

S3100 Series Switches Troubleshooting Guide

Models: S3100-16TF; S3100-8TMS-P; S3100-16TF-P; S3100-16TMS-P

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Chapter 1 Switch Hardware Fault Maintenance

1.1 Indicator Light Status Fault

1.1.1 Status Light

Status Light: An LED indicating the system's operating status, usually a dual-color (red/green) light. It flashes green during the initialization phase, remains solid green after successful initialization, and turns red when a system fault occurs.

When the Status light is red, you can use a PC super terminal to confirm whether the switch's software is running normally.

The S3100 series does not have a Power indicator. The Status light only remains solid after the software has successfully loaded. During the switch's boot process, all panel lights may remain off. Please wait patiently. During a software upgrade, do not power off the switch due to the absence of indicator lights, as this may damage the boot area and render the switch irreparable.

1.1.2 Port Link/ACT Light

Port Link/ACT Light: An LED indicating the current status of the network port, usually green.

The indicated network ports include the front panel 10/100M or 10/100/1000M ports, as well as the ports on the rear panel expansion modules or stacking ports. These indicator lights often fail, and the following are specific manifestations and corresponding troubleshooting methods:

Light does not turn on:

1. Check if the switch is powered on and if the power cable is properly connected.
2. Use the **show interface status** command to check if the corresponding port is Linkup.
3. If possible, try re-plugging the network cable to see if the light turns on.
4. Verify if the network cable is functioning properly by testing with a replacement cable.
5. If possible, power off the switch and observe if the light turns on during initialization. If the light remains off during initialization, it is likely a hardware fault. Otherwise, save all verification results for further investigation.

Light does not turn off:

1. Use the Console to confirm if the corresponding port is LinkDown using the **show interface status** command.
2. Use the command to reset the faulty port. Specifically, enter the interface configuration mode and input '**shutdown**' and '**no shutdown**'. If the indicator light is flashing abnormally, confirm whether all ports are flashing abnormally or individual ports are flashing abnormally.

3. Normally, the LED flashes only during data transmission, and the flashing frequency is the same for the same model. Compare with normal ports to determine if the flashing is abnormal.
4. Use the **show interface status** command to confirm if the port status is normal and if it is in an unstable Link state. If so, proceed to the "Port Link Status Abnormal" case for further investigation.

1.2 Power Supply Fault

Symptom: The power supply has no output, and the entire board does not power on. The board's indicator lights do not turn on, and the system fan does not spin. The power panel's red light is on. The output voltage measured with a multimeter is not a stable 48V.

Fault Point: Internal component failure in the switching power supply.

Check if the power supply is normal:

Execute **Show power** to confirm if the power supply is functioning properly. Check if the power supply is recognized and pay attention to the Status field to see if it is OK.

Example (normal power supply):

FS# show power

Chassis-type: S12010 I Series

power-redun: no valid

power auto-down: no

power-id	power-type	supply(W)	status
----------	------------	-----------	--------

1	RG_PA2000I	2000	ok
---	------------	------	----

- If the Status is "ok," the power supply is normal.
- If the Status is "Fail," the power supply is faulty. Try re-plugging the power module. If the power supply remains faulty, proceed with repair.
- Handling Method: Follow the process to return the power supply for factory repair.

1.3 Fan Fault

The fan troubleshooting process for box switches applies to environments where all fans in the box switch have stopped. This process provides fault location and handling:

1. First, confirm if the power supply to the fan is normal.
2. If the fan's power supply is normal, install a working fan in one of the fan sockets and confirm if it operates normally. If it does, the fan is faulty, and all fans should be replaced.
3. If the fan's power supply is abnormal, since such power sockets are usually directly soldered to the motherboard, the unit needs to be returned for factory repair.

To view the device's fan information, use the **show fan** command.

```
FS# show fan
```

```
Fan-id Fan-type Status
```

```
1  RG_FAN  ok
```

- If the Status is "ok," the fan is normal.
- If the Status is "Fail," the fan is faulty. Follow the process to return it for factory repair.

1.4 Optical Module Fault Handling

1.4.1 Optical Module Fault Handling

If there is a connection issue between optical ports, debugging is required. During debugging, pay attention to the LED display of both ports and the port status information in the serial port.

1. Confirm if the fiber optic cable and optical module are properly installed.
2. Check if the end face of the optical module that cannot LINK is clean and free of obstructions. Also, ensure that the end face of the used fiber optic jumper is clean.
3. Confirm if the optical module specifications match the on-site environment.
4. Confirm if the port configurations of the interconnected optical ports on the switch match.
5. Set the interconnected optical ports to auto-negotiation and confirm if the issue is resolved.
6. If the fault is still not located after the above steps (the port configuration should be auto-negotiation at this point),

proceed with the following steps for further analysis.

7. Replace one of the optical modules and confirm if the issue is resolved.
8. Replace the fiber optic cable and confirm if the issue is resolved.
9. Move one of the optical modules to a third device and confirm if the issue is resolved.
10. Insert a third optical module and confirm the connection status between the third module and the other two.
11. Test the TX end of the optical module and the light intensity after connecting the fiber. On-site equipment for testing light intensity is required.

The above steps can be selectively executed based on on-site conditions. After completing these steps, the fault point can usually be identified. If the issue is with the fiber optic cable, handle it with the customer. If the issue is with the optical module, use a blower (e.g., a rubber bulb) or strong wind (e.g., from a fan) to blow or suck the TX and RX ports of the optical module, then test the connection status of the optical module. (Dust on the optical port can cause connection issues, and this method can eliminate dust problems.)

If all the above measures confirm that the optical module is faulty, record the following information and provide feedback to R&D:

1. Configuration of both ports.
2. LED display on both sides during each connection attempt as per the above steps.
3. Port status information in the serial port during each connection attempt as per the above steps.
4. On-site environment (including equipment used, fiber optic cables, and environmental information).

1.4.2 Fiber Optic Related

1. The bending radius of the fiber optic cable must not be less than 30mm. Avoid any bends less than 90 degrees.
2. The axial pulling force on the fiber optic cable must not exceed 1Kg. Do not let the device hang on the fiber optic cable.
3. The fiber optic cable must not be subjected to axial impact forces. Avoid strong compression on the fiber optic cable.
4. The operating temperature of the fiber optic cable should be between -20°C and 70°C. Note that the maximum temperature the fiber optic cable can withstand under any circumstances should not exceed 85°C.
5. The lifespan of fiber optic jumpers and general connectors is usually 2000 plugging and unplugging cycles. The replacement cycle should be determined based on the daily plugging and unplugging frequency of the fiber optic connection to ensure reliable optical connection performance.
6. Laser safety: Avoid direct exposure to the light-emitting port during power-on testing to prevent eye damage from

laser radiation.

7. The quality of fiber optic jumpers directly affects the connection performance of the entire optical link (transmission distance, connection stability, etc.). Poor-quality jumpers can introduce more contamination risks and directly damage the module. Therefore, always use reputable brands and quality-assured jumpers for installation. During initial installation, strictly inspect the end face of newly unpacked fiber optic jumpers to ensure cleanliness before use.

1.4.3 Optical Module Related

1. Do not use single-mode fiber to connect two multi-mode optical modules. Multi-mode signals experience significant attenuation on single-mode fiber.
2. When inserting the fiber optic cable, do so slowly and align it properly with the optical port. Avoid using excessive force or inserting the cable at an angle, as this may damage the optical module.
3. The optical module contains ceramic components. Handle with care when removing the module to avoid dropping it. If the module is accidentally dropped, return it to avoid potential future faults.
4. The optical port of the module should not be left exposed for long periods. If the module is not in use for an extended time, install a dust cover to protect it.
5. Although the optical module supports hot-plugging, frequent hot-plugging is not recommended as it may cause electrical damage.

1.4.4 Attenuator Usage

1. 40km Gigabit Optical Module: Use a 10dB attenuator for single-mode fiber less than 7km; use a 5dB attenuator for single-mode fiber between 7-12km; no attenuator is needed for single-mode fiber longer than 12km.
2. 50km Gigabit Optical Module: Use a 5dB attenuator for single-mode fiber less than 10km; no attenuator is needed for single-mode fiber longer than 10km.
3. 80km Gigabit Optical Module: Use a 10dB attenuator for single-mode fiber less than 20km; no attenuator is needed for single-mode fiber longer than 20km.
4. 100km Gigabit Optical Module: Use a 15dB attenuator for single-mode fiber less than 35km; no attenuator is needed for single-mode fiber longer than 35km.
5. 40km 10 Gigabit Optical Module: Use a 5dB attenuator for single-mode fiber less than 15km; no attenuator is needed for single-mode fiber longer than 15km.
6. 80km 10 Gigabit Optical Module: Use a 20dB attenuator for single-mode fiber less than 40km; no attenuator is needed for single-mode fiber longer than 40km.

1.5 POE Function Abnormal

1. Confirm the status and legitimacy of the customer's PD (Powered Device). If all PD devices at the customer's site cannot be powered, test using our PD device (e.g., AP). If some PDs are abnormal, connect a working PD to the abnormal port to confirm if it functions normally.
2. Check if the port has POE disabled or if the POE output power is limited.
3. Inspect the connecting cables and ensure they are properly plugged in.
4. Check the remaining POE power. If it is less than 15.4W, use the **show poe interface** command.
5. Confirm if the customer's PD exceeds the 15.4W power limit. Collect the power consumption information of the customer's devices.
6. Try re-plugging the line card or power cycling the switch.
7. If none of the above works, determine if it is a POE port fault.
8. Confirm if the customer's PD and wireless manager negotiate properly. If not, the switch interface may fail to link up.
9. Record all operations and information generated during the process for further analysis.

Chapter 2 Switch System Fault Maintenance

2.1 Device Cannot Enter Console

This fault commonly manifests as no terminal output, inability to input, or garbled text.

1. Confirm if the fault occurs immediately after the switch boots or after a period of normal operation.
2. Check if the switch is running normally through port LEDs or fans.
3. Verify if the PC terminal software settings are correct, such as the baud rate.
4. Confirm if the serial cable is damaged, if the connection is secure, and if the PC's serial port is faulty. Try connecting to another device's Console port.
5. If possible, power off and restart the switch. Check if the serial port outputs any information and record it.
6. If the serial port outputs no information, for RGNOS 10.X software devices, input @@@@ in the console to observe if there is any output. If there is no output, the serial port chip may be faulty, or it may be a software issue.
7. If the serial port outputs information, analyze the program's progress based on the output. For example, if the main program runs but no further information is output, the main program may have an issue, possibly due to a failed component on the board causing the main program to fail.
8. Perform multiple power cycles to see if the fault persists.
9. If the above steps do not resolve the issue, record all operations and information generated during the process for backend analysis.

2.2 Device fault

1. Confirm if the switch crashes immediately after booting or after running for some time. If it crashes after running for some time, focus on any suspicious operations before the crash and check the surrounding environment for abnormalities, such as unstable voltage or lightning strikes.
2. When the fault occurs, input @@@@ in the Console to see if information can be collected. If so, save it for further analysis.
3. Observe the status of port indicator lights and system indicator lights (Power or Status).
4. Disconnect all network cables and stacking cables connected to the switch one by one to see if there is any improvement. If the device returns to normal after disconnecting a cable, mirror the traffic of all ports to analyze if the crash is caused by abnormal packets received by the switch.
5. Restart the switch to see if it still crashes.

6. If there are expansion modules, remove them to see if there is any improvement.
7. Try entering Boot or Ctrl to check the software version number and file system for abnormalities.
8. Delete the configuration file to see if there is any improvement.
9. Record all operations and information generated during the process for further analysis.

2.3 Device Reboot

1. Confirm the timing of the device reboot. Does it reboot continuously after being powered on, or does it reboot after running for some time? Focus on any suspicious operations before the reboot and check the surrounding environment for abnormalities, such as unstable voltage or lightning strikes.
2. Confirm if a single switch in the rack is rebooting or if multiple switches are rebooting. If multiple switches are rebooting, first check if the power supply is normal and if the power requirements of the switching equipment are met.
3. Confirm if the ground wire is properly grounded.
4. Connect to the switch's Console to collect output information during the reboot.
5. Disconnect all network cables and stacking cables connected to the switch one by one to see if there is any improvement.
6. If there are expansion modules, remove them to see if there is any improvement.
7. Try entering Boot or Ctrl to check the software version number and file system for abnormalities.
8. Delete the configuration file to see if there is any improvement.
9. Collect the switch's log records to check for any abnormal records.
10. Record all operations and information generated during the process for further analysis.

2.4 Software Upgrade Failure

1. Compare with the version release notes to confirm if the upgrade source file is correct.
2. Check the switch product warning notices to see if there are any known bugs related to this product or software version.
3. Use TFTP in the Ctrl layer or the main program's TFTP to see if normal operation can be restored.
4. If file copying fails during the upgrade, check the PC port, cable, and connection. Confirm TFTP settings and the PC's

network settings (e.g., firewall) to ensure TFTP transmission is not blocked.

5. Use a packet capture tool to confirm if the port used for upgrade is sending TFTP request packets. If requests are sent but no response is received, the issue is on the PC side. If no request packets are captured, the switch port hardware may be faulty.
6. Confirm if the serial Flash capacity is sufficient. After sufficient backup, format the serial Flash.
7. Try downloading a smaller file to confirm if it can be successfully downloaded.
8. If you can enter the Ctrl layer, check if the file has CRC errors.
9. Record all operations and information generated during the process for further analysis.

Chapter 3 Common Fault Handling

3.1 Optical Port Cannot Link or CRC Error Statistics

1. Confirm the switch configuration is correct.
2. Confirm the interface negotiation status is consistent on both ends (e.g., both are in auto mode or forced mode).
3. Confirm the fiber optic cable matches the optical module. Do not use single-mode fiber to connect two multi-mode optical modules, as multi-mode signals experience significant attenuation on single-mode fiber. You can use multi-mode fiber to connect single-mode modules, but the connection distance must be less than 220 meters.
4. Confirm the optical module is installed correctly.
5. Confirm the optical module specifications match the on-site environment. Fiber optic communication is a precise technology, and harsh environments (especially dusty ones) can significantly affect communication quality. Avoid using fiber optic in such environments if possible. If necessary, ensure proper protection for the fiber optic and optical module interfaces.
6. Confirm the port configurations of the interconnected optical ports on the switch match. Pay special attention to whether the photoelectric multiplexing port has been switched to the optical port and if the rate configurations of the interconnected optical ports are symmetric.
7. Set the interconnected optical ports to forced mode and confirm if the issue is resolved. Note that the flow control/duplex/rate settings should all be set to non-auto mode (i.e., forced mode). For example, set flow control to off, duplex to full, and rate to 1000M.
8. Set the interconnected optical ports to auto-negotiation and confirm if the issue is resolved.
9. Use a blower to remove dust from the optical module and confirm if the issue is resolved.
10. Note: If the configuration changes, ensure to save the configuration to avoid losing it due to power cycling.

If the fault is still not located after the above steps (the port configuration should be auto-negotiation at this point), proceed with the following steps for further analysis:

11. Replace one of the optical modules and confirm if the issue is resolved.
12. Replace the fiber optic cable and confirm if the issue is resolved.
13. Move one of the optical modules to a third device and confirm if the issue is resolved.
14. Insert a third working optical module and confirm the connection status between the third module and the other two.
15. Test the TX end of the optical module and the light intensity after connecting the fiber. On-site equipment for testing light intensity is required.

The above steps can be selectively executed based on on-site conditions. After completing these steps, the fault point can usually be identified. If the issue is with the fiber optic cable, replace it. If the issue is with the optical module, use a blower or strong wind (e.g., from a fan) to blow or suck the TX and RX ports of the optical module, then test the connection status of the optical module. (Dust on the optical port can cause connection issues, and this method can eliminate dust problems).

3.2 Port Link Status Abnormal

Use the **show interface status command** to confirm if the port Link status is abnormal (do not rely solely on the port LED lights). Link status abnormalities are mainly divided into the following three situations:

3.2.1 Port Abnormal Linkdown

1. First, confirm if there is a configuration issue, such as the port being in shutdown state or the photoelectric multiplexing port not being switched to the correct state.
2. Check if the negotiation modes on both ends are consistent. It is recommended to enable auto-negotiation and adjust flow control (set flow control/duplex/rate to auto) on both devices to ensure consistent working states. If forced mode must be used, configure the interconnected ports' flow control/duplex/rate to forced mode. In both modes, try using straight and crossover cables to see if the link can come up. If one side is in auto-negotiation and the other is in forced mode, a half-duplex connection may occur.
3. Try setting the flow control/duplex/rate to non-auto mode (i.e., forced mode). For example, set flow control to off, duplex to full, and rate to 1000M. See if the link can come up. (For 100G interfaces, check if FEC is consistent.)
4. Re-plug the cable (network cable, fiber optic cable, or optical module) to see if the link can come up.
5. Try replacing the network cable or fiber optic cable (or optical module, expansion module) to see if the link can come up.
6. Move the cable to another port on the same device to see if it can link up normally. If it can link up on another port, the original port is likely faulty. If it cannot link up, try replacing the network cable (try both straight and crossover cables) and confirm the correct connection of the fiber optic cable's TX and RX.
7. If the twisted pair cable is long, replace it with a shorter cable and connect it to a normal port to see if the link is normal.
8. Move the other end to another normal port to see if it can link up normally.
9. Use testing equipment to test the attenuation of the network cable or fiber optic cable and compare it with standard values to confirm if the cable is damaged.
10. Also, confirm if there are abnormal packets being sent on the port. Some devices from other vendors may shut down their ports if they receive abnormal packets, causing the port to link down.
11. Try looping the TX and RX of the optical module to see if the link can come up. If it still cannot link up, the optical

module is likely faulty.

12. Try replacing the optical module to check if it is a module fault.
13. Try replacing the expansion module to check if it is an expansion module fault.
14. Record all operations and information generated during the process for further analysis.

3.2.2 Optical Port Cannot Come Up

After inserting the SFP module and fiber optic cable, the indicator light does not turn on, and the interface cannot link up with the peer device.

Possible Causes:

1. The fiber optic cable is inserted in the wrong direction.
2. The wrong optical module model is used, with incorrect wavelength or rate, or a non-Ethernet optical module.
3. The interface photoelectric attribute configuration is incorrect.
4. Optical attenuation is too high.
5. Hardware fault.

3.2.3 Port Link Unstable

The signal quality of the link is poor. Perform steps 3-9 of the "Linkdown Status Abnormal" checks.

3.2.4 Port Link at Abnormal Rate/Duplex Mode

This may be caused by incorrect auto-negotiation configuration. For some electrical port products, if the signal quality of the line is poor, the rate may automatically degrade. Perform steps 3-9 of the "Linkdown Status Abnormal" checks.

3.2.5 Port Packet Loss/Error Frames, High Ping Latency, Slow Network

1. Confirm if there is an issue with the network topology and if the configuration is correct.
2. Confirm if the switch's MAC table and ARP table are correct. Check if there is constant refreshing of table entries. If so, there may be an abnormality in the network. Simplify the network topology to determine if it is a hardware issue.

- 3.** Confirm if the user's computer firewall is turned off.
- 4.** Use the Console to enter the main program interface and use the Show interface Fa 0/1 counters command (assuming Fa 0/1 is faulty) to confirm if there are CRC errors and whether they are on the sending or receiving end. Collect the information for further analysis.
- 5.** Try moving the network cable from the faulty port to another port that is not experiencing packet loss to see if the issue persists.
- 6.** Use testing equipment to test the attenuation of the network cable or fiber optic cable and compare it with standard values to confirm if the cable is damaged.
- 7.** Replace the network cable (if the network cable is not made to standard, it may cause packet loss) or fiber optic cable (or optical module, expansion module) to see if normal operation can be restored.
- 8.** Confirm if the issue is caused by the usage environment. Isolate the device from the network topology and set up a simple environment, such as PC---Switch---PC, to perform ping tests and check for abnormalities.
- 9.** If the issue persists in the simple test environment, confirm if it is caused by a MAC chip abnormality. If all ports are abnormal, the MAC chip is likely faulty.
- 10.** Use replacement methods to confirm if normal operation can be restored (e.g., network cable, module, fiber optic cable, expansion module).
- 11.** Record all operations and information generated during the process for further analysis.

Chapter 4 Log Collection

4.1 Basic Information Collection

- **show power** // Confirm if the device's power supply is sufficient.
- **show log** // Use **show log** to check for abnormal information, such as power supply issues that may prompt "The power not enough, current system is in danger."
- **show run**
- **show version**
- **show cpu**
- **show memory**
- **show arp**
- **show mac-address-table**
- **show spanning-tree**
- **show spanning-tree summary**
- **show int count rate**

4.2 Cannot Access WEB Issues

When the issue occurs, follow these steps for analysis and information collection:

- Check if there is a loop in the network causing a broadcast storm.
- Confirm if the management VLAN and the management PC are in the same VLAN.
- Confirm if the management PC's IP segment is in the same network as the device's management IP.
- If the issue occurred suddenly after previously being able to access, record the recent operations and collect the following information:
 - Version information: **show version**
 - Memory information: **show memory** (three times, with 2-second intervals)
 - CPU information: **show cpu**

- Configuration information: **show running-config**
- Network topology information

4.3 PC Cannot Access Network or Other Communication Issues

When communication issues occur, follow these steps for analysis and information collection:

1. Check if the switch has configured port security, ACL, or other access rules that may restrict the PC. If so, make corrections.
2. Check if the VLAN division is correct.
3. Check if the uplink port is functioning normally.
4. Check if there are any abnormal print messages on the serial port. If so, collect the abnormal print messages and the following information, then contact 4008111000:

- Version information: **show version**
- Configuration information: **show running-config**
- MAC address information: **show mac-address all**
- Network topology structure

4.4 Switch Crash Issues

When the device crashes, follow these methods for analysis and information collection:

1. Record the operations performed before the crash.
2. If there are abnormal print messages, including stack information, before the crash, save the print messages locally.
3. Try restarting the device and check the shell print messages. If the device cannot start normally, save the log print messages during the startup process.
4. If the device can start normally, export the configuration file.
5. Also, record the device's uptime before the crash, network information, and configuration information.
6. Try restarting the device and check the crash stack print messages using the command: **show crash-stack**.

4.5 General Issue Information Collection

When encountering uncommon issues, try to collect the following information:

1. Logs corresponding to the issue when it occurs.
2. Information about newly added devices and configurations in the environment when the issue occurs.
3. Device version information: **show version** (including boot version information).
4. Configuration information: **show running-config**.
5. Network topology (including information about upstream or downstream devices).
6. MAC address information: **show mac-address all**.
7. Memory information: **show memory** (three times, with 2-second intervals).
8. Click the "One-click Fault Collection" button on the WEB page to collect switch information, or enter the command **show taskSwitch** in the Console.