CHAPTER 29

Connecting Alarm Interface Controller Network Modules

This chapter describes how to install the alarm interface controller (AIC) network module and contains the following sections:

- Alarm Interface Controller Network Module, page 29-1
- Connecting the AIC Network Module to the Network, page 29-2
- AIC Network Module LEDs, page 29-8

Tip To determine whether your router supports a specific network module, see Table 1-6 on page 1-16.

Alarm Interface Controller Network Module

The AIC network module, shown in Figure 29-1, supports 64 alarm inputs. Fifty-six alarm inputs are discrete and can operate on dry contact closure when a patch panel is used. The last eight alarm inputs can be provisioned to accept analog inputs. The AIC network module has 16 control relay outputs.

The AIC network module can be connected to a patch panel. The patch panel provides the bias to the circuit.

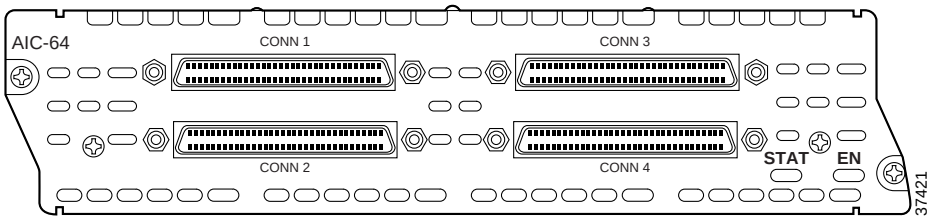
The analog alarm inputs can be configured to monitor either DC voltage or current. The AIC can measure voltage from –60 to 60 V or current from 0 to 20 mA. The control relay can be operated to turn an external device on or off. When an event is detected, notification messages are sent to the Operations Support System (OSS) in the network operation center (NOC). These alarm inputs are configured in Cisco IOS software. Some reportable events include:

- Equipment alarm
- Building intrusion (door/window)
- Temperature threshold violation
- Voltage fluctuation

The AIC network module converts relay contact alarm signals to TL1 and SNMP message formats, providing TL1 over TCP/IP and SNMP protocols. All the contact closure-related alarms are routed and reported through the existing OSS and the associated OSS networks. With this network module, the Cisco router sends the TL1 or SNMP messages to the OSS autonomously or in response to TL1 or SNMP commands from the OSS.

The AIC network module is connected to the network using four high-density SCSI-type connectors on the front panel.

Figure 29-1 Alarm Interface Controller Network Module



Connecting the AIC Network Module to the Network

An AIC network module provides four 50-pin receptacles. Use cables that have male Micro DB-50 connectors at both ends with all conductors straight-wired. Central office equipment is cabled to the patch panel, and then cross-connected to the AIC cable.

Two different patch panels can be used. The AIC-1 patch panel terminates one AIC and has voltage terminations with lugs and fuses for voltage monitoring. The AIC-2 patch panel terminates up to two AICs or 128 contact closure points

See Figure 29-2 through Figure 29-6 for examples of the AIC connections to the patch panels.

See the AIC data sheet on www.cisco.com for recommended patch panel and cable vendors.

Caution Damage to the AIC network module can occur if an alarm set for monitoring current is connected to a sensor for monitoring voltage. Make sure that your alarms are connected to the proper sensors.

Caution Connect the cable to the AIC before connecting it to the patch panel or other connection. Otherwise, voltage could be present on the male pins that connect to the AIC.

Caution The signal I/O connections on this unit are intended only for connection to NEC/CEC Class 2 or equivalent circuit. This means that the voltages applied to I/O connections should not exceed 42.4 Vpk or 60 Vdc and it should be a limited/fused power source. For more details on Class 2 circuits, refer to the National Electrical Code/Canadian Electrical Code. This does not apply to the analog input/output terminal strip numbers 1–8 on the AIC-1 patch panel.

Caution This unit is not intended for connection to exposed plant leads. Therefore, it should not be connected to circuit conductors that extend beyond one building and are run so as to be subject to accidental contact with AC main conductors, or are exposed to lightning on interbuilding circuits on the same premises.

Ports are numbered from right to left and from bottom to top, as labeled on the module rear panel. Pinouts for the AIC-1 patch panel are shown in Table 29-1. The connector 3 voltage monitor pinouts for AIC-1 are shown in Table 29-2. Pinouts for the AIC-2 patch panel are shown in Table 29-3.

Cables are not provided with the network module. For ordering information, see the "Obtaining Technical Assistance" section on page xi.

Figure 29-2 AIC Network Module Connection Diagram

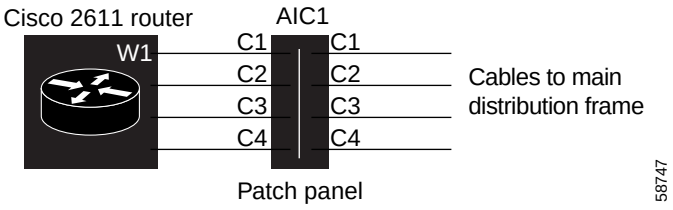


Figure 29-3 AIC Network Module Faceplate Connections

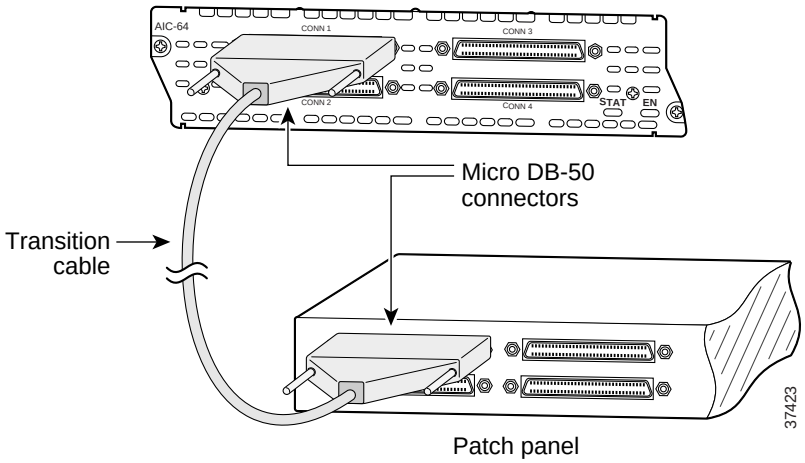


Figure 29-4 AIC Network Module Connected to AIC-1 Patch Panel

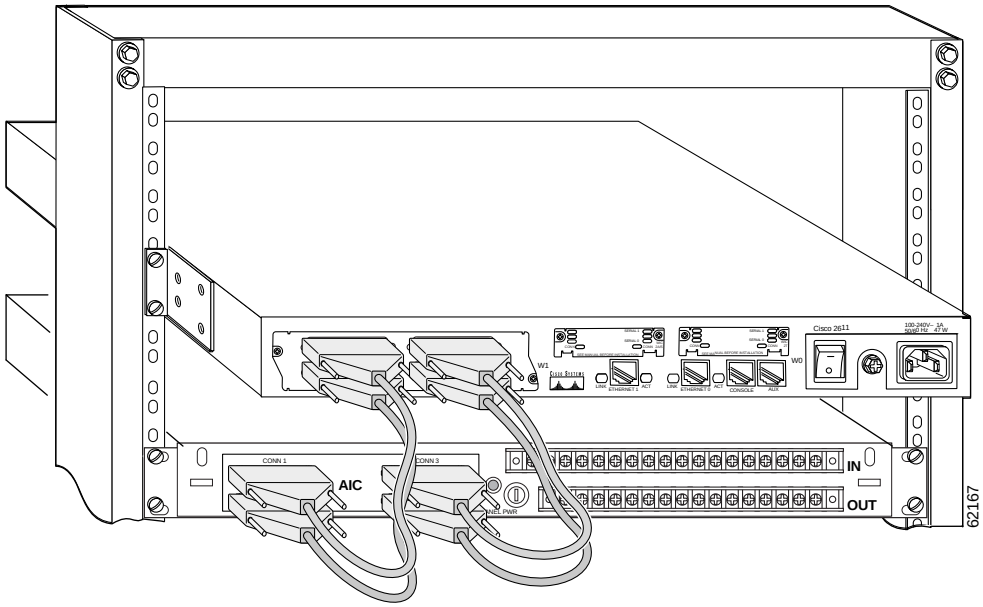


Figure 29-5 AIC Network Module Connected to AIC-2 Patch Panel

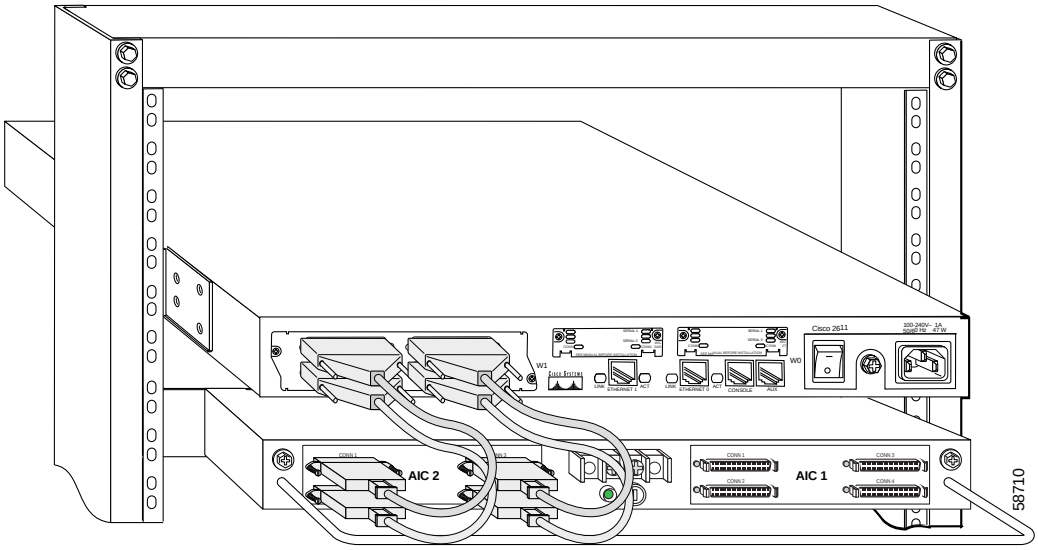


Figure 29-6 AIC-2 Patch Panel Connected to MDF

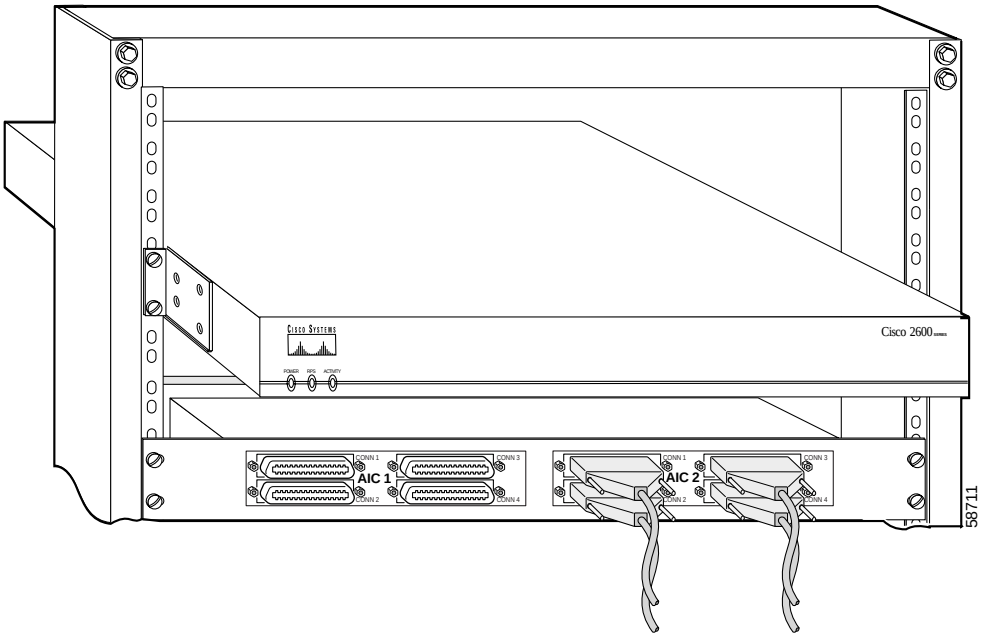


Table 29-1 AIC-1 Connector Pinouts

Telco Connector	Connector 1	Connector 2	Connector 3	Connector 4
1	Alarm Neg1	Alarm Neg 26	Alarm Neg 51	Control Common 1
26	Alarm Pos 1	Alarm Pos 26	Alarm Pos 51	Control N.O. 1
2	Alarm Neg 2	Alarm Neg 27	Alarm Neg 52	Control Common 2
27	Alarm Pos 2	Alarm Pos 27	Alarm Pos 52	Control N.O. 2
3	Alarm Neg 3	Alarm Neg 28	Alarm Neg 53	Control Common 3
28	Alarm Pos 3	Alarm Pos 28	Alarm Pos 53	Control N.O. 3
4	Alarm Neg 4	Alarm Neg 29	Alarm Neg 54	Control Common 4
29	Alarm Pos 4	Alarm Pos 29	Alarm Pos 54	Control N.O. 4
5	Alarm Neg 5	Alarm Neg 30	Alarm Neg 55	Control Common 5
30	Alarm Pos 5	Alarm Pos 30	Alarm Pos 55	Control N.O. 5
6	Alarm Neg 6	Alarm Neg 31	Alarm Neg 56	Control Common 6
31	Alarm Pos 6	Alarm Pos 31	Alarm Pos 56	Control N.O. 6
7	Alarm Neg 7	Alarm Neg 32	See Table 29-2	Control Common 7
32	Alarm Pos 7	Alarm Pos 32	See Table 29-2	Control N.O. 7
8	Alarm Neg 8	Alarm Neg 33	See Table 29-2	Control Common 8
33	Alarm Pos 8	Alarm Pos 33	See Table 29-2	Control N.O. 8
9	Alarm Neg 9	Alarm Neg 34	See Table 29-2	Control Common 9
34	Alarm Pos 9	Alarm Pos 34	See Table 29-2	Control N.O. 9
10	Alarm Neg 10	Alarm Neg 35	See Table 29-2	Control Common 10
35	Alarm Pos 10	Alarm Pos 35	See Table 29-2	Control N.O. 10
11	Alarm Neg 11	Alarm Neg 36	See Table 29-2	Control Common 11
36	Alarm Pos 11	Alarm Pos 36	See Table 29-2	Control N.O. 11
12	Alarm Neg 12	Alarm Neg 37	See Table 29-2	Control Common 12
37	Alarm Pos 12	Alarm Pos 37	See Table 29-2	Control N.O. 12
13	Alarm Neg 13	Alarm Neg 38	See Table 29-2	Control Common 13
38	Alarm Pos 13	Alarm Pos 38	See Table 29-2	Control N.O. 13
14	Alarm Neg 14	Alarm Neg 39	See Table 29-2	Control Common 14
39	Alarm Pos 14	Alarm Pos 39	See Table 29-2	Control N.O. 14
15	Alarm Neg 15	Alarm Neg 40	Not used	Control Common 15
40	Alarm Pos 15	Alarm Pos 40	Not used	Control N.O. 15
16	Alarm Neg 16	Alarm Neg 41	Not used	Control Common 16
41	Alarm Pos 16	Alarm Pos 41	Not used	Control N.O. 16
17	Alarm Neg 17	Alarm Neg 42	Not used	Not used
42	Alarm Pos 17	Alarm Pos 42	Not used	Not used
18	Alarm Neg 18	Alarm Neg 43	Not used	Not used
43	Alarm Pos 18	Alarm Pos 43	Not used	Not used

Table 29-1 AIC-1 Connector Pinouts (continued)

Telco Connector	Connector 1	Connector 2	Connector 3	Connector 4
19	Alarm Neg 19	Alarm Neg 44	Not used	Not used
44	Alarm Pos 19	Alarm Pos 44	Not used	Not used
20	Alarm Neg 20	Alarm Neg 45	Not used	Not used
45	Alarm Pos 20	Alarm Pos 45	Not used	Not used
21	Alarm Neg 21	Alarm Neg 46	Not used	Not used
46	Alarm Pos 21	Alarm Pos 46	Not used	Not used
22	Alarm Neg 22	Alarm Neg 47	Not used	Not used
47	Alarm Pos 22	Alarm Pos 47	Not used	Not used
23	Alarm Neg 23	Alarm Neg 48	Not used	Not used
48	Alarm Pos 23	Alarm Pos 48	Not used	Not used
24	Alarm Neg 24	Alarm Neg 49	Not used	Not used
49	Alarm Pos 24	Alarm Pos 49	Not used	Not used
25	Alarm Neg 25	Alarm Neg 50	Not used	Not used
50	Alarm Pos 25	Alarm Pos 50	Not used	Not used

Table 29-2 Voltage Monitor Connections on Connector 3 for the AIC-1 Patch Panel

Terminal Strip		Signal
1	RET	Alarm Pos 57
	BAT	Alarm Neg 57
2	RET	Alarm Pos 58
	BAT	Alarm Neg 58
3	RET	Alarm Pos 59
	BAT	Alarm Neg 59
4	RET	Alarm Pos 60
	BAT	Alarm Neg 60
5	RET	Alarm Pos 61
	BAT	Alarm Neg 61
6	RET	Alarm Pos 62
	BAT	Alarm Neg 62
7	RET	Alarm Pos 63
	BAT	Alarm Neg 63
8	RET	Alarm Pos 64
	BAT	Alarm Neg 64

Table 29-3 AIC-2 Connector Pinouts

Telco Connector	Connector 1	Connector 2	Connector 3	Connector 4
1	Alarm Neg1	Alarm Neg 26	Alarm Neg 51	Control Common 1
26	Alarm Pos 1	Alarm Pos 26	Alarm Pos 51	Control N.O. 1
2	Alarm Neg 2	Alarm Neg 27	Alarm Neg 52	Control Common 2
27	Alarm Pos 2	Alarm Pos 27	Alarm Pos 52	Control N.O. 2
3	Alarm Neg 3	Alarm Neg 28	Alarm Neg 53	Control Common 3
28	Alarm Pos 3	Alarm Pos 28	Alarm Pos 53	Control N.O. 3
4	Alarm Neg 4	Alarm Neg 29	Alarm Neg 54	Control Common 4
29	Alarm Pos 4	Alarm Pos 29	Alarm Pos 54	Control N.O. 4
5	Alarm Neg 5	Alarm Neg 30	Alarm Neg 55	Control Common 5
30	Alarm Pos 5	Alarm Pos 30	Alarm Pos 55	Control N.O. 5
6	Alarm Neg 6	Alarm Neg 31	Alarm Neg 56	Control Common 6
31	Alarm Pos 6	Alarm Pos 31	Alarm Pos 56	Control N.O. 6
7	Alarm Neg 7	Alarm Neg 32	Alarm Neg 57	Control Common 7
32	Alarm Pos 7	Alarm Pos 32	Alarm Pos 57	Control N.O. 7
8	Alarm Neg 8	Alarm Neg 33	Alarm Neg 58	Control Common 8
33	Alarm Pos 8	Alarm Pos 33	Alarm Pos 58	Control N.O. 8
9	Alarm Neg 9	Alarm Neg 34	Alarm Neg 59	Control Common 9
34	Alarm Pos 9	Alarm Pos 34	Alarm Pos 59	Control N.O. 9
10	Alarm Neg 10	Alarm Neg 35	Alarm Neg 60	Control Common 10
35	Alarm Pos 10	Alarm Pos 35	Alarm Pos 60	Control N.O. 10
11	Alarm Neg 11	Alarm Neg 36	Alarm Neg 61	Control Common 11
36	Alarm Pos 11	Alarm Pos 36	Alarm Pos 61	Control N.O. 11
12	Alarm Neg 12	Alarm Neg 37	Alarm Neg 62	Control Common 12
37	Alarm Pos 12	Alarm Pos 37	Alarm Pos 62	Control N.O. 12
13	Alarm Neg 13	Alarm Neg 38	Alarm Neg 63	Control Common 13
38	Alarm Pos 13	Alarm Pos 38	Alarm Pos 63	Control N.O. 13
14	Alarm Neg 14	Alarm Neg 39	Alarm Neg 64	Control Common 14
39	Alarm Pos 14	Alarm Pos 39	Alarm Pos 64	Control N.O. 14
15	Alarm Neg 15	Alarm Neg 40	Not used	Control Common 15
40	Alarm Pos 15	Alarm Pos 40	Not used	Control N.O. 15
16	Alarm Neg 16	Alarm Neg 41	Not used	Control Common 16
41	Alarm Pos 16	Alarm Pos 41	Not used	Control N.O. 16
17	Alarm Neg 17	Alarm Neg 42	Not used	Not used
42	Alarm Pos 17	Alarm Pos 42	Not used	Not used
18	Alarm Neg 18	Alarm Neg 43	Not used	Not used
43	Alarm Pos 18	Alarm Pos 43	Not used	Not used

Table 29-3 AIC-2 Connector Pinouts (continued)

Telco Connector	Connector 1	Connector 2	Connector 3	Connector 4
19	Alarm Neg 19	Alarm Neg 44	Not used	Not used
44	Alarm Pos 19	Alarm Pos 44	Not used	Not used
20	Alarm Neg 20	Alarm Neg 45	Not used	Not used
45	Alarm Pos 20	Alarm Pos 45	Not used	Not used
21	Alarm Neg 21	Alarm Neg 46	Not used	Not used
46	Alarm Pos 21	Alarm Pos 46	Not used	Not used
22	Alarm Neg 22	Alarm Neg 47	Not used	Not used
47	Alarm Pos 22	Alarm Pos 47	Not used	Not used
23	Alarm Neg 23	Alarm Neg 48	Not used	Not used
48	Alarm Pos 23	Alarm Pos 48	Not used	Not used
24	Alarm Neg 24	Alarm Neg 49	Not used	Not used
49	Alarm Pos 24	Alarm Pos 49	Not used	Not used
25	Alarm Neg 25	Alarm Neg 50	Not used	Not used
50	Alarm Pos 25	Alarm Pos 50	Not used	Not used

AIC Network Module LEDs

This section describes AIC network module LEDs. (See Figure 29-7.)

All network modules have an enable (EN) LED. This LED indicates that the module is receiving power from the router chassis.

The AIC network module also has a status (STAT) LED, which is a software-controlled bicolor (green and orange) LED. Both the EN and STAT LEDs turn on when the router is powered up, recycled, or power-cycled, or the AIC is hot-swapped. When the AIC starts to boot up, the STAT LED is initially turned off. It turns green when the software has initialized, has passed POST, and has established communication with IOS.

The STAT LED turns from green to orange when POST has failed or when the software encounters any other fatal fault in its firmware during normal operation.

Table 29-4 defines the state of the card with respect to the states of the LEDs.

Figure 29-7 AIC Network Module LEDs

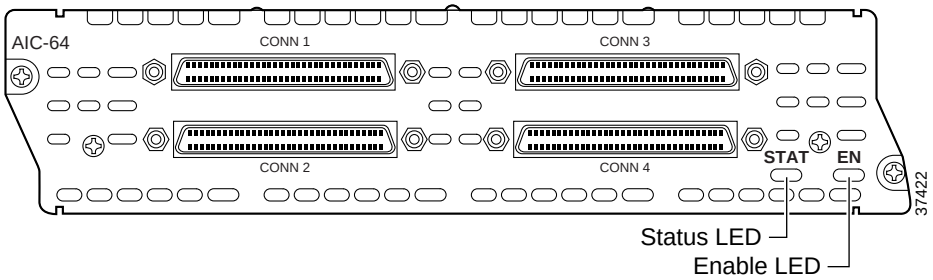


Table 29-4 AIC LED Description

EN LED	STAT LED		Description
	Green	Orange	
Off	Off	Off	No power to the AIC
On	Off	Off	Software initializing
On	On	Off	Normal operation
On	Off	On	Fault encountered