

# **Ai-Logix**

An **AudioCodes** Company



**SMARTWORKS™ PRODUCT CATALOG**

Ai-Logix, Inc.

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## FEATURES

- Common native API across entire product line
- All SmartWORKS™ Products have a 1:1 ratio for DSP voice resource channels to external ports
- Selectable CODECS per channel
- Caller ID/FSK/DTMF/MF
- Advanced SDK
- Operating Systems Support
  - Windows2000 Professional/Server
  - WindowsXP Professional (SP3)
  - Windows7 (32-bit/64-bit)
  - Windows2003 server (32-bit/64-bit)
  - Windows2008 server (32-bit/64-bit)
  - Windows8 Server
  - Linux
- Common DSP Architecture across SmartWORKS™ product line
- Full duplex for simultaneous record and play
- Stereo recording – record far and near end of conversations separately
- Supports industry leading CODECS, including G.729a/G.723

# SMARTWORKS

INTELLIGENT COMPUTER TELEPHONY

## Many Products, One Powerful API

SmartWORKS™ is a complete line of CTI components for the call recording market.

The SmartWORKS™ API provides full access to a large variety of features on the SmartWORKS™ hardware platform.

SmartWORKS™ uses a single C++ API, which gives customers the flexibility to develop their applications with one board, or with any combination of boards in the family. With multiple programming models supported, developers can tailor their applications to suit their specific needs.

## The SmartWORKS™ Family

### Passive Tap Recording Cards:

Analog · Digital Extension · Digital Trunk · Analog Trunk

### Trunk Interface:

Analog · Digital Trunk

### VoIP Interface:

Passive VoIP recording solution

## SmartWORKS Product Family

Analog POTs <i>Universal</i>	Digital Extension <i>Passive</i>	Digital Trunk <i>Passive</i>	Digital Trunk <i>Terminate</i>	IP PBX <i>Call Recording</i>	Accessories <i>NGX / IPX / HPX</i>	Voice Acquisition <i>Device</i>
LD409	NGX800	DP3209	DT3209	IPX-C	RTS BOX	Breakout BOX
LD809(X)	NGX1600	DP6409	DT6409	HPX	TX100	Mic Phone
LD1609	NGX2400	DP3209-eh	DT6409-eh	HPX Media	TX1000	
LD2409	MX80	DP6409-eh	PCM6409-eh	IPX-EX		
LD809-eh	NGX800-eh					
LD1609-eh	NGX1600-eh					
LD2409-eh	NGX2400-eh					
	MX80A					

### Legend

Universal PCI Slot

PCI Express Slot

# SMARTWORKS™ LD SERIES

NEXT GENERATION ANALOG PASSIVE/ACTIVE TELEPHONY CARD

## 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.

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.



## 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 accommodates 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.

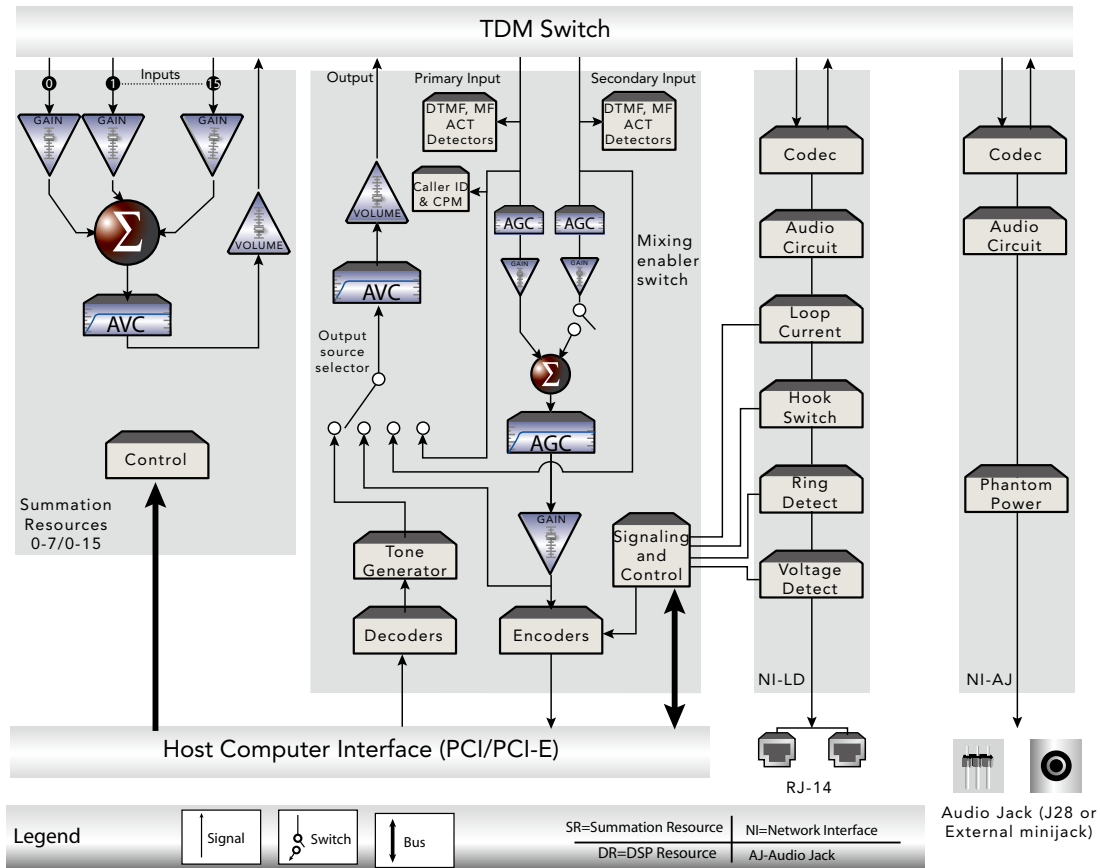
## World-Wide Analog Support

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.

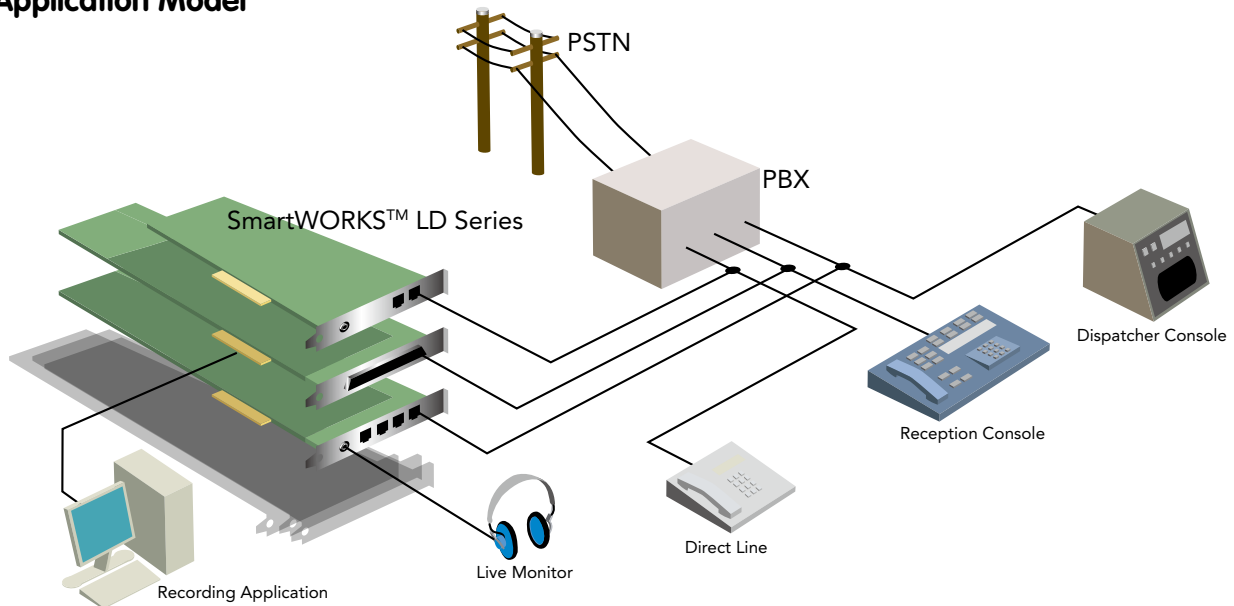
## Built in Performance Monitoring

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.

# LD Logical Card Model



# LD Application Model



# 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), Windows7 (32-bit/64-bit), Windows8 Server, Linux (Call for variant details)

## TECHNICAL SPECIFICATIONS

Max boards per system: .....16  
Max ports per system: .....Up to 512  
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 than 20dBnc  
Crosstalk coupling: .....Less than -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: .....RJ-21x  
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 (LD409)  
-OR- 3.5mm (LD809/LD809X/LD809-eh,  
LD1609/LD1609-eh, LD2409/LD2409-eh)  
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 than 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	16 ports
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 (16 CHANNEL)

+ 3.3 VDC	1.3 A
+5 VDC	n/a
-12 VDC	n/a
+12 VDC	200 mA
Watts (Max)	6.7W

### POWER REQUIREMENTS (24 CHANNEL)

+ 3.3 VDC	1.5 A
+5 VDC	n/a
-12 VDC	n/a
+12 VDC	220 mA
Watts (Max)	7.6W

# SMARTWORKS™ MIC BOX

VOICE ACQUISITION DEVICE

## SmartWORKS™ MIC BOX

- High Sensitivity Microphone
- Built-in High Pass Filter
- LED voice activity indicator
- Manual Button to Trigger Recording (Optional)
- External Remote Trigger (Optional)
- External Microphone (Optional)
- 1 Power Supply for 24 Microphones



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.

The SmartWORKS™ MIC BOX moves away from traditional telephone call recording to capture live conversations.

By utilizing our new microphone capture technology, businesses can now record any transaction necessary, whether for verification or dispute resolution. Using sensitive, directional microphones combined with our industry leading SmartWORKS blade technology, a live conversation recording system is now just as easy to deploy as a standard telephone recording application.



## Key Features and Benefits

### Business Use Cases

There are many uses for SmartWORKS™ LIVE Recording. Any place where a transaction may occur is an ideal spot to deploy a SmartWORKS™ MIC BOX. Negotiation rooms, Bank Tellers, Loan Closings, Home Closings, Interviews, Dispute Conferences and Court Rooms are only a sample of where the SmartWORKS™ MIC BOX can be deployed.

### Recording Using LD

**VOX Trigger:** Using the voice activity detectors of the SmartWORKS™ LD Board (requires application), conversations can be automatically recorded.

**Voltage Trigger:** Using the voltage detectors of the SmartWORKS™ LD Board (requires application), conversations can be automatically recorded when the manual button is pressed.

### External Power Supply

Drive multiple microphones with a single power supply, significantly simplifying the installation process.

U.S.A

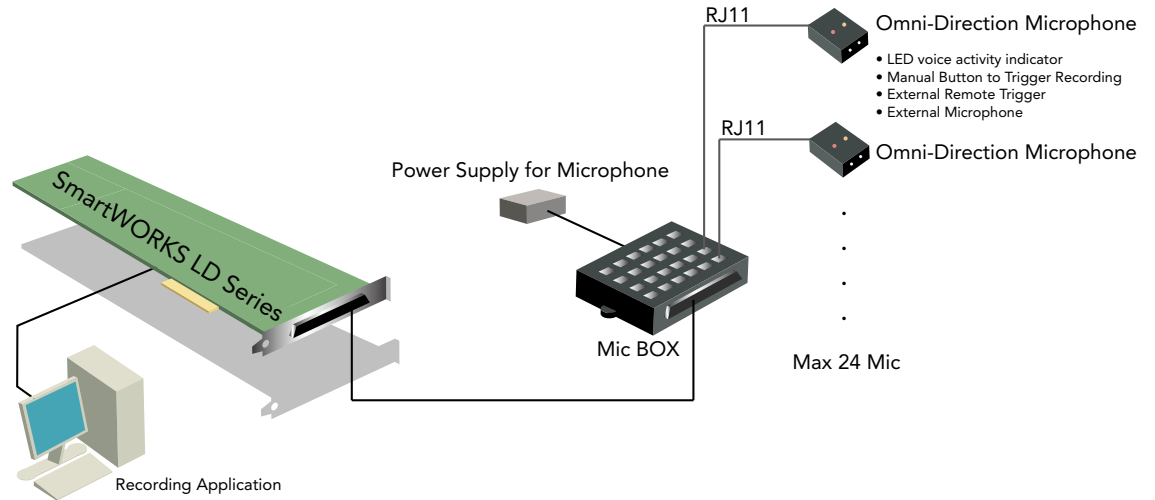
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## MIC BOX Application Model



## MIC BOX Specifications

### POWER

Power Requirement.....DC 15V~24V (External Power Adaptor connected to RJ11 Breakout box)  
Current Consumption.....4mA

### SPECIFICATIONS

Dimension.....50mm(L) x 35mm(W) x 20mm(H)  
Operation Temperature.....-20~70 C  
Amplifier Fidelity.....0.1%  
Manual Trigger Switch.....10V DC Normal State / Push button Momentary 24V DC 800ms  
Microphone Type.....Omni-direction Condenser  
External Microphone.....Audio Jack 3.5 mm (Internal Microphone disabled when connected)  
Remote Trigger Switch.....Audio Jack 2.5mm

### TELEPHONY

Frequency Response.....600Hz ~ 3400Hz +/- 3db  
Signal /Noise ratio.....50db  
Output Impedance.....50ohm  
Connections.....RJ11 Connector (2wires)  
Low Frequency Elimination.....-40db (50Hz or 60Hz)  
Sensitivity.....-42db

### CABLE LENGTH

Maximum length of RJ11 connector  
.....750 meters

### ORDER INFORMATION

910-0800-001.....Microphone  
910-0800-002.....RJ11 Breakout Box with power adapter

# SMARTWORKS™ NGX SERIES

CALL RECORDING FOR PROPRIETARY PBXS AND BRI

## Standard Features for SmartWORKS™ Family of Call Recording Products

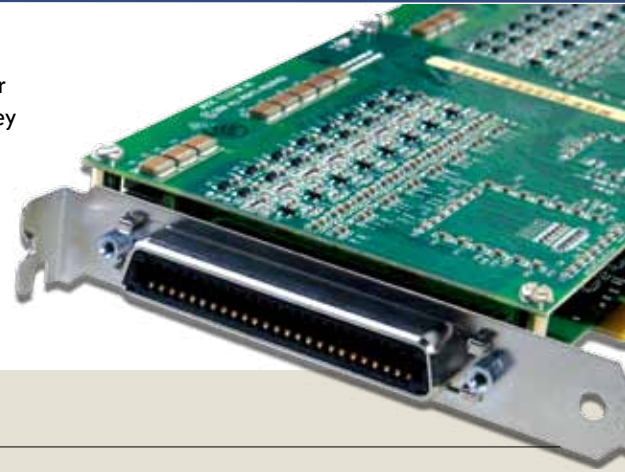
The SmartWORKS™ API provides a common interface that controls the following call recording features:

- Media Control - CODECS
- CallerID/FSK/DTMF/MF Detection
- Activity / Silence Detectors
- Switching (H.100 and MVIP)
- Automatic Gain Control (AGC)
- Automatic Volume Control (AVC)
- Stereo Recording
- Call Progress Monitoring (CPM)
- Full-duplex Channels
- Media Streaming
- Live Monitoring
- Start/Stop Call Recording Triggers



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.

The SmartWORKS™ NGX is an all-in-one resource for logging behind a PBX or before a PBX on BRI. Every key pressed, call taken, and telephone action performed by an agent is automatically decoded and sent to the recording application. A powerful set of features, combined with PBX integration, makes the NGX a true single slot solution for call logging application providers.



## Key Features and Benefits

### Multiple PBX support

A single board interfaces with a majority of industry leading PBXs and BRI to simplify the design of global call recording applications.

### Firmware Upgraded

A simple firmware upgrade allows the NGX to adapt to different PBX environments.

### Wide Spectrum of Trigger Events

Initiate and terminate recordings based on voice activity, raw D-channel, or Call Progress Monitoring (CPM) events.

### Summation

Monitors up to 24 channels in real-time with on-board audio jack resources.

### CODEC Support

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

## Tap Environment

The NGX is designed for tapping behind a proprietary PBX. Residing between the PBX and agent phones, the SmartWORKS™ NGX's high impedance receivers record both sides of a call without interrupting service. The NGX is available in 8,16,and 24 port configurations. The SmartWORKS™ API supports a total of 512 channels per system. As a result, the SmartWORKS™ NGX is ideal for low to high-density environments.

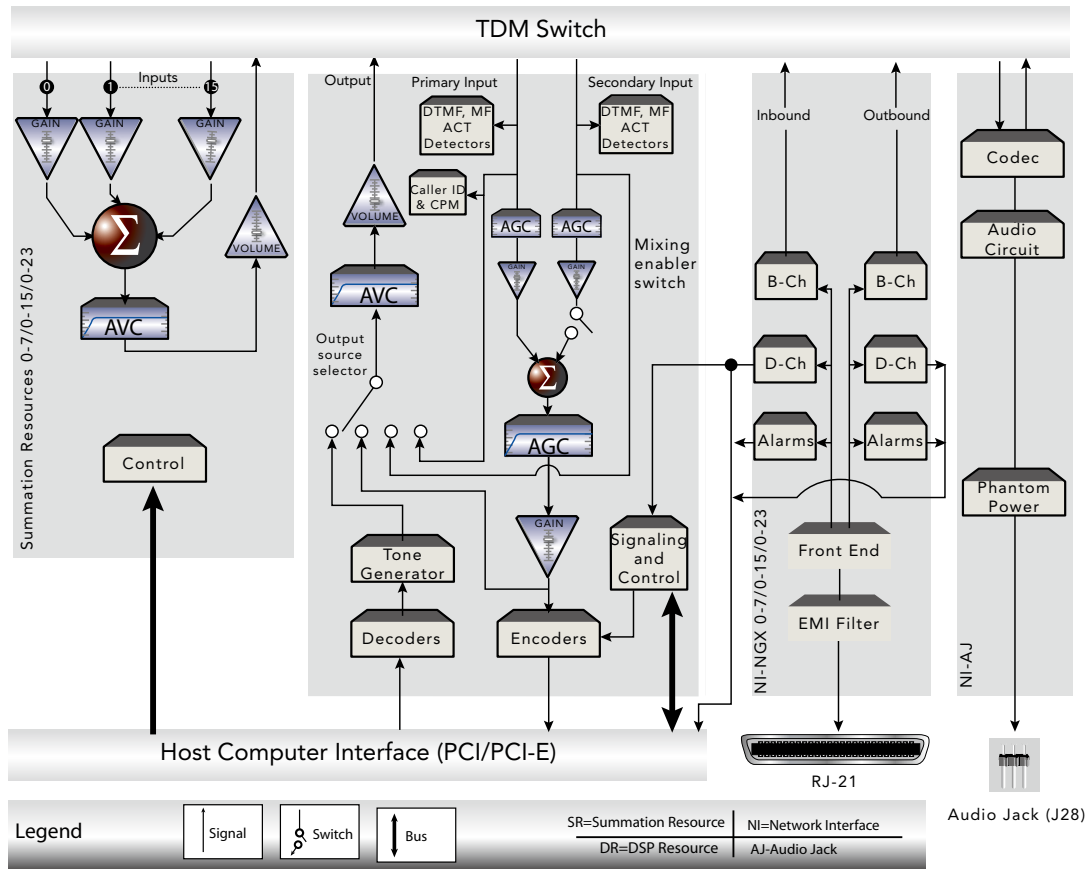
## Extensive PBX Support

Designed with international deployment in mind, the SmartWORKS™ NGX taps 2-wire, 4-wire, BRI and full duplex PBX's. The list of PBXs the NGX supports is constantly growing. Contact your Ai-Logix sales representative for more information.

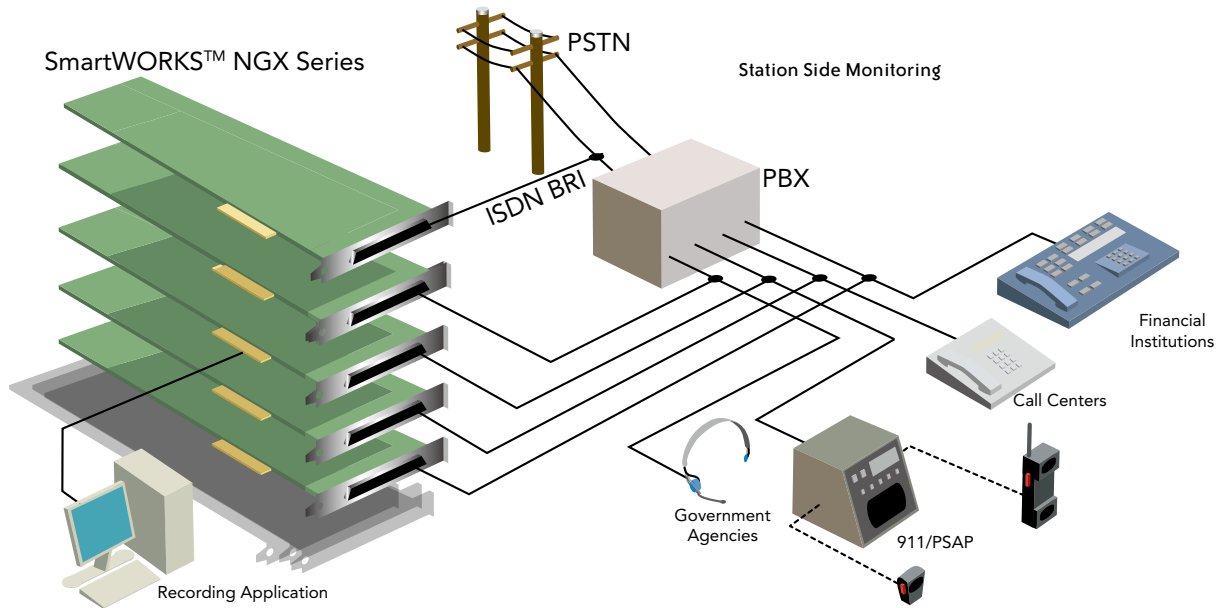
## Built in Performance Monitoring

The SmartWORKS™ API provides framer alarms and network statistics to pass easily into performance monitoring applications. Event driven framer alarms are generated with a loss of signal condition. Network statistics are available for both sides of the conversation, incoming and outgoing. Statistics such as synchronization errors, line amplitude, noise or clipping are available via a simple API function call.

# NGX Logical Card Model



# NGX Application Model



# PRODUCT SPECIFICATIONS · SMARTWORKS™ NGX

## 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, Linux (Call for variant details)

## TECHNICAL SPECIFICATIONS

Max boards per system: ..... Any combination up to 512 ports  
Max ports per system: ..... Up to 512  
Resource Sharing Bus: ..... MVIP or H.100  
Boards Status: ..... On-board LEDs  
Clocking: ..... Master/Slave

## 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 card

## POWER REQUIREMENTS

SmartWORKS™ NGX (base)  
+ 3.3 VDC: ..... 0.9 A  
+5 VDC: ..... 15 mA  
-12 VDC: ..... 25 mA  
+12 VDC: ..... 25 mA  
SmartWORKS™ NGX (expanded 24 channels)  
+ 3.3 VDC: ..... 1.6 A  
+5 VDC: ..... 15 mA  
-12 VDC: ..... 35 mA  
+12 VDC: ..... 35 mA

## TAP INTERFACE

Insertion loss: ..... <1dB  
Isolation: ..... Galvanic 500VDC +/-10%,  
100VRMS 1 sec  
Impedance: ..... Soft-Switchable 1KOhms/100Ohms  
External connector: ..... RJ-21X 25 Pair female

## 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  
Output impedance: ..... 300Ohms  
Input impedance: ..... 33KOhms  
Return loss: ..... >25dB  
Mic bias: ..... +5VDC @ 4.7KOhms  
Input gain: ..... +9dB  
Output gain: ..... 2.6dBm @ 300Ohms  
Full scale input: ..... 370 mVRMS  
Full scale output: ..... 1.5 VRMS open circuit

## PBX INTERFACE

PBX Support: ..... Software Configurable  
Alcatel, Avaya, Bosch, Cisco, eON, Ericsson, Fujitsu, Harris, LG, Mitel, Nakayo, NEC, Nortel, Panasonic, Philips, Rockwell, Samsung, Siemens, Tadiran, Telrad, Toshiba, etc. (see www.ai-logix.com for a complete list)

## 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 MVIP/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)

## 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: .....  $\mu$ -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

## 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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D CHANNEL EVENTS

The following types of D-channel events are decoded:

*PBX Event (Command Events):*

Generated by the PBX and passed to the phone as a command to perform some type of action.

Signaling - these events indicate a call progress tone (dial tone, ring tones), or audio changes

LEDs - these events correspond to light changes on the phone

Display - these events indicate that the LCD on the phone has been updated. These are usually related to the clock display, or messages displayed on the LCD.

*Phone Events*

Generated by the phone indicating an action has been taken (i.e. button pressed).

Hook State - off hook and on hook changes occur when the handset is removed or replaced

Button events - indicate that a button on the phone was used. For example: digits pressed, speaker buttons etc.

SAFETY AND CERTIFICATIONS

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

MODELS AVAILABLE

NGX800/NGX800-eh: .....8 ports  
NGX1600/NGX1600-eh: .....16 ports  
NGX2400/NGX2400-eh: .....24 ports  
MX80/MX80A: .....8 ports daughtercard

# ACCESSORY: RTS BOX

RESISTIVE TAP SPLITTER

## Features

Provides both voice and D-channel data for:

- Avaya INDeX
- Mitel SX200/SX2000
- Siemens Rolm 9751

Breaks out full-duplex signal into 2 half-duplex signals

Passive device - No power supply required



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.

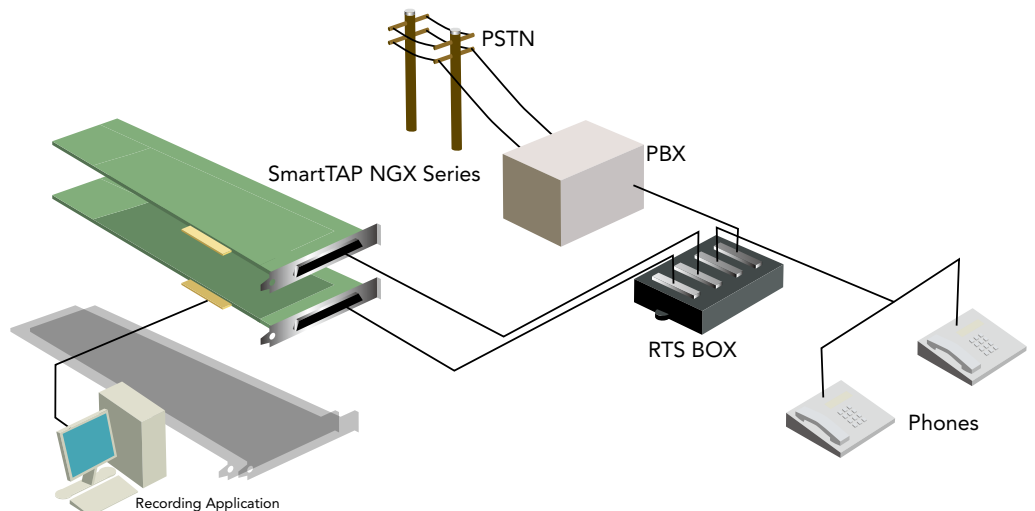


## Key Features and Benefits

The RTS BOX is a tap-point product designed for use with the SmartWORKS™ NGX. Using the RTS BOX with two NGX2400 boards provides a 24-port solution for call recording applications.

The RTS BOX provides voice and D-channel data for the Avaya INDeX, Mitel SX200/SX2000\* and the Siemens Rolm 9751. The unique design supports all 3 PBXs with one assembly. The RJ21x Amp connectors provide reliable connections to the NGX, PBX, and phones by treating the PBX as a 4-wire supporting half the channels.

## RTS BOX Application Diagram



# SMARTWORKS™ DP SERIES

T1/E1 PASSIVE TAP CARD

## 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
- CallerID/FSK/DTMF/MF Detection
- Activity / Silence Detectors
- Switching (H.100 and MVIP)
- Automatic Gain Control (AGC)
- Automatic Volume Control (AVC)
- Stereo Recording with AGC
- Call Progress Monitoring (CPM)
- Full-duplex Channels
- Media Streaming
- Start/Stop Call Recording Triggers



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.

The SmartWORKS™ DP sets the standard for passive tapping of T1/E1 trunks in high-density environments. The SmartWORKS™ DP is a reliable tool used globally by many of the world's largest call logging application providers.



## Key Features and Benefits

### Software Switchable T1/E1 Interface

Supports T1 and E1 using the same board. Automatically configures for all supported ISDN variants.

### ISDN Call State Monitoring

Interprets the ISDN signaling protocol and reports the call states and call parameters via comprehensible API events.

### True Dual Span Capabilities

A single RJ-45 interface is capable of recording both sides of a conversation, which maximizes the usefulness of each individual port.

### On-board DSP to Complete Voice Processing

Robust call recording features combined with ISDN call control, eliminates the need for other resources on the system.

### CODEC Support

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

### High Density Passive Tap Capabilities

Operating between a central office and PBX, the SmartWORKS™ DP's high impedance receivers records both sides of a call without interrupting service. Each board can process up to 60 channels, with a maximum of 512 channels per host. Service is never interrupted even if the SmartWORKS™ DP-equipped PC is shut down.

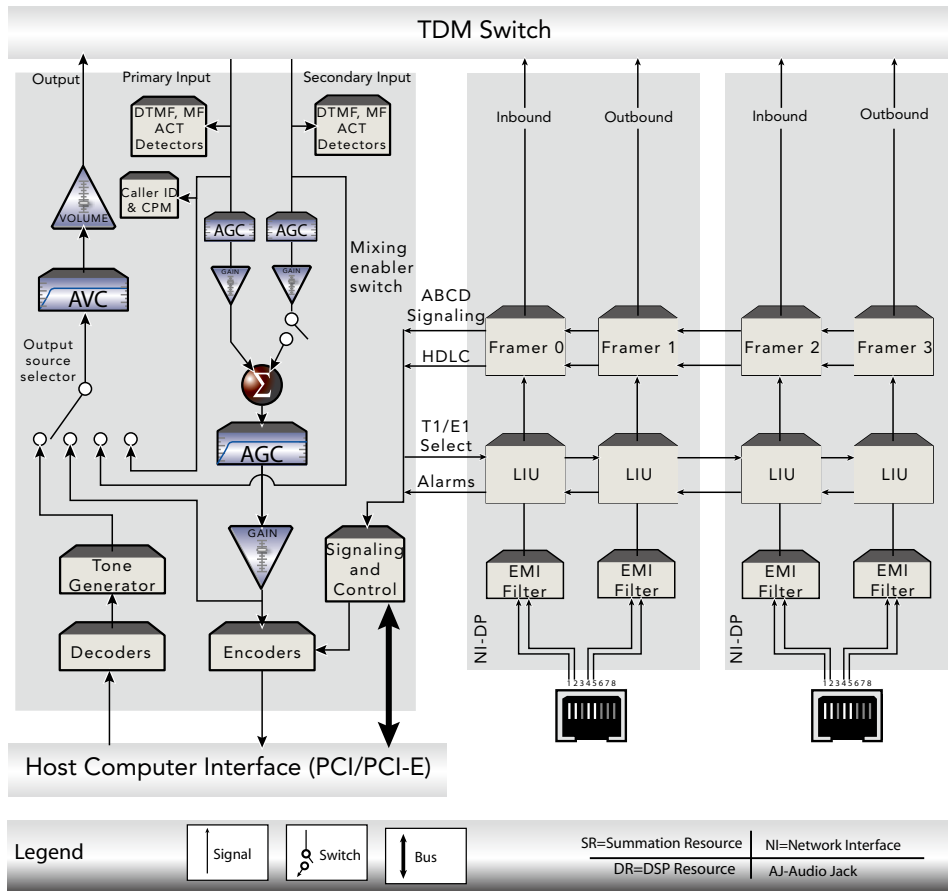
### International Protocol Support

The SmartWORKS™ DP supports Channel Associated Signaling (CAS), Non-Facility Associated Signaling (NFAS), DASS2 and any Q.931 based ISDN variant. Trunk coding and framing is selected on a per framer basis. This allows a single board to monitor two trunks, each with different settings.

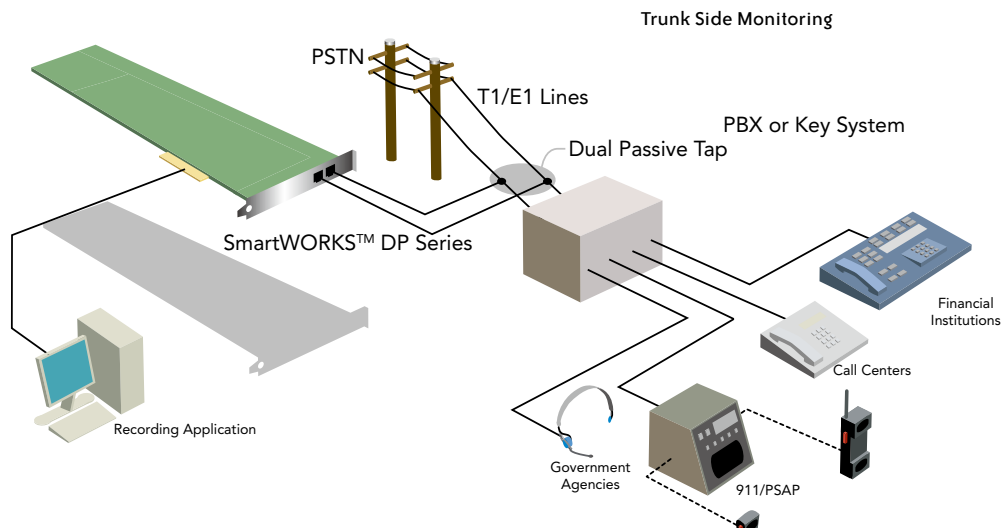
### Built in Performance Monitoring

Network conditions and call statistics are easily accessed via the SmartWORKS™ API. Event driven alarms are reported for loss of signal conditions or synchronization errors. Framing and call statistics are available through standard API function calls.

## DP Logical Card Model



## DP Application Model



Technical Specs

SMARTWORKS™ DP SERIES

## U.S.A

Somerset, NJ · 08873  
T: +1-732-469-0880

## ASIA

Shanghai, China  
Tel +86-21-5358-0108

[www.ai-logix.com.cn](http://www.ai-logix.com.cn)

### 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), Windows7 (32-bit/64-bit), Windows8 Server, Linux (Call for variant details)

### TECHNICAL SPECIFICATIONS

Max boards per system: .....Any combination  
up to 512 ports  
Max ports per system: .....Up to 512  
Resource Sharing Bus: .....MVIP or H.100  
Boards Status: .....On-board LEDs  
Clocking: .....Master/Slave

### 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 card

### POWER REQUIREMENTS (6409)

+ 3.3 VDC: .....2.8 A  
+5 VDC: .....5 mA  
-12 VDC: .....n/a  
+12 VDC: .....20 mA

### 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

### 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

### TELEPHONY INTERFACE

Trunk type: .....T1/E1  
Trunk Interface: .....Digital High  
Impedance (Z)  
AC Impedance: .....1k Ohms  
Input Impedance: .....1000 Ohm +/- 5%  
Maximum Tap Length: .....30m (100 feed) of  
CAT 3 cable  
Connectors: .....Two RJ-45  
connectors

### T1 INTERFACE

Receive Clock Rate: .....1.544 MHz +/-  
200ppm  
Transmit Clock: .....Recovered RX  
clock or 50 ppm  
Input Level: .....LBO 0dB to -22dB  
Framing: .....SF (D4), ESF  
Line Coding: .....AMI, B8ZS  
Signaling Protocol: .....ISDN, NFAS, CAS  
Clock and Data Recovery: .....Complies with  
AT&T TR62411 and  
Bellcore TA-  
TSY-000170  
Loss of Signal Detection: .....ANSI T1.231  
Alarm Detection and Integration: .....LOS, LOF, Yellow,  
and AIS per ANSI  
T1.231  
Binary Sequence Detector: .....Per ITU-T 0.151

### E1 INTERFACE

Receive Clock Rate: .....2.048 +/- 175ppm  
Transmit Clock: .....Recovered RX  
clock or 50 ppm  
Input Level: .....3.2V down to 0.45 V  
Framing: .....Basic G.704, CRC-4  
Line Coding: .....AMI, HDB3  
Signaling Protocol: .....ISDN, DASS2, CAS  
Loss of Signal Detection: .....per ITU-T G.775  
Alarm Detection and Integration: .....LOS, LOSMF, TS16,  
CRC  
Binary Sequence Detector: .....Per ITU-T 0.151

### 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  
MVIP/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)

## 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:.....	$\mu$ -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

## SAFETY AND CERTIFICATIONS

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

## MODELS AVAIABLE

DP3209/DP3209-eh: .....	Single E1/T1
DP6409/DP6409-eh: .....	Dual E1/T1

# SMARTWORKS™ DT SERIES

DIGITAL TERMINATE CARD

## 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)
- Stereo Recording with AGC
- Echo Cancellation
- Call Progress Monitoring (CPM)
- Full-duplex Channels
- Media Streaming
- Live Monitoring
- Start/Stop Call Recording Triggers



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.

The SmartWORKS™ DT provides trunk termination and call control on digital T1/E1 networks. Call Progress Monitoring (CPM), DTMF detection, voice play / record, and barge-in features makes this board an invaluable resource for interactive telephony applications.



## Key Features and Benefits

### Software Switchable T1/E1 Interface

Supports T1 and E1 using the same board. Uses software to switch the telephony interfaces to T1 or E1 on a trunk basis.

### Auto-configures for all ISDN variants

Configure to any supported ISDN variant. Save time and reduce operator error when installing and configuring the board in the field.

### ANI and DNIS

Calling and called numbers are collected from ISDN signaling packets and passed to the user application via the SmartWORKS™ API.

### On-board DSP to complete voice processing

Encoding capabilities, with a rich set of CODECS, reduces the need to purchase other hardware components.

### CODEC Support

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

## Terminate Environment

The SmartWORKS™ DT connects directly to a Central Office or PBX providing line supervision to answer and generate inbound and outbound calls. Each board processes up to 60 channels, with a maximum of 512 channels per system. Each channel has programmable volume control, tone generation, echo cancellation, and Call Progress Monitoring. Outbound dialing and call control is managed through the SmartWORKS™ API.

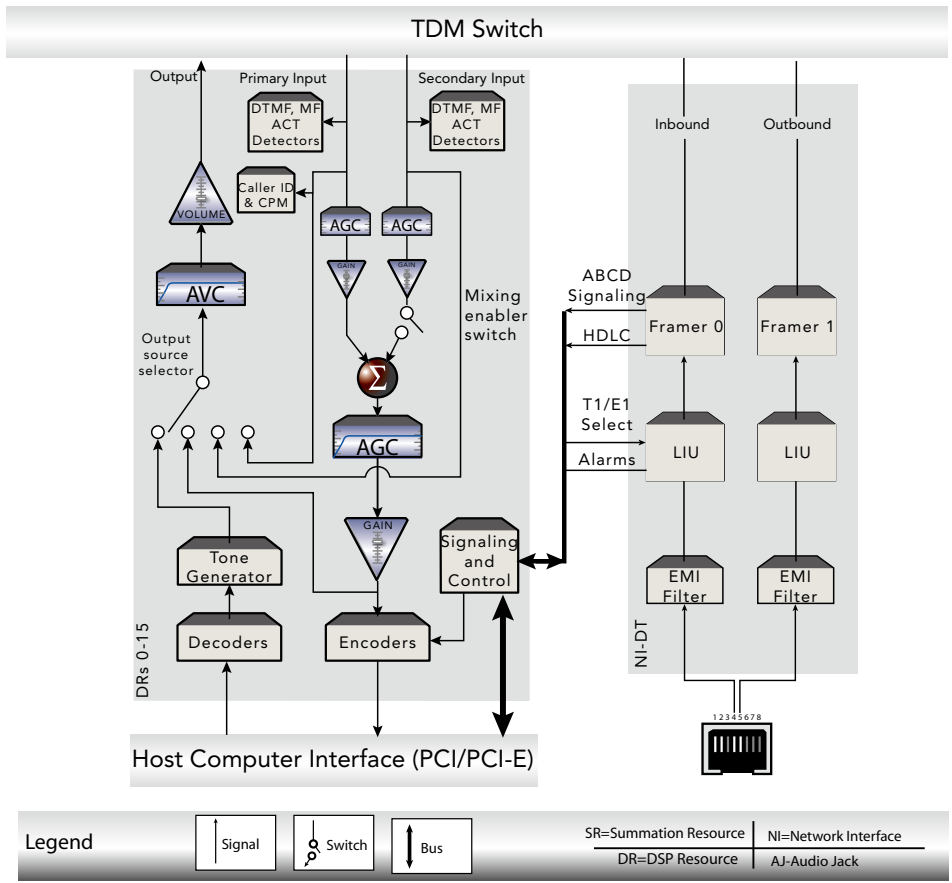
## International ISDN Support

The SmartWORKS™ DT supports Channel Associated Signaling (CAS), and any Q.931 based ISDN variant. Trunk coding and framing is selected on a per framer basis. This allows a single board to control two trunks, each with different settings.

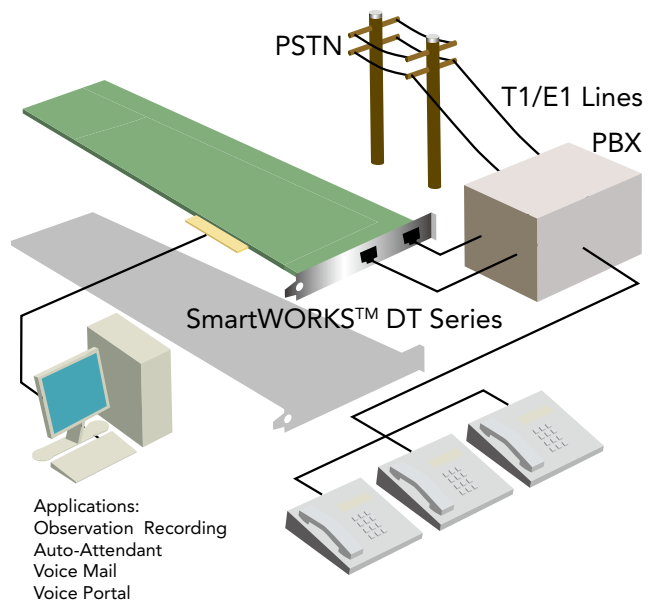
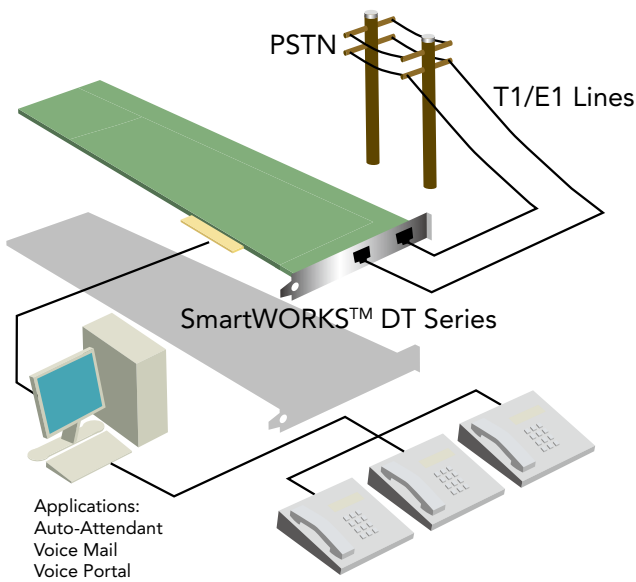
## Built in Performance Monitoring

Network conditions and call statistics are available via the SmartWORKS™ API. Event driven alarms are reported for loss of signal conditions or synchronization errors. Framer and call statistics are available through standard API function calls.

### DT Logical Card Model



### DT Application Model



Technical Specs

SMARTWORKS™ DT SERIES

## U.S.A

Somerset, NJ · 08873  
T: +1-732-469-0880

## ASIA

Shanghai, China  
Tel +86-21-5358-0108

[www.ai-logix.com.cn](http://www.ai-logix.com.cn)

### HARDWARE SYSTEM REQUIREMENTS

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

### 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, Linux  
(Call for variant details)

### TECHNICAL SPECIFICATIONS

Max boards per system: ..... Any combination up  
to 512 ports  
Max ports per system: ..... Up to 512  
Control Microprocessor: ..... Motorola Coldfire™ RISC  
(50 MHz)  
DSP ..... Multiple Texas  
Instruments  
TMS320C5409 A  
Boards errors ..... On-board LEDs  
Clocking ..... Master/Slave  
DRAM ..... 16 MB per board  
SRAM ..... 128 Kword/DSP

### ENVIRONMENTAL CONDITIONS

Operating Temperature: ..... 0C to +50C  
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 card

### 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  
Shared Memory: ..... 16 MB Global shared

### SDK

Ai-Logix Native SmartWORKS™ API  
SmartControl (Control Panel)  
SmartVIEW (card functionality test application)  
SmartWF (firmware flash update utility)

### POWER REQUIREMENTS (6409)

+3.3 VDC: ..... 2.8 Amp  
+5 VDC: ..... 5mA  
-12 VDC: ..... Not Required  
+12 VDC: ..... 20 mA

### TELEPHONY INTERFACE

Trunk Type: ..... T1/E1  
Trunk Interface: ..... Digital network  
interface  
Connectors: ..... RJ-45 connectors

### T1 INTERFACE

Receive Clock Rate: ..... 1.544 MHz +/-200ppm  
Transmit Clock: ..... Recovered RX clock or  
50 ppm  
Input Level: ..... LBO 0dB to -22dB  
Framing: ..... SF (D4), ESF  
Line Coding: ..... AMI, B8ZS  
Signaling Protocol: ..... ISDN, NFAS, CAS  
Robbed Bit Signaling: ..... E&M Immediate, E&M  
wink, FXS, FXO  
Clock and Data Recovery: ..... Complies with AT&T  
TR62411 and Bellcore  
TA-TSY-000170  
Loss of Signal Detection: ..... ANSI T1.231  
Alarm Detection and Integration: ..... LOS, LOF, Yellow, and  
AIS per ANSI T1.231  
Binary Sequence Detector: ..... Per ITU-T 0.151

### E1 INTERFACE

Receive Clock Rate: ..... 2.048 +/- 175ppm  
Transmit Clock: ..... Recovered RX clock or  
50 ppm  
Input Level: ..... 3.2V down to 0.45 V  
Framing: ..... Basic G.704, CRC-4  
Line Coding: ..... AMI, HDB3  
Signaling Protocol: ..... ISDN, DASS2, CAS  
Loss of Signal Detection: ..... per ITU-T G.775  
Alarm Detection and Integration: ..... LOS, LOSMF, TS16,  
CRC, and Yellow  
Binary Sequence Detector: ..... Per ITU-T 0.151

### 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  
Automatic Gain Control: ..... (AGC) Programmable  
from API  
Automatic Volume Control (AVC): ..... Programmable  
from API  
Activity Detection: ..... Programmable  
from API  
Alert Tone: ..... Programmable  
Frequency Response: ..... 300 - 3400 Hz (+/- 3dB)

### CALL PROGRESS MONITORING

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

# PRODUCT SPECIFICATIONS · SMARTWORKS™ DT

T1/E1 - TERMINATE

## TONE DIALING

DTMF digits: ..... 0 -9, \*, #  
A, B, C, D  
Frequency variation: ..... Less than 1 Hz  
Rate: ..... API Programmable

## 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: .....  $\mu$ -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

## DTMF/MF TONE DETECTION

DTMF digits: ..... 0 - 9, \*, #,  
A, B, C, D  
MF R2 Digits: ..... 15 Digits Forward  
& Reverse per  
Q.441  
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

## TRIGGER CONDITIONS

Event Driven: ..... Caller ID,  
Min/Max silence,  
Min/Max activity

## GLOBAL TONE GENERATION

Tone Type: ..... Single or dual  
frequency  
Frequency range: ..... 300 Hz – 3400 Hz  
Frequency resolution: ..... 1 Hz  
Duration: ..... 1 ms – 8191 ms  
programmable in  
1 ms steps  
Amplitude: ..... +3 dBm to -68 dBm  
Duration: ..... API Programmable

## VOICE PROCESSING

Echo cancellation: ..... G.165  
Caller ID: ..... V.23 & Bell 202  
DTMF Detector: ..... Primary & Secondary  
channel  
MF Detection: ..... R1 & R2

## SAFETY AND CERTIFICATIONS

Telecom: ..... DOC  
Emissions: ..... FCC Part 15 class A  
EN 55022  
Immunity: ..... EN 55024  
Safety: ..... EN 60950  
Estimated MTBF: ..... 150,000 hours per  
Bellcore Method I

## MODELS AVAILABLE

DT6409/DT6409-eh: ..... Dual E1/T1

# SMARTWORKS™ IPX SERIES

CALL RECORDING FOR IP-PBXs

## Standard Features for SmartWORKS™ IPX

- Universal PCI & PCI Express
- Two 10/100 BT ports for non-intrusive monitoring
- Target Recording
- One 10/100 BaseT active NIC
- Forwards VoIP RTP sessions to one or more network devices
- Processes all VoIP call and terminal control signaling
- SmartWORKS™ API (Common to all SmartWORKS™ boards)
- Field upgradeable
- Low to high density - call capacity up to 480 stations
- RTP timeout & RTCP QoS
- Available for Windows 2000, XP, Windows 2003 server, windows2008 server, windows7, Windows8 Server



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.

SmartWORKS™ IPX is an essential component of your call recording solution that provides packet filtering and media forwarding for IP-PBXs. It has one on-board connection for forwarding up to 480 RTP streams and two on-board connections for monitoring the IP traffic at the wire speed. When combined with the Ai-Logix HPXMedia, the IPX provides complete event triggering, call state reporting and media processing for many of the industry leading IP-PBXs.



## Key Features and Benefits

### Multiple PBX Support

The same hardware supports multiple protocols including Skinny and Avaya and is designed to accommodate future protocols such as SIP and H.323 with just a software upgrade.

### Multiple Protocol Support

The same hardware supports SIP, H.323 and Skinny (SCCP) etc. and is designed to accommodate future protocols with just a software upgrade

### Flexible Event Triggering

Applications can start and stop recording based on Ai-Logix call control or take advantage of PBX/protocol specific messages.

### RTP Timeout & RTCP QoS

IPX/HPX detect the RTP timeout, when exceed the time set in the SmartControl, the IPX/HPX regard this call is already ended and report the ""EVT\_MEDIA\_SESSION\_STOPPED"" to user application. This feature can avoid the lost packet cause the recording problem.

### Tapping Environment

The IPX is designed for IP call recording applications. It's active interfaces can be connected directly to an available mirror port or, when used in conjunction with a TX100/TX1000, can be connected passively anywhere within the IP-PBX configuration.

Up to 480 media sessions per board can be monitored at a time.

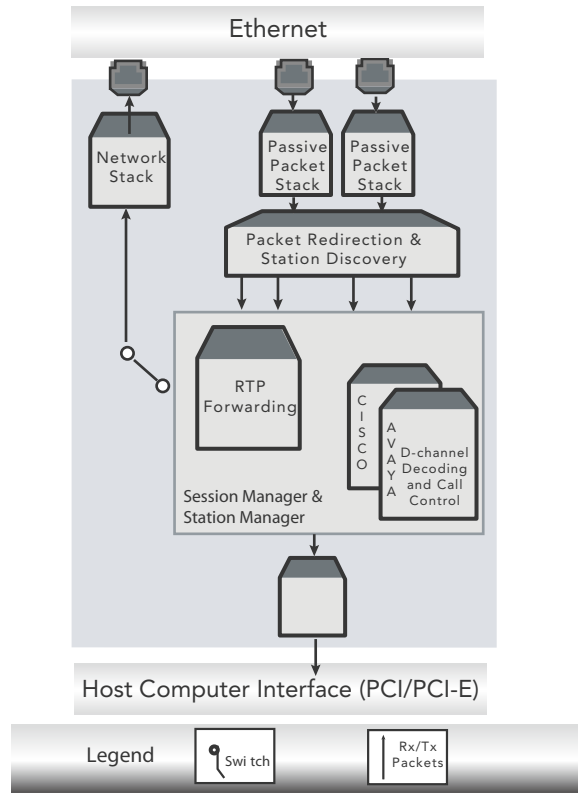
### Session Management

The IPX software includes a Session Manager for tracking media sessions on the IP network. Each media session is treated as a unique call with a unique Session ID. Your application can easily manage media forwarding with the Session IDs provided by the IPX.

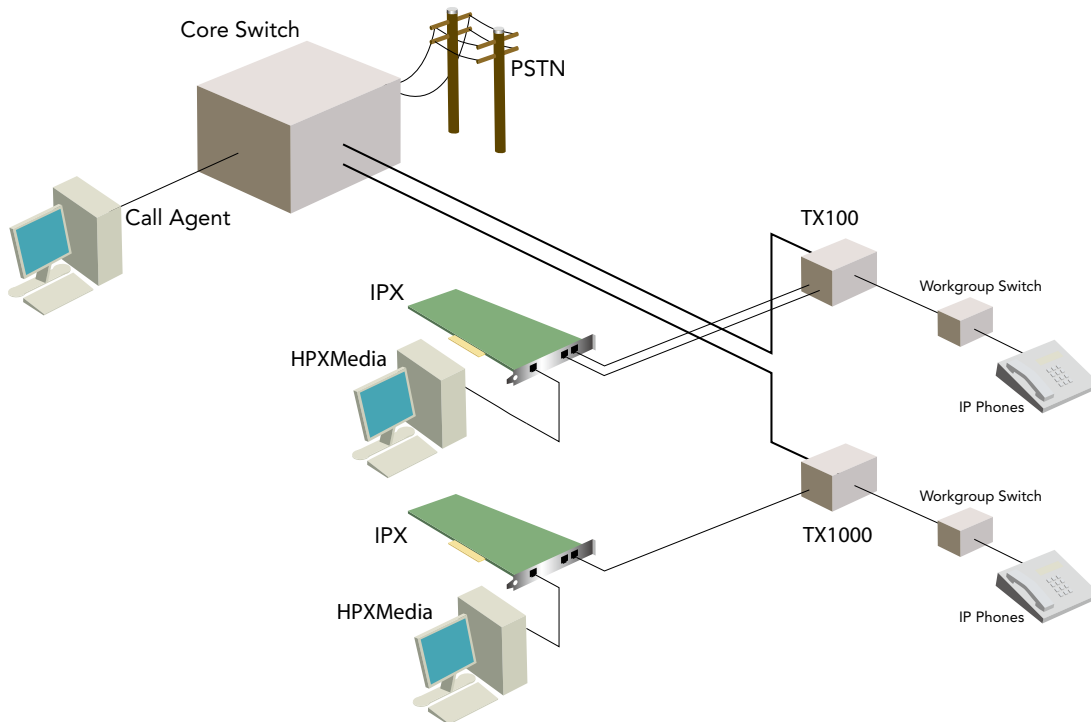
### Station Management

Automatically locates all VoIP endpoints on the network and assigns each a unique Station ID. IPX software dynamically identifies phones as they are added to the network and reports when they are removed.

### IPX Logical Card Model



### IPX Application Model



Technical Specs

SMARTWORKS™ IPX

## U.S.A

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## ASIA

Shanghai, China  
Tel +86-21-5358-0108

[www.ai-logix.com.cn](http://www.ai-logix.com.cn)

### HARDWARE SYSTEM REQUIREMENTS

Dual Core 1.6 GHz ATX PCI motherboard or passive back-plane with 3.3V ATX power supplier PCI2.2/PCI3.0/PCI-X/PCI-E bus · Bus speed: 33 or 66 MHz · Bus mode: 32 bits

### OPERATING SYSTEMS

Windows2000 Professional/Server  
WindowsXP Professional (SP3)  
Windows2003 server (32-bit/64-bit)  
Windows2008 server (32-bit/64-bit)  
Windows7 (32-bit/64-bit)  
Windows8 server

### TECHNICAL SPECIFICATIONS

Max. board per system: ..... 8  
LEDs: ..... 3 LEDs - board state  
1 LED - host to board communication  
2 LEDs per Ethernet port

### ENVIRONMENTAL CONDITIONS

Operating Temperature: ..... 0C -- +50C  
Storage Temperature: ..... -20C -- +85C  
Humidity: ..... 8% -- 80%  
Storage humidity: ..... 8% -- 80%

### PHYSICAL CHARACTERISTICS

Form factor: ..... Full size PCI card & half size PCI-express card  
Host interface: ..... PICMG 2.3  
Bus speed: ..... 33 or 66MHz  
Bus Mode: ..... 32 bits  
Ethernet Interface: ..... Complies with 802.3 10/100Base-T  
Connector: ..... 3xRJ45

### VOIP PROTOCOLS

Cisco Call Manager (Skinny)  
Avaya Office Manager (H.323) , IP Office  
Ericsson (H.323)  
Nortel (Unistem/SIP)  
SIP (Station Side/ Trunk Side)  
H.323 (Station Side/ Trunk Side)  
Alcatel OmniPCX 4400  
Siemens Hi-Path 4000  
Intertel CS-5200  
NEC NEAX 2400  
ShoreTel (VOX only)  
Alcatel OXE  
Panasonic TDE/NCP  
Astra NexSpan XS  
LG iPECS  
NEC SV8X00  
Others: Contact Ai-Logix Sales.

### POWER REQUIREMENTS

3.3 V: ..... TBD  
+5V: ..... TBD  
+12V: ..... TBD  
-12V: ..... TBD

### SAFETY AND CERTIFICATIONS

Emissions: ..... EN55022, FCC part 15 class A  
Immunity: ..... EN55024  
Safety: ..... EN60950

### MODELS AVAILABLE

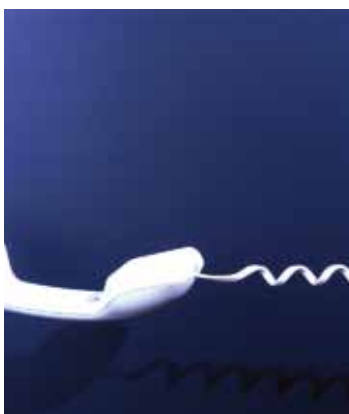
SmartWORKS™ IPX-C  
SmartWORKS™ IPX-EX  
SmartWORKS™ HPXMedia  
TX100/TX1000

# SMARTWORKS™ HPX

CALL RECORDING FOR IP PBXs

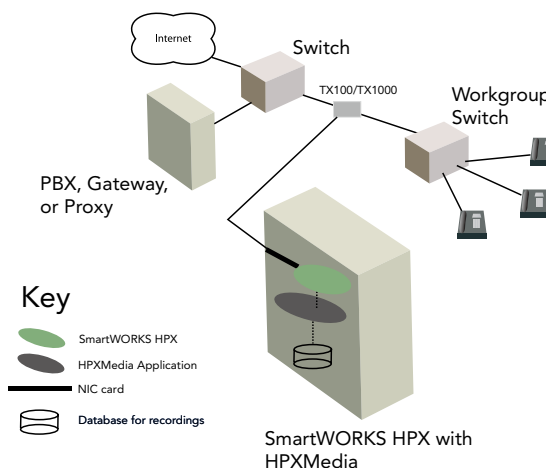
## Standard Features for SmartWORKS™ HPX

- Eliminates need for hardware
- Multiple PBX/Protocol Support
- Runs without a PCI slot
- Flexible Event Triggering
- RTP Forwarding
- Watchdog
- Packet Filtering
- Packet Capture
- Target Recording
- RTP timeout & RTCP Qos



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.

SmartWORKS™ HPX is an essential component of your call recording solution that provides packet filtering and media forwarding for IP-PBXs. The HPX is designed to service low to medium density solutions and is capable of monitoring and forwarding 480 concurrently active calls. When combined with the HPXMedia, the HPX provides complete event triggering, call state reporting and media processing for many of the industry leading IP-PBXs.



## Key Features and Benefits

### Tapping Environment

The HPX is the first software only SmartWORKS™ blade. The host computer's NIC card can be connected directly to an available mirror port. When used in conjunction with a TX100/TX1000, it can be connected passively anywhere within the IP-PBX configuration.

### Session Management

The HPX includes a Session Manager for tracking calls and media sessions on the IP network. Each media session is treated independently with a unique session ID. Your application can easily manage call forwarding with the session IDs provided by the HPX software using the SmartWORKS™ API.

### Station Management

Automatically locates all VoIP stations on the network and assigns a unique ID to each endpoint. HPX dynamically identifies phones as they are added to the network and reports when they are removed.

### RTP Timeout & RTCP QoS

IPX/HPX detect the RTP timeout, when exceed the time set in the SmartControl, the IPX/HPX regard this call is already ended and report the ""EVT\_MEDIA\_SESSION\_STOPPED"" to user application. This feature can avoid the lost packet cause the recording problem.

## Product features

- Uses SmartWORKS™ API
- Supports 10/100/1000 network interfaces
- Decodes proprietary VoIP signaling as well as standard SIP and H.323
- Scalable - 1 to N Sessions support per server. 480 session support tested and certified. HPX performance limited by Server capabilities and Network bandwidth. It may be possible to exceed 480 sessions

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## HARDWARE SYSTEM REQUIREMENTS

Dual Core 1.6 GHz CPU , 1 Gig RAM or better for 100 conversations

## 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

## VOIP PROTOCOLS

Cisco Call Manager (Skinny)  
Avaya Office Manager (H.323) , IP Office  
Ericsson (H.323)  
Nortel (Unistem/SIP)  
SIP (Station Side/ Trunk Side)  
H.323 (Station Side/ Trunk Side)  
Alcatel OmniPCX 4400  
Siemens Hi-Path 4000  
Intertel CS-5200  
NEC NEAX 2400  
ShoreTel (VOX only)  
Alcatel OXE  
Panasonic TDE/NCP  
Astra NexSpan XS  
LG iPECS  
NEC SV8X00  
Others: Contact Ai-Logix Sales.

## RTP FORWARDING

Certified for forwarding 480 full duplex media sessions

## APPLICATION PERFORMANCE

Capacity to monitor from 1 to N active VoIP endpoints limited by license. Certified for 480 Monitoring and Forwarding HPX performance limited by Server capabilities and Network bandwidth. It may be possible to exceed 480 sessions

## MODELS AVAILABLE

SmartWORKS™ HPX  
SmartWORKS™ HPXMedia  
TX100/TX1000

# SMARTWORKS™ HPX MEDIA

VoIP RECORDING DEVICE

## Standard Features for SmartWORKS™ HPX

- Low/High Density VoIP Recording
- Automated Stop Recording
- Media Control - CODECS
- DTMF Tone Detection (RFC 2833)
- Programmable Jitter Buffer
- Full-duplex Recording
- Stop Recording Triggers
- Streaming to Remote Destination
- File Offset (recording)
- Single Side recording



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SmartWORKS™ HPXMedia recorder, a host based recording solution, has been designed to work with the Ai-Logix IPX or HPX product.

The IPX/HPX monitors the line for signaling , plus forwards all RTP media to the recorder for processing.



## Key Features and Benefits

### VoIP Call Recording

Supports multiple CODECs commonly used on VoIP networks. Encoding support of both low/high bit rate formats with .WAV header support.

### High Density Architect

The HPXMedia is designed to create a high density recording solution by offering recording capabilities up to 480 conversations per server. Communicates over TCP/IP allowing for a geographically separate installations of multiple servers (under development).

### Automated Termination of Recording

The HPXMedia API provides programmatic control of termination conditions while recording. Provides maximum time and file size (bytes) conditions to control the automated termination of recording.

### Automatic Summation

Complete support of full-duplex recording. Once recording is initiated the HPXMedia automatically sums the conversation without application management.

## U.S.A

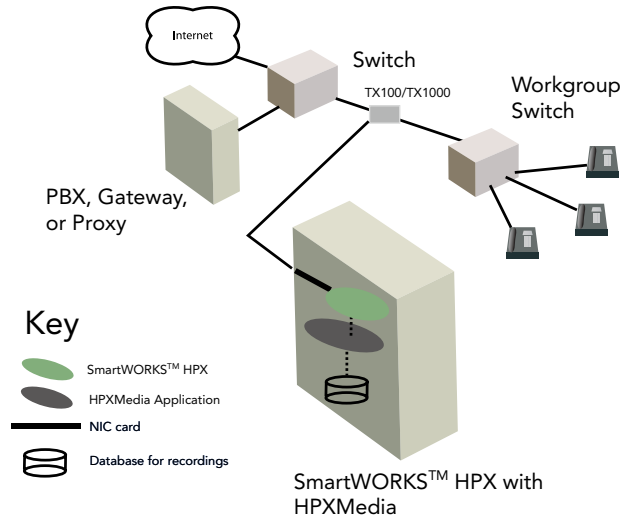
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## HPXMedia Application Model



### HARDWARE SYSTEM REQUIREMENTS

Dual Core 1.6 GHz CPU , 1 Gig RAM or better for 100 conversations

### 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

### TELEPHONY INTERFACING

IP Interface ..... Designed to support RFC 3550  
 Jitter Buffer ..... Programmable jitter buffer  
 RTP Port Management ..... The HPXMedia supports any number management skema, no restrictions apply  
 CODECS ..... RAW, WAV file formats  
 PCM, G.711, G.729A, G.723 & GSM. Other LBR CODECS available, contact Product Manager for details

### SOFTWARE

SDK ..... SmartWORKS API · License Key Utility  
 DTMF Tone Detection ..... DTMF digits: 0 - 9, \*, #, A, B, C, D · Primary & Secondary stream - out-of-band RFC 2833  
 Audio Digitizing ..... Microsoft GSM &  $\mu$ -law or A-law per G.711  
 Gain Control ..... Programmable gain can be set per each input (upstream/downstream)  
 Recording Termination ..... Automatic stop record upon maximum time and file size (bytes)

### MODELS AVAILABLE

SmartWORKS™ IPX  
 SmartWORKS™ HPX  
 SmartWORKS™ HPXmedia  
 TX100/TX1000

### SERVER CONFIGURATIONS (IPX/HPX+HPXMEDIA)

<p><b>1-150 Channel</b></p> <ul style="list-style-type: none"> <li>• Windows2008 32bit</li> <li>• Quad Core 2GHz</li> <li>• 3Gb Memory</li> <li>• 250Gb 7200 RPM C:\</li> <li>• Dual Gb NIC (HPX)</li> <li>• PCIe slots (IPX)</li> <li>• 1 USB Port</li> <li>• YMT 7 slot PCI Expansion Chassis (Option)</li> </ul>	<p><b>1-300 Channel</b></p> <ul style="list-style-type: none"> <li>• Windows2008 32bit</li> <li>• Quad Core 2GHz</li> <li>• 4Gb Memory</li> <li>• 250Gb 7200 RPM C:\</li> <li>• Dual Gb NIC (HPX)</li> <li>• PCIe slots (IPX)</li> <li>• 1 USB Port</li> <li>• YMT 7 slot PCI Expansion Chassis (Option)</li> </ul>
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# ACCESSORY: TX100

FOR USE WITH IPX

## Standard Features for

### TX100

- Provides 2 active connections to network monitoring equipment
- Separate connections for monitoring upstream and downstream traffic
- Passive access point to 10/100BaseT network devices and traffic
- Network transparent, this device does not require a Mac/IP address
- Compatible with all major manufacturer's network equipment
- Redundant power supply option provides fault tolerance for logging



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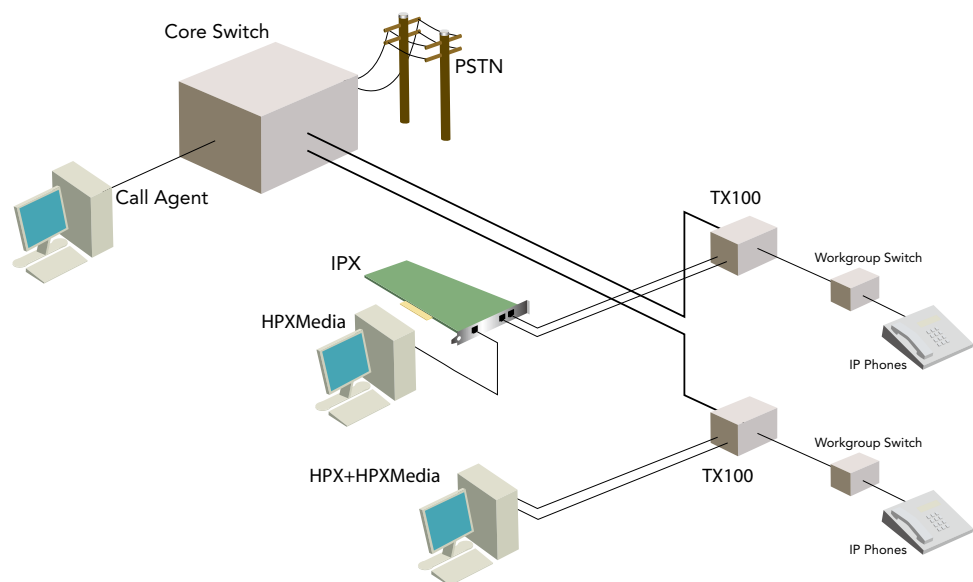


## Key Features and Benefits

The TX100 provides access to a gigabit network with connections to 10/100 monitoring equipment such as a SmartWORKS™ IPX. It can be placed anywhere in the configuration between two network devices.

The traffic from the access point is amplified and balanced for connection to network monitoring equipment. Upstream and downstream traffic are separated for improved application flexibility.

## TX100 Application Model



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An AudioCodes Company

# ACCESSORY: TX1000

FOR USE WITH IPX

## Standard Features for TX1000

- VLAN Filtering Support on Mirror ports
- Power Over Ethernet (PoE) relay
- 10/100/1000 network interfaces
- Redundant Power Supply (optional)
- Network Transparent
- Full-Duplex Monitoring
- Auto-Negotiation
- Rack Mountable (optional)
- VLAN Configurable
- Power Over Ethernet (PoE) relay



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**Ai-Logix**  
An AudioCodes Company



## Key Features and Benefits

The TX1000 provides access to a gigabit network with connections to 10/100/1000 monitoring equipment such as a SmartWORKS™ IPX. It can be placed anywhere in the configuration between two network devices. Advanced switching capabilities allows for filtering not available on other Gigabit tapping products.

### Mirror Port Output

Upstream and downstream traffic can be maintained as separate streams or aggregated to a single output port.

### Fail Over Technology

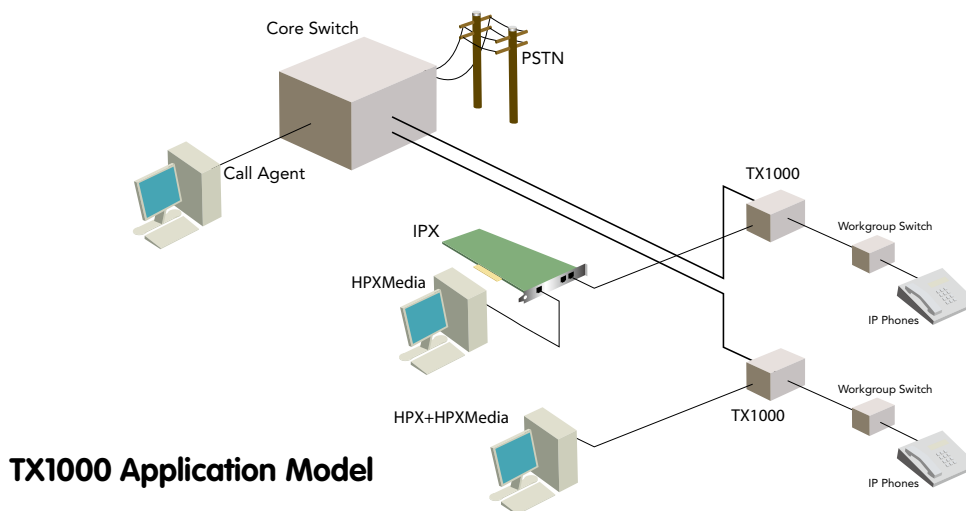
Designed with pass through circuitry, the TX1000 does not introduce a point of failure in the network even if there is no power to the device.

### Relay Technology

Relay capabilities will not break the Power Over Ethernet (PoE) circuit of the monitored line even in the event of power loss to the TX1000. PoE support means that endpoints will not lose power supply on PoE enabled networks

### Network Transparent

The TX1000 does not require a MAC or IP Address, therefore; will not be visible to your customer's equipment.



TX1000 Application Model

Technical Specs →

TX100 / TX1000

# PRODUCT SPECIFICATIONS · TX100 / TX1000

## PHYSICAL REQUIREMENTS

TX100 / TX1000

Dimensions ..... 3.2cm H x 14.1cm W x 13.3cm D  
Form Factor ..... Rack mounted (optional 3 card rack mount available)  
Power Supply ..... Dual 12VDC/200mA

## LEDs

(1) power indicator  
(2) traffic activity indicators

## CONNECTORS

Network Ports two 10/100 RJ45  
Tap Out Ports two 10/100/1000 RJ45  
specifications  
IEEE 802.3 compliant shielded 8-pin

## CABLING

CAT 5 (straightthrough)

## SAFETY AND CERTIFICATIONS (PENDING)

Safety: ..... IEC60950-1 (pending)  
EMI: ..... EN55022:1994 + A1:95 + A2:97, EN55024:1998 + A1:01 +  
A2:03 and FCC CFR 47 part 15 subpart B: 2005

## MODELS AVAILABLE

TX100/TX1000  
TX100/TX1000 Power Supply  
TX100/TX1000 Blank Panel



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