Unit 2- ARM Processors and Peripherals

Block Diagram of ARM 9

This family enables single processor solution for microcontroller, DSP & JAVA applications, offering sav ings in chip area & complexity, power consumption & time to market.

ARM9 – enhanced processors are well suited for applications requiring a mix of DSP+ Microcontroller performance

ARM ARCHITECTURE

- ARM was an acronym for Advanced RISC Machine. ARM is a family of computer processor designed by Advanced RISC Machine (ARM) Limited company.
- The architectural simplicity of ARM processors has traditionally led to very small implementations, which allow devices with very low power consumption.
- Implementation size, performance, and very low power consumption remain key attributes in the development of the ARM architecture.
- ARM Processor are used for low-power and low-cost applications like Mobile phones, Communication modems, Automotive engine management systems and Hand-held digital systems.
- ARM architecture has been developed since 1980s and most widely used 32-bit instruction set architecture.

Features of ARM 9

- ARM Processors are based on reduced instruction set computing (RISC) architecture.
- 32-bit Architecture but also supports 16 bits or 8 bits data types 32-bit processor register.
- 32-bit addresses.
- ARM Processors follow Load and Store type architecture where the data processing is performed only on the contents of the registers rather than directly on the memory.
- The instructions for data processing on registers are different from that access the memory.
- The instruction set of ARM is uniform and fixed in length.
- 32-bit ARM Processors have three instruction sets: general 32-bit ARM Instruction Set, 16- bit Thumb Instruction Set and Jazelle instruction set

- Pipeline Depth: 5 stage (Fetch, Decode, Execute, Decode, Write)
- Operating frequency: 150 MHz
- Power Consumption: 0.19 MW/MHz
- MIPS/MHz: 1.1
- Architecture used: Harvard
- MMU/MPU: Present
- Cache Memory: Present (separate 16k/8k)
- ARM/ Thumb Instruction: Support bot

ARM920T PROCESSOR

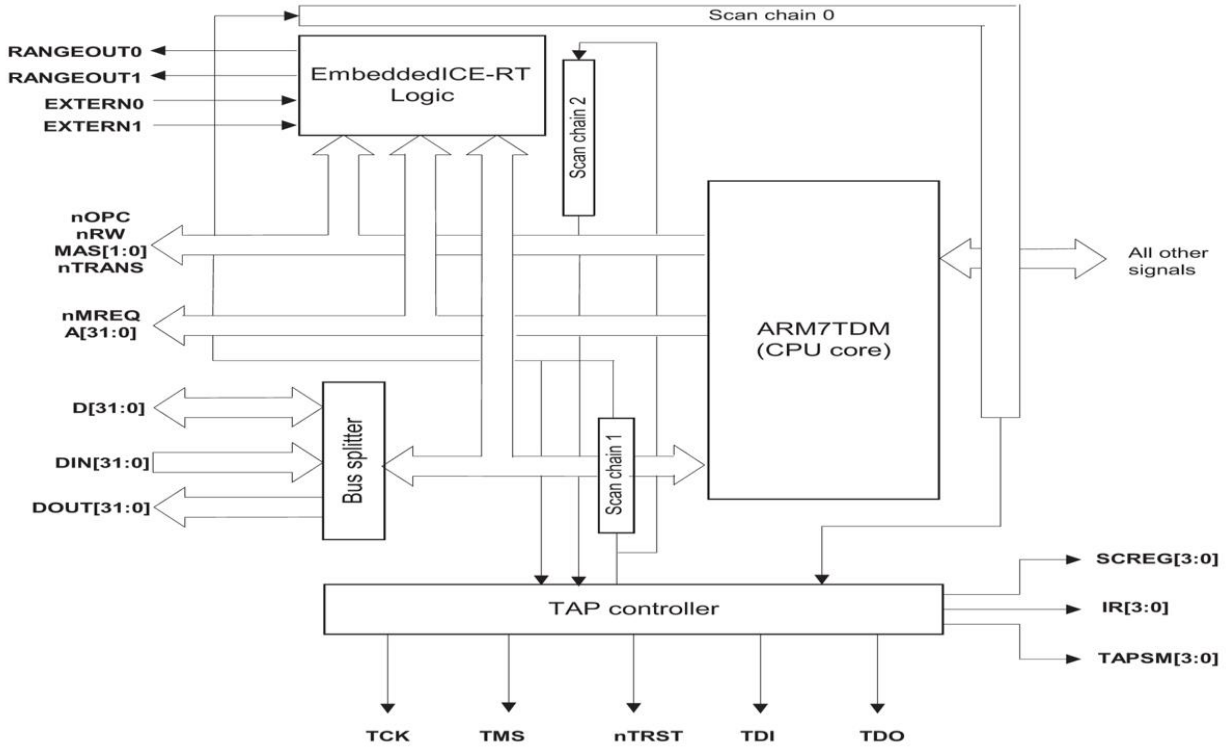
The ARM920T processor is a member of the ARM9TDMI family of general-purpose microprocessors, which includes

- ARM9TDMI (core) ARM940T (core plus cache and protection unit)
- ARM920T (core plus cache and MMU)

ARM9TDMI (CORE)

- The ARM9TDMI processor core is a Harvard architecture dev ice implemented using a fivestage pipeline consisting of Fetch, Decode, Execute, Memory, and Write stages.
- It can be provided as a standalone core that can be embedded into more complex devices.
- The standalone core has a simple bus interface that allows you to design your own caches and memory systems around it.
- The ARM9TDMI family of microprocessors supports both the 32-bit ARM and 16-bit Thumb instruction sets, allowing you to trade-off between high performance and high code density.

ARM920T FUNCTIONALBLOCKDIAGRAM



Applications of ARM9

1. Consumer type: Smart phones, PDA, Set-Top box, Electronics Toys, Digital Cameras, etc.
2. Networking type: Wireless LAN, 802.11, Bluetooth, etc
3. Automatic: Power Train, ABS, Navigation, etc
4. Embedded USB controllers, Bluetooth controllers, Medical scanners, etc.
5. Storage: HDD controllers, solid state drivers etc

Thank you