



# T3 Maintenance Data Link Messages on the Cisco 7304 Router

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## Feature History

Release	Modification
12.1(13)EX	This feature was introduced on the Cisco 7304 router.
12.2(18)S	This feature was introduced on Cisco 7304 routers running Cisco IOS Release 12.2 S.

This document describes the T3 Maintenance Data Link Messages on the Cisco 7304 Router feature and includes information on the benefits of the new feature, supported platforms, configuration tasks and a command reference.

This document includes the following sections:

- Feature Overview, page 1
- Supported Platforms, page 2
- Supported Standards, MIBs, and RFCs, page 2
- Prerequisites, page 3
- Configuration Tasks, page 3
- Configuration Example, page 6
- Command Reference, page 7

## Feature Overview

This feature introduces the ability to send and receive MDL messages on Cisco 7304 T3 interfaces.

MDL messages are used to communicate identification information between local and remote ports. The type of information included in MDL messages includes the equipment identification code (EIC), location identification code (LIC), frame identification code (FIC), unit, Path Facility Identification (PFI), port number, and Generator Identification numbers. The values for each piece of MDL message identification can be defined only by a network administrator and are discussed in ANSI T1.107.

## Related Features and Technologies

Clear Channel 6-port T3 (DS3) line card

## Related Documents

- Clear Channel 6-Port T3 (DS3) Line Card Installation and Configuration document for the Cisco 7304 router
- “Configuring Serial Interfaces” chapter of *Cisco IOS Interface Configuration Guide*, Release 12.1
- *Cisco IOS Interface Command Reference*, Release 12.1

## Supported Platforms

Although implementation of MDL on the Cisco 7304 router is similar across most Cisco platforms, this documentation only covers MDL on the Cisco 7304 router.

### Determining Platform Support Through Cisco Feature Navigator

Cisco IOS software is packaged in feature sets that support specific platforms. To get updated information regarding platform support for this feature, access Cisco Feature Navigator. Cisco Feature Navigator dynamically updates the list of supported platforms as new platform support is added for the feature.

Cisco Feature Navigator is a web-based tool that enables you to quickly determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or release. Under the release section, you can compare releases side by side to display both the features unique to each software release and the features in common.

To access Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to [cco-locksmith@cisco.com](mailto:cco-locksmith@cisco.com). An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions at <http://www.cisco.com/register>.

Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

<http://www.cisco.com/go/fn>

## Supported Standards, MIBs, and RFCs

### Standards

MDL messaging is defined in ANSI T1.107.

### MIBs

No new or modified MIBs are supported by this feature.

**RFCs**

No new or modified RFCs are supported by this feature.

## Prerequisites

C-bit framing has to be enabled in order to transport MDL messages between source and destination T3 ports.

This specific feature only works on Cisco 7304 interfaces using a T3 line card. For information on MDL messaging on another platform, check the IOS and line card documentation for that platform.

## Configuration Tasks

See the following sections for configuration tasks for the MDL Messages on the Cisco 7304 feature:

- Enabling and Configuring MDL Messaging, page 4
- Verifying Local and Remote MDL Message Information, page 5

## Enabling and Configuring MDL Messaging

All information that is transmitted using MDL messages is user-configurable. The same command used to configure the information in MDL messages is also used to enable MDL messaging.

To enable MDL messaging or to configure the information contained in the MDL messages, enter the following commands:

Command	Purpose
<b>Step 1</b> Router(config)# <b>interface</b> <i>interface-type</i> <i>slot/interface-number</i>	Selects the DS3 interface that is enabling or configuring MDL messaging.
<b>Step 2</b> Router(config-if)# <b>mdl</b> { <b>transmit</b> { <b>path</b>   <b>idle-signal</b>   <b>test-signal</b> }   <b>string</b> { <b>eic</b> <i>string</i>   <b>lic</b> <i>string</i>   <b>fic</b> <i>string</i>   <b>unit</b> <i>string</i>   <b>pfi</b> <i>string</i>   <b>port</b> <i>string</i>   <b>generator</b> <i>string</i> }	Enables MDL messaging and configures the values provided using MDL messages. <ul style="list-style-type: none"> <li>• <b>transmit path</b>—Enables transmission of the MDL path message. An MDL path message, as defined by ANSI T1.107, is distinguished from idle and test signal messages in that it contains a facility identification code as its final data element.</li> <li>• <b>transmit idle-signal</b>—Enables transmission of the MDL idle signal message. An MDL idle signal message, as defined by ANSI T1.107, is distinguished from path and test signal messages in that it contains a port number as its final data element.</li> <li>• <b>transmit test-signal</b>—Enables transmission of the MDL test signal message. An MDL test signal message, as defined by ANSI T1.107, is distinguished from path and idle signal messages in that it contains a generator number as its final data element.</li> <li>• <b>string</b>—Required keyword that specifies an MDL element will be configured.</li> <li>• <b>eic string</b>—Equipment identification code (up to 10 characters), which is a value used to describe a specific piece of equipment according to ANSI T1.107-1995.</li> <li>• <b>lic string</b>—Location identification code (up to 11 characters), which is a value used to describe a specific location according to ANSI T1.107-1995.</li> <li>• <b>fic string</b>—Frame identification code (up to 10 characters), which is a value used to identify where the equipment is located within a building at a given location according to ANSI T1.107-1995.</li> <li>• <b>unit string</b>—Unit identification code (up to 6 characters), which is a value that identifies the equipment location within a bay according to ANSI T1.107-1995.</li> <li>• <b>pfi string</b>—Facility identification code to send in the MDL path message (up to 38 characters), which is a value that identifies a specific DS3 path according to ANSI T1.107-1995.</li> <li>• <b>port string</b>—Equipment port, which initiates the idle signal, to send in the MDL idle signal message (up to 38 characters) as defined in ANSI T1.107-1995.</li> <li>• <b>generator string</b>—Generator number to send in the MDL test signal message (up to 38 characters), which is the number of the signal generator according to ANSI T1.107-1995.</li> </ul> Use the <b>no</b> form of this command to remove MDL messages. The default is that no MDL message is configured.

## Verifying Local and Remote MDL Message Information

The following command can be used to verify MDL information on the local router and to view incoming MDL information from devices transmitting to the local router:

Command	Purpose
Router# <b>show controllers serial</b> <i>slot/interface-number</i>	Shows the status of the controller, including local and remote MDL information.

## Configuration Example

This section provides the following configuration examples:

- Enabling and Configuring MDL Messaging Example
- Verifying Local and Remote MDL Information Example

### Enabling and Configuring MDL Messaging Example

In the following example, the local MDL information for idle signal and test signal MDL messages is configured and MDL messaging is enabled.

```
interface Serial4/2
 ip address 60.0.0.1 255.0.0.0
 no keepalive
 clock source internal
 mdl string eic EIC_4_2
 mdl string lic LIC_4_2
 mdl string fic FIC_4_2
 mdl string unit U_4_20
 mdl string pfi PFI_4_2
 mdl string port PORT_4_2
 mdl string generator GEN_4_2
 mdl transmit path
 mdl transmit idle-signal
 mdl transmit test-signal
```

## Verifying Local and Remote MDL Information Example

In the following example, the local and remote MDL information is gathered using the **show controllers** command. In this particular example, the MDL information includes information related to path signals, idle signals, and test signals.

```
Router# show controllers serial 4/2
Interface Serial4/2 (DS3 port 2)
Line state is up
  rxLOS inactive, rxLOF inactive, rxAIS inactive
  txAIS inactive, rxRAI inactive, txRAI inactive
Current configurable parameter settings:
  Loopback is none, Framing is c-bit
  Clock source is internal, Cable length is 50
  DSU mode is cisco, DSU bandwidth limit is 44210
  Payload scrambling is disabled, CRC is 16
  Bert pattern is disabled, Bert interval is 0 minutes
  Transmitter delay is 0, Encapsulation is HDLC
  Idle character is flags, Invert data is disabled
  Remote fullrate has no request outstanding
  Remote accept is enabled, MTU is 4470
MIB information:
  Data in current interval (86 seconds elapsed):
    0 Line Code Violations, 0 P-bit Coding Violations
    0 C-bit Coding Violations
    0 P-bit Err Secs, 0 P-bit Sev Err Secs
    0 Sev Err Framing Secs, 0 Unavailable Secs
    0 Line Errored Secs, 0 C-bit Errored Secs, 0 C-bit Sev Err Secs
  No alarms detected.
    0 Sev Err Line Secs, 0 Far-End Err Secs, 0 Far-End Sev Err Secs
    0 P-bit Unavailable Secs, 0 CP-bit Unavailable Secs
    0 CP-bit Far-end Unavailable Secs
    0 Near-end path failures, 0 Far-end path failures
    0 Far-end code violations
MDL transmission is enabled
Local MDL Information:
  EIC:EIC_4_2, LIC:LIC_4_2, FIC:FIC_4_2, UNIT:U_4_20
  Path FI:PFI_4_2
  Idle Signal PORT_NO:PORT_4_2
  Test Signal GEN_NO:GEN_4_2
Far-End MDL Information:
  EIC:EIC_4_3, LIC:LIC_4_3, FIC:FIC_4_3, UNIT:U_4_3
  Path FI:PFI_4_3
  Idle Signal PORT_NO:PORT_4_3
  Test Signal GEN_NO:GEN_4_3
  ...
```

## Command Reference

This section documents the modified commands in this feature. All other commands used with this feature are documented in the Cisco IOS Release 12.1 configuration guide and command reference publications.

- **mdl**

# mdl

To configure the Maintenance Data Link (MDL) message defined in the ANSI T1.107a-1990 specification, use the **mdl** command in interface configuration mode. To remove the message, use the **no** form of this command.

```
mdl { transmit { path | idle-signal | test-signal } | string { eic | lic | fic | unit | pfi | port | generator }
      string }
```

```
no mdl { transmit { path | idle-signal | test-signal } | string { eic | lic | fic | unit | pfi | port
      | generator } string }
```

## Syntax Description

<b>transmit path</b>	Enables transmission of the MDL Path message.
<b>transmit idle-signal</b>	Enables transmission of the MDL Idle Signal message.
<b>transmit test-signal</b>	Enables transmission of the MDL Test Signal message.
<b>string eic</b> <i>string</i>	Specifies the Equipment Identification Code; can be up to 10 characters.
<b>string lic</b> <i>string</i>	Specifies the Location Identification Code; can be up to 11 characters.
<b>string fic</b> <i>string</i>	Specifies the Frame Identification Code; can be up to 10 characters.
<b>string unit</b> <i>string</i>	Specifies the Unit Identification Code; can be up to 6 characters.
<b>string pfi</b> <i>string</i>	Specifies the Facility Identification Code sent in the MDL Path message; can be up to 38 characters.
<b>string port</b> <i>string</i>	Specifies the Port number string sent in the MDL Idle Signal message; can be up to 38 characters.
<b>string generator</b> <i>string</i>	Specifies the Generator number string sent in the MDL Test Signal message; can be up to 38 characters.

## Defaults

No MDL message is configured unless the **mdl** command is entered.

## Command Modes

Interface configuration

## Command History

Release	Modification
11.3	This command was introduced.
12.1(13)EX	This command was introduced on the Cisco 7304 router.
12.2(18)S	This command was introduced on Cisco 7304 routers running Cisco IOS Release 12.2 S.

**Examples**

In the following example, the local MDL information for idle signal and test signal MDL messages is configured and MDL messaging is enabled.

```
interface Serial4/2
ip address 60.0.0.1 255.0.0.0
no keepalive
clock source internal
mdl string eic EIC_4_2
mdl string lic LIC_4_2
mdl string fic FIC_4_2
mdl string unit U_4_20
mdl string pfi PFI_4_2
mdl string port PORT_4_2
mdl string generator GEN_4_2
mdl transmit path
mdl transmit idle-signal
mdl transmit test-signal
```

In the following example, the local and remote MDL information is gathered using the **show controllers** command.

```
Router# show controllers serial 4/2
Interface Serial4/2 (DS3 port 2)
Line state is up
  rxLOS inactive, rxLOF inactive, rxAIS inactive
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Current configurable parameter settings:
  Loopback is none, Framing is c-bit
  Clock source is internal, Cable length is 50
  DSU mode is cisco, DSU bandwidth limit is 44210
  Payload scrambling is disabled, CRC is 16
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  Idle character is flags, Invert data is disabled
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MIB information:
  Data in current interval (86 seconds elapsed):
    0 Line Code Violations, 0 P-bit Coding Violations
    0 C-bit Coding Violations
    0 P-bit Err Secs, 0 P-bit Sev Err Secs
    0 Sev Err Framing Secs, 0 Unavailable Secs
    0 Line Errorred Secs, 0 C-bit Errorred Secs, 0 C-bit Sev Err Secs
  No alarms detected.
    0 Sev Err Line Secs, 0 Far-End Err Secs, 0 Far-End Sev Err Secs
    0 P-bit Unavailable Secs, 0 CP-bit Unavailable Secs
    0 CP-bit Far-end Unavailable Secs
    0 Near-end path failures, 0 Far-end path failures
    0 Far-end code violations
  MDL transmission is enabled
  Local MDL Information:
    EIC:EIC_4_2, LIC:LIC_4_2, FIC:FIC_4_2, UNIT:U_4_20
    Path FI:PFI_4_2
    Idle Signal PORT_NO:PORT_4_2
    Test Signal GEN_NO:GEN_4_2
  Far-End MDL Information:
    EIC:EIC_4_3, LIC:LIC_4_3, FIC:FIC_4_3, UNIT:U_4_3
    Path FI:PFI_4_3
    Idle Signal PORT_NO:PORT_4_3
    Test Signal GEN_NO:GEN_4_3
  ...
```