SmartWORKS™ LD Series

Next Generation Analog Passive/Active Telephony Card

Designed for analog networks, the SmartWORKS™ LD has both passive and terminate network interface capabilities. Featuring programmable voltage thresholds and loop reversal detection, the SmartWORKS™ LD is easily configured to accommodate variations across analog networks. This product is offered in 4, 8, 16 and 24 port versions, suitable for small to large offices and call centers.

Standard Features for SmartWORKS™ Family of Call Recording Products

The SmartWORKS™ API provides a common interface that controls the following call recording features:

- Media Control - CODECS
- Tone Detection / Generation
- CallerID/FSK/DTMF/MF Detection
- Activity / Silence Detectors
- Switching (H.100 and MVIP)
- Automatic Gain Control (AGC)
- Automatic Volume Control (AVC)
- Echo Cancellation
- Call Progress Monitoring (CPM)
- Full-duplex Channels
- Media Streaming
- Live Monitoring
- Start/Stop Call Recording Triggers
- Beep tone generation for passive mode

Since 1991, Ai-Logix has designed boards used in interactive and passive telephony applications. With global support for all types of telephone and radio systems - analog, digital, and enterprise PBXs, Ai-Logix products have set a new world standard in telephony communications. A single API, combined with event driven reporting simplifies application development by providing one standard for all types of networks.

Key Features and Benefits

4-24 Port Telephony Cards

Offers low to high density boards that are ideal for any analog environment.

On Demand Voltage Detection

Voltage values are reported with standard SmartWORKS™ API events to simplify application development.

Programmable Voltage Thresholds

Control voltage detection event reporting with ease by adjusting the board to the local analog environment.

Detects Polarity Reversal

Adapts to environments where Tip and Ring are reversed.

Minimum 18k Ohm Impedance

High impedance receivers record both sides of a call without interrupting service.

CODEC Support

SmartWORKS™ offers a large selection of voice CODECS (including G.723.1, G.729A and MS GSM)

Tap Environment

The LD series accomodates low to high density environments with 4, 8, 16, or 24 port boards. The SmartWORKS™ API supports a total of 512 channels per system. The tapping point can be anywhere on an analog line: between Central Office and PBX, Central Office and phones, or PBX and phones.

Terminate Environment

The LD series can be used to initiate as well as terminate calls. When configured as an interactive resource, phone lines can directly connect to and terminate on the LD boards. Standard ring detection is available.

World-Wide Analog Support

The SmartWORKS™ LD supports passive call recording on ground start and loop start analog networks. It has line terminating capabilities for loop start environments. Features such as programmable voltage thresholds, voltage detection, and polarity reversal are managed through the common SmartWORKS™ API. As a result, the SmartWORKS™ LD easily adapts to variations found on analog systems throughout the world.

Built in Performance Monitoring

Built in voltage detection allows SmartWORKS™ LD to distinguish a disruption of service if a cable is damaged or disconnected. This feature is unique in the industry and only available on the LD series.

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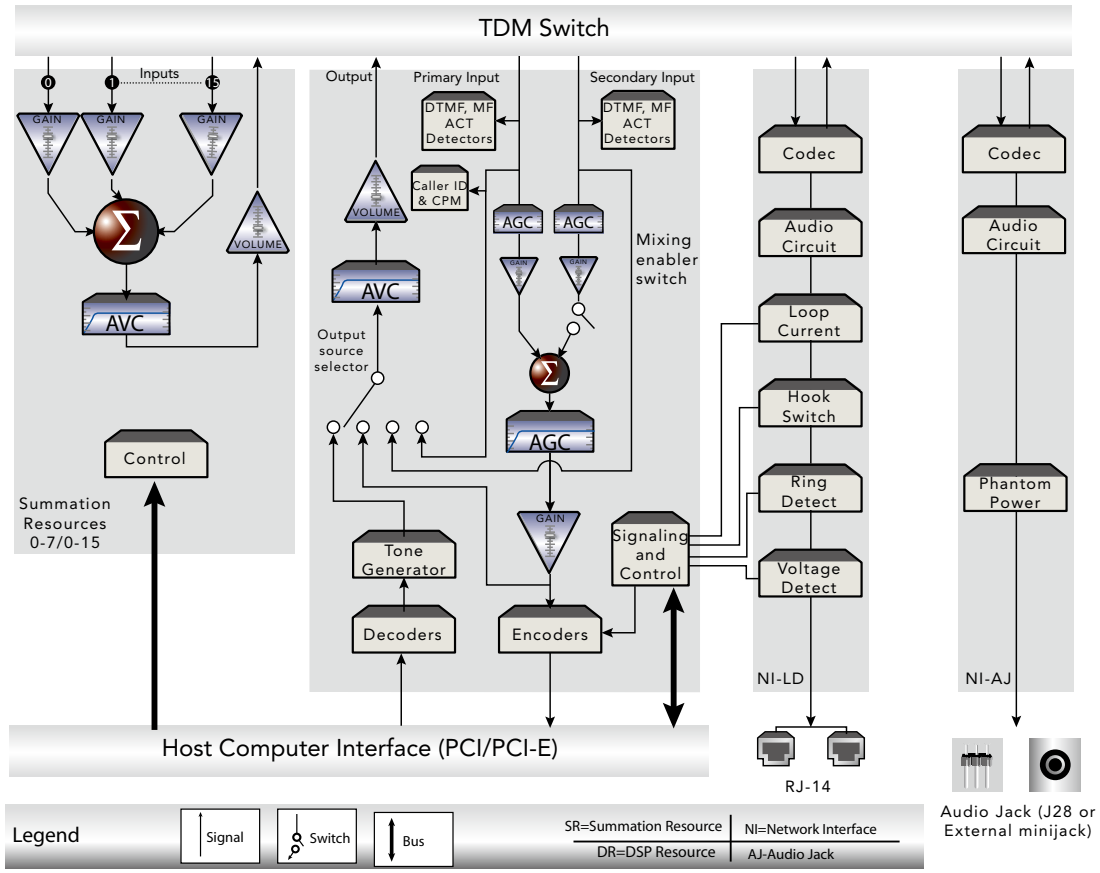
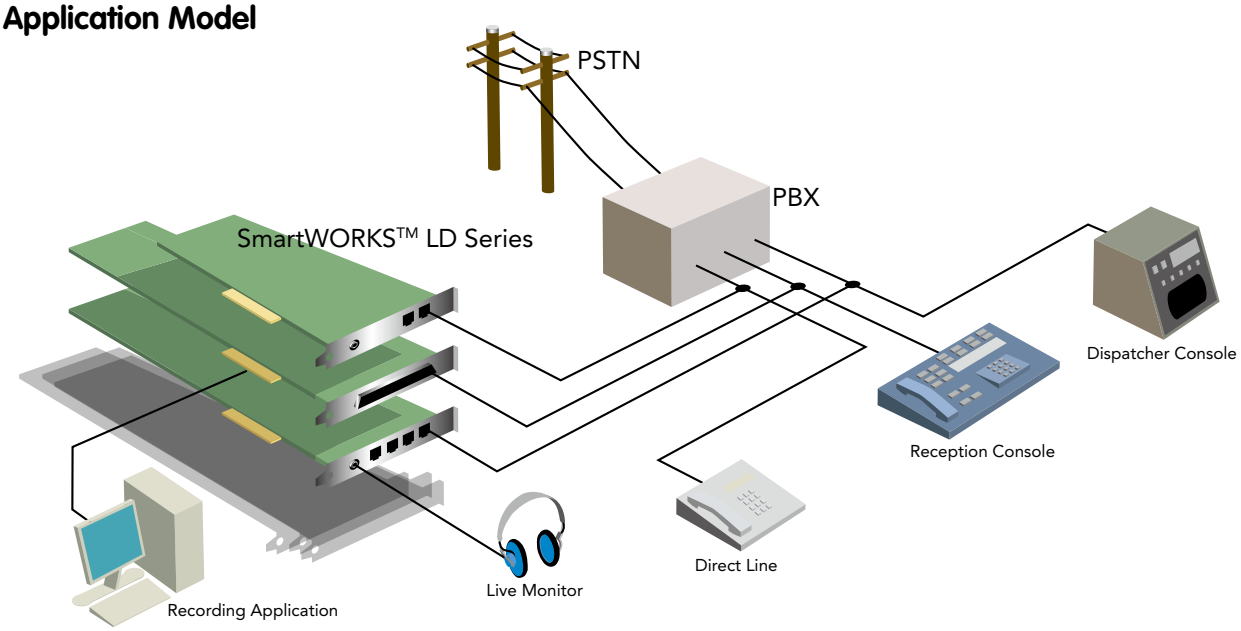
LD Logical Card Model



LD Application Model



SMARTWORKS

INTELLIGENT COMPUTER TELEPHONY

Product Specifications · SmartWORKS™ LD

Hardware System Requirements

Pentium 4 or equivalent · 2 GHz or better
PCI2.2/PCI3.0/PCI-X/PCI-E with 3.3V power supply

Operating Systems

Windows2000 Professional/Server, WindowsXP Professional (SP3), Windows2003 server (32-bit/64-bit), Windows2008 server (32-bit/64-bit), Widnows7 (32-bit/64-bit), Windows8 Server (Call for variant details)

Technical Specifications

Max boards per system:	16
Max ports per system:	Up to 384
Resource Sharing Bus:	H.100 (except LD409)

Environmental Conditions

Operating Temperature:	0C to +60C
Storage Temperature:	-20C to +85C
Humidity:	8% to 80% non-condensing
Storage humidity:	8% to 80% non-condensing

Physical Characteristics

Form Factor:	Full size PCI/PCI- E card Or half size PCI card

Telephony Interface

Signal/Noise ratio:	35dB referenced to -15dBm
Idle channel noise:	Less then 20dBrnc
Crosstalk coupling:	Less then -70 dB (0dBm, 1004Hz)
Frequency response:	300Hz to 3400Hz +/-3dB
Ring detection:	30Vrms (min), 16 to 68Hz
Ringer Equivalence Number:	< 0.5
Echo return loss:	28 dB +/- 3dB @1400Hz
External Connector:	RJ-14 (LD409, LD809) OR RJ-21 (LD809X/LD809-eh, LD1609/LD1609-eh, LD2409/LD2409-eh)

Telephony Interface (Passive Mode)

Trunk Type:	Loop Start/Ground Start
Trunk Interface:	High Impedance (Z)
AC Impedance:	18 kOhms
Voltage Detection:	Two software programmable thresholds
Range:	-61V to + 61V
Accuracy	+/- 2V

Telephony Interface (Terminate Mode)

Trunk Type:	Loop Start
AC Impedance:	Software Selectible, FCC, EU, China, Australia
Loop Detection:	Off Hook: 8mA (max) *LD409* On Hook: 6mA (min) *LD409* OFF Hook: 11mA (max) LD809/LD809X/LD809-eh, LD1609/LD1609-eh, LD2409/LD2409-eh On Hook: 9mA (min) LD809/LD809X/LD809-eh, LD1609/LD1609-eh, LD2409/LD2409-eh

Telephony Connectors

LD409/LD809:	RJ-14
LD809X/LD809-eh:	RJ-21x
LD1609/LD1609-eh:	RJ-21x
LD2409/LD2409-eh:	RJ-21x

SDK

Ai-Logix Native SmartWORKS™ API
SmartControl (Control Panel)
SmartVIEW (Card functionality test application)

Host Interface

Bus Compatibility:	PCISIG 2.2/PCI-X/PCI-E1.1/x1,x4, x8, x16 and Gen 2.0 PCI Express slots
Bus Speed:	33/66/2500MHZ
Bus Mode:	32/64 bit bus

Analog Jack

Audio Connector:	3-pin 0.1" ctr header (LD809X/LD809-eh, LD1609/LD1609-eh, LD2409/LD2409-eh) -OR- 3.5mm (LD409/LD809) Male stereo Plug (1609 & 2409 only)
Output impedance:	300Ohms
Input impedance:	33KOhms
Mic bias:	+5VDC @ 4.7KOhms
Input gain:	+9dB
Output gain:	0 db @ 300Ohms
Full scale input:	370 mVRMS
Full scale output:	1.1 mVRMS open circuit

Audio Signal

Receive range:	-68 dBm to + 3 dBm
Input gain control:	+24 to -50 dB
Silence Detection:	Programmable from API
Transmit volume control:	+24 to -50 dB to H.100
Automatic Gain Control (AGC):	Programmable from API
Automatic Volume Control (AVC):	Programmable from API
Activity Detection:	Programmable from API
Frequency Response:	300 - 3400 Hz (+/- 3dB)

DTMF Tone Detection

DTMF digits:	0 - 9, *, #, A, B, C, D
Dynamic range:	-38 dBm to 0 dBm
Minimum tone detection:	40 ms / programmable
Interdigit timing:	40 ms min.
Acceptable twist:	Per LSSGR sec. 6, 8 dB forward, 4 dB reverse
Frequency variation:	Accept all +/- 1.5%, reject all +/-2.5%
Noise tolerance:	Per LSSGR sec. 6
Talk off:	Bellcore TR-TSY-000762

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MF Detection

MF Detection	R1 & R2
R1 digits:	Per Q.151

Call Progress Monitoring (Terminate Mode)

Number of programmable tones	20
Number of bandpass filters	10
Number of filters per tone	1,2 or 3
Number of cycles	0 to 255
SIT tones	Yes, programmable frequencies and duration
Answering Machine Detection	Yes

Voice Processing

Caller ID	V.23 & Bell 202
DTMF Detector	Primary & Secondary channel

Echo Cancellation (Terminate Mode)

Input Dynamic Range	G.165 compliant
Double-talk detection	G.165 compliant
End path delay	8ms

Tone Dialing (Terminate Mode)

DTMF digits	0 – 9, *, #, A, B, C, D
Frequency variation	Less then 1 Hz
Rate	API Programmable
Duration	API Programmable

Safety and Certifications (Pending)

Telecom:	DOC
Emissions:	FCC Part 15 class A EN 55022
Immunity:	EN 55024
Safety:	EN 60950
Estimated MTBF:	250,000 hours per Bellcore Method I

Ports

LD409	4 ports, no H.100
LD809/LD809X/LD809-eh	8 ports
LD1609/LD1609-eh	16ports
LD2409/LD2409-eh	24 ports

Audio Digitizing (Encoding & Decoding)

5.3 Kb/s	G.723.1
6.3 Kb/s	G.723.1
8 Kb/s:	G.729A
13 Kb/s:	GSM 6.10, Microsoft GSM
16 Kb/s:	G.726
24 Kb/s:	G.726, OKI
32 Kb/s:	G.726, OKI
40 Kb/s:	G.726
64 Kb/s:	μ-law or A-law per G.711, 8 bit linear PCM (signed & unsigned)
96 Kb/s	6 Khz 16 bit linear PCM(signed)
128 Kb/s:	16 bit linear PCM (signed & unsigned)
Wave file formats:	Microsoft GSM, Linear signed 8 & 16-bit PCM
Digitization selection:	Programmable per channel, independent for encode and decode

Power Requirements (4 or 8 channel)

+ 3.3 VDC:	1.0 A
+5 VDC:	n/a
-12 VDC:	n/a
+12 VDC:	100 mA
Watts (Max)	4.5W

Power Requirements

4 or 8 Channel (PCI 2.2):	+ 3.3 VDC: 1.0 A, +5 VDC: n/a, -12 VDC: n/a, +12 VDC: 100 mA, Watts (Max): 4.5W
16 Channel (PCI 2.2):	+ 3.3 VDC: 1.3 A, +5 VDC: n/a, -12 VDC: n/a, +12 VDC: 200 mA, Watts (Max): 6.7W
24 Channel (PCI 2.2):	+ 3.3 VDC: 1.5 A, +5 VDC: n/a, -12 VDC: n/a, +12 VDC: 220 mA, Watts (Max): 7.6W
8 Channel (PCI Express):	+ 3.3 VDC: 1.6 A (RJ-21 connector only)
16 Channel (PCI Express)	+ 3.3 VDC: 2.1 A
24 Channel (PCI Express)	+ 3.3 VDC: 2.3 A

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