

# Measuring the Optical Level through IOS

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## Introduction

This document discusses the options for measuring the optical level of a signal for optical links between Cisco routers. It describes which command to use in order to measure signal level, and provides a reference for determining attenuation and power budget.

## Prerequisites

### Requirements

There are no specific requirements for this document.

### Components Used

This document is not restricted to specific software and hardware versions.

### Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

## Measure the Optical Level

Only Gigabit Switch Router (GSR) Engine 4 line cards 1xOC192 and 4xOC48 have built-in power monitoring capabilities. Issue the **show controllers optics** command in order to view the measured transmit and receive values.

This sample output was captured on the 4xOC48 line card for the GSR.

```
LC-Slot1#show controllers optics
Rx AC+DC optical power in mWs or dBms
  Port 0 =    0.000 mW
  Port 1 =    0.000 mW
  Port 2 =    0.000 mW
  Port 3 =    0.000 mW

Tx laser diode forward bias current I(F) in milliamps
  Port 0 =    0.000 mA
```

```
Port 1 = 0.000 mA
Port 2 = 0.000 mA
Port 3 = 0.000 mA
```

This sample output was captured on the 1xOC192 line card for the GSR.

```
LC-Slot4#show controllers optics
Rx AC+DC optical power in mWs or dBms
AC+DC = - 1.611 dBm

Rx AC optical power in mWs or DBMS
AC = 0.000 mW
Tx optical power in mWs or DBMS
power = - 8.239 dBm
TX laser diode forward bias current I(F) in milliamps
current = 105.830 mA
TX laser diode temperature in degrees centigrade
temperature = 61.889 C
```

In addition, the 1xOC-48c/STM-16 POS and 1xOC-48 channelized STS-12c/STM-4, STS-3c/STM-1 or DS3/E3 POS Internet Services Engine (ISE) line cards for the Cisco 12000 Series support power monitoring. Use the **show controllers <interface>** command in order to view the current levels.

```
12404#show diag sum
SLOT 1 (RP/LC 1 ): 1 Port ISE Packet Over SONET OC-48c/STM-16 Single
Mode/SR SC connector

12404#show controller pos 1/0
POS1/0
SECTION
  LOF = 0          LOS = 0          BIP(B1) = 0
LINE
  AIS = 0          RDI = 0          FEBE = 0          BIP(B2) = 0
PATH
  AIS = 0          RDI = 0          FEBE = 0          BIP(B3) = 0
  LOP = 0          NEWPTR = 0       PSE = 0          NSE = 0

Active Defects: None
Active Alarms: None
Alarm reporting enabled for: SF SLOS SLOF B1-TCA B2-TCA PLOP B3-TCA

Framing: SONET
APS

COAPS = 0          PSBF = 0
State: PSBF_state = False
ais_shut = FALSE
Rx(K1/K2): 00/00 S1S0 = 03, C2 = FF
Remote aps status (none); Reflected local aps status (none)
CLOCK RECOVERY
RDOOL = 0
State: RDOOL_state = False
PATH TRACE BUFFER : UNSTABLE
Remote hostname :
Remote interface:
Remote IP addr :
Remote Rx(K1/K2): / Tx(K1/K2): /

BER thresholds: SF = 10e-3 SD = 10e-6
TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6

Optical Power Monitoring
Laser Bias = 2.8 mA
```

**Receive Power = -32.04 dBm (+/- 2 dBm)**

The benefit of built-in power monitoring is that you can view the actual optical level seen by the card, rather than only the measured value before the fiber is attached to the line card. In rare circumstances, a dirty receive interface can lead to different values on the card than on the wire and in turn to high error rates.

For all other cards, ensure the receiver is clean. Ensure you use the same drop cable with the tester and the card.

**Note:** Over time, the power of the sender (or last repeater) and receiver sensitivity can fluctuate and fall out of range. In addition, frequently handling the connection can increase the chances of a degraded signal.

## Determine the Power Budget

These publications contain information on determining attenuation and Power Budget (PB).

- T1E1.2/92-020R2 ANSI, the Draft American National Standard for Telecommunications entitled Broadband ISDN Customer
- Installation Interfaces: Physical Layer Specification
- Power Margin Analysis, AT&T Technical Note, TN89-004LWP, May 1988

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## Related Information

- [Optical Product Support Pages](#)
- [Technical Support & Documentation – Cisco Systems](#)

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