ADAS
Advanced Driver Assistance Subsystem

Key Features

- FFT accelerator
- Camera Parallel Interface with DMA
- High bandwidth memory

Highlights

- The AURIX™ – ADAS derivative products contain a Camera and Radar Interface (CIF), a Fast Fourier Transform accelerator (FFT) and Extended Memory (EMEM)
- These peripherals aim to support radar/video based applications for Advanced Driver Assistance Systems and audio applications

Customer Benefits

- Fast Fourier Transform calculated without software interaction
- Integrated DMA engines reduce the CPU load
- Enables block/burst transfers before and after FFTs
ADAS
FFT accelerator

› FFT takes the input data from the EMEM (e.g. time domain image data), processes it and stores the calculation’s result back to the EMEM (e.g. frequency data)

› Feature set:
  - Configurable FFT:
    - from FFT8 through FFT2048
    - with 16-bit or 32-bit precision
  - Integrated ROM for twiddle coefficients
  - Integrated RAM buffer for storing calculation coefficients

› The main advantage is the faster FFT processing speed due to the tightly coupled modules
The Camera and ADC Interface (CIF) offers a wide range of features e.g. JPEG encoding, picture cropping.

- 16-bit parallel camera interface with image resolution up to 4095x4095 pixels.
- The DMA engines inside the CIF moves the data with up to 96 Mpixel/s into the memory (EMEM).
- The processing of the image/radar data and transfer to EMEM is done without the CPU interaction.
ADAS
High bandwidth memory

› Dual port shared memory:
  – Memory split in 8 tiles
  – Concurrent accesses possible with no penalty when on separated tiles and with arbitration when on the same tile

› Multiple masters can access different tiles with no extra latency (e.g. CIF can store a picture in one of the tiles of EMEM, while CPU can process another tile with the previous picture without competing for resources)
ADAS System integration

- The Camera Interface is a complete video and still picture input interface which transfers data from an image sensor into EMEM.
- The FFT accelerator can be used for processing in Radar or Ultrasound/Audio applications.
- Both have assigned interrupts, which can trigger movement of data through the CPUx or the DMA general engine.
**Application Example**

Blind spot detection when leaving a parking slot

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**Overview**

- The above system describes a small parking assistance mode
- The AURIX™ device has the role of acquiring the images, process and send them to an external client (in this case the screen inside the car)

**Advantages**

- No additional hardware needed for image processing
- Low complexity electronic scanning
- Reduced costs

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