Audio In Building Automation

Click here for more information about TI Audio

Control Panels - Application Specific Value

Subsystem	Feature Focus	Part to start with	Why this part
Voice input/voice communication	Voice Control/Telecom	Codec(full featured): TLV320AIC3262 Codec(basic): TLV320AIC3104	AIC3262 – Has maximum # of i/os, can drive a speaker, on-chip miniDSP, minimum power AIC3104 – Low Cost, Low Power, Microphone Support
Audible feedback	Drive a speaker	Codec(full featured): TLV320AIC3262 Codec(basic): TLV320AIC3101 Amplifier: TAS5720	AIC3262 – See above AIC3101 – Low Cost, Low Power, Can also drive a speaker TAS5720 – High Quality, Cost effective, Designed for mono speaker systems, loudness

Click here for more information about TI Audio

Surveillance - Application Specific Value

Subsystem	Feature Focus	Part to start with	Why this part
IP Cameras	Capture External Audio while driving a speaker or alarm	CODEC: TLV320AIC3101 CODEC(w/o speaker): TLV320AIC3104 ADC(line powered): PCM1808 ADC(battery powered): TLV320ADC3101	• AIC3101 – Low power codec and can also drive a speaker • AIC3104 – Pin to Pin compatible with 3101 but can't drive speaker • PCM1808 – Low Cost high quality • ADC3101 – Low Cost, Low Power
Network Video Recorders (NVR) Digital Video Recorders (DVR)	Digitalize Recordings	ADC: PCM1808	PCM1808 – Low Cost high quality

Click here for more information about TI Audio

Elevators - Application Specific Value

Subsystem	Feature Focus	Part to start with	Why this part
Emergency Phone	Talk in, Sound out	TLV320AIC3104	Lowest cost and covers basics with microphone support
Music Speaker	Amplify music while minimizing space/cost	TAS5720	High Quality, Low Cost, Focused for mono speaker applications for minimal space/cost and maximum quality

Click here for more information about TI Audio

Fire and Security Systems - Application Specific Value

Subsystem	Value Added	Part to start with	Why this part
Speaker Alarm	Hear voice commands with maximum loudness with a single speaker	TAS5720	High Quality, Low Cost, Focused for mono speaker applications for minimal space/cost and maximum quality
Telecommunication/ Ecall	Digitalize Voice audio to be send and convert received digital audio to analog to play through speakers	TLV320AIC3104	Lowest cost and covers basics with microphone support

*Also see recommendations for control panels and Surveillance

Click here for more information about TI Audio

A/V Distribution- Application Specific Value

Subsystem	Value Added	Part to start with	Why this part
Digital audio transmission	Enable S/PDIF inputs	PCM9211	Has numerous I/Os including: • 1 x 101dB Stereo ADC, 12x S/PDIF inputs, 3x Aux PCM Data (e.g. I2S), S/PDIF Transceiver, 14 Multipurpose I/Os

Analog Transmission	Digitalize Recordings	• ADC:
		  • PCM1808
		• DAC:
		  • PCM5242
		• CODEC (basic):
		  • TLV320AIC3104
		• CODEC (w/DSP):
		  • TLV320AIC3254
			• PCM1808: Low Cost high quality
			• PCM5242: Very high quality part with miniDSP
			• AIC3104: Low Cost, Low Power, and Microphone support
			• AIC3254 – All advantages of 3104 and has miniDSP

Video Conferencing- Application Specific Value

Subsystem	Value Added	Part to start with	Why this part
Audio Capture and Playback	Digitalize Voice audio to be send and convert received digital audio to analog to play through speakers	CODEC: TLV320AIC3104 Amp: TAS5766	AIC3104 - Lowest cost and covers basics with microphone support TAS5766 – Closed loop amplifier system designed using feedback to get the best quality from any speaker/system

Click here for more information about TI Audio

Feature Specific Value

Feature	Possible Application	Part to start with	Why this part
Voice Control	Lights, Control Panels, All in one controller (Echo/Google Home), Televisions	ADC: TLV320ADC3101	ADC3101-Low Cost, Low Power, miniDSP, Proven Solution
Drive a single speaker	Control Panels, Speaker Sounder	TAS5720	High Quality, Low Cost, Focused for mono speaker applications for minimal space/cost and maximum quality
Smart amp	Get professional level tuning done automatically to design any sound or get the same sound out of less expensive speakers	TAS5766	Closed loop amplifier system designed using feedback to get the best quality from any speaker/system

Click here for more information about TI Audio

Recommended Component Overviews (Amps)

TAS5720: 15W Mono Closed Loop I2S Amplifier With TDM Support up to 8 Channels

Feature

- 15Wx1 @17V/4ohm
- Supports 8kHz to 96kHz sample rates
- Closed loop amplifier with flexible switching frequencies
- Low BOM cost
- Multi channels support up to 8 channels
- Very High performance for THD+N, idle noise, X-talk

Building Automations Applications

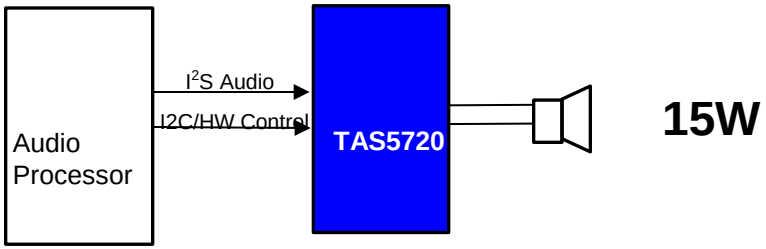
- Anything that needs to run a single speaker
  - Control panels or camera playback

Why choose this part

- Low-cost solution for mono speaker applications

Benefit

- Fits majority of mid-power home applications
- Flexibility to accept multiple sources
- Improved EMI, reduced filtering requirements and low BOM count
- Integrated solution reduces board space
- Flexibility to support up to 8 channels
- Meet high performance requirements for end system



TAS5766M
20W Class-D Stereo PurePath™ Smart Amp

Features

- **PurePath™ Console Feed Forward Protection Algorithms**
- **Smart Amp characterization and tuning tools**
- 20W/4Ω/12V continuous and 50W/4Ω/24V peak (10% THD+N)
- Wide 4.5V to 26V supply voltage operation
- Available in two 12.5x6 TSSOP and 5x7mm QFN packages

Benefits

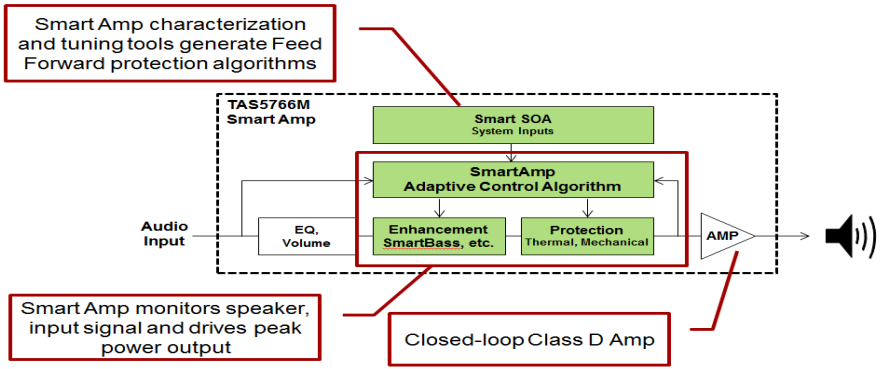
- **10-15dB increase of sound pressure level while protects speakers**
- **Fast speaker modeling to improve performance**
- High peak power to delivers clarity and loudness
- Works in 12V, 24V and 2S battery systems
- TSSOP for maximum thermal performance, QFN

Building Automation Applications

- A/V Conferencing Equipment

Why choose this part

- Expert level turning done automatically
- Use less expensive speakers for the same sound



Recommended Component Overviews (ADCs)

TLV320ADC3101: Low-Power Stereo ADC with miniDSP and with Digital Mic Support

Shaping Innovation

Feature

- Variable, Low-Power Recording:
- 6 – 10mW mono record
- 11 – 17mW stereo record
- miniDSP to support fully programmable filters (>20 biquads)
- Support for both analog and digital microphones
- Integrated PLL with a range of 512KHz to 50MHz

Benefit

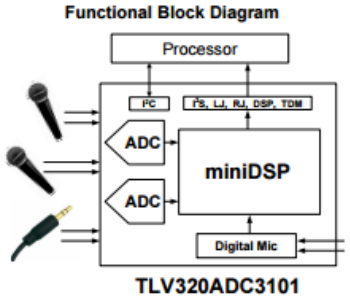
- Longer battery life, or less expensive batteries
- Easily match digital filtering and sound shaping to system requirements (i.e. mic or line in equalization)
- Digital mic improves system level noise immunity (10dB+ better SNR)
- Integrated PLL simplifies layout and lowers system cost

Building Automation Applications

- Voice Control

Why choose this part

- Use this part if you need a low power ADC that also has DSP capabilities



PCM1808: 99dB SNR Stereo ADC with Single-Ended Inputs

Shaping Innovation

Feature

- 99dB Dynamic Range with -93dB THD+N
- Includes a digital decimation filter and high-pass filter
- Supports master and slave modes and four data formats in serial interface
- Includes feature to halt the system clock

Building Automation Applications

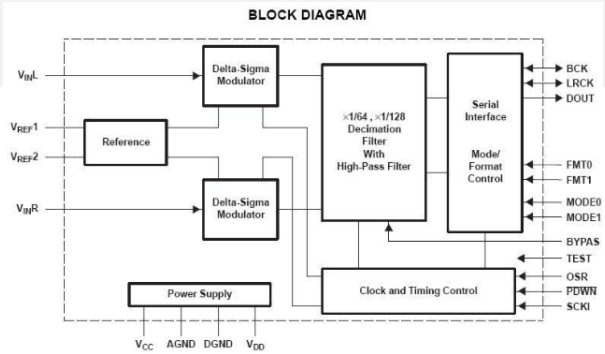
- IP Cameras
- NVR/DVR

Why choose this part

- This is the go-to for a basic ADC, it is low cost but Burr-Brown quality

Benefit

- High performance Audio
- Helps remove the DC component of the input signal
- Suitable for a wide variety of consumer applications
- Supports power-down and reset function



PCM9211: Multisource Analog/Digital Audio router

Feature

- Inputs include:
- 1 x 101dB Stereo ADC
- 12 x S/PDIF inputs
- 3x Aux PCM Data (e.g. I2S)
- 192kHz S/PDIF Transceiver with Ultra Low Jitter (50pS)
- 14 Multipurpose Input and Output pins: DIR Flags, Aux Digital Audio I/O, DIT I/O
- HS, SPI, or I2C Control

Building Automation Applications

- Control Panels
- AV Receivers

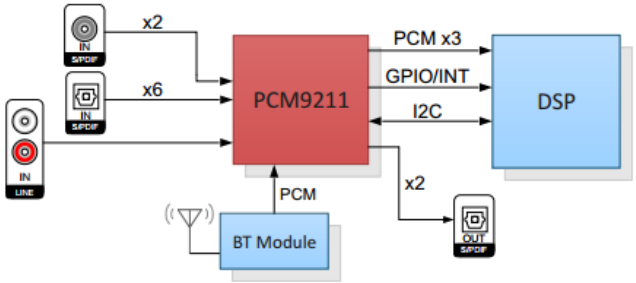
Why choose this part

- This is the go-to part for anything that requires SPDIFF inputs

Benefit

- Complete front end for analog, S/PDIF and I2S sources.
- High performance clock regeneration lowers high frequency distortion with 4x lower jitter than the leading competition
- Flexibility to customize the digital I/O to your systems architecture. Find a balance between S/PDIF sources and I2S sources.
- Easy to use in different systems, configure on the fly with SPI, I2C, or set and forget with H/W mode!

Simplified Application Schematic



Recommended Component Overviews (DACs)

PCM1690: 113dB SNR 8-Channel Audio DAC with Differential Outputs

Feature

- 33-level Current Segment DAC Architecture.
- D-Range/SNR: 113dB
- THD+N: -94dB
- Differential Voltage Output
- Aanalog Mute Circuit with Clock Halt Detectrion
- TDM Format Support
- SPI/I2C/Hardware Control

Applications

- AV Receiver

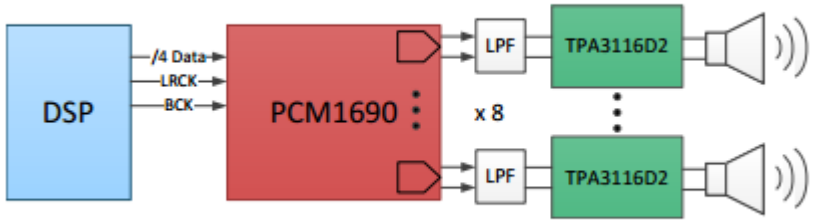
Why choose this part

- Use this part if you need a DAC with a lot of outputs

Benefit

- High Quality Sound with good Jitter Sensitivity & PSRR.
- Reduce Audible Noise under unstable clock conditions
- Simplify Multi Channel Digital Audio Interface

Simplified Application Diagram



PCM5242

Differential output DAC with open processing capability

Features

- Up to 114dB Dynamic Range
- Fully programmable miniDSP
- Differential drive for best CMRR with in-system amplifier
- Advanced mute circuitry with clock error and UVP detection
- Integrated Audio PLL
- Single 3.3V power supply w/ DirectPath™

Benefits

- Superb performance
- Graphically programmable audio processing for the best audio experience
- Best performance and noise cancellation
- Soft volume ramp and analog mute

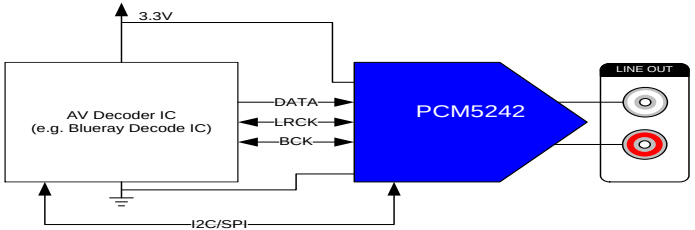
- Run from non-audio clock sources
- Ground biased output requires no DC Blocking Caps

Building Automation Applications

- A/V distribution

Why choose this part

- Choose if you need a high quality DAC with miniDSP



Recommended Component Overviews (CODECs)

TLV320AIC3104: Low Power Stereo Audio Codec

Feature

- Low-Power: 14mW stereo 48ksps playback
- Integrated PLL (512kHz to 50MHz input clock)
- Programmable digital audio Bass/Treble/EQ/De-emphasis/3-D
- Microphone Input with Bias, Preamp, AGC
- Programmable Notch Filtering

Benefit

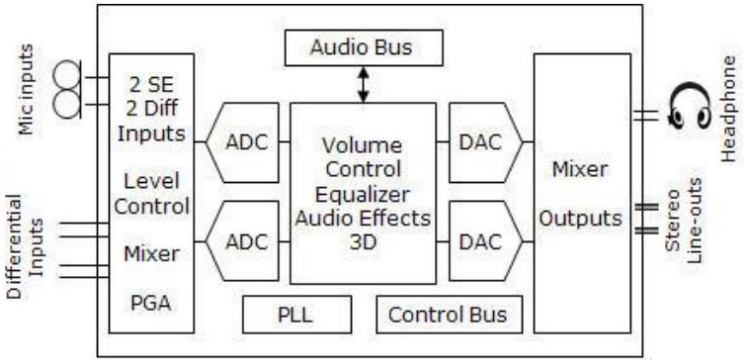
- Allows for longer playback or smaller batteries
- No need to add an external PLL: decreases board cost and size
- Improves audio by equalizing the signal to the load
- Flexible Interfaces and ability to multiplex devices
- Seamless Interface to Electret Microphones
- Eliminate motor and CCD noise in DSCs

Building Automation Applications

- AV Receiver

Why choose this part

- This is the go to Audio Codec, it is lowest cost while maintaining audio quality and power efficiency



TLV320AIC3101: Low Power Stereo Audio Codec with stereo speaker amps

Feature

- Low-Power: 14mW stereo 48ksps playback
- Stereo class-AB speaker amplifier integrated
- Integrated PLL (512Khz to 50MHz input clock)
- Programmable digital audio Bass/Treble/EQ/De-emphasis/3-D

Benefit

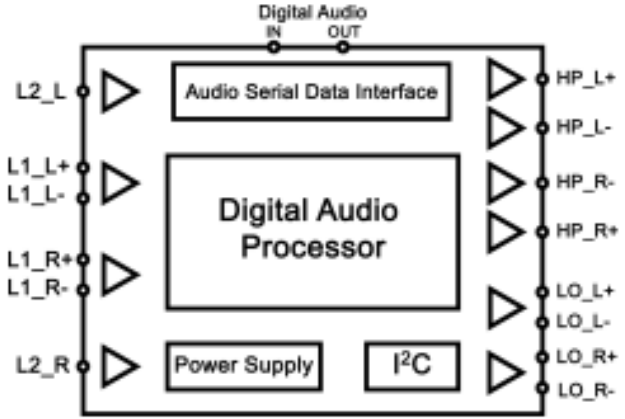
- Allows for longer battery life
- Improves audio by equalizing the signal to the load

Building Automation Applications

- IP Cameras
- Control Panels

Why choose this part

- Choose this part if you need to run a speaker off the codec



TLV320AIC3262 (with miniDSP) and TLV320AIC3212 (no miniDSP): Stereo CODEC with Integrated Amplifiers, 3x I2S Interfaces with miniDSP

Features

93dB SNR

- DirectPath™ headphone amplifier
- Differential receiver output amplifier
- Stereo Class-D speaker amplifiers
- Fully programmable miniDSP (AIC3262 Only)
  - Includes PurePath Studio support
- Stereo digital and analog microphone inputs
- Three independent digital audio serial interfaces

Benefits

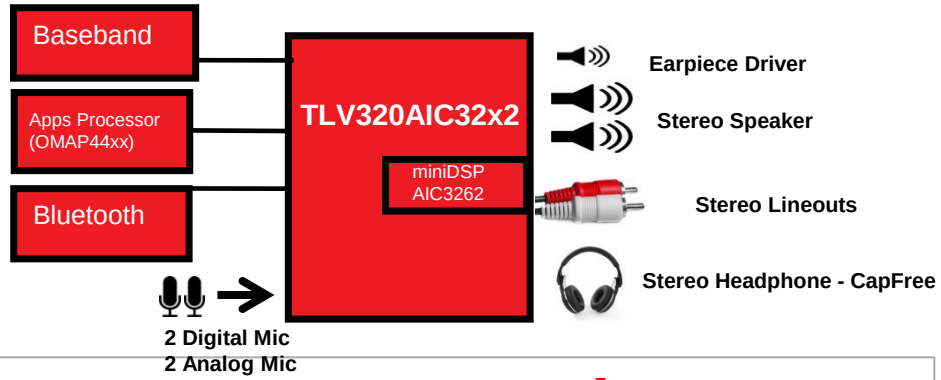
- Excellent playback/record fidelity
- No HP output capacitors
- Integrated receiver amplifier reduces solution size
- High efficiency integrated speaker amplifiers
- Extensive signal processing options
  - Easy to use programmability and validation
- Dual-mic support for noise cancelling algorithms
- Connection to apps processor, modem, and Bluetooth
- Compact solution size

Building Automation Applications

- Control Panels
- All in one cameras

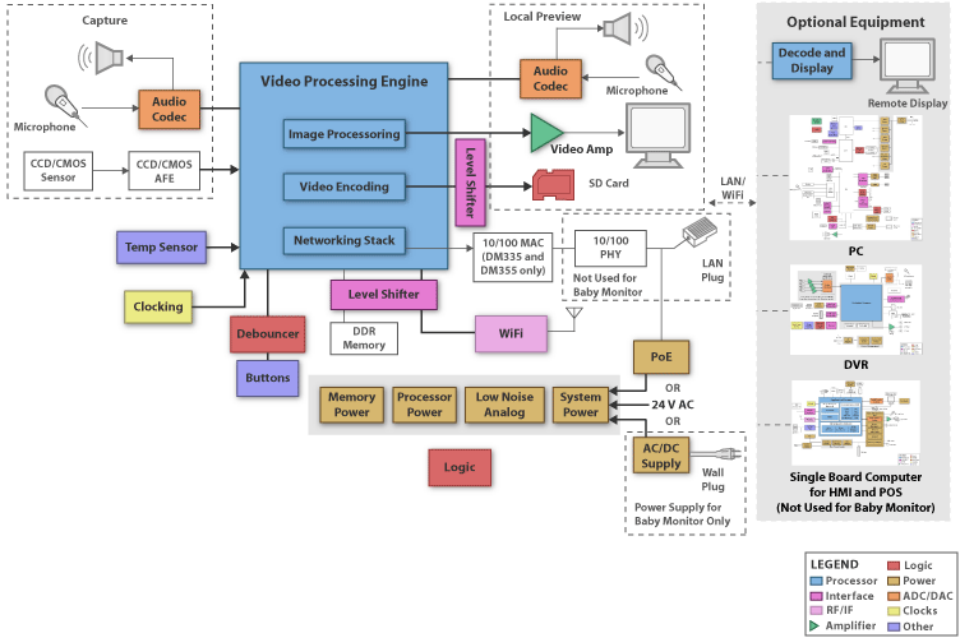
Why choose this part

- Choose this part if you want an all in one part with miniDSP, speaker driver, and maximum i/os



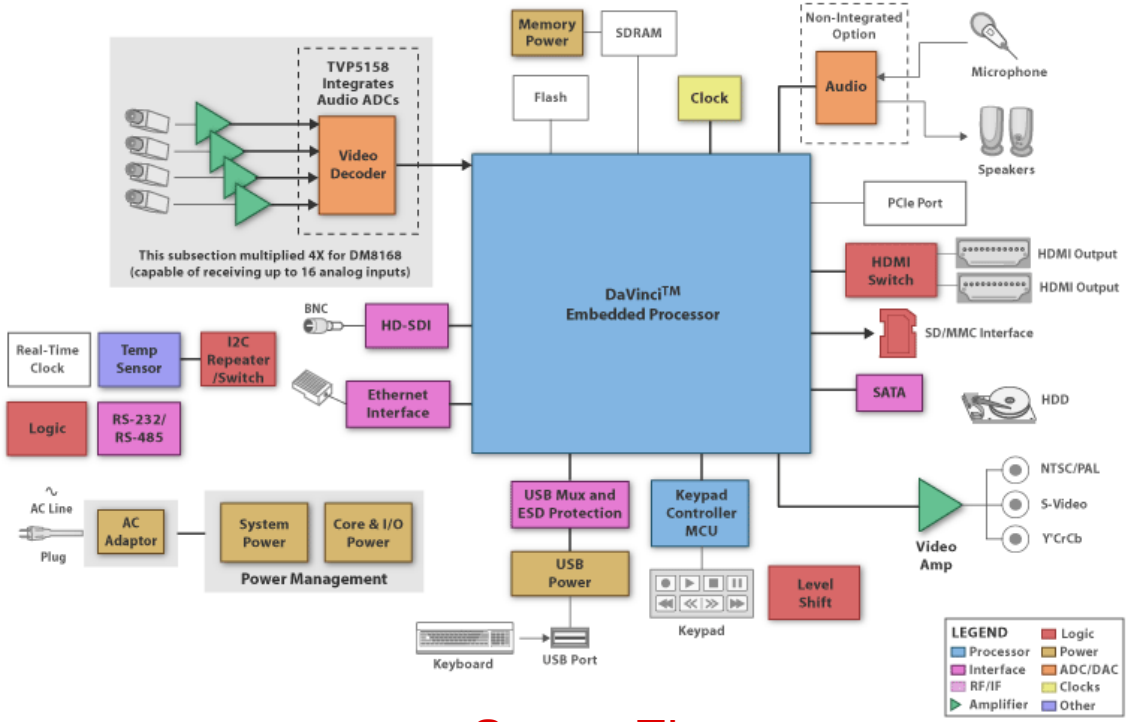
Block Diagrams from TI.com

Video Doorbell



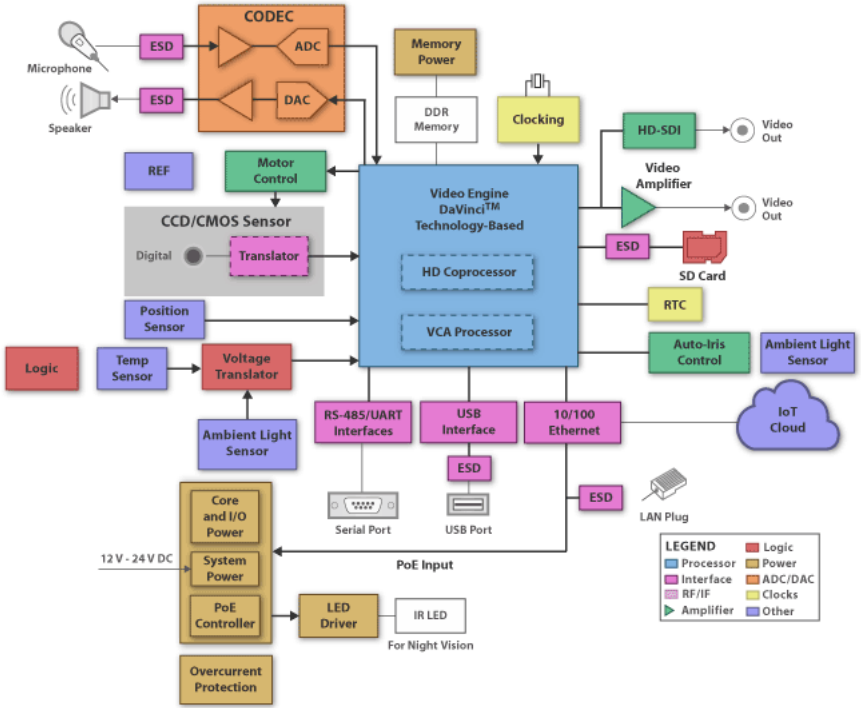
See on TI.com

DVR/NVR



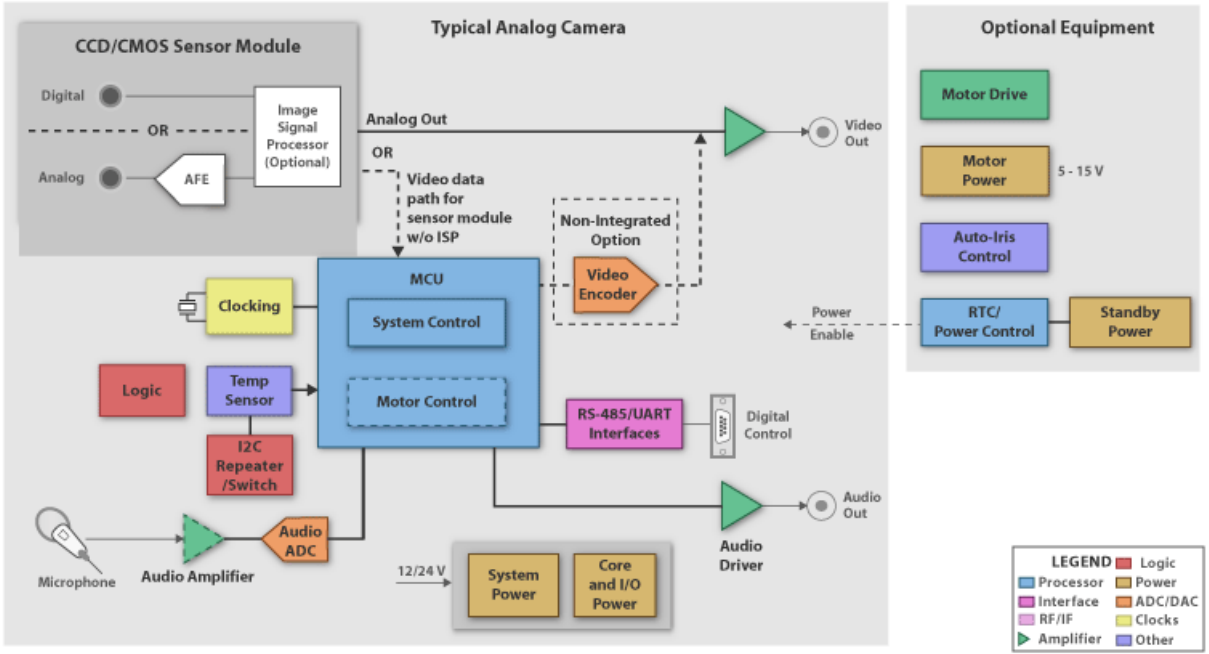
See on TI.com

IP Network Camera



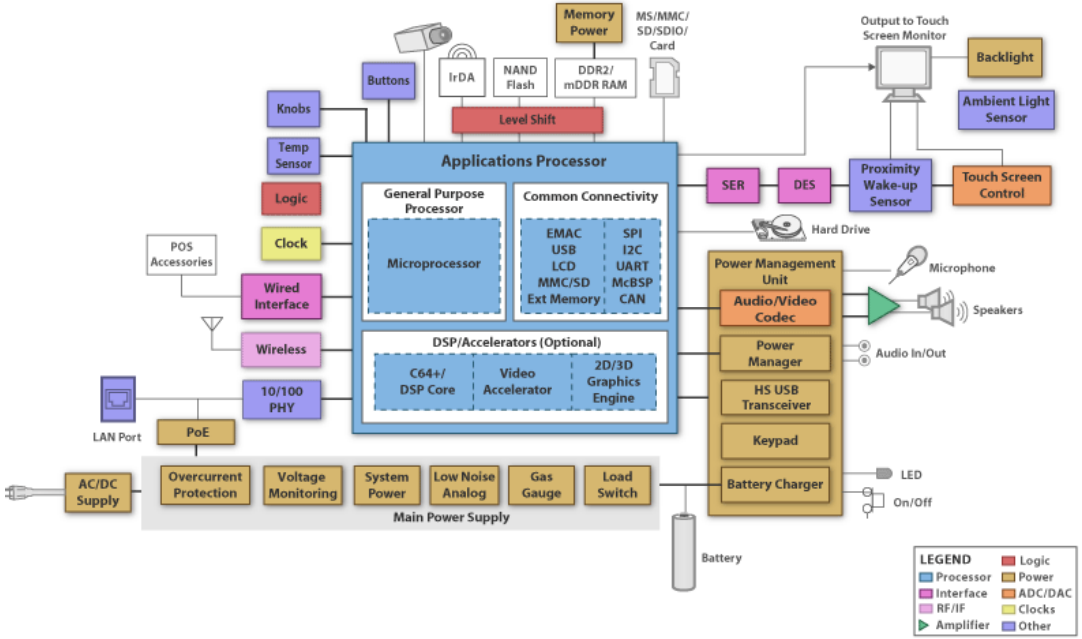
See on TI.com

Analog Security Camera



See on TI.com

Control Panel



See on TI.com

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as “components”) are sold subject to TI’s terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI’s terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers’ products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers’ products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI’s goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or “enhanced plastic” are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have ***not*** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products		**Applications**	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265