Continuing Configuration Using the Command-Line Interface

Note The information herein applies to the Cisco AS5350, Cisco AS5400, and Cisco AS5400HPX universal gateways. Note that the latter requires use of Cisco IOS release 12.2(2)XB or later.

This chapter continues where "Basic Configuration Using the Command-Line Interface" ends. After you have commissioned your Cisco AS5350 or Cisco AS5400 universal gateway, you might want to configure other features that include serial interface support, CT1 channel groups, and signaling.

Proceed to the following sections:

For advanced configuration topics and procedures, go to *Configuring Selected 12.1 Cisco IOS Software Features*, available online at http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/as5400/index.htm

You can also view these publications on the Documentation CD-ROM that arrived with your gateway.

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/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.

Configure

	Command	Purpose
Step 1	AS5350> **enable** Password: *password* AS5350#	Enters enable mode (also called privileged EXEC mode) and enter 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**	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 you have configured the interfaces correctly:

- 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,
     reliablility 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 the network interface is properly connected and terminated.

Note If you have questions or need assistance, see the “Obtaining Documentation” on page xvi.

Configuring CT1 Channel Groups

You can configure up to 24 channel groups for each CT1 for backup links or serial backhaul connections.

First, you must define the timeslots that belong with each channel group. Channel groups are numbered 0 to 23, and timeslots 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 CT1 controller can be arbitrarily assigned.

Configure

Perform the following task in controller configuration mode to define the channel groups and timeslots:

Command	Purpose
AS5350(config-controller)# **channel-group** *number* **timeslots** *range* [**speed** {**48** | **56** | **64**}]	Defines the channel group number and, if needed, circuit speed.[1] **Note** Working with your local service provider, you can create channel-groups with from 1 to 24 timeslots. These timeslots can be in any order, contiguous or noncontiguous.

1. In the United States, channel-group speeds can be either 56 or 64 kbps; the default is 56 kbps. If 64 kbps is used, it is recommended to be used with framing type of ESF and a linecode of B8ZS. The speed you select must match the speed provided by the telephone company.

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

Perform the following task in global configuration mode to enter interface configuration mode and configure the serial interface that corresponds to a channel group:

Command	Purpose
AS5350(config)# **interface serial** *slot/port*:*channel-group*	Defines the serial interface for a CT1 channel group.

Verify

The following example shows a channelized T1 controller configured for channel groups and an ISDN PRI group. The **pri-group** command and the **channel-group** command cannot have overlapping timeslots; note the correct timeslot 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 CT1 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 channelized T1 controllers configured for ISDN, you use an extended version of the ISDN **pri-group** command to specify the following:

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

Note Your Cisco AS5350 or Cisco AS5400 must connect to a Primary-4ess, Primary-DMS 100, or Primary-NI switch (see Table 3-3 on page 3-16) 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 in 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 set 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 DNIS support turned on by default. If you enable the 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, the ANI number is assigned to gateway A. Also, note that ANI is similar to caller ID.

Configure

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

	Command	Purpose

Step 1	`AS5350> enable`
	`Password: password`
	`AS5350#`
		Enters enable mode (also called privileged EXEC mode) and enter 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 controller dfc-slot, port number, and channel. On the CE1 trunk 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 timeslots 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 the ANI addr info 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.
Step 6	`AS5350(config-ctrl-cas)# country country use-default`	Uses defaults for the specified country. **Note** To view the parameters for the country (if the country defaults are the same as ITU defaults), enter **write term**. The default setting for all countries is **ITU**. See "Country Codes for R2 Signaling" section on page 4-9 for a list of supported countries.

	Command	Purpose
Step 7	`AS5350(config-ctrl-cas)# answer-signal group-b 6`	Sets the **cas custom** command answer-signal to group-b to 6. Cas custom commands include **caller-digits**, **category**, **country**, **unused-abcd**, **invert-abcd**, **metering**, **ka**, **kd**, **dnis-digits**, **answer-signal**, and **nc-congestion**
	`[or]` `AS5350(config-ctrl-cas)# default answer-signal group-b 6`	Sets answer-signal group-b to the default ITU value.
	`[or]` `AS5350(config-ctrl-cas)# no answer-signal group-b 6`	Resets answer-signal group-b 6 to the default value. **Note** The parameters you do not set are automatically set to the ITU default by the gateway.

	`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`
		After you configure a country with default settings, the gateway displays a write term, similar to the one displayed here.

	`AS5350(config-ctrl-cas)# exit` `AS5350(config)#`	Exits cas-custom mode and returns to global configuration mode.
Step 8	`AS5350(config)# spe country` {*country* | **e1-default**}	Set the SPE country code or use the E1 default (A-Law). **Note** The gateway must be in idle state (no calls are active) to execute the SPE country command **Note** On the Cisco AS5350 and Cisco AS5400, DS-0 companding law selection is configured for the entire system rather than on individual voice ports.
Step 9	`AS5350(config)# voice-port` *slot/controller-number:DS0 group-number* `AS5350(config-voiceport)#`	Enter voice port mode for the port you want to configure.
Step 10	`AS5350(config-voiceport)# cptone` *contry-code*	Enter the two-digit country code to configure the regional ring tone.

Step 11	`AS5350(config-voiceport)# Ctrl-Z`
	
	`AS5350#`
		Return to enable mode.

Country Codes for R2 Signaling

Table 4-1 lists the country codes supported for R2 signaling.

Table 4-1 Country Codes for R2 Signaling

argentina	greece	paraguay
australia	guatamala	peru
bolivia	hongkong-china	philippines
brazil	india	saudiarabia
bulgaria	indonesia	singapore
china	israel	southafrica-panaftel
colombia	itu	telmex
costarica	korea	telnor
croatia	laos	thailand
easteurope	malaysia	uraguay
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** *#* 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
```

Tip If the connection does not go 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
- CT1/CE1/CT3 controller down
- Trunk card failure
- Redundant power supply (RPS) failure

Cisco IOS software polls every second to detect the failure events that you have configured and turns on the 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: password`
	`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)#`.

	Command	Purpose
Step 3	`AS5350(config)# facility-alarm detect interface` [*interface type*] [*slot/port*]	Turns on the facility alarm when an interface goes down. Enter interface type and slot/port designation.
Step 4	`AS5350(config)# facility-alarm detect controller` [**t1** | **e1** | **t3**] [*slot/port*]	Turns on alarm when controller goes down. The slot values range from **1** to **7**. The port values range from **0** to **7** for T1 and E1. For T3, the port value is always **0**.
Step 5	`AS5350(config)# facility-alarm detect modem-board` [*slot*]	Turns on alarm when modem board present in 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: • I/P voltage failure • O/P voltage failure • Overvoltage condition • Multiple failures
Step 7	`AS5350(config)# facility-alarm detect temperature`	Turns on alarm if thermal failure event is detected.
Step 8	`AS5350(config)# facility-alarm detect fan`	Turns on alarm if 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
    ------            -----

  FastEthernet0/0      UP
  Modem Card 4         UP

 Facility Alarm is ON
```

Tip 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: password`
	`AS5350#`
		Enters enable mode (also called privileged EXEC mode) and enter 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:

- Chapter 5, "Managing and Troubleshooting the Universal Port Card" to configure, manage, and troubleshoot universal-port-card connections on your gateway.
- Appendix C, "Comprehensive Configuration Examples."
- *Monitoring Voice and Fax Services on the Cisco AS5400 Universal Gateway,* available online at http://www.cisco.com/univercd/cc/td/doc/product/software/. Select your Cisco IOS release and search for this title.

Tip The following publications are available on the Documentation CD-ROM that came with your gateway, on the World Wide Web from the Cisco home page, or you can order printed copies.

- For additional basic configuration information, refer to *Cisco IOS Dial Technologies Configuration Guide* and *Cisco IOS Dial Technologies Command Reference*, available online at http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122cgcr/index.htm. For more advanced configuration topics, refer to the Cisco IOS software configuration guide, feature modules, and command reference publications that pertain to your Cisco IOS software release.
- For troubleshooting information, refer to the *System Error Messages* and *Debug Command Reference* publications.