

Advanced Alarm Interface Controller for the Cisco ONS 15454

The advanced Alarm Interface Controller Card (AIC-I) shown in Figure 1 further advances the capabilities of the Cisco ONS 15454 SONET and SDH multiservice provisioning platforms, enabling greater network monitoring for improved network reliability.

Figure 1
Alarm Interface Controller Card (AIC-I) for Cisco ONS 15454



Background

Service providers and enterprise customers continue to look for ways to improve their profitability through lower operating costs. The new AIC-I card allows network administrators to better monitor the health of the network, with additional visibility to the operations in remote, unstaffed facilities. The AIC-I card extends the capability of the Cisco ONS 15454 to retrieve environmental alarms and monitor the health of the system's power source. The AIC-I card supports standard orderwire capabilities as well as Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH) overhead-based data channels, lowering the user's need for ancillary leased lines to support inter-central office and management connectivity. These features help reduce the overall costs of operating a network, resulting in improved return on investment (ROI).

Cisco AIC-I Solution

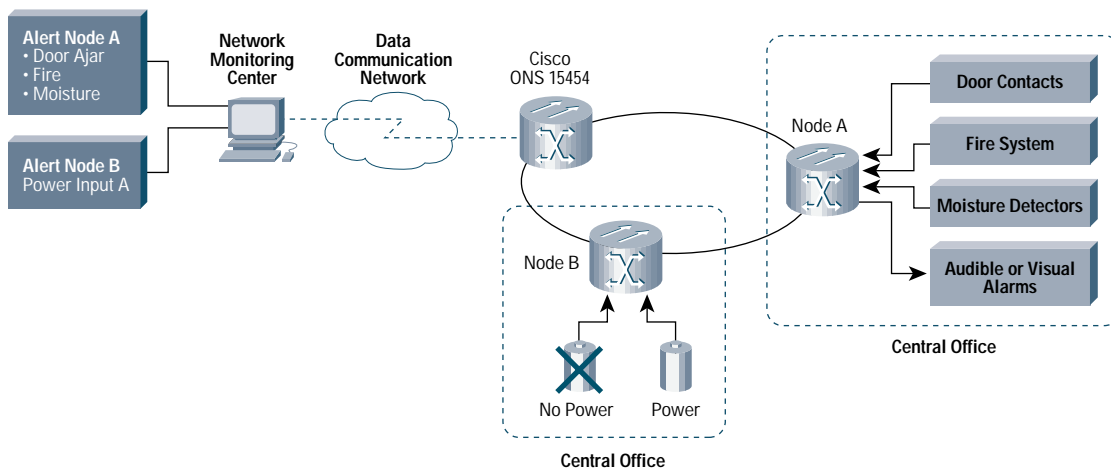
The AIC-I is a single-slot-wide card installable in the central card slot (#9) of the Cisco ONS 15454 SONET and SDH platforms. The card is optional and it advances the overall platform through the following feature enhancements:

- Increased environmental contact closure support
- Input voltage monitoring (SONET)
- User data channels
- Orderwire

Environmental Alarms

The AIC-I card enables the monitoring and event reporting of environmental conditions at remote facilities, and provides the ability to activate remote systems (Figure 2), such as warning lights and sirens, and secondary-power-generation equipment. The Cisco ONS 15454 AIC-I equipped SONET/ANSI shelf assembly will support up to 16 shelf-terminated alarm inputs and up to four shelf-terminated, Form-A output contact closures (provisionable as either inputs or outputs) with expansion capability to 32 inputs and 16 outputs with the use of an optional rear-chassis external Alarm Expansion Panel (AEP), shown in Figure 5. The Cisco ONS 15454 AIC-I equipped SDH/ETSI shelf assembly will support 16 shelf-terminated alarm inputs and four shelf-terminated alarm outputs via the MIC-A/P FMEC card. The alarm inputs are provisionable for contact activation (normally open or normally closed), severity (critical, major, minor, or external condition), and alarm description.

Figure 2
Environmental Alarm and Power Monitoring



Voltage Monitoring (SONET/ANSI Systems)¹

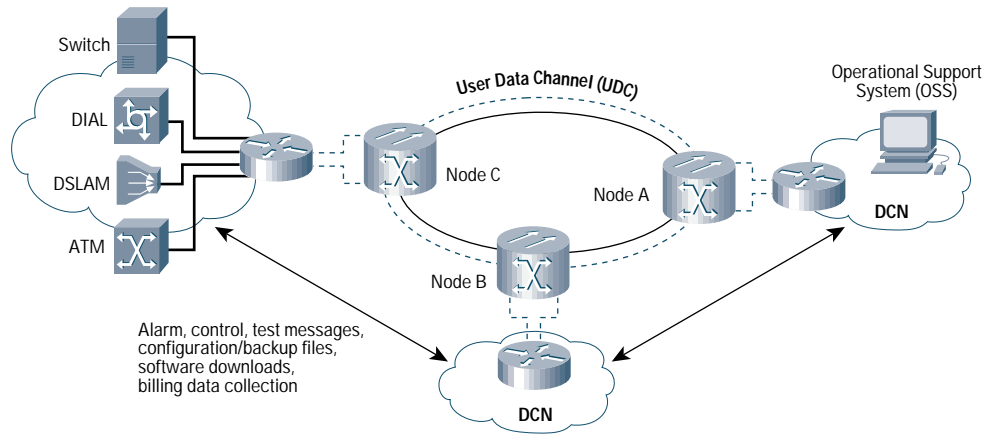
The voltage monitoring function enables the user to proactively determine the health of the input power source to the Cisco ONS 15454 SONET. The AIC-I will enable the reporting and alarming of voltage threshold crossings, providing visibility into network changes.

¹ Input voltage monitoring is supported on the Cisco ONS 15454 SDH platform via the TCC-I card in conjunction with the MIC-A/P FMEC card.

Data Channels

The AIC-I data channels feature enables the use of SONET overhead bandwidth for the creation of data links for the network administrator's use, such as a data communication network for remote management data (Figure 3). The Cisco ONS 15454 AIC-I equipped system allows up to four point-to-point circuits to be created using the SONET/SDH overhead bytes. Two circuits are provisioned using the F1 byte in the Section/Regenerator Section overhead, each providing a 64 kbps data channel. The mechanical interface for these channels is via two RJ-11 connectors located on the faceplate of the AIC-I card. The remaining two circuits are provisioned over the D4-D12 bytes in the Line/Multiplex Section overhead, providing 576 kbps data channels. The mechanical interface to these channels is via two RJ-45 connectors located on the faceplate of the AIC-I card.

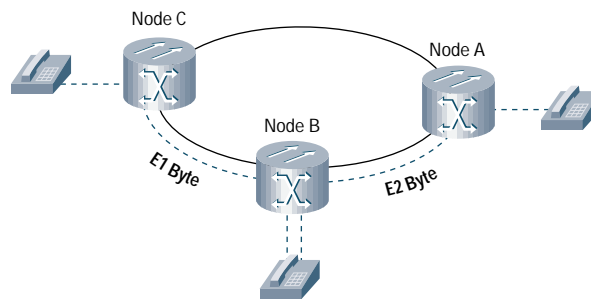
Figure 3
Data Channels for Remote Equipment Management



Orderwire

The AIC-I orderwire feature enables the craft technicians to communicate between network elements via bandwidth dedicated on the SONET/SDH overhead bytes (Figure 4). The voice channels use the E1 and E2 bytes of the SONET section overhead (SOH) / SDH regenerator section overhead (RSOH) and SONET line overhead (LOH) / SDH multiplex section overhead, respectively. The AIC-I card accepts the input from a standard telephone (two- or four-wire) or technician telephone test set and encodes the voice channel using A-Law or Mu-Law pulse code modulation (PCM). Each AIC-I card can be provisioned with a four-digit station number for selective card-to-card connection calling. A built-in call buzzer and LED are provided to alert the craft technician to an incoming call.

Figure 4
Communication via Orderwire Channels



Cisco ONS 15454 AIC-I Features and Specifications

Features are described below, followed by technical specifications of the AIC-I card in Table 1 and the AEP in Table 2. Product part numbers with descriptions are listed in Table 3.

Alarm Contacts

- Up to 48 contacts per shelf for Cisco ONS 15454 SONET platform and 20 contacts for Cisco ONS 15454 SDH platform
- Provisionable parameters
 - Normally open or normally closed for inputs contacts
 - Alarm severity (critical, major, minor, external condition, service affecting, nonservice affecting)
 - Alarm description

Power Monitoring

- Proactively monitors the health of the system input voltage and notifies of condition changes

Data Channels

- Two 64 kbps data channels (F1 byte of SONET section/SDH regenerator section overhead)
- Two 576 kbps data channels (D4-12 bytes of SONET line/SDH multiplexing section overhead)
- Reduces the need for ancillary leased-line data circuits between central offices

System Requirements

- Cross-connect card: Any
- Timing, communications and control processor card: TCC+ (SONET) or TCC-I (SDH)
- Shelf assembly: NEBS3E, ANSI and ETSI shelf assemblies
- System software: R3.4 or greater

Compliance

- Network Equipment Building Standards (NEBS) Level 3 compliant (GR-63-CORE, GR-1089-CORE)
- EN 60950 and ETS 300 386-1
- TR-NWT-000332, Issue 4, Method 1 calculation for 20-year mean time between failure (MTBF)

Figure 5

Alarm Expansion Panel (AEP) on Cisco ONS 15454 ANSI Shelf Assembly

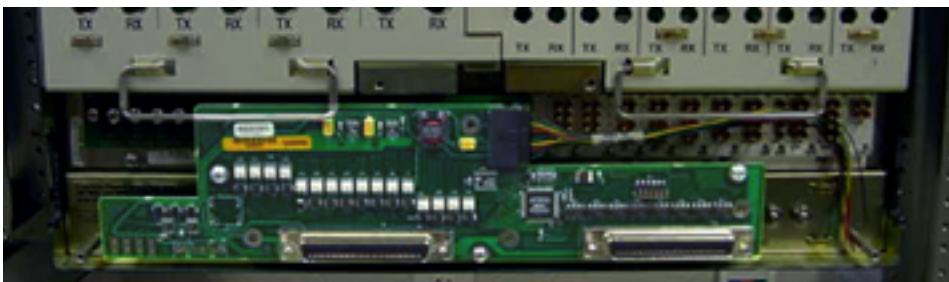


Table 1 Technical Specifications for AIC-I Card

Specification	SONET/ANSI Specification	SDH/ETSI Specification
Environmental alarm contacts		
Inputs	<ul style="list-style-type: none"> • 12 fixed plus 4 provisionable as inputs or outputs • 32 fixed (with AEP) 	<ul style="list-style-type: none"> • 16 fixed plus 4 provisionable as inputs or outputs
Outputs	<ul style="list-style-type: none"> • 4 (same 4 provisionable as above) • 16 fixed (with AEP) 	<ul style="list-style-type: none"> • 4 fixed (same 4 provisionable as above)
Contact drivers		
Input closures	<ul style="list-style-type: none"> • 32 VDC • 2 mA 	<ul style="list-style-type: none"> • 32 VDC • 2 mA
Output closures (Form-A Relay)	<ul style="list-style-type: none"> • 60 VDC • 100 mA 	<ul style="list-style-type: none"> • 60 VDC • 100 mA
Voltage monitoring		
-48VDC systems <ul style="list-style-type: none"> • Major alarm • No alarm • Major alarm 	<ul style="list-style-type: none"> • -40.5 VDC • -40.5 to -56.7 VDC • -56.7 VDC 	Not applicable ¹
-60VDC systems ² <ul style="list-style-type: none"> • No alarm 	Not applicable	Not applicable ¹
Connector types		
Alarm communication channel	26-pin SSIO	26-pin SSIO
User data channel	RJ-11 (2)	RJ-11 (2)
DCC channels	RJ-45 (2)	RJ-45 (2)
Orderwire	RJ-11 (2)	RJ-11 (2)
Contact closure mechanicals		
Cisco ONS 15454 shelf assembly	Wire wrap pins, rear shelf, 16 pairs	DB64 (MALE) on MIC-A/P card
Orderwire PCM encoding		
	Mu-Law	A-Law Mu-Law
Power (maximum)		
AIC-I card	8.4 watts	8.4 watts
AEP	2.5 watts	Not applicable
Data channel bandwidth		
User data channels (2): F1 byte (2)	64 kbps	64 kbps
Data communication channels (2): D4-D12 bytes	576 kbps	576 kbps

Table 1 Technical Specifications for AIC-I Card

Specification	SONET/ANSI Specification	SDH/ETSI Specification
Operating environment		
Temperature	-40 to +65 C -40 to +149 F	-40 to +65 C -40 to +149 F
Humidity	5 to 95%, noncondensing	5 to 95%, noncondensing
Storage environment		
Temperature	-40 to +85 C -40 to +185 F	-40 to +85 C -40 to +185 F
Humidity	5 to 95%, non-condensing	5 to 95%, non-condensing

Table 2 Technical Specifications: AEP—SONET/ANSI Platform Only

Specification	AEP
Connector types	
Contact closures, inputs/outputs	Two 50 pin AMP CHAMP
Alarm communication channel	Wire wrap
Power (maximum)	
AEP	2.5 watts
Operating environment temperature	
Temperature	-40 to +65 C -40 to +149 F
Humidity	5 to 95%, noncondensing
Storage environment	
Temperature	-40 to +85 C -40 to +185 F
Humidity	5 to 95%, noncondensing

Specifications subject to change without notice.

Table 3 Product Part Numbers and Descriptions

Part Number	Description
15454-AIC-I	Alarm Interface Controller, advanced, Cisco ONS 15454, SONET/ANSI platform, industrial temperature rated
15454E-AIC-I	Alarm Interface Controller, advanced, Cisco ONS 15454, SDH/ETSI platform, industrial temperature rated
15454-AEP	Alarm Expansion Panel, Cisco ONS 15454, SONET/ANSI platform only, industrial temperature rated

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