Integrated solutions for full HD security IP cameras with H.264 compression

A range of pin-to-pin compatible high definition surveillance camera products that integrate the full functionality from raw image sensor data input, image signal processing (ISP), and high profile H.264 compression to secure transmission over the network. The ‘Advanced’ version of these IP Camera products exhibits further improved image enhancement capabilities for low light conditions and frame-rates up to 1080p/60. At the same time, these products remain fully pin-to-pin compatible with the previous IP camera products of NXP, enabling easy design upgrades without the need for hardware modifications.

Key features
- 12 MPixel sensor support
- Advanced image processing pipeline with 3D noise reduction, edge enhancement, and motion adaptive de-Interlacing
- High Profile H.264, with flexibility to encode any resolution of 2 Mpixel @ 60 fps or 5 Mpixel @ 25 fps
- Support of parallel substream of D1 @ 30 fps
- Support of parallel 1080p MJPEG substream of 45 fps
- Excellent video quality versus compression bit-rate ratio
- ROI encoding and SVC-T for H.264 compression
- iPS audio and multiple audio codecs
- 24-bit video output for up to 1080p @ 60 fps
- Advanced data encryption
- 600 MHz ARM926 CPU
- SDRAM DDR-II/III support up to a total of 2 GB
- Support for wide range of peripheral interfaces
- Compact TFBGA-484 package (15 x 15 mm, 0.65 mm pitch)
- 1.3 W power consumption for 1080p @ 60 fps

Key benefits
- Independent H.264 and MJPEG hardware compression engines for multi-stream and multi-encoding
- Feature rich and configurable image processing pipeline hardware for flexible and superior picture quality tuning, including 12-bit gamma correction, independent R, B, Gb, Gr black clamp, 64 bins R, G, B histograms, and advanced 3A accumulators
- Pin-to-pin and software-compatible family of products from 720p @ 30 fps to 1080p @ 60 fps
- Reference design and software development kit (SDK) available for fast time-to-market
- SDK supports a wide range of image sensors from all major suppliers

Key applications
- Surveillance IP camera
- Car Video Recording
- Digital Video Recorder (8x D1)
- Video conferencing
- Video door phone and intercom
- Industrial vision

Description
Transition of standard defintion analog CCTV cameras to high definition digital IP cameras is rapidly increasing in video security entailing the move from analog cable networks towards digital switched networks. Such a move brings along additional
advantages, such as support of longer distances without losing quality, fewer interference issues, integration with existing data networks, and access of video images at any location worldwide connected to the Ethernet.

NXPs integrated IP camera products take care of the image optimization, low delay and low bitrate compression, and secure transmission to the IP network by the integrated Ethernet controller.

The IP camera products also support USB, SPI, PCIe, UARTs, and GPIO interfaces for control functions such as PTZ. The I²S interface provides local audio recording and playback functionality. A video output is available to display the captured video for local viewing.

ASC884xA, ASC885xA IP camera block diagram

Selection guide for ASC884xA, ASC885xA family

<table>
<thead>
<tr>
<th>Product feature</th>
<th>ASC8848A</th>
<th>ASC8849A</th>
<th>ASC8850A</th>
<th>ASC8851A</th>
<th>ASC8852A</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARM926EJ frequency</td>
<td>400 MHz</td>
<td>500 MHz</td>
<td>600 MHz</td>
<td>600 MHz</td>
<td>600 MHz</td>
</tr>
<tr>
<td>Max sensor resolution</td>
<td>5 MPixels</td>
<td>5 MPixels</td>
<td>12 MPixels</td>
<td>12 MPixels</td>
<td>12 MPixels</td>
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<tr>
<td>Video compression max performance</td>
<td>H.264</td>
<td>720p @ 45 fps or 1080p @ 30 fps</td>
<td>SXGA @ 40 fps or 1080p @ 25 fps or 4 x D1 @ 30 fps</td>
<td>1080p @ 45 fps or 9 x D1 @ 30 fps</td>
<td>1080p @ 45 fps or 13 x D1 @ 30 fps</td>
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<tr>
<td></td>
<td>MPEG-4 (instead of H.264)</td>
<td>720p @ 25 fps</td>
<td>SXGA @ 24 fps</td>
<td>1080p @ 17 fps</td>
<td>1080p @ 17 fps</td>
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<tr>
<td></td>
<td>MJPEG (in addition to H.264/MJPEG-4)</td>
<td>720p @ 45 fps</td>
<td>SXGA @ 60 fps</td>
<td>1080p @ 45 fps</td>
<td>1080p @ 45 fps</td>
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<tr>
<td></td>
<td>BT.1120</td>
<td>N.A.</td>
<td>1-ch</td>
<td>1-ch</td>
<td>1-ch</td>
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<tr>
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<td>BT.656</td>
<td>4-ch</td>
<td>8-ch</td>
<td>8-ch</td>
<td>8-ch</td>
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<tr>
<td></td>
<td>BT.601</td>
<td>1-ch 8-bit</td>
<td>2-ch 8-bit or 1-ch 16-bit</td>
<td>1-ch 8-bit or 1-ch 16-bit</td>
<td>1-ch 8-bit or 1-ch 16-bit</td>
</tr>
<tr>
<td>Video output</td>
<td>Output pins</td>
<td>8</td>
<td>24</td>
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<td></td>
<td>BT.656</td>
<td>8-bit</td>
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<tr>
<td></td>
<td>RGB 24-bit</td>
<td>N.A.</td>
<td>1080p @ 60 fps</td>
<td>1080p @ 60 fps</td>
<td>1080p @ 60 fps</td>
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<td>BT.1120</td>
<td>N.A.</td>
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<td>1080p @ 60 fps</td>
<td>1080p @ 60 fps</td>
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<td>Interfaced</td>
<td>I²S</td>
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<tr>
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<td>SPI</td>
<td>x1</td>
<td>x2</td>
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<td>x2</td>
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<tr>
<td></td>
<td>SD/SDIO/MMC</td>
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<td>x2</td>
<td>x2</td>
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<tr>
<td></td>
<td>UART</td>
<td>x2 (1 full + 1 partial)</td>
<td>x4 (2 full + 2 partial)</td>
<td>x4 (2 full + 2 partial)</td>
<td>x4 (2 full + 2 partial)</td>
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<tr>
<td></td>
<td>NAND Flash</td>
<td>x1</td>
<td>x2</td>
<td>x2</td>
<td>x2</td>
</tr>
<tr>
<td>SDRAM channels, each supporting up to 1 GB DDR-III or up to 512 MB for DDR-II</td>
<td>1-ch @ 266 MHz</td>
<td>2-ch @ 333 MHz</td>
<td>2-ch @ 400 MHz</td>
<td>2-ch @ 400 MHz</td>
<td>2-ch @ 400 MHz</td>
</tr>
<tr>
<td>Ethernet MAC</td>
<td>MII</td>
<td>MII/GMII/RGMII</td>
<td>MII/GMII/RGMII</td>
<td>MII/GMII/RGMII</td>
<td>MII/GMII/RGMII</td>
</tr>
</tbody>
</table>

Please contact application support at http://www.nxp-asc.com for up-to-date list of supported image sensors.
## ASC885xA technical specs

### Sensor and video input
- Up to 12 MPixels 16-bit raw data (RGB and CMYG) with pixel clock up to 180 MHz.
- Direct interface with CMOS sensors and support for CCD image sensor with external analog front-end
- Support for external decoders with BT.656, quad-multiplexed BT.656, BT.1120, BT.601 interface and HDMI/HD-SDI receivers

### Image processing
- Color and gamma correction
- 3D Noise reduction, edge-enhancement and motion adaptive 3D de-interlacing
- Digital WDR, advanced contrast enhancement
- Auto white balance, auto exposure
- Auto iris, auto focus, zoom control and IR-cut filter support through SW and GPIOs
- Cropping, mirroring, flipping, up and down scaling
- Photometric and geometric lens distortion correction
- Privacy mask
- Motion detection for up to 16 windows

### Video compression
- Up to 1080p @ 65 fps or D1 @ 390 fps H.264 video compression
- Baseline, Main, and High Profile for H.264, supporting CAVLC and CABAC entropy encoding with VBR, CBR and CVBR
- Up to 2 reference frames for motion estimation
- ROI encoding
- SVC-T support enabling H.264 (1080p @ 30 fps + 1080p @ 15 fps + 1080 @ 7.5 fps + 1080p @ 3.75 fps)
- Support for MPEG-4 simple profile up to 1080p @ 17 fps and MJPEG baseline with up to 1080p @ 45 fps.
- Multi-stream and multi-encoding support: e.g. H.264 (1080p @ 30 fps + 720p @ 30 fps) + MJPEG (1080p @ 30 fps)

### Audio
- Up to 5 I2S channels (4 input only and 1 input/output to support playback)
- Multiple codecs: G.711, AAC, GAMR, G.726

### Video output
- Up to 24-bit RGB supporting up to 1080p @ 60 fps to HD-SDI Tx/HDMI Tx/LCD
- BT.1120 to HD-SDI Tx/HDMI Tx
- BT.656

### Data encryption
- AES, TDES, DES, SHA-1, SHA-224, SHA-256, SHA-384, SHA-512

### CPU
- ARM926EJ-S CPU with 16 KB I-Cache and 16 KB D-cache operating at up to 600 MHz on Linux 2.6

### Memory
- 2x 16-bit SDRAM memory channels, each supporting up to 1 GB DDR-III or 512 MB DDR-II @ 400 MHz

### Interfaces
- Ethernet MAC 10/100/1000, USB 2.0 OTG, PCIe 1.1, SPI, SD/SDIO/MMC, UARTs, IrDA

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ASC8848ET/M2,551  ASC8848ET/M2,557  ASC8849ET/M2,551  ASC8849ET/M2,557  ASC8850ET/M2,557
ASC8851ET/M2,551  ASC8851ET/M2,557  ASC8850ET/M2,551