

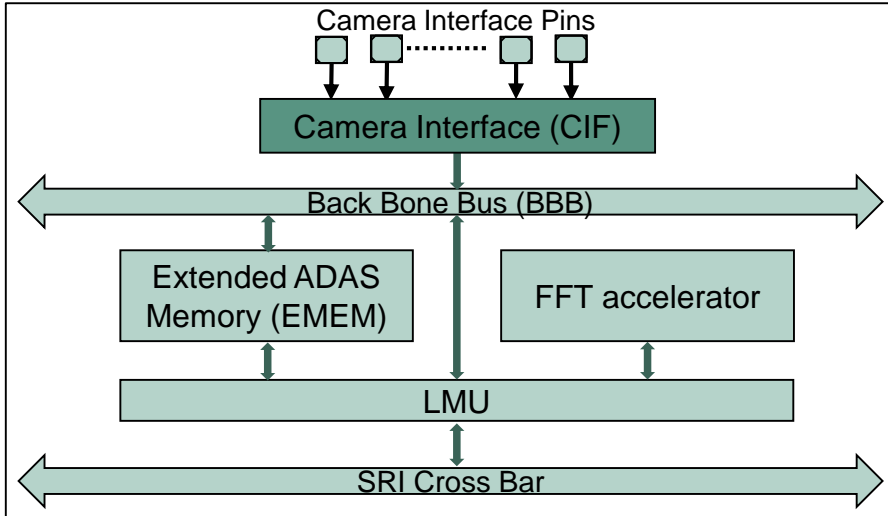
ADAS

Advanced Driver Assistance Subsystem

AURIX™ TC2xx Microcontroller Training
V1.0



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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

Key Features

FFT accelerator

Camera Parallel Interface with DMA

High bandwidth memory

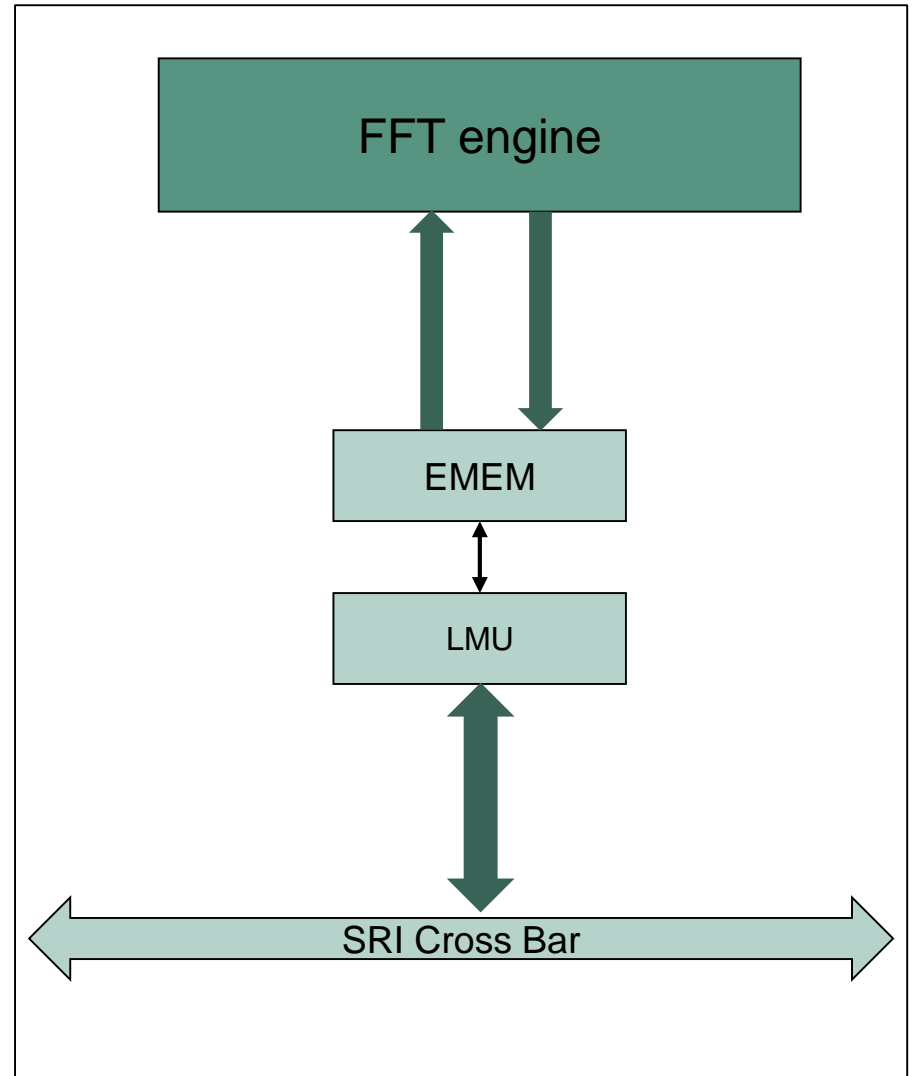
Customer Benefits

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

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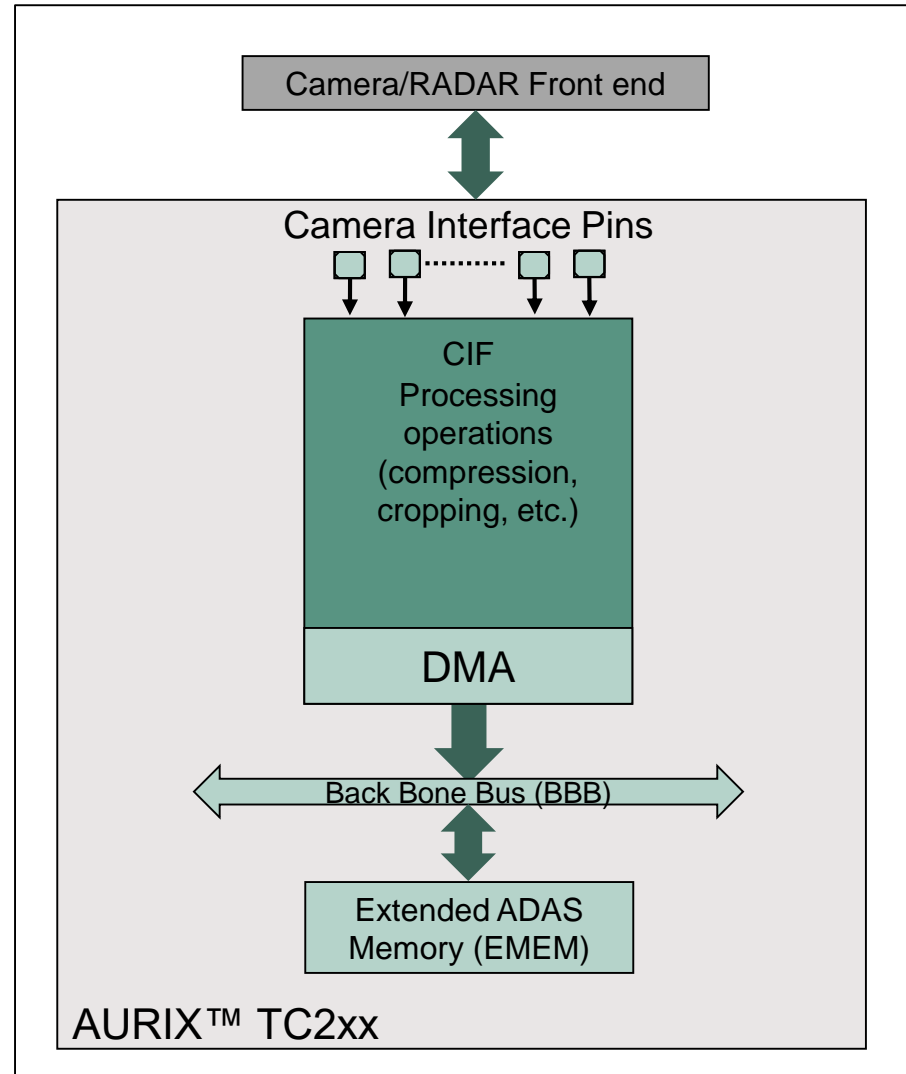
FFT accelerator

- › 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



Camera Parallel Interface with DMA

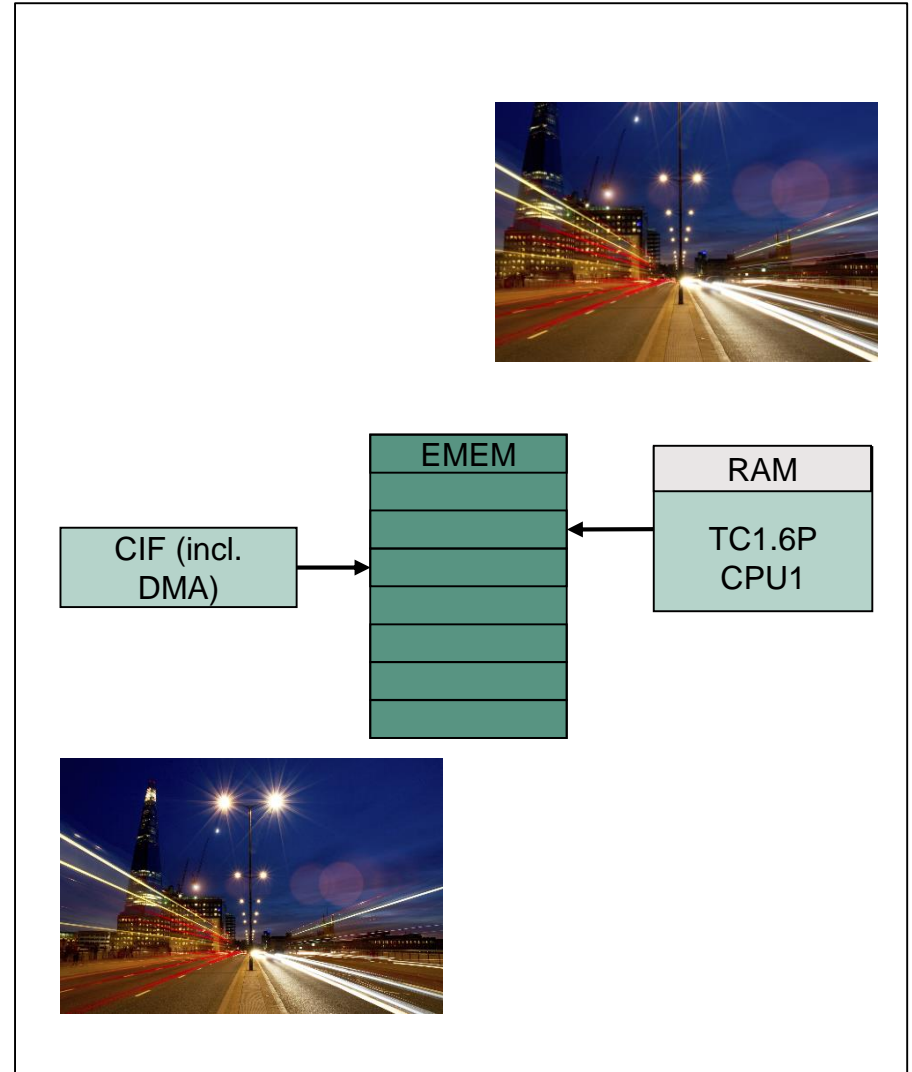
- › The Camera and ADC Interface (CIF) offers a wide range of features e.g. JPEG encoding, picture cropping
- › 16-bit parallel camera interface with image resolution up to 4095x4095 pixels
- › The DMA engines inside the CIF moves the data with up to 96 Mpixel/s into the memory (EMEM)
- › The processing of the image/radar data and transfer to EMEM is done without the CPU interaction



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

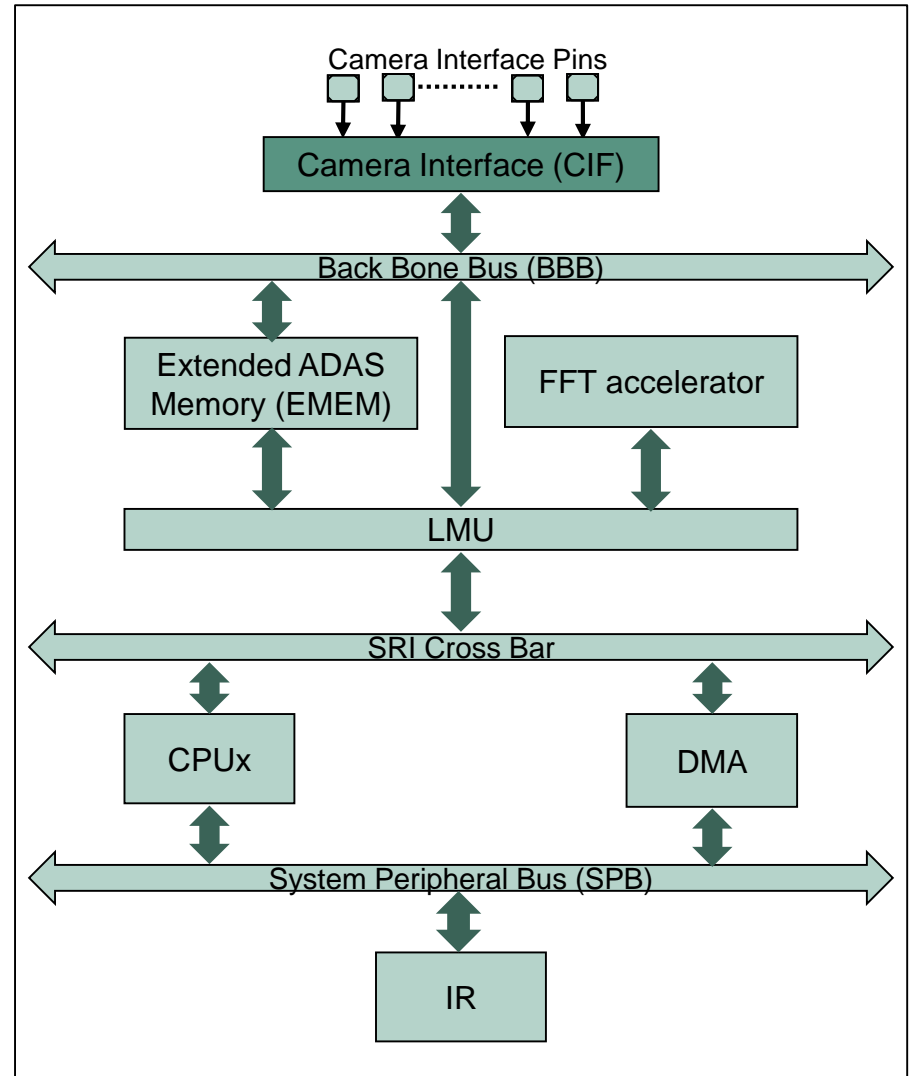
- › Multiple masters can access different tiles with no extra latency (e.g. CIF can store a picture in one of the tiles of EMEM, while CPU can process another tile with the previous picture without competing for resources)



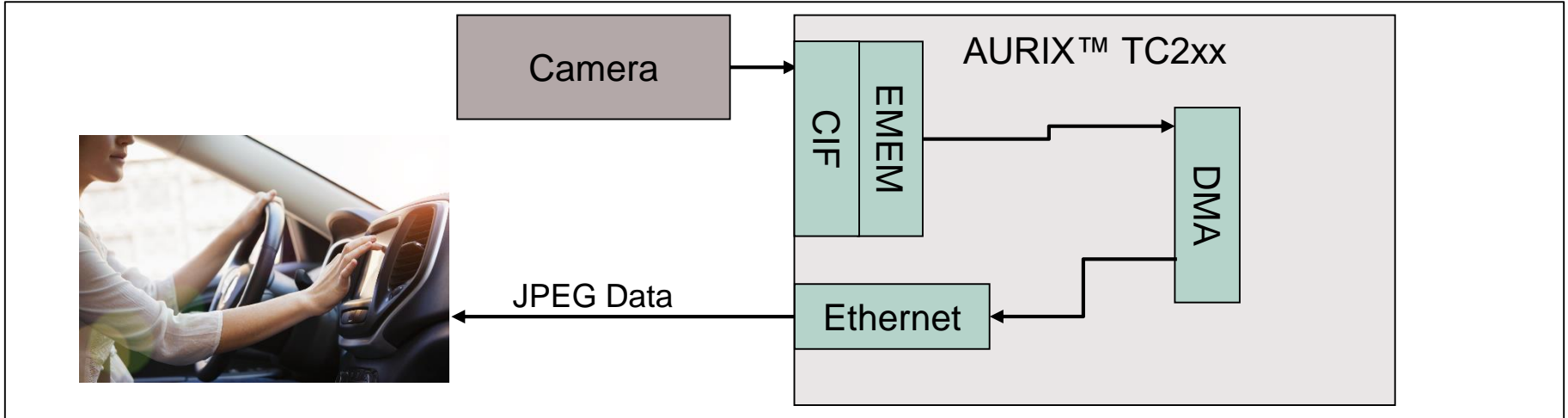
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System integration

- > 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



Blind spot detection when leaving a parking slot



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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