Project List for IC Design Group

The following table provides information about some of the current and completed R&D projects of IC Design Group which illustrates ASTRI’s technical strengths in the domain.

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Core Technologies</th>
<th>Target Industries</th>
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</thead>
</table>
| **1** Ultra Low Energy Analog-to-Digital Converter Technologies | • Ultra-low power comparator, register, switches, and logics circuits | • IC design companies  
• Solution providers |
| **2** AMS IP Platform for MEMS Sensor | • On-chip thermal and power management IPs  
• Low power data converters  
• Low noise-micro-power signal processing analog front end IPs  
• On-chip timing generation and IOs  
• MEMS specific SoC ESD protection cells  
• An integrated g-sensor IC for multi-axis MEMS micro-accelerometer | • MEMS sensor manufacturers  
• IC Design houses  
• MEMS foundries |
| **3** Mixed Signal System-on-Chip (AMS SoC) Design Platform | • High performance ADC, DAC, LDO, DC/DC converters and etc for embedded SoC. | • IC design companies  
• Solution providers |
| **4** Nanometer SoC Design Technology | • DFM / DFY at 65nm  
• Dynamic Process Variation Scaling (DPVS)  
• Adaptive Clock Tree Synchronizer (ACTS)  
• Design Specific Yield Optimizer (DSYO)  
• Nanometer Silicon IP | • IC Design Houses moving into nanometer range: 90nm / 65nm |
| **5** Brain Computer Interface (BCI) System and ICs for E-learning | • The BCI module system  
• Low Noise Instrumentation Amplifier  
• Analog to digital converter | • Semiconductor IC design companies  
• Education Institutes  
• Solution providers |
| **6** AMS NFC (analog Mixed Signal Near Field Communication | • 13.56MHz short range wireless technology  
• Compatible with ISO/IEC 14443, 18092 and 15693  
• Supports card emulation, read/write, peer-to-peer mode.  
• Enables device in tags, stickers, key fobs or cards without batteries operation | • IC design companies  
• Solution providers |
| **7** High Speed & Agile Direct Digital Synthesizer | • 32-bit DDS core based on new compression algorithm  
• 12-bit high speed DAC with novel current cell architecture  
• High speed I/O | • Automatic testing equipment (ATE), medical imaging, wireless communication, and radar system |
| **8** Reconfigurable Serial Link Transceiver for Low Power Wireline Communication | • FPGA prototyping of CDR loop filter, PRBS generator and BER monitor  
• Low noise phase locked loop and phase interpolator  
• FIR pre-emphasis transmitter output buffer  
• Continuous time linear equalizer, programmable gain amplifier, decision feedback equalizer | • IC Design Houses  
• IP Providers  
• High-speed IC vendors |
| **9** Medical Acoustic Processing Platform | • Novel adaptive noise cancellation algorithm  
• Advanced digital stethoscope with ambient noise cancellation, signal amplification, sound separation, data recording and wireless transmission | • Medical device manufacturer |
| **10** Bluetooth Low Energy System on Chip | • Bluetooth Low Energy Digital Baseband Algorithms and FPGA design  
• Bluetooth Low Energy RF Transceiver Front End architecture and models | • IC design companies  
• Solution providers |
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<td>Advanced AC-DC Power Conversion Platform for LED SSL</td>
<td>• Mixed signal IPs for AC/DC control&lt;br&gt;• High voltage driver circuits</td>
<td>• IC design companies&lt;br&gt;• Solution providers</td>
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<tr>
<td>LED Driver Lighting Solutions</td>
<td>• High voltage buck converters.&lt;br&gt;• HV analog IP&lt;br&gt;• Power switches using high voltage CMOS/BCD</td>
<td>• IC design companies&lt;br&gt;• Solution providers</td>
</tr>
<tr>
<td>Power Factor Correction for Dimmable and Green LED lighting</td>
<td>• Mixed signal IPs for AC/DC control&lt;br&gt;• High voltage driver circuits</td>
<td>• IC design companies&lt;br&gt;• Lighting products manufacturers&lt;br&gt;• Power supply manufacturers</td>
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<tr>
<td>Micro-Inverters for Renewable Energy Generation</td>
<td>• Maximum Power Point Tracking for maximum energy harvesting&lt;br&gt;• Grid-tie technology&lt;br&gt;• Power -line communication to monitor each solar panel</td>
<td>• Solar panel manufacturers&lt;br&gt;• Inverter manufactures</td>
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<tr>
<td>Integrated LCoS Imager IP Development For Pico-projectors</td>
<td>• Low power video memory&lt;br&gt;• Mix signal IPs for display applications</td>
<td>• Pico projectors manufactures</td>
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<td>Integrated LED Driver for Pico Projectors</td>
<td>• Programmable LED drivers and programmable DC/DC converters&lt;br&gt;• Integrated IC containing the LED driver, DC/DC converters and a 100MHz serial communication port</td>
<td>• IC design companies&lt;br&gt;• Solution providers</td>
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<tr>
<td>LCD TV Display Enhancement Controller</td>
<td>• Motion Estimation and Compensation based video image interpolation (Frame Rate Conversion, FRC)&lt;br&gt;• Scene Detection to enhance motion estimation accuracy&lt;br&gt;• Integrated LED Backlight&lt;br&gt;• Scanning Control&lt;br&gt;• Real-time 2D—3D Image Converter</td>
<td>• LCD TV Manufacturers&lt;br&gt;• Media Processor IC design houses</td>
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<td>Hardware Accelerated Super-Resolution Technology</td>
<td>• Adaptive Single-frame and Multi-frame Super-Resolution for image quality enhancement&lt;br&gt;• Global and Sub-pixel Motion Estimation for spatial interpolation</td>
<td>• LCD TV , DVD player and STB Manufacturers&lt;br&gt;• Tablet Manufacturers&lt;br&gt;• Media Processor IC design houses</td>
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<td>Stereoscopic Image Processor Signal</td>
<td>• Single, dual or multiple camera support&lt;br&gt;• Multi-view color and brightness correction&lt;br&gt;• Multiple 3D file format support</td>
<td>• Digital Still and Video Camera Manufactures&lt;br&gt;• Mobile Phone and Tablet Manufacturers&lt;br&gt;• Media Processor IC design houses</td>
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<tr>
<td>High Performance Storage Controller Platform</td>
<td>• New multi-buffer read/write mechanism to improve data throughput&lt;br&gt;• New error correction algorithm for data integrity&lt;br&gt;• HPSC FPGA application development platform&lt;br&gt;• SSD controller IC</td>
<td>• IC Design Houses&lt;br&gt;• IP Providers</td>
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<tr>
<td>SSD Controller with Super Speed USB 3.0</td>
<td>• Supports both asynchronous and synchronous NAND Flash&lt;br&gt;• More robust ECC engine support up to 48bit error correction&lt;br&gt;• Higher data bandwidth for USB super speed</td>
<td>• IC Design Houses&lt;br&gt;• IP Providers</td>
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<td>Feasibility study of a DDR4 analog PHY's architectural design with industry standard</td>
<td>• High speed single ended parallel input/output (I/O) interface</td>
<td>• System-on-chip design companies&lt;br&gt;• Embedded system solution providers</td>
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<tr>
<td>DFI bus interface</td>
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</table>
| 23 ESD Design and Device Modeling                | • Simulation methodology for I-V snapback curve and extraction algorithm for critical parameters  
• Structure definition and calibration technology  
• A complexity algorithm for the second-order linear model | • IC foundries  
• Fabless design house  
• Other research institutions                      |
| 24 High-Speed ICs for Optical Fiber Communication | • CMOS & SiGe based opto-electrical front-end  
• Low-jitter Phase Locked Loop  
• Ultra-high speed Analog-to-Digital Converter for coherent optical communication | • High-speed IC vendors                |
| 25 Advanced Augmented Reality Technologies       | • Object detection, hybrid marker-less tracking, deformable surface tracking         | • Product design, advertising, gaming, education |