspcons** command to identify which connections have failed and to determine the remote end connection assignments.
		2. Use the **dsplog** command to determine the cause of failure of the connections. These failures could consist of failed circuit lines, trunks cards, or clock over speeds.
		a. If the connections have failed due to a circuit line failure, go to probable cause 2.

Symptom	Probable Cause		Remedy	
				b.If the connections have failed due to a packet line failure, go to probable cause 3.
				c. If the connections have failed due to a card failure, go to probable cause 4.
				d. If connections have failed due to a clock over speed condition, go to probable cause 5.
	2.	Failed circuit line.	1.	Use the **dspclns** command to identify the circuit line number and failure type.
				a.If the failure is a circuit line local CGA (no pulses received at the local end of circuit line) go to probable cause 2a.
				b.If the failure is a circuit line remote CGA (no pulses received at the remote end of circuit line), go to probable cause 2B.
				c.If the failure is circuit line frame slips (indicating excessive frame slips on the T1 between the IPX and the PBX) go to probable cause 2C.
				d.If the failure is circuit line bipolar errors (indicating excessive bipolar errors on this circuit line) go to probable cause 2D.
	2A	Circuit line local CGA.	1.	Use the **dsplog** command to determine date, time of day, and the duration of the CGA alarm.
			2.	Determine if the PBX T1 subrate or the PBX E1 interface went down at the time the CGA alarm was logged by the IPX.
			3.	Check cabling between IPX and the PBX and make necessary repairs if defective.
			4.	Make a note of the steps taken and call StrataCom ISC center.
	2B	Circuit line remote CGA.	1.	Refer to remedies for probable cause 2A.
	2.	Circuit line frame slips.	1.	Use the **dsplog** command to determine date, time of day, and duration of the frame slip alarm. Also determine if the clock source for this line has changed due to line failure in the network.
			2.	Use the **dspclnerrs** command to quantify frame slips and rate information.
			3.	Use the **dspclnhist** command to obtain historical information on frame slips.
			4.	Use the **dspcurclk** command to identify the current clock source and path to the current clock source.
			5.	Use the **clrclnalm** command to clear the circuit line alarms

Symptom	Probable Cause		Remedy	
			6.	Make a note of the steps taken, and call StrataCom ISC.
	2	Circuit bipolar errors.	1.	Use the **dsplog** command to determine when the bipolar error threshold was exceeded, and the duration of the alarm.
			2.	Use the **dspclnerrs** command to quantify the bipolar errors.
			3.	Use the **dspclnhist** command to obtain historical information on bipolar errors.
			4.	Check cabling between IPX and the PBX for loose connections, and tighten it if it is loose.
			5.	Use the **clrclnalm** command to clear line alarms.
			6.	Make a note of the steps taken, and call StrataCom ISC.
	3.	Failed trunk.	1.	Use the **dsptrks** command to identify the remote end node name, trunk numbers at each end, and the type of failure.
				a. If the display shows a communication failure, go to probable cause 3A.
				b.If the display shows a local CGA, go to probable cause 3B.
				c.If the display shows a remote CGA, go to probable cause 3C.
				d.If the display shows a bipolar error, go to probable cause 3D.
				e.If the display shows a frame slip error, go to probable cause 3E.
				f.If the display shows an out-of-frame error, go to probable cause 3F.
				g.If the display shows a time-stamped packet drop error, go to probable cause 3G.
				h.If the display shows a non time-stamped packet drop error, go to probable cause 3H.
				i.If the display shows a loop-back, go to probable cause 3I.
	3A	Communication Failure.	1.	Use the **dsplog** command to determine when the communication failure or CGA occurred, and identify connections that may have failed due to lack of bandwidth on an alternate route.
			2.	Use the **dsptrkerrs** command at each end of the packet line to quantify errors, and determine if they are unidirectional or bi-directional.

Symptom	Probable Cause		Remedy	
			3.	Call the telephone carrier to request span testing. Ask the carrier to perform BER tests using multiple test patterns, including standard quasi, all 1, and 3 and 24 patterns.
			4.	Make a note of the steps taken, and call StrataCom ISC.
	3B	Local CGA—indicates no pulses at the local end of the trunk.	1.	Refer to probable cause 3A remedies.
	3C	Remote CGA—indicates no pulses at the remote end of the trunk.	1.	Refer to probable cause 3A remedies
	3D	Bipolar errors—indicates excessive bipolar errors on this trunk.	1.	Use the **dsplog** command to determine the date, time of day, and the duration of the alarm.
			2.	Use the **dsptrkerrs** command at each end of the trunk to quantify errors, and determine whether they are unidirectional, or bi-directional.
			3.	Use the **dsptrkhist** command at each end of the trunk to collect historical information on line errors. (Refer to the StrataView Plus User's Guide for command information.)
			4.	Use the **clrtrkalm** command to clear trunk alarms.
			5.	Call StrataCom ISC for assistance. StrataCom can monitor line errors and may advise disruptive testing to be scheduled with telephone carrier.
			6.	Call the telephone carrier and request span testing. Ask the carrier to perform BER tests using multiple test patterns, including standard quasi, all 1, and 3 and 24 patterns.
			7.	If telephone carrier is unable to isolate the problem on the span, contact StrataCom ISC for assistance.
	3E	Frame slip errors indicates excessive frame slips on this trunk	1.	Refer to probable cause 3D remedies.
	3F.	Out-of-frame errors—indicates excessive out-of-frame errors on the trunk.	1.	Refer to probable cause 3D remedies
	3G	Time-stamped packet drops—indicates time-stamped packet drops have exceeded the threshold for generating an alarm.	1.	Use the **dsplog** command to determine when the dropped packet alarm threshold was exceeded, and determine the duration of the alarm.
			2.	Use the **dspload** command alarm. to determine the current loading of this trunk.

Symptom	Probable Cause		Remedy	
			3.	Make a note of steps taken and call StrataCom ISC. Refer to probable cause 3G remedies.
	3H	Non time-stamped packet drops —indicates that non time -stamped packet drops have exceeded the threshold for generating an alarm.		Refer to probable cause 3G remedies.
	3I.	Loop-back.	1.	Determine if company personnel are performing span tests with CSU loop-backs, demarc, or DSX panel.
			2.	If company personnel are performing loop-back tests, ask them to indicate when they have completed testing, and monitor the system to ensure that the loop-back indication disappears when testing is complete.
			3.	If company personnel are not performing loopback tests, telephone carrier most likely has the E1 span in loopback mode.
			4.	Call telephone carrier to verify that they are testing the E1 span, and ask them to indicate when they have completed their tests. Monitor the system to ensure that the loopback indication disappears when testing is completed.
			5.	Make a note of the alarm steps taken, and call StrataCom ISC.
	4.	Failed cards—indicates the number of cards that have failed.	1.	Use the **dspcds** command to determine which card has failed, along with its status (active or standby).
			2.	Use the **dsplog** command to determine time of day the card failed and whether or not any connections using this card are also in a failed condition.
			3.	If the failed card is an SDP or LDP card, use the **dspbob** command at each end of the connection using this card to verify that data is passing. For the CDP use the command dspchstats.
			4.	If a card has failed, make a note of the steps taken, and call StrataCom ISC.
	5.	Unreachable node-shows the number of unreachable nodes in the network.	1.	At any node, use the **dsplog** command to determine the date and time of day that the node became unreachable. A node is usually unreachable due to a trunk failure or a power outage.
			2.	Contact personnel at that node to determine whether or not there a power failure happened at the time logged by the IPX.

Symptom	Probable Cause	Remedy
		3. If there was a power failure, check that NPC comes up and run diagnostics.
		4. If there was not a power failure, call StrataCom ISC.
	6. Clock Overspeed.	1. Use the **dspbob** command to determine the incoming baud rate for this connection.
		2. Use the **dspcon** command to verify that the console incoming baud rate is the same as the configured baud rate.
		3. Reconfigure the incoming baud rate to match the configured baud rate.
		4. Note of the steps taken, and call StrataCom ISC.

Displaying a Summary of Alarms

The first step in IPX troubleshooting is to check the condition of the system by displaying system-wide alarm conditions. To see a summary of current alarms on an IPX node, use the **dspalms** command. The alarms summary includes the following:

- Number of failed connections
- Number of major and minor alarms
- Number of failed cards
- Power monitor failures
- Bus failures (either failed or needs diagnostics)
- Number of alarms on other nodes in the network
- Number of unreachable nodes in the network

Note The **dspalms** command cannot be included in a job.

To display alarms, enter the command **dspalms**. If the screen indicates a failure, refer to the commands in Table 3-3 to further isolate the fault.

Table 3-3 Fault Isolation Commands

Failure	Diagnostic Commands
Connections	**dspcons** (display connections)
Line Alarms	**dspclns** (display circuit lines)
	dsptrks (display trunks)
Cards	**dspcds** (display cards)
Power Monitor	**dsppwr** (display power supply status)
Remote Node	**dspnw** (display network)
Unreachable Nodes	**dspnw** (display network)
Remote Node Alarms	**dspnw** (display network)

Displaying the Status of Cards

When a card indicates a failed condition on the alarm summary screen, use the **dspcds** command to display the status of the circuit cards on a node. The information displayed for each card type includes the card slot number, software revision level, and status of the card.

Table 3-4 lists all possible status descriptions for each card type.

Table 3-4 Card Status

Card Type	Status	Description
All card types (including CDP)	Active	Active card
	Active—F	Active card with non terminal failure.
	Standby	Standby card
	Standby—F	Standby card with non terminal failure.
	Standby—T	Standby card performing diagnostics.
	Standby—F–T	Standby card with non terminal failure performing diagnostics.
	Failed	Card with terminal failure.
	Unavailable	Card is present but it may be in any of the following states:
		1. The node does not recognize the card (may need to be reseated).
		2. The card is running diagnostics.
		3. A VCD card is paired with a VDP and the VDP has failed (upgraded systems).
	Down	Downed card.
	Empty	No card in that slot.
VDP (upgraded systems)	Same status as for all card types, plus:	
	Active—T	Active card performing diagnostics.

Card Type	Status	Description
NPC	Same status as for all card types, plus:	
	Updating	Standby NPC is downloading network configuration from an active NPC.
		NOTE: Red FAIL LED flashes during updating.
	Cleared	NPC is preparing to become active.
	Loading Software	Downloader commands appear when the system is downloading software to the NPC.

Note Cards with an **F** status (non terminal failure) are activated only when necessary (for example, when there is no card of that type available). Cards with a failed status are never activated.

Note The **dspcds** command cannot be included in a job.

To display cards enter the following command:

dspcds <RET>

User-Initiated Tests

User-initiated tests are available to diagnose the state of the IPX system, as follows:

- **tstcon** on voice connections.
- **tstcon** on data connections.
- **tstport** on data and frame relay ports.

Woolpack Tests

Woolpack tests are available to help diagnose the state of the IPX system, as follows:

- CDP/NTC or TXR (T1 only) (upgraded systems) for implicit internal loopback.
- CIP (E1 only) (upgraded systems) for implicit internal loopback.
- Voice: **addloclp**, **addrmtlp**.
- Data: **addloclp**, **addrmtlp**.
- Frame relay: **addloclp**.