



Continuing Configuration Using the Command-Line Interface

The information in this chapter applies to the Cisco AS5350XM and Cisco AS5400XM universal gateways. This chapter continues where the “[Basic Configuration Using the Command-Line Interface](#)” chapter ends. After you have commissioned your Cisco AS5350XM or Cisco AS5400XM universal gateway, you might want to configure other features that include serial interface support, T1 channel groups, and signaling.

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Tip

If you are experienced using the Cisco IOS software, you might find the “[Where to Go Next](#)” section at the end of this chapter a useful reference for configuration.

Configuring Synchronous Serial Interfaces for WAN Support

Configure the synchronous serial interfaces on the motherboard to connect to a WAN through a CSU or DSU.

This section describes how to enable the serial interface, specify IP routing, and set up external clock timing on a DCE or DTE interface. To use a port as a DTE interface, you need only connect a DTE adapter cable to the port. When the system detects the DTE mode cable, it automatically uses the external timing signal. To use a port in DCE mode, you must connect a DCE interface cable and set the clock speed with the **clock rate** configuration command. You must also set the clock rate to perform a loopback test.



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Configure

	Command	Purpose
Step 1	AS5350> enable Password: <i>password</i> AS5350#	Enters enable mode (also called privileged EXEC mode) and enters the password. You are in enable mode when the prompt changes to AS5350# or AS5400#.
Step 2	AS5350# configure terminal Enter configuration commands, one per line. End with CNTL/Z. AS5350 (config)#	Enters global configuration mode. You are in global configuration mode when the prompt changes to AS5350 (config)# or AS5400 (config)#.
Step 3	AS5350 (config)# interface serial 0/0	Enters interface configuration mode and specifies the first interface to be configured.
Step 4	AS5350 (config-int)# ip address 172.22.4.67 255.255.255.0	If IP routing is enabled, assigns an IP address and subnet mask to the interface.
Step 5	AS5350 (config-int)# clock rate 2015232	Configures the external clock signal only if you are configuring a DCE interface. The available options include 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 56000, 64000, 128000, and 2015232.
Step 6	AS5350 (config-int)# no shutdown	Changes the shutdown state to up and enables the interface.
Step 7	AS5350 (config-controller)# Ctrl-Z AS5350#	Returns to enable mode.

Verify

To verify that you have configured the interfaces correctly, use these commands:

- Specify one of the new serial interfaces with the **show interfaces serial port** command and verify that the first line of the display specifies the interface with the correct slot number. Also verify that the interface and line protocol are in the correct state: up or down.

```
AS5350# show interfaces serial 0/0
Serial0/0 is up, line protocol is up
  Hardware is 4T
  Internet address is 172.0.0.1/8
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 16, loopback not set, keepalive set (10 sec)
  Last input 00:00:08, output 00:00:04, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    392 packets input, 33312 bytes, 0 no buffer
      Received 392 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    358 packets output, 25157 bytes, 0 underruns
    0 output errors, 0 collisions, 1 interface resets
    0 output buffer failures, 0 output buffers swapped out
```

```
0 carrier transitions DCD=up DSR=up DTR=up RTS=up CTS=up
```

- Display the entire system configuration file with the **show configuration** command. Verify that the configuration is accurate for the system and each interface.

**Tip**

If you are having trouble, make sure that the network interface is properly connected and terminated.

**Note**

If you have questions or need assistance, see the [“Obtaining Documentation”](#) section on page 21.

Configuring T1 Channel Groups

You can configure up to 24 channel groups for each T1 controller for backup links or serial backhaul connections.

First, you must define the time slots that belong with each channel group. Channel groups are numbered 0 to 23, and time slots are numbered 1 to 24. Defining a channel group creates a serial interface; defining multiple channel groups creates an equal number of serial interfaces that you can configure independently.

**Note**

The channel group numbers for each channelized T1 controller can be arbitrarily assigned.

Configure

To define the channel groups, time slots, and (if needed) circuit speed, enter the following command in controller configuration mode:

```
AS5350(config-controller)# channel-group number timeslots range [speed {48 | 56 | 64}]
```

In the United States, channel-group speeds can be either 56 or 64 kbps. If 64 kbps is used, we recommend that you use the ESF framing type and a linecode of B8ZS. Working with your local service provider, you can create channel groups with from 1 to 24 time slots. These time slots can be in any order, contiguous or noncontiguous.

After you define the T1 channel groups, you can configure each channel group as a serial interface (think of each channel group as a virtual serial interface). Subinterface configuration is also supported on the created serial interface.

To define the serial interface that corresponds to a T1 channel group, enter the following command in global configuration mode to enter interface configuration mode:

```
AS5350(config)# interface serial slot/port:channel-group
```

Verify

The following example shows a T1 controller configured for channel groups and an ISDN PRI group. The **pri-group** command and the **channel-group** command cannot have overlapping time slots; note the correct time slot configuration.

```

AS5350# show running-config

Building configuration...

Current configuration:
!
! Last configuration change at 15:49:30 UTC Mon Apr 3 2000 by admin
! NVRAM config last updated at 01:35:05 UTC Fri Mar 17 2000 by admin
!
version 12.0
service timestamps debug datetime msec localtime show-timezone
service timestamps log datetime msec localtime show-timezone
service password-encryption
!
---text omitted---
!

controller t1 1/0
channel-group 0 timeslot 1-6
channel-group 1 timeslot 7
channel-group 2 timeslot 8
channel-group 3 timeslot 9-11
pri-group timeslot 12-24

```

Configuring ISDN NFAS on Channelized T1 PRI Groups

ISDN Non-Facility Associated Signaling (NFAS) allows a single D channel to control multiple PRI interfaces. A backup D channel can also be configured for use when the primary NFAS D channel fails.

When configuring NFAS for T1 controllers configured for ISDN, you use an extended version of the ISDN **pri-group** command to specify the following:

- Range of PRI time slots to be under the control of the D channel (time slot 24)
- Function to be performed by time slot 24 (primary D channel, backup, or none); the last specifies its use as a B channel
- Group identifier number for the interface under control of this D channel



Note

Your Cisco AS5350XM or Cisco AS5400XM universal gateway must connect to a Primary-4ESS, Primary-DMS 100, or Primary-NI switch (see [Table 5 on page 15](#)) and must also have a channelized T1 controller and, as a result, be ISDN PRI capable.

Configure

To configure ISDN NFAS, complete the following tasks in controller configuration mode:

Command	Purpose
AS5350(config-controller)# pri-group timeslots 1-24 nfas_d primary nfas_interface number nfas_group number	On one channelized T1 controller, configures the NFAS primary D channel.
AS5350(config-controller)# pri-group timeslots 1-24 nfas_d backup nfas_interface number nfas_group number	On a different channelized T1 controller, configures the NFAS backup D channel to be used if the primary D channel fails.
AS5350(config-controller)# pri-group timeslots 1-24 nfas_d none nfas_interface number nfas_group number	(Optional) On other channelized T1 controllers, configures a 24 B channel interface, if desired.

Take a Channel or Interface Out of Service

You can take a specified channel or an entire PRI interface out of service or put it into one of the other states that is passed on to the switch.

To do so, complete one of the following tasks in interface configuration mode:

Command	Purpose
AS5350(config-controller)# isdn service dsl number b_channel number state state-value	Takes an individual B channel out of service or sets it to a different state.
AS5350(config-controller)# isdn service dsl number b_channel 0 state state-value	Sets the entire PRI interface to the specified state.

These are the supported state values:

- 0—In service
- 1—Maintenance
- 2—Out of service

Verify

Monitor NFAS groups by entering the **show isdn nfas group number** command:

```
AS5350# show isdn nfas group 0
ISDN NFAS GROUP 0x0 ENTRIES:
```

```
The primary D is Serial0:23.
The backup D is Serial1:23.
```

```
There are 2 total nfas members.
There are 24 total available B channels.
The primary D-channel is DSL 0 in state IN SERVICE.
The backup D-channel is DSL 1 in state STANDBY.
The current active layer 2 DSL is 0.
```

Configuring E1 R2 Signaling

R2 signaling is an international signaling standard that is common to channelized E1 networks. You can configure a channelized E1 interface to support different types of R2 signaling, used in older analog telephone networks.



Note

The Cisco implementation of R2 signaling has dialed number identification support (DNIS) turned on by default. If you enable the automatic number identification (ANI) option, the collection of DNIS information is still performed. Specifying the ANI option does not disable DNIS collection. DNIS is the number being called. ANI is the caller's number. For example, if you are configuring gateway A to call gateway B, then the DNIS number is assigned to gateway B, and the ANI number is assigned to gateway A. Also, note that ANI is similar to caller ID.

Configure

To configure E1 R2 signaling, use the following commands, beginning in global configuration mode:

	Command	Purpose
Step 1	AS5350> enable Password: <i>password</i> AS5350#	Enters enable mode (also called privileged EXEC mode) and enters the password. You are in enable mode when the prompt changes to AS5350# or AS5400#.
Step 2	AS5350# configure terminal Enter configuration commands, one per line. End with CNTL/Z. AS5350 (config)#	Enters global configuration mode. You are in global configuration mode when the prompt changes to AS5350 (config)# or AS5400 (config)#.
Step 3	AS5350 (config)# controller e1 0/0 AS5350 (config-controller)#	Enters controller configuration mode to configure your E1 controller port. Specifies E1 feature card slot, port number, and channel. On the E1 feature card, port number values range from 0 to 1.
Step 4	AS5350 (config-controller)# ds0-group 1 timeslots 1-30 type r2-analog r2-compelled ani	Configures the time slots that belong to each E1 circuit for R2 signaling. Sets R2 signaling to R2 ITU Q411, the tone signal to R2 compelled register signaling, and ANI to address information provisioned option. R2 line signaling options include r2-analog , r2-digital , and r2-pulse . Tone signaling options include dtmf (default), r2-compelled , r2-non-compelled , and r2-semi-compelled . You can also set ani (ANI address information provisioned) for any of the above options.
Step 5	AS5350 (config-controller-cas)# cas-custom 1	Enters the channel number to customize.

	Command	Purpose
Step 6	AS5350(config-ctrl-cas)# country <i>country</i> use-default	<p>Uses defaults for the specified country.</p> <p>Note To view the parameters for the country (if the country defaults are the same as ITU defaults), enter write term.</p> <p>The default setting for all countries is ITU.</p> <p>See the “Country Codes for R2 Signaling” section on page 8 for a list of supported countries.</p>
Step 7	<pre>AS5350(config-ctrl-cas)# answer-signal group-b 6 [or] AS5350(config-ctrl-cas)# default answer-signal group-b 6 [or] AS5350(config-ctrl-cas)# no answer-signal group-b 6 controller E1 0 clock source line primary ds0-group 0 timeslots 1-15,17-31 type r2-analog r2-compelled cas-custom 0 country singapore use-defaults category 2 <--- default category for singapore answer-signal group-b 6 <--- default bxfree for singapore AS5350(config-ctrl-cas)# exit AS5350(config)#</pre>	<p>Sets the cas custom command answer signal to group-b 6.</p> <p>CAS custom commands include caller-digits, category, country, unused-abcd, invert-abcd, metering, ka, kd, dnis-digits, answer-signal, and nc-congestion</p> <p>Sets answer-signal group-b to the default ITU value.</p> <p>Resets answer-signal group-b 6 to the default value.</p> <p>Note The parameters you do not set are automatically set to the ITU default by the gateway.</p> <p>After you configure a country with default settings, the gateway displays a write term, similar to the one displayed here.</p> <p>Exits CAS custom mode and returns to global configuration mode.</p>
Step 8	AS5350(config)# spe country { <i>country</i> e1-default }	<p>Sets the SPE country code or uses the E1 default (A-law).</p> <p>Note The gateway must be in idle state (no calls are active) to execute the SPE country command.</p> <p>Note On the Cisco AS5350XM and Cisco AS5400XM universal gateway, DS-0 companding law selection is configured for the entire system rather than on individual voice ports.</p>

	Command	Purpose
Step 9	AS5350 (config)# voice-port <i>slot/controller-number:DS0 group-number</i>	Enters voice port mode for the port you want to configure.
	AS5350 (config-voiceport)#	
Step 10	AS5350 (config-voiceport)# cptone <i>contry-code</i>	Enters the 2-digit country code to configure the regional ring tone.
Step 11	AS5350 (config-voiceport)# Ctrl-Z	Returns to enable mode.
	AS5350#	

Country Codes for R2 Signaling

Table 9 lists the country codes supported for R2 signaling.

Table 9 Country Codes for R2 Signaling

argentina	greece	paraguay
australia	guatemala	peru
bolivia	hongkong-china	philippines
brazil	india	saudi Arabia
bulgaria	indonesia	singapore
china	israel	southafrica-panafel
colombia	itu	telmex
costarica	korea	telnor
croatia	laos	thailand
easturope	malaysia	uruguay
equador-itu	malta	venezuela
ecuador-lme	newzealand	vietnam

Verify

To verify your R2 signaling configuration, enter the **show controller e1** command to view the status for all controllers, or enter the **show controller e1 #** command to view the status for a particular controller. Make sure the status indicates the controller is up (line 2 in the following example) and no alarms (line 4 in the following example) or errors (lines 9 and 10 in the following example) have been reported.

```
AS5350# show controller e1 0/0
E1 0/0 is up.
  Applique type is Channelized E1 - balanced
  No alarms detected.
  Version info of Slot 0: HW: 2, Firmware: 4, PLD Rev: 2

Manufacture Cookie is not programmed.

Framing is CRC4, Line Code is HDB3, Clock Source is Line Primary.
Data in current interval (785 seconds elapsed):
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
```

```
0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Secs
Total Data (last 13 15 minute intervals):
0 Line Code Violations, 0 Path Code Violations,
0 Slip Secs, 12 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins,
0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 12 Unavail Secs
```

If the connection does not come up, check for the following:

- Loose wires, splices, connectors, shorts, bridge taps, and grounds
- Backwards transmit and receive
- Mismatched framing types (for example, CRC-4 and no-CRC-4)
- Transmit and receive pair separation (crosstalk)
- Faulty line cards or repeaters
- Noisy lines (for example, power and crosstalk)

If you see errors on the line or the line is going up and down, check for the following:

- Mismatched line codes (HDB3 versus AMI)
- Receive level
- Frame slips because of poor clocking plan

When the E1 controller comes up, you see the following message:

```
%CONTROLLER-3-UPDOWN: Controller E1 0, changed state to up
```

Configuring Alarms

Facility alarms currently monitor the following failure events:

- Interface down
- T1, E1, or T3 controller down
- Modem board failure
- Redundant power supply (RPS) failure
- Thermal failure
- Fan failure

Cisco IOS software polls every second to detect the failure events that you have configured and turns on an alarm when any one of the failure events is detected. By default, the facility alarm is off. Users have to configure a facility alarm command to enable monitoring of the failure conditions.

Enter **no** before the full command to disable any of the alarm commands.

```
AS5350# no facility-alarm detect rps
```

Configure

	Command	Purpose
Step 1	AS5350> enable Password: <i>password</i> AS5350#	Enters enable mode and enters the password. You are in enable mode when the prompt changes to AS5350# or AS5400#.
Step 2	AS5350# configure terminal Enter configuration commands, one per line. End with CNTL/Z. AS5350(config)#	Enters global configuration mode. You are in global configuration mode when the prompt changes to AS5350(config)# or AS5400(config)#.
Step 3	AS5350(config)# facility-alarm detect interface [<i>interface type</i>] [<i>slot/port</i>]	Turns on the facility alarm when an interface goes down. Enters the interface type and slot/port designation.
Step 4	AS5350(config)# facility-alarm detect controller [<i>t1 e1 t3</i>] [<i>slot/port</i>]	Turns on an alarm when the controller goes down. The slot values range from 1 to 7. The port values range from 0 to 7 for T1 and E1. The port value is always 0 for T3.
Step 5	AS5350(config)# facility-alarm detect modem-board [<i>slot</i>]	Turns on an alarm when the modem board present in the specified slot fails.
Step 6	AS5350(config)# facility-alarm detect rps	Turns on alarm when RPS failure event is detected. Any of the following failures turns on the alarm: <ul style="list-style-type: none"> • Input power voltage failure • Output power voltage failure • Overvoltage condition • Multiple failures
Step 7	AS5350(config)# facility-alarm detect temperature	Turns on an alarm if a thermal failure event is detected.
Step 8	AS5350(config)# facility-alarm detect fan	Turns on an alarm if a fan failure event is detected.
Step 9	AS5350(config-if)# Ctrl-Z AS5350#	Returns to enable mode.

Verify

To see the status of the alarms, enter the **show facility-alarm** command:

```
AS5350# show facility-alarm

Device           State
-----
gigabitethernet 0/0 UP
Modem Card 4     UP

Facility Alarm is ON
```

If you are having trouble:

- Make sure the cable connections are not loose or disconnected.
- Make sure you are using number 12 or 14 AWG copper wires to connect to the alarm port terminal blocks.
- Make sure your alarm is operational.

Saving Configuration Changes

To prevent the loss of the gateway configuration, save it to NVRAM.

Configure

	Command	Purpose
Step 1	AS5350> enable Password: <i>password</i> AS5350#	Enters enable mode (also called privileged EXEC mode) and enters the password. You are in enable mode when the prompt changes to AS5350# or AS5400#.
Step 2	AS5350# copy running-config startup-config	Saves the configuration changes to NVRAM so that they are not lost during resets, power cycles, or power outages.
Step 3	AS5350 (config-if)# Ctrl-Z AS5350#	Returns to enable mode.

Where to Go Next

At this point you can go to these references:

- [Chapter 5, “Managing and Troubleshooting the Universal Port and Dial-Only Feature Cards,”](#) to configure, manage, and troubleshoot universal port and dial-only feature card connections on your gateway.
- [Chapter 6, “Managing and Troubleshooting the Voice Feature Card,”](#) to configure, manage, and troubleshoot voice feature card connections on your gateway.
- [Appendix C, “Comprehensive Configuration Examples.”](#)



Tip

The following publications are available on the Documentation DVD, on the World Wide Web from the Cisco home page, or you can order printed copies.

- For additional basic configuration information, see the *Cisco IOS Dial Technologies Configuration Guide* and *Cisco IOS Dial Technologies Command Reference* publications for your software release. For more advanced configuration topics, see the Cisco IOS software configuration guide, feature modules, and command reference publications that pertain to your Cisco IOS software release.
- For troubleshooting information, see the *System Error Messages* and *Debug Command Reference* publications.

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